**Variable definitions and data sources**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Definition** | **Source** |
| IP Index | The index comprises 9 indicators, each ranging theoretically from a minimum value of 0 to a maximum value of 1. In each case, higher scores indicate closer alignment with US-style rules. Scores across indicators are added, such that each indicator receives equal weight and the index ranges theoretically from a minimum value of 0 to a maximum value of 9. 1) Patentability of plants (excluding plant variety protection): If no, 0; if neither specifically permitted nor prohibited, 0.5; if yes, 1. 2) Copyright term of 70 years or more after death: If no, 0; if yes, 1.3) Prohibition of the dissemination of technology used to circumvent measures that control access to copyrighted works: If no, 0; if prohibition is on commercial dissemination only, 0.5; if prohibition covers non-commercial dissemination as well, 1.4) Ratification of UPOV91: If no, 0; if yes, 1.5) Ratification of WIPO internet copyright treaty: If no, 0; if yes, 1.6) Ratification of the Brussels Convention on satellite signal: If no, 0; if yes, 1.7) Requirements for the protection of pharmaceutical data for at least five years: If no, 0; if yes, 1. Note that protection “against unfair commercial use” and “against disclosure by a third party” without a specific time limit of five years or more were not considered sufficient.8) National or regional exhaustion of patent rights (as opposed to international exhaustion): If no, 1; if yes, 0. In the case of South Africa and the Philippines, which adopt national exhaustion but create an exception for pharmaceuticals, a score of 0.5 was assigned.9) Compulsory licenses may granted: If only for anti-competitive practices or national emergencies, 1; if only for anti-competitive practices, national emergencies, failure to work, insufficient working, or use for use of a dependent patent, 0.5; if for any reasons beyond those already listed, 0. | WIPO and national government websites. |
| Income Class | Each year, the World Bank classifies countries into one of 4 categories: Low Income (L), Lower Middle Income (LM), Upper Middle Income (UM) and High Income (not studied), based on estimates of gross national income per capita in the previous year. To further refine these groups, if a country was at or above the median GDP per capita of its Income Class in a given year, it was placed in the plus group for that year (L+, LM+, UM+), and if it was below the median in a year it was placed in the minus group for that year instead (L-, LM-, UM-). AllDev is the group of all developing countries across all years L, LM and UM. | World Bank |
| Economic Freedom(Ecofree) | The Index of Economic Freedom, published every year since 1995, aims to provide a measure of the extent to which governments allows for the free movement of labor, capital and goods in their countries. It is a composite measure of 10 factors organized around four broad categories of freedom, each scored out of 100 and averaged to give an overall score, with each given equal weighting. These categories are:1. Rule of Law (property rights, freedom from corruption)
2. Limited Government (fiscal freedom, government spending)
3. Regulatory Efficiency (business freedom, labor freedom, monetary freedom)
4. Open Markets (trade freedom, investment freedom, financial freedom)
 | The Heritage Foundation and the Wall Street Journal |
| Enrolment | The total enrollment in tertiary education, regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving. | World Bank(Note: All World Bank Data is from the 2014 publication of the World Development Indicators) |
| Population Growth(Popgrowth) | Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin. | World Bank |
| Gross Capital Formation (GCF) | From the World Bank: Gross capital formation, expressed as a percentage of GDP consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. | World Bank |
| GDP Per Capita (GDP) | Gross domestic product measured in 2005 US dollars, divided by population.  | World Bank |
| Log IP Imports (IP Imports) | Total value of merchandise Imports with an IP component. This is the sum of machinery and transport equipment, parts and components for electrical and electronic goods, chemicals and related products, electronics excluding parts and components, in thousands of dollars. (Log transformed) | UNCTAD |
| Log USPTO Apps(USPTO) | The number of applications a given country submitted to the United States Patent and Trademark office in a given year. (Log plus one transformed) | USPTO |
| Log PCT Destination | The number of designations made by rights holders to a given country’s patent office seeking patent protection through the PCT system in a given year. This is labeled as ‘PCT national phase entries – Total Count by Filing Office’ in the WIPO Statistics Database. (Log plus one transformed) | World Intellectual Property Organization Statistics Database |
| Log PCT Origin | The number of applications made by rights holders seeking patent protection from a given country through the PCT system in a given year. This is labeled as ‘PCT national phase entries – Total Count by Applicant’s Origin’ in the WIPO Statistics Database. (Log plus one transformed) | World Intellectual Property Organization Statistics Database |

**Detailed Results**

Model 2.1: The Total Effect of IP on Growth

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.000573 | 0.00270\* | 0.0105\*\* | 0.0117\*\*\* | 0.0273\* | 0.0224\* | 0.0135\*\*\* |
| *t value* | (0.645) | (2.170) | (3.576) | (4.134) | (2.557) | (2.395) | (3.683) |
| *Pr(>|t|)* | 0.524 | 0.0365 | 0.00104 | 0.000220 | 0.0160 | 0.0248 | 0.000371 |
| **GDP L5** | 0.539\*\*\* | 0.0767 | 0.342 | 0.115 | 0.509\* | 0.344 | 0.624\*\*\* |
| *t value* | (6.123) | (0.552) | (1.977) | (0.803) | (2.586) | (1.557) | (6.532) |
| *Pr(>|t|)* | 2.12e-06 | 0.584 | 0.0560 | 0.428 | 0.0150 | 0.133 | 2.59e-09 |
| **Ecofree** | 0.00212\* | 0.00377\*\* | 0.00882\* | 0.00913 | -0.0164 | -0.00283 | 0.00627 |
| *t value* | (2.294) | (2.757) | (2.193) | (1.422) | (-1.432) | (-0.120) | (1.255) |
| *Pr(>|t|)* | 0.0305 | 0.00902 | 0.0350 | 0.164 | 0.163 | 0.906 | 0.212 |
| **Enrolment** | 0.00866\*\* | 0.0155\*\*\* | 0.0269\*\* | 0.0375\*\*\* | 0.0170\* | 0.0612\*\*\* | 0.0341\*\*\* |
| *t value* | (3.524) | (5.430) | (3.533) | (4.715) | (2.127) | (4.877) | (4.321) |
| *Pr(>|t|)* | 0.00166 | 3.72e-06 | 0.00118 | 4.01e-05 | 0.0421 | 5.68e-05 | 3.61e-05 |
| **Popgrowth** | 0.000274 | -0.00450 | -0.00345 | -0.00588 | -0.00884 | -0.0217\*\*\* | -0.00510 |
| *t value* | (0.771) | (-0.969) | (-0.716) | (-0.780) | (-1.699) | (-4.416) | (-0.902) |
| *Pr(>|t|)* | 0.448 | 0.339 | 0.479 | 0.441 | 0.0999 | 0.000184 | 0.369 |
| **GCF** | 0.000478 | 0.000406 | 0.00475 | 0.0102\*\* | 0.0197\* | 0.0400\*\* | 0.00518 |
| *t value* | (1.947) | (0.715) | (1.592) | (3.191) | (2.313) | (3.285) | (1.707) |
| *Pr(>|t|)* | 0.0629 | 0.479 | 0.120 | 0.00304 | 0.0280 | 0.00313 | 0.0909 |
|  |  |  |  |  |  |  |  |
| Observations | 183 | 198 | 166 | 178 | 127 | 143 | 994 |
| R-squared | 0.651 | 0.524 | 0.644 | 0.726 | 0.539 | 0.730 | 0.732 |
| Number of ccf | 26 | 38 | 36 | 35 | 30 | 25 | 103 |
| F test | 5.28e-11 | 0 | 4.44e-09 | 0 | 2.24e-06 | 0 | 0 |
| Variables are scaled to standardize the coefficients. |
| Robust t-statistics in parentheses |
| \*\*\* p<0.001, \*\* p<0.01, \* p<0.05 |

Model 2.2: The Effect of IP on Inward Technology Transfer

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** |
| **IP Index L2** | -0.0327 | 0.0643 | 0.176\*\*\* | 0.0967\*\*\* | 0.228\* | 0.0112 | 0.139\*\*\* |
| *t value* | (-0.313) | (1.613) | (4.180) | (4.033) | (2.392) | (0.696) | (5.444) |
| *Pr(>|t|)* | 0.757 | 0.115 | 0.000185 | 0.000294 | 0.0232 | 0.493 | 3.50e-07 |
| **GDP L5** | 45.34\*\*\* | 4.470 | 6.136\*\*\* | 2.346\*\* | 0.574 | 1.268\*\*\* | 0.603 |
| *t value* | (3.797) | (1.396) | (4.183) | (3.281) | (0.632) | (3.863) | (1.515) |
| *Pr(>|t|)* | 0.000832 | 0.171 | 0.000183 | 0.00240 | 0.532 | 0.000703 | 0.133 |
| **Ecofree** | 0.156\* | 0.102 | 0.0540 | 0.0381 | -0.163 | 0.0808 | 0.131\*\* |
| *t value* | (2.730) | (1.889) | (0.742) | (0.598) | (-1.772) | (1.960) | (3.103) |
| *Pr(>|t|)* | 0.0114 | 0.0668 | 0.463 | 0.554 | 0.0865 | 0.0613 | 0.00246 |
| **Enrolment** | 0.636 | 0.415\*\* | 0.326\*\*\* | 0.163\*\*\* | 0.0873 | 0.138\*\* | 0.174\*\*\* |
| *t value* | (1.851) | (3.313) | (4.074) | (4.048) | (1.939) | (3.155) | (3.585) |
| *Pr(>|t|)* | 0.0761 | 0.00207 | 0.000252 | 0.000283 | 0.0620 | 0.00415 | 0.000515 |
| **Popgrowth** | 0.0609\* | -0.554\*\* | 0.0342 | -0.0188 | -0.0811\*\* | -0.0243 | -0.0224 |
| *t value* | (2.771) | (-3.319) | (0.772) | (-0.531) | (-2.931) | (-0.652) | (-0.856) |
| *Pr(>|t|)* | 0.0104 | 0.00204 | 0.445 | 0.599 | 0.00640 | 0.520 | 0.394 |
| **GCF** | 0.128\*\*\* | 0.0629\*\* | 0.0541 | 0.139\*\*\* | 0.0836 | 0.00115 | 0.0965\*\*\* |
| *t value* | (5.599) | (2.862) | (1.802) | (3.653) | (1.846) | (0.0390) | (4.301) |
| *Pr(>|t|)* | 7.98e-06 | 0.00688 | 0.0802 | 0.000865 | 0.0747 | 0.969 | 3.85e-05 |
|  |  |  |  |  |  |  |  |
| Observations | 183 | 198 | 169 | 178 | 128 | 144 | 999 |
| R-squared | 0.652 | 0.503 | 0.615 | 0.650 | 0.395 | 0.711 | 0.556 |
| Number of ccf | 26 | 38 | 36 | 35 | 31 | 26 | 105 |
| F test | 6.99e-09 | 1.07e-08 | 0 | 1.94e-10 | 0.0226 | 1.84e-10 | 0 |

Model 2.3: The Effect of IP on Growth with Inward Technology Transfer as Mediator

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.000729 | 0.00189 | 0.00433\* | 0.00623\*\* | 0.00755 | 0.0215\* | 0.0108\*\* |
| *t value* | (1.229) | (1.636) | (2.212) | (2.984) | (0.741) | (2.501) | (2.920) |
| *Pr(>|t|)* | 0.231 | 0.110 | 0.0336 | 0.00523 | 0.465 | 0.0196 | 0.00431 |
| **IP Imports**  | 0.00477\*\*\* | 0.0126\*\*\* | 0.0351\*\*\* | 0.0566\*\*\* | 0.0870\* | 0.0869 | 0.0199 |
| *t value* | (3.978) | (4.393) | (6.180) | (7.018) | (2.549) | (1.860) | (1.804) |
| *Pr(>|t|)* | 0.000524 | 9.02e-05 | 4.47e-07 | 4.24e-08 | 0.0163 | 0.0752 | 0.0742 |
| **GDP L5** | 0.323\*\* | 0.0204 | 0.131 | -0.0177 | 0.459\*\* | 0.234 | 0.612\*\*\* |
| *t value* | (3.166) | (0.183) | (0.899) | (-0.125) | (3.099) | (1.074) | (6.486) |
| *Pr(>|t|)* | 0.00404 | 0.856 | 0.375 | 0.901 | 0.00429 | 0.294 | 3.20e-09 |
| **Ecofree** | 0.00138 | 0.00248 | 0.00713\* | 0.00697 | -0.00223 | -0.00985 | 0.00369 |
| *t value* | (1.420) | (1.924) | (2.515) | (1.431) | (-0.278) | (-0.472) | (0.813) |
| *Pr(>|t|)* | 0.168 | 0.0620 | 0.0167 | 0.161 | 0.783 | 0.641 | 0.418 |
| **Enrolment** | 0.00562\* | 0.0103\*\*\* | 0.0157\* | 0.0283\*\*\* | 0.00939 | 0.0492\*\* | 0.0306\*\*\* |
| *t value* | (2.472) | (6.391) | (2.064) | (4.642) | (1.491) | (3.086) | (4.186) |
| *Pr(>|t|)* | 0.0206 | 1.86e-07 | 0.0465 | 4.98e-05 | 0.147 | 0.00505 | 6.03e-05 |
| **Popgrowth** | -1.64e-05 | 0.00247 | -0.00487 | -0.00481 | -0.00179 | -0.0196\*\*\* | -0.00466 |
| *t value* | (-0.0432) | (0.725) | (-1.172) | (-0.663) | (-0.342) | (-4.071) | (-0.848) |
| *Pr(>|t|)* | 0.966 | 0.473 | 0.249 | 0.512 | 0.735 | 0.000441 | 0.398 |
| **GCF** | -0.000133 | -0.000387 | 0.00274 | 0.00233 | 0.0124 | 0.0399\*\* | 0.00325 |
| *t value* | (-0.416) | (-0.874) | (1.111) | (0.934) | (1.649) | (3.018) | (0.949) |
| *Pr(>|t|)* | 0.681 | 0.388 | 0.274 | 0.357 | 0.110 | 0.00594 | 0.345 |
|  |  |  |  |  |  |  |  |
| Observations | 183 | 198 | 166 | 178 | 127 | 143 | 994 |
| R-squared | 0.718 | 0.632 | 0.752 | 0.789 | 0.687 | 0.743 | 0.739 |
| Number of ccf | 26 | 38 | 36 | 35 | 30 | 25 | 103 |
| F test | 0 | 0 | 0 | 0 | 4.77e-08 | 0 | 0 |

Model 2.4: The Effect of IP on Domestic Inventive Activity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **USPTO** | **USPTO** | **USPTO** | **USPTO** | **USPTO** | **USPTO** | **USPTO** |
| **IP Index L2** | -0.00160 | 0.0555 | 0.302\*\* | 0.0445 | 0.0954 | 0.0181 | 0.0807\* |
| *t value* | (-0.0186) | (0.863) | (3.246) | (0.985) | (0.719) | (0.760) | (2.389) |
| *Pr(>|t|)* | 0.985 | 0.394 | 0.00258 | 0.332 | 0.478 | 0.454 | 0.0187 |
| **GDP L5** | 0.538 | 4.089 | 5.927 | 2.184 | 4.552\* | 2.188\*\*\* | 2.519\*\*\* |
| *t value* | (0.0997) | (0.747) | (1.064) | (1.335) | (2.578) | (4.550) | (4.441) |
| *Pr(>|t|)* | 0.921 | 0.460 | 0.295 | 0.191 | 0.0151 | 0.000120 | 2.24e-05 |
| **Ecofree** | -0.0416 | 0.0291 | -0.121 | 0.262\* | -0.0733 | 0.138 | 0.0158 |
| *t value* | (-0.518) | (0.368) | (-1.062) | (2.117) | (-0.493) | (1.897) | (0.335) |
| *Pr(>|t|)* | 0.609 | 0.715 | 0.296 | 0.0417 | 0.626 | 0.0694 | 0.738 |
| **Enrolment** | 0.0353 | 0.275 | 0.126 | 0.110\* | 0.183 | 0.0958 | 0.132\*\*\* |
| *t value* | (0.188) | (1.102) | (0.509) | (2.071) | (1.109) | (1.097) | (3.857) |
| *Pr(>|t|)* | 0.852 | 0.278 | 0.614 | 0.0460 | 0.276 | 0.283 | 0.000200 |
| **Popgrowth** | -0.00119 | -0.0936 | -0.0928 | -0.000127 | -0.182\* | 0.0626 | -0.0539 |
| *t value* | (-0.0641) | (-0.415) | (-0.465) | (-0.00138) | (-2.169) | (1.284) | (-1.224) |
| *Pr(>|t|)* | 0.949 | 0.681 | 0.645 | 0.999 | 0.0381 | 0.211 | 0.224 |
| **GCF** | 0.0227 | 0.0347 | 0.102 | 0.0417 | 0.0796 | -0.0283 | 0.0426 |
| *t value* | (1.216) | (1.000) | (1.276) | (0.620) | (1.247) | (-0.856) | (1.771) |
| *Pr(>|t|)* | 0.235 | 0.324 | 0.210 | 0.539 | 0.222 | 0.400 | 0.0795 |
|  |  |  |  |  |  |  |  |
| Observations | 183 | 198 | 169 | 178 | 128 | 144 | 999 |
| R-squared | 0.012 | 0.095 | 0.251 | 0.134 | 0.288 | 0.508 | 0.266 |
| Number of ccf | 26 | 38 | 36 | 35 | 31 | 26 | 105 |
| F test | 0.599 | 0.772 | 0.00777 | 0.101 | 0.00152 | 0 | 5.81e-11 |

Model 2.5: The Effect of IP on Growth with Domestic Inventive Activity as Mediator

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.000574 | 0.00244\* | 0.00799\*\* | 0.0115\*\*\* | 0.0269\* | 0.0225\* | 0.0132\*\*\* |
| *t value* | (0.660) | (2.032) | (3.250) | (4.267) | (2.375) | (2.466) | (3.607) |
| *Pr(>|t|)* | 0.515 | 0.0493 | 0.00255 | 0.000150 | 0.0244 | 0.0212 | 0.000481 |
| **USPTO**  | 0.000556 | 0.00470\*\* | 0.00849\* | 0.00550 | 0.00446 | -0.00650 | 0.00430 |
| *t value* | (0.708) | (2.965) | (2.646) | (1.292) | (0.404) | (-0.410) | (1.377) |
| *Pr(>|t|)* | 0.486 | 0.00528 | 0.0121 | 0.205 | 0.689 | 0.685 | 0.171 |
| **GDP L5** | 0.539\*\*\* | 0.0575 | 0.287 | 0.103 | 0.489\*\* | 0.358 | 0.613\*\*\* |
| *t value* | (5.975) | (0.461) | (1.728) | (0.739) | (2.812) | (1.496) | (6.347) |
| *Pr(>|t|)* | 3.07e-06 | 0.647 | 0.0929 | 0.465 | 0.00874 | 0.148 | 6.14e-09 |
| **Ecofree** | 0.00215\* | 0.00364\*\* | 0.00964\* | 0.00769 | -0.0161 | -0.00194 | 0.00619 |
| *t value* | (2.364) | (2.862) | (2.395) | (1.233) | (-1.329) | (-0.0843) | (1.253) |
| *Pr(>|t|)* | 0.0262 | 0.00689 | 0.0221 | 0.226 | 0.194 | 0.934 | 0.213 |
| **Enrolment** | 0.00864\*\* | 0.0142\*\*\* | 0.0255\*\*\* | 0.0369\*\*\* | 0.0162\* | 0.0619\*\*\* | 0.0335\*\*\* |
| *t value* | (3.497) | (6.624) | (4.094) | (4.704) | (2.089) | (4.981) | (4.230) |
| *Pr(>|t|)* | 0.00178 | 9.04e-08 | 0.000238 | 4.15e-05 | 0.0456 | 4.37e-05 | 5.11e-05 |
| **Popgrowth** | 0.000275 | -0.00406 | -0.00250 | -0.00588 | -0.00803 | -0.0213\*\*\* | -0.00486 |
| *t value* | (0.765) | (-0.978) | (-0.654) | (-0.764) | (-1.899) | (-4.283) | (-0.869) |
| *Pr(>|t|)* | 0.451 | 0.334 | 0.517 | 0.450 | 0.0675 | 0.000257 | 0.387 |
| **GCF** | 0.000466 | 0.000242 | 0.00399 | 0.00997\*\* | 0.0193\* | 0.0398\*\* | 0.00500 |
| *t value* | (1.831) | (0.481) | (1.422) | (3.032) | (2.255) | (3.277) | (1.639) |
| *Pr(>|t|)* | 0.0791 | 0.633 | 0.164 | 0.00462 | 0.0318 | 0.00319 | 0.104 |
|  |  |  |  |  |  |  |  |
| Observations | 183 | 198 | 166 | 178 | 127 | 143 | 994 |
| R-squared | 0.652 | 0.571 | 0.687 | 0.731 | 0.540 | 0.731 | 0.733 |
| Number of ccf | 26 | 38 | 36 | 35 | 30 | 25 | 103 |
| F test | 0 | 0 | 1.87e-10 | 0 | 5.18e-07 | 0 | 0 |

Model 2.6: The Effect of IP on Growth with Both Mediators

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.000729 | 0.00179 | 0.00306 | 0.00602\*\* | 0.00689 | 0.0216\* | 0.0106\*\* |
| *t value* | (1.238) | (1.643) | (1.724) | (3.005) | (0.679) | (2.577) | (2.892) |
| *Pr(>|t|)* | 0.227 | 0.109 | 0.0935 | 0.00496 | 0.503 | 0.0166 | 0.00468 |
| **IP Imports**  | 0.00475\*\*\* | 0.0113\*\*\* | 0.0320\*\*\* | 0.0564\*\*\* | 0.0874\* | 0.0865 | 0.0193 |
| *t value* | (3.839) | (4.355) | (6.026) | (7.209) | (2.550) | (1.838) | (1.730) |
| *Pr(>|t|)* | 0.000749 | 0.000101 | 7.14e-07 | 2.43e-08 | 0.0163 | 0.0785 | 0.0867 |
| **USPTO**  | 0.000194 | 0.00327\* | 0.00611\* | 0.00515 | 0.00592 | -0.00549 | 0.00246 |
| *t value* | (0.246) | (2.329) | (2.194) | (1.502) | (0.791) | (-0.364) | (0.779) |
| *Pr(>|t|)* | 0.807 | 0.0254 | 0.0349 | 0.142 | 0.435 | 0.719 | 0.438 |
| **GDP L5** | 0.323\*\* | 0.0129 | 0.109 | -0.0284 | 0.432\*\* | 0.246 | 0.606\*\*\* |
| *t value* | (3.120) | (0.125) | (0.794) | (-0.205) | (3.061) | (1.032) | (6.393) |
| *Pr(>|t|)* | 0.00452 | 0.901 | 0.433 | 0.839 | 0.00472 | 0.312 | 4.96e-09 |
| **Ecofree** | 0.00139 | 0.00252\* | 0.00787\*\* | 0.00563 | -0.00173 | -0.00907 | 0.00372 |
| *t value* | (1.440) | (2.170) | (2.892) | (1.087) | (-0.211) | (-0.447) | (0.820) |
| *Pr(>|t|)* | 0.162 | 0.0365 | 0.00655 | 0.285 | 0.834 | 0.659 | 0.414 |
| **Enrolment** | 0.00563\* | 0.00994\*\*\* | 0.0157\* | 0.0278\*\*\* | 0.00827 | 0.0498\*\* | 0.0304\*\*\* |
| *t value* | (2.456) | (5.831) | (2.372) | (4.620) | (1.314) | (3.105) | (4.129) |
| *Pr(>|t|)* | 0.0214 | 1.06e-06 | 0.0233 | 5.32e-05 | 0.199 | 0.00483 | 7.46e-05 |
| **Popgrowth** | -1.50e-05 | 0.00206 | -0.00407 | -0.00481 | -0.000681 | -0.0192\*\*\* | -0.00453 |
| *t value* | (-0.0393) | (0.632) | (-1.209) | (-0.648) | (-0.140) | (-4.015) | (-0.830) |
| *Pr(>|t|)* | 0.969 | 0.532 | 0.235 | 0.521 | 0.890 | 0.000507 | 0.409 |
| **GCF** | -0.000135 | -0.000419 | 0.00237 | 0.00215 | 0.0119 | 0.0397\*\* | 0.00321 |
| *t value* | (-0.420) | (-0.970) | (1.016) | (0.820) | (1.619) | (3.017) | (0.935) |
| *Pr(>|t|)* | 0.678 | 0.338 | 0.316 | 0.418 | 0.116 | 0.00595 | 0.352 |
|  |  |  |  |  |  |  |  |
| Observations | 183 | 198 | 166 | 178 | 127 | 143 | 994 |
| R-squared | 0.718 | 0.653 | 0.774 | 0.793 | 0.690 | 0.743 | 0.739 |
| Number of ccf | 26 | 38 | 36 | 35 | 30 | 25 | 103 |
| F test | 0 | 0 | 0 | 0 | 1.14e-08 | 0 | 0 |

**Model 2A: Mediator Growth Model Excluding Enrolment as a Control**

Model 2.1A: The Total Effect of IP on Growth (Excluding Enrolment as a Control)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.00331\* | 0.00452\*\*\* | 0.0125\*\* | 0.0143\* | 0.0148 | 0.0334\*\* | 0.0153\*\*\* |
| *t value* | (2.105) | (4.368) | (3.208) | (2.575) | (1.929) | (3.441) | (4.562) |
| *Pr(>|t|)* | 0.0441 | 8.03e-05 | 0.00259 | 0.0137 | 0.0621 | 0.00184 | 1.33e-05 |
| **GDP L5** | 0.314 | 0.205 | 0.202 | 0.491\* | 0.587\*\* | 0.458 | 0.814\*\*\* |
| *t value* | (2.041) | (1.718) | (0.781) | (2.024) | (3.550) | (1.810) | (8.693) |
| *Pr(>|t|)* | 0.0505 | 0.0932 | 0.440 | 0.0495 | 0.00115 | 0.0810 | 0 |
| **Ecofree** | 0.00111 | 0.00544\*\*\* | 0.00345 | 0.00661 | -0.0219\* | 0.0152 | 0.00542 |
| *t value* | (1.529) | (4.099) | (0.742) | (1.046) | (-2.356) | (0.686) | (1.154) |
| *Pr(>|t|)* | 0.137 | 0.000186 | 0.463 | 0.302 | 0.0244 | 0.498 | 0.251 |
| **Popgrowth** | -0.000128 | 0.00289 | -0.00242 | -0.0158 | -0.0158\*\* | -0.0197\*\* | -0.00450 |
| *t value* | (-0.387) | (0.792) | (-0.660) | (-1.607) | (-3.047) | (-3.421) | (-0.954) |
| *Pr(>|t|)* | 0.702 | 0.433 | 0.513 | 0.116 | 0.00445 | 0.00194 | 0.342 |
| **GCF** | 0.000963\*\*\* | 0.000618 | 0.00640\* | 0.0140\*\*\* | 0.0199\*\* | 0.0260 | 0.00743\*\* |
| *t value* | (4.010) | (0.959) | (2.335) | (3.699) | (3.494) | (1.565) | (2.944) |
| *Pr(>|t|)* | 0.000389 | 0.343 | 0.0245 | 0.000636 | 0.00134 | 0.129 | 0.00395 |
|  |  |  |  |  |  |  |  |
| Observations | 280 | 301 | 247 | 244 | 182 | 182 | 1,435 |
| R-squared | 0.363 | 0.325 | 0.394 | 0.449 | 0.537 | 0.599 | 0.636 |
| Number of ccf | 30 | 43 | 42 | 42 | 35 | 29 | 111 |
| F test | 3.31e-05 | 6.59e-07 | 0.00104 | 5.33e-09 | 8.13e-06 | 0 | 0 |

Model 2.2A: The Effect of IP on Inward Technology Transfer (Excluding Enrolment as a Control)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** | **IP Imports** |
| **IP Index L2** | 0.293\*\* | 0.169\*\*\* | 0.169\*\* | 0.112\*\* | 0.174\*\*\* | 0.0795\* | 0.169\*\*\* |
| *t value* | (3.455) | (4.902) | (3.297) | (3.121) | (4.439) | (2.115) | (7.838) |
| *Pr(>|t|)* | 0.00172 | 1.46e-05 | 0.00202 | 0.00330 | 8.62e-05 | 0.0432 | 0 |
| **GDP L5** | 22.79\* | 4.322 | 4.937 | 3.751\*\* | 1.441 | 0.973 | 1.680\*\*\* |
| *t value* | (2.616) | (1.331) | (1.510) | (3.453) | (1.795) | (1.726) | (3.718) |
| *Pr(>|t|)* | 0.0140 | 0.191 | 0.139 | 0.00130 | 0.0813 | 0.0949 | 0.000316 |
| **Ecofree** | 0.0580 | 0.0582 | -0.00688 | -0.00812 | -0.230\*\* | 0.0674 | 0.0759 |
| *t value* | (0.959) | (1.203) | (-0.0594) | (-0.102) | (-3.487) | (1.216) | (1.560) |
| *Pr(>|t|)* | 0.346 | 0.236 | 0.953 | 0.919 | 0.00134 | 0.234 | 0.122 |
| **Popgrowth** | 0.00708 | -0.180 | 0.0303 | -0.0649 | -0.0614 | -0.0307 | -0.0331 |
| *t value* | (0.357) | (-1.469) | (0.551) | (-1.271) | (-1.351) | (-0.804) | (-1.456) |
| *Pr(>|t|)* | 0.723 | 0.149 | 0.584 | 0.211 | 0.185 | 0.428 | 0.148 |
| **GCF** | 0.175\*\*\* | 0.0962\*\* | 0.110\*\* | 0.180\*\*\* | 0.0960\*\*\* | 0.00723 | 0.122\*\*\* |
| *t value* | (9.551) | (3.534) | (3.452) | (4.016) | (3.917) | (0.245) | (5.387) |
| *Pr(>|t|)* | 1.85e-10 | 0.00101 | 0.00131 | 0.000246 | 0.000397 | 0.808 | 4.00e-07 |
|  |  |  |  |  |  |  |  |
| Observations | 280 | 301 | 250 | 244 | 183 | 184 | 1,441 |
| R-squared | 0.540 | 0.257 | 0.378 | 0.519 | 0.454 | 0.521 | 0.438 |
| Number of ccf | 30 | 43 | 42 | 42 | 36 | 30 | 113 |
| F test | 2.81e-10 | 1.69e-08 | 7.02e-09 | 9.73e-10 | 7.04e-08 | 1.50e-07 | 0 |

Model 2.3A: The Effect of IP on Growth with Inward Technology Transfer as Mediator (Excluding Enrolment as a Control)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.00111 | 0.00226\* | 0.00499\* | 0.00524 | 0.000130 | 0.0296\*\* | 0.00924\*\* |
| *t value* | (0.890) | (2.062) | (2.624) | (1.669) | (0.0166) | (2.944) | (2.858) |
| *Pr(>|t|)* | 0.381 | 0.0455 | 0.0121 | 0.103 | 0.987 | 0.00645 | 0.00510 |
| **IP Importsl1** | 0.00748\*\*\* | 0.0134\*\*\* | 0.0428\*\*\* | 0.0816\*\*\* | 0.0842\*\* | 0.0486 | 0.0360\*\*\* |
| *t value* | (4.714) | (3.712) | (6.787) | (6.076) | (3.009) | (1.193) | (4.047) |
| *Pr(>|t|)* | 5.62e-05 | 0.000598 | 3.30e-08 | 3.38e-07 | 0.00491 | 0.243 | 9.66e-05 |
| **GDP L5** | 0.144 | 0.147 | 0.0190 | 0.185 | 0.466\*\* | 0.411 | 0.754\*\*\* |
| *t value* | (1.133) | (1.423) | (0.123) | (0.842) | (3.537) | (1.601) | (7.936) |
| *Pr(>|t|)* | 0.267 | 0.162 | 0.903 | 0.405 | 0.00119 | 0.121 | 0 |
| **Ecofree** | 0.000678 | 0.00466\*\* | 0.00484\* | 0.00727 | -0.00255 | 0.0119 | 0.00280 |
| *t value* | (1.089) | (2.852) | (2.255) | (1.509) | (-0.325) | (0.544) | (0.720) |
| *Pr(>|t|)* | 0.285 | 0.00672 | 0.0295 | 0.139 | 0.747 | 0.591 | 0.473 |
| **Popgrowth** | -0.000181 | 0.00531 | -0.00333 | -0.0105 | -0.0106\* | -0.0182\*\*\* | -0.00327 |
| *t value* | (-0.602) | (1.581) | (-1.409) | (-1.186) | (-2.450) | (-3.737) | (-0.722) |
| *Pr(>|t|)* | 0.552 | 0.121 | 0.166 | 0.243 | 0.0196 | 0.000847 | 0.472 |
| **GCF** | -0.000342 | -0.000673 | 0.00192 | -0.000667 | 0.0118 | 0.0257 | 0.00307 |
| *t value* | (-1.166) | (-1.409) | (0.955) | (-0.216) | (1.891) | (1.499) | (1.189) |
| *Pr(>|t|)* | 0.253 | 0.166 | 0.345 | 0.830 | 0.0672 | 0.145 | 0.237 |
|  |  |  |  |  |  |  |  |
| Observations | 280 | 301 | 247 | 244 | 182 | 182 | 1,435 |
| R-squared | 0.581 | 0.520 | 0.688 | 0.649 | 0.685 | 0.606 | 0.669 |
| Number of ccf | 30 | 43 | 42 | 42 | 35 | 29 | 111 |
| F test | 0 | 5.19e-09 | 1.04e-09 | 0 | 7.55e-11 | 0 | 0 |

Model 2.4A: The Effect of IP on Domestic Inventive Activity (Excluding Enrolment as a Control)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **USPTO** | **USPTO** | **USPTO** | **USPTO** | **USPTO** | **USPTO** | **USPTO** |
| **IP Index L2** | 0.0140 | 0.128\* | 0.227\* | 0.0852 | 0.140\* | 0.0573\* | 0.0907\*\*\* |
| *t value* | (0.327) | (2.595) | (2.477) | (1.546) | (2.400) | (2.712) | (3.428) |
| *Pr(>|t|)* | 0.746 | 0.0130 | 0.0175 | 0.130 | 0.0218 | 0.0111 | 0.000851 |
| **GDP L5** | -4.409 | 4.917 | 5.200 | 3.075 | 4.611\*\*\* | 2.285\*\*\* | 3.331\*\*\* |
| *t value* | (-0.865) | (0.977) | (1.083) | (1.857) | (3.839) | (4.474) | (5.999) |
| *Pr(>|t|)* | 0.394 | 0.334 | 0.285 | 0.0706 | 0.000496 | 0.000109 | 2.48e-08 |
| **Ecofree** | -0.00693 | 0.0286 | -0.134 | 0.206 | -0.0857 | 0.106 | -0.00863 |
| *t value* | (-0.133) | (0.602) | (-1.427) | (1.763) | (-0.798) | (1.631) | (-0.241) |
| *Pr(>|t|)* | 0.895 | 0.550 | 0.161 | 0.0853 | 0.430 | 0.114 | 0.810 |
| **Popgrowth** | -0.00495 | -0.125 | -0.0484 | -0.0413 | -0.102 | 0.0668 | -0.0482 |
| *t value* | (-0.394) | (-1.213) | (-0.376) | (-0.462) | (-1.940) | (1.430) | (-1.521) |
| *Pr(>|t|)* | 0.696 | 0.232 | 0.709 | 0.647 | 0.0605 | 0.164 | 0.131 |
| **GCF** | 0.00987 | 0.0519 | 0.0746 | -0.00595 | 0.00670 | -0.0258 | 0.0409\* |
| *t value* | (0.624) | (1.474) | (1.200) | (-0.0977) | (0.137) | (-0.749) | (2.159) |
| *Pr(>|t|)* | 0.537 | 0.148 | 0.237 | 0.923 | 0.892 | 0.460 | 0.0330 |
|  |  |  |  |  |  |  |  |
| Observations | 280 | 301 | 250 | 244 | 183 | 184 | 1,441 |
| R-squared | 0.009 | 0.070 | 0.163 | 0.109 | 0.296 | 0.485 | 0.219 |
| Number of ccf | 30 | 43 | 42 | 42 | 36 | 30 | 113 |
| F test | 0.758 | 0.0674 | 0.107 | 0.0780 | 7.05e-05 | 0 | 0 |

Model 2.5A: The Effect of IP on Growth with Domestic Inventive Activity as Mediator (Excluding Enrolment as a Control)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.00331\* | 0.00397\*\*\* | 0.00964\*\* | 0.0135\* | 0.0135 | 0.0335\*\* | 0.0144\*\*\* |
| *t value* | (2.101) | (3.703) | (3.203) | (2.624) | (1.660) | (3.243) | (4.354) |
| *Pr(>|t|)* | 0.0444 | 0.000616 | 0.00263 | 0.0121 | 0.106 | 0.00305 | 3.01e-05 |
| **USPTO**  | -0.000348 | 0.00429\*\* | 0.0125\*\*\* | 0.00994 | 0.00958 | -0.00201 | 0.0103\*\*\* |
| *t value* | (-0.271) | (2.840) | (4.081) | (1.824) | (1.036) | (-0.0973) | (3.823) |
| *Pr(>|t|)* | 0.788 | 0.00692 | 0.000202 | 0.0755 | 0.308 | 0.923 | 0.000219 |
| **GDP L5** | 0.313\* | 0.184 | 0.132 | 0.460 | 0.543\*\* | 0.463 | 0.779\*\*\* |
| *t value* | (2.047) | (1.753) | (0.598) | (1.904) | (3.546) | (2.037) | (8.268) |
| *Pr(>|t|)* | 0.0498 | 0.0868 | 0.553 | 0.0640 | 0.00116 | 0.0512 | 0 |
| **Ecofree** | 0.00111 | 0.00531\*\*\* | 0.00494 | 0.00457 | -0.0211\* | 0.0154 | 0.00549 |
| *t value* | (1.512) | (4.065) | (1.166) | (0.743) | (-2.090) | (0.666) | (1.181) |
| *Pr(>|t|)* | 0.141 | 0.000206 | 0.250 | 0.461 | 0.0441 | 0.511 | 0.240 |
| **Popgrowth** | -0.000129 | 0.00342 | -0.00173 | -0.0154 | -0.0148\*\* | -0.0195\*\*\* | -0.00400 |
| *t value* | (-0.394) | (1.010) | (-0.541) | (-1.562) | (-2.986) | (-3.896) | (-0.861) |
| *Pr(>|t|)* | 0.697 | 0.318 | 0.592 | 0.126 | 0.00521 | 0.000555 | 0.391 |
| **GCF** | 0.000966\*\*\* | 0.000395 | 0.00554\* | 0.0141\*\* | 0.0198\*\* | 0.0260 | 0.00701\*\* |
| *t value* | (3.989) | (0.735) | (2.391) | (3.425) | (3.555) | (1.525) | (2.820) |
| *Pr(>|t|)* | 0.000412 | 0.466 | 0.0215 | 0.00141 | 0.00113 | 0.138 | 0.00570 |
|  |  |  |  |  |  |  |  |
| Observations | 280 | 301 | 247 | 244 | 182 | 182 | 1,435 |
| R-squared | 0.363 | 0.370 | 0.508 | 0.464 | 0.544 | 0.599 | 0.641 |
| Number of ccf | 30 | 43 | 42 | 42 | 35 | 29 | 111 |
| F test | 6.48e-05 | 1.07e-08 | 9.28e-08 | 3.38e-08 | 8.75e-06 | 0 | 0 |

Model 2.6A: The Effect of IP on Growth with Both Mediators (Excluding Enrolment as a Control)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Income Class** | **L-** | **L+** | **LM-** | **LM+** | **UM-** | **UM+** | **AllDev** |
| **Variables** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** | **GDP** |
| **IP Index L2** | 0.00111 | 0.00208 | 0.00403\*\* | 0.00471 | -0.000663 | 0.0298\*\* | 0.00898\*\* |
| *t value* | (0.893) | (1.955) | (2.722) | (1.604) | (-0.0870) | (2.824) | (2.784) |
| *Pr(>|t|)* | 0.379 | 0.0572 | 0.00949 | 0.116 | 0.931 | 0.00864 | 0.00633 |
| **IP Importsl1** | 0.00752\*\*\* | 0.0126\*\* | 0.0384\*\*\* | 0.0805\*\*\* | 0.0833\*\* | 0.0494 | 0.0346\*\*\* |
| *t value* | (4.802) | (3.515) | (7.753) | (6.233) | (2.902) | (1.240) | (3.817) |
| *Pr(>|t|)* | 4.39e-05 | 0.00107 | 1.46e-09 | 2.02e-07 | 0.00647 | 0.225 | 0.000223 |
| **USPTO**  | -0.000861 | 0.00250\* | 0.00766\*\*\* | 0.00758 | 0.00668 | -0.00487 | 0.00544 |
| *t value* | (-0.798) | (2.149) | (3.640) | (1.857) | (0.949) | (-0.251) | (1.961) |
| *Pr(>|t|)* | 0.431 | 0.0374 | 0.000757 | 0.0705 | 0.349 | 0.804 | 0.0525 |
| **GDP L5** | 0.139 | 0.138 | -0.00520 | 0.166 | 0.436\*\* | 0.421 | 0.738\*\*\* |
| *t value* | (1.100) | (1.441) | (-0.0373) | (0.763) | (3.437) | (1.796) | (7.831) |
| *Pr(>|t|)* | 0.280 | 0.157 | 0.970 | 0.450 | 0.00157 | 0.0833 | 0 |
| **Ecofree** | 0.000669 | 0.00463\*\* | 0.00560\*\* | 0.00571 | -0.00216 | 0.0124 | 0.00294 |
| *t value* | (1.057) | (2.881) | (3.276) | (1.052) | (-0.266) | (0.542) | (0.753) |
| *Pr(>|t|)* | 0.299 | 0.00622 | 0.00215 | 0.299 | 0.792 | 0.592 | 0.453 |
| **Popgrowth** | -0.000185 | 0.00547 | -0.00281 | -0.0103 | -0.01000\* | -0.0178\*\*\* | -0.00305 |
| *t value* | (-0.616) | (1.679) | (-1.394) | (-1.146) | (-2.306) | (-4.437) | (-0.678) |
| *Pr(>|t|)* | 0.543 | 0.101 | 0.171 | 0.258 | 0.0273 | 0.000129 | 0.499 |
| **GCF** | -0.000341 | -0.000725 | 0.00185 | -0.000429 | 0.0118 | 0.0255 | 0.00301 |
| *t value* | (-1.178) | (-1.607) | (1.031) | (-0.135) | (1.897) | (1.460) | (1.173) |
| *Pr(>|t|)* | 0.248 | 0.116 | 0.309 | 0.893 | 0.0663 | 0.155 | 0.243 |
|  |  |  |  |  |  |  |  |
| Observations | 280 | 301 | 247 | 244 | 182 | 182 | 1,435 |
| R-squared | 0.583 | 0.534 | 0.728 | 0.658 | 0.688 | 0.606 | 0.671 |
| Number of ccf | 30 | 43 | 42 | 42 | 35 | 29 | 111 |
| F test | 0 | 1.26e-10 | 0 | 0 | 6.71e-11 | 0 | 0 |

Model 3-A Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.660677 | 0.037236 | 17.743 | 2.00E-16 |
| Log PCT Destination (5-year lag) | 0.002405 | 0.006662 | 0.361 | 0.7182 |
| IP Index (5-year lag) | 0.03701 | 0.008361 | 4.427 | 1.11E-05 |
| Economic Freedom | 0.00942 | 0.011132 | 0.846 | 0.3977 |
| Enrolment | 0.15854 | 0.014321 | 11.071 | 2.00E-16 |
| Population Growth | -0.009817 | 0.01225 | -0.801 | 0.4232 |
| Gross Capital Formation | 0.014054 | 0.006784 | 2.071 | 0.0387 |

Residual standard error: 0.09805 on 703 degrees of freedom

Multiple R-squared(full model): 0.9918 Adjusted R-squared: 0.9904

F-statistic(full model): 723 on 117 and 703 DF, p-value: < 2.2e-16

F-statistic(proj model): 118 on 7 and 702 DF, p-value: < 2.2e-16

Model 3-B Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.661844 | 0.037072 | 17.853 | 2.00E-16 |
| IP Index (5-year lag) | 0.03698 | 0.008355 | 4.426 | 1.11E-05 |
| Economic Freedom | 0.009106 | 0.011091 | 0.821 | 0.4119 |
| Enrolment | 0.158638 | 0.014309 | 11.086 | 2.00E-16 |
| Population Growth | -0.009992 | 0.012233 | -0.817 | 0.4143 |
| Gross Capital Formation | 0.014061 | 0.00678 | 2.074 | 0.0385 |

Residual standard error: 0.09799 on 704 degrees of freedom

Multiple R-squared(full model): 0.9918 Adjusted R-squared: 0.9904

F-statistic(full model):730.2 on 116 and 704 DF, p-value: < 2.2e-16

F-statistic(proj model): 137.9 on 6 and 703 DF, p-value: < 2.2e-16

Model 3-C Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.731161 | 0.034101 | 21.441 | <2e-16 |
| Log PCT Destination (5-year lag) | 0.002105 | 0.006749 | 0.312 | 0.7552 |
| Economic Freedom | 0.015716 | 0.011186 | 1.405 | 0.1605 |
| Enrolment | 0.154433 | 0.014478 | 10.666 | <2e-16 |
| Population Growth | -0.005156 | 0.012365 | -0.417 | 0.6768 |
| Gross Capital Formation | 0.013424 | 0.006872 | 1.953 | 0.0512 |

Residual standard error: 0.09934 on 704 degrees of freedom

Multiple R-squared(full model): 0.9915 Adjusted R-squared: 0.9901

F-statistic(full model):710.3 on 116 and 704 DF, p-value: < 2.2e-16

F-statistic(proj model): 131 on 6 and 703 DF, p-value: < 2.2e-16

Model 4-A Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.61703 | 0.032 | 19.28 | 2.00E-16 |
| IP Index (5-year lag) | 0.03641 | 0.00739 | 4.927 | 9.64E-07 |

Residual standard error: 0.1187 on 1099 degrees of freedom

Multiple R-squared(full model): 0.9866 Adjusted R-squared: 0.9851

F-statistic(full model):663.1 on 122 and 1099 DF, p-value: < 2.2e-16

Model 4-B Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.66996 | 0.037527 | 17.853 | 2.00E-16 |
| IP Index (5-year lag) | 0.035959 | 0.008125 | 4.426 | 1.11E-05 |
| Economic Freedom | 0.011807 | 0.014381 | 0.821 | 0.4119 |
| Enrolment | 0.149588 | 0.013493 | 11.086 | 2.00E-16 |
| Population Growth | -0.010699 | 0.013099 | -0.817 | 0.4143 |
| Gross Capital Formation | 0.017423 | 0.008401 | 2.074 | 0.0385 |

Residual standard error: 0.1005 on 704 degrees of freedom

Multiple R-squared(full model): 0.9918 Adjusted R-squared: 0.9904

F-statistic(full model):730.2 on 116 and 704 DF, p-value: < 2.2e-16

Model 4-C Dependent variable: IP Index

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.54156 | 0.09664 | 5.604 | 2.65E-08 |
| IP Index (5-year lag) | 0.19641 | 0.0223 | 8.808 | 2.00E-16 |

Residual standard error: 0.3582 on 1098 degrees of freedom

Multiple R-squared(full model): 0.8997 Adjusted R-squared: 0.8884

F-statistic(full model):80.04 on 123 and 1098 DF, p-value: < 2.2e-16

F-statistic(proj model): 93.81 on 2 and 1097 DF, p-value: < 2.2e-16

Model 5-A Dependent variable: Log IP Imports. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| Log IP Imports (5-year lag) | 0.104649 | 0.025091 | 4.171 | 3.26E-05 |
| IP Index (5-year lag) | 0.011772 | 0.007347 | 1.602 | 0.109 |

Residual standard error: 0.1316 on 1161 degrees of freedom

Multiple R-squared(full model): 0.9844 Adjusted R-squared: 0.9827

F-statistic(full model): 581 on 126 and 1161 DF, p-value: < 2.2e-16

F-statistic(proj model): 11.08 on 2 and 1160 DF, p-value: 1.706e-05

Model 5-B Dependent variable: Log IP Imports. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| Log IP Imports (5-year lag) | 0.050154 | 0.032442 | 1.546 | 0.12255 |
| IP Index (5-year lag) | 0.010024 | 0.008587 | 1.167 | 0.24344 |
| Economic Freedom | 0.097228 | 0.016151 | 6.02 | 2.77E-09 |
| Enrolment | -0.006782 | 0.015326 | -0.443 | 0.65824 |
| Population Growth | 0.023534 | 0.0153 | 1.538 | 0.12446 |
| Gross Capital Formation | 0.026112 | 0.009663 | 2.702 | 0.00705 |

Residual standard error: 0.1184 on 727 degrees of freedom

Multiple R-squared(full model): 0.9875 Adjusted R-squared: 0.9855

F-statistic(full model):479.1 on 120 and 727 DF, p-value: < 2.2e-16

F-statistic(proj model): 11.52 on 6 and 726 DF, p-value: 2.427e-12

Model 5-C Dependent variable: Log USPTO App. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| Log USPTO App (5-year lag) | 0.20254 | 0.02429 | 8.337 | 2.00E-16 |
| IP Index (5-year lag) | 0.06304 | 0.01245 | 5.064 | 4.77E-07 |

Residual standard error: 0.2225 on 1161 degrees of freedom

Multiple R-squared(full model): 0.9629 Adjusted R-squared: 0.9589

F-statistic(full model):239.3 on 126 and 1161 DF, p-value: < 2.2e-16

F-statistic(proj model): 54.93 on 2 and 1160 DF, p-value: < 2.2e-16

Model 5-D Dependent variable: Log USPTO App. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| Log USPTO App (5-year lag) | 0.194107 | 0.030852 | 6.291 | 5.43E-10 |
| IP Index (5-year lag) | 0.067095 | 0.017011 | 3.944 | 8.78E-05 |
| Economic Freedom | 0.070138 | 0.031249 | 2.245 | 0.0251 |
| Enrolment | 0.10702 | 0.030373 | 3.524 | 0.000452 |
| Population Growth | -0.062603 | 0.03012 | -2.078 | 0.038018 |
| Gross Capital Formation | 0.002881 | 0.018949 | 0.152 | 0.87919 |

Residual standard error: 0.2337 on 727 degrees of freedom

Multiple R-squared(full model): 0.9641 Adjusted R-squared: 0.9581

F-statistic(full model):162.5 on 120 and 727 DF, p-value: < 2.2e-16

F-statistic(proj model): 15.4 on 6 and 726 DF, p-value: < 2.2e-16

**Models without Enrolment**

Model 3-A Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.719516 | 0.031587 | 22.779 | 2.00E-16 |
| Log PCT Destination (5-year lag) | 0.008712 | 0.006287 | 1.386 | 0.1661 |
| IP Index (5-year lag) | 0.028424 | 0.006893 | 4.124 | 4.03E-05 |
| Economic Freedom | 0.010286 | 0.009424 | 1.091 | 0.2753 |
| Population Growth | -0.022318 | 0.010804 | -2.066 | 0.0391 |
| Gross Capital Formation | 0.01356 | 0.00564 | 2.404 | 0.0164 |

Residual standard error: 0.1067 on 1011 degrees of freedom

Multiple R-squared(full model): 0.9899 Adjusted R-squared: 0.9886

F-statistic(full model):789.8 on 125 and 1011 DF, p-value: < 2.2e-16

F-statistic(proj model): 130.2 on 6 and 1010 DF, p-value: < 2.2e-16

Model 3-B Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.724833 | 0.031367 | 23.108 | 2.00E-16 |
| IP Index (5-year lag) | 0.028227 | 0.006894 | 4.094 | 4.57E-05 |
| Economic Freedom | 0.009343 | 0.009404 | 0.994 | 0.3207 |
| Population Growth | -0.023355 | 0.010782 | -2.166 | 0.0305 |
| Gross Capital Formation | 0.01363 | 0.005643 | 2.415 | 0.0159 |

Residual standard error: 0.1068 on 1012 degrees of freedom

Multiple R-squared(full model): 0.9898 Adjusted R-squared: 0.9886

F-statistic(full model):795.4 on 124 and 1012 DF, p-value: < 2.2e-16

F-statistic(proj model): 155.7 on 5 and 1011 DF, p-value: < 2.2e-16

Model 3-C Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.769037 | 0.029446 | 26.117 | <2e-16 |
| Log PCT Destination (5-year lag) | 0.008176 | 0.006335 | 1.291 | 0.1971 |
| Economic Freedom | 0.015373 | 0.009417 | 1.633 | 0.1029 |
| Population Growth | -0.020058 | 0.010875 | -1.844 | 0.0654 |
| Gross Capital Formation | 0.011812 | 0.005669 | 2.084 | 0.0374 |

Residual standard error: 0.1076 on 1012 degrees of freedom

Multiple R-squared(full model): 0.9897 Adjusted R-squared: 0.9884

F-statistic(full model):783.6 on 124 and 1012 DF, p-value: < 2.2e-16

F-statistic(proj model): 150.5 on 5 and 1011 DF, p-value: < 2.2e-16

Model 4-B Dependent variable: GDP per Capita. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| GDP per Capita (5-year lag) | 0.730633 | 0.031618 | 23.108 | 2.00E-16 |
| IP Index (5-year lag) | 0.02761 | 0.006743 | 4.094 | 4.57E-05 |
| Economic Freedom | 0.011503 | 0.011577 | 0.994 | 0.3207 |
| Population Growth | -0.025215 | 0.011641 | -2.166 | 0.0305 |
| Gross Capital Formation | 0.014524 | 0.006013 | 2.415 | 0.0159 |

Residual standard error: 0.1047 on 1012 degrees of freedom

Multiple R-squared(full model): 0.9898 Adjusted R-squared: 0.9886

F-statistic(full model):795.4 on 124 and 1012 DF, p-value: < 2.2e-16

F-statistic(proj model): 155.7 on 5 and 1011 DF, p-value: < 2.2e-16

Model 5-B Dependent variable: Log IP Imports. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| Log IP Imports (5-year lag) | 0.068703 | 0.026575 | 2.585 | 0.00987 |
| IP Index (5-year lag) | 0.004549 | 0.00716 | 0.635 | 0.52538 |
| Economic Freedom | 0.087787 | 0.013135 | 6.683 | 3.79E-11 |
| Population Growth | 0.016253 | 0.013267 | 1.225 | 0.22083 |
| Gross Capital Formation | 0.03203 | 0.006904 | 4.639 | 3.94E-06 |

Residual standard error: 0.1209 on 1046 degrees of freedom

Multiple R-squared(full model): 0.9866 Adjusted R-squared: 0.985

F-statistic(full model):606.9 on 127 and 1046 DF, p-value: < 2.2e-16

F-statistic(proj model): 19.43 on 5 and 1045 DF, p-value: < 2.2e-16

Model 5-D Dependent variable: Log USPTO App. Variables are scaled to standardize the coefficients.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std Error | t value | Pr(>|t|) |
| Log USPTO App (5-year lag) | 0.193233 | 0.025135 | 7.688 | 3.44E-14 |
| IP Index (5-year lag) | 0.066344 | 0.013321 | 4.98 | 7.42E-07 |
| Economic Freedom | 0.02417 | 0.023674 | 1.021 | 0.308 |
| Population Growth | -0.027835 | 0.024646 | -1.129 | 0.259 |
| Gross Capital Formation | 0.005101 | 0.012724 | 0.401 | 0.689 |

Residual standard error: 0.2247 on 1046 degrees of freedom

Multiple R-squared(full model): 0.9638 Adjusted R-squared: 0.9594

F-statistic(full model):219.2 on 127 and 1046 DF, p-value: < 2.2e-16

F-statistic(proj model): 19.98 on 5 and 1045 DF, p-value: < 2.2e-16