Final Report

# Table 1: Variable Descriptions

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Description** | **Units** | **Source** |
| rgdpo.pop | Real GDP Output per Capita | 2017 US$ | Penn World  Tables 10.01 |
| log.rgdpo.pop | Natural log of real GDP output per capita | 2017 US$ | Penn World  Tables 10.01 |
| year\_orig | Years since 1970 | Years | Penn World  Tables 10.01 |
| yrs\_sch | Average number of years of education | Years | Barro & Lee |
| voc | Share of all students in secondary education enrolled in vocational programmes (binary: above EU average 0/1) | Numerical Factor | World Bank |
| gen | Gender ratio for average years of schooling (binary: above European average 0/1) | Numerical Factor | Barro & Lee |
| avh | Average annual hours worked by persons engaged (employed) | Hours | Penn World  Tables 10.01 |
| csh\_x | Share of merchandise exports at current PPPs | Numerical Factor | Penn World  Tables 10.01 |
| fdi | Foreign Direct Investment (FDI), net inflows as a share of GDP | % of GDP | World Bank |
| ctfp | TFP level at current PPPs (USA=1) | Numerical Factor | Penn World  Tables 10.01 |

# Table 2: Model Descriptions

|  |  |  |
| --- | --- | --- |
| **Model Name** | **Model Description** | **Model Formula** |
| Pooled OLS Model | A simple pooled OLS regression model | rgdpo.pop = const + B1·year\_orig + B2·yrs\_sch + B3·voc |
| Pooled OLS Model with ctfp | A simple pooled OLS regression model, controlling for ctfp | rgdpo.pop = const + B1·year\_orig + B2·yrs\_sch + B3·voc + B4·ctfp |
| Random Effects Model |  |  |

# Table 3: Summary Statistics

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Minimum** | **1st Q.** | **Median** | **Mean** | **3rd Q.** | **Maximum** | **Standard Deviation** |
| rgdpo.pop | 3002.00 | 15534.00 | 23531.00 | 25538.00 | 33447.00 | 82382.00 | 14031.57 |
| log.rgdpo.pop | 8.01 | 9.65 | 10.07 | 9.99 | 10.42 | 11.32 | 0.60 |
| year\_orig | 0.00 | 10.00 | 22.50 | 22.50 | 35.00 | 45.00 | 14.40 |
| yrs\_sch | 3.17 | 8.16 | 9.64 | 9.45 | 10.93 | 13.57 | 1.84 |
| voc | 0.00 | 0.00 | 0.50 | 0.50 | 1.00 | 1.00 | 0.50 |
| gen | 0.00 | 0.00 | 0.00 | 0.48 | 1.00 | 1.00 | 0.50 |
| avh | 1401.00 | 1627.00 | 1766.00 | 1778.00 | 1903.00 | 2334.00 | 207.67 |
| csh\_x | 0.00 | 0.16 | 0.27 | 0.34 | 0.49 | 1.22 | 0.24 |
| fdi | -15.71 | 0.58 | 1.95 | 10.36 | 5.39 | 340.26 | 31.16 |
| ctfp | 0.45 | 0.76 | 0.87 | 0.88 | 0.98 | 1.44 | 0.18 |

# Model 1: Pooled OLS Model

rgdpo.pop = const + B1·year\_orig + B2·yrs\_sch + B3·voc

Model 3: Pooled OLS, using 210 observations.

Included 21 cross-sectional units.

Time-series length = 10

Dependent variable: rgdpopop

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Variable* | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* |  |
| const | −934.224 | 4994.95 | −0.1870 | 0.8518 |  |
| year\_orig | 507.573 | 87.7213 | 5.786 | <0.0001 | \*\*\* |
| yrs\_sch | 1488.12 | 684.626 | 2.174 | 0.0309 | \*\* |
| voc | 1973.48 | 1409.87 | 1.400 | 0.1631 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mean dependent var | 25537.53 |  | S.D. dependent var | 14031.57 |
| Sum squared resid. | 2.13e+10 |  | S.E. of regression | 10168.31 |
| R-squared | 0.482386 |  | Adjusted R-squared | 0.474848 |
| F (3, 206) | 63.99327 |  | P-value(F) | 2.80e-29 |
| Log-likelihood | −2233.634 |  | Akaike criterion | 4475.269 |
| Schwarz criterion | 4488.657 |  | Hannan-Quinn | 4480.681 |
| rho | 0.099718 |  | Durbin-Watson | 1.635858 |

# Model 2: Pooled OLS Model with ctfp

rgdpo.pop = const + B1·year\_orig + B2·yrs\_sch + B3·voc + B4·ctfp

Model 1: Pooled OLS, using 207 observations.

Included 21 cross-sectional units.

Time-series length: minimum 9, maximum 10

Dependent variable: rgdpopop

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Variable* | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* |  |
| const | −26984.1 | 5159.49 | −5.230 | <0.0001 | \*\*\* |
| year\_orig | 463.974 | 75.6221 | 6.135 | <0.0001 | \*\*\* |
| yrs\_sch | 1572.45 | 585.182 | 2.687 | 0.0078 | \*\*\* |
| voc | 1606.11 | 1209.39 | 1.328 | 0.1857 |  |
| ctfp | 30130.7 | 3359.27 | 8.969 | <0.0001 | \*\*\* |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mean dependent var | 25828.86 |  | S.D. dependent var | 13920.36 |
| Sum squared resid | 1.51e+10 |  | S.E. of regression | 8653.999 |
| R-squared | 0.621020 |  | Adjusted R-squared | 0.613515 |
| F(4, 202) | 82.75230 |  | P-value(F) | 1.76e-41 |
| Log-likelihood | −2167.805 |  | Akaike criterion | 4345.611 |
| Schwarz criterion | 4362.274 |  | Hannan-Quinn | 4352.349 |
| rho | 0.028359 |  | Durbin-Watson | 1.702494 |

# Model 3: Pooled OLS Model using log(e) 5-year GDP averages, accounting for ctfp changes.

Add model format

Model 1: Pooled OLS, using 189 observations

Included 21 cross-sectional units

Time-series length = 9

Dependent variable: logrgdpopoproll

Robust (HAC) standard errors

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* |  |
| const | 7.64226 | 0.487247 | 15.68 | <0.0001 | \*\*\* |
| l\_year\_orig | 0.324146 | 0.0552646 | 5.865 | <0.0001 | \*\*\* |
| l\_yrs\_sch | 0.703497 | 0.254183 | 2.768 | 0.0119 | \*\* |
| voc | 0.00289160 | 0.0976738 | 0.02960 | 0.9767 |  |
| l\_ctfp | 1.11519 | 0.396489 | 2.813 | 0.0108 | \*\* |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mean dependent var | 10.05903 |  | S.D. dependent var | 0.544711 |
| Sum squared resid | 24.12912 |  | S.E. of regression | 0.362128 |
| R-squared | 0.567435 |  | Adjusted R-squared | 0.558031 |
| F(4, 20) | 88.24199 |  | P-value(F) | 2.06e-12 |
| Log-likelihood | −73.66741 |  | Akaike criterion | 157.3348 |
| Schwarz criterion | 173.5436 |  | Hannan-Quinn | 163.9014 |
| rho | 0.891665 |  | Durbin-Watson | 0.113573 |

# Model 4: Pooled OLS Model using log(e) 5-year GDP averages.

Add model format

Model 2: Pooled OLS, using 189 observations

Included 21 cross-sectional units

Time-series length = 9

Dependent variable: logrgdpopoproll

Robust (HAC) standard errors

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* |  |
| const | 7.64788 | 0.592850 | 12.90 | <0.0001 | \*\*\* |
| l\_year\_orig | 0.369713 | 0.0822809 | 4.493 | 0.0002 | \*\*\* |
| l\_yrs\_sch | 0.571489 | 0.362000 | 1.579 | 0.1301 |  |
| voc | −0.00239907 | 0.142727 | −0.01681 | 0.9868 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mean dependent var | 10.05903 |  | S.D. dependent var | 0.544711 |
| Sum squared resid | 34.10828 |  | S.E. of regression | 0.429382 |
| R-squared | 0.388538 |  | Adjusted R-squared | 0.378622 |
| F(3, 20) | 104.1034 |  | P-value(F) | 2.24e-12 |
| Log-likelihood | −106.3758 |  | Akaike criterion | 220.7517 |
| Schwarz criterion | 233.7186 |  | Hannan-Quinn | 226.0049 |
| rho | 0.922891 |  | Durbin-Watson | 0.072190 |

# Table 4: Model Coefficient Comparison

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Model* | *R2* | *Adj. R2* | *Durbin-Watson* | *Durbin Lower* | *Durbin Upper* | *White’s Test* |
| Model 1 | 0.482 | 0.475 | 1.636 | 1.61 (k=4) | 1.74 (k=4) | 0.000013 |
| Model 2 | 0.621 | 0.614 | 1.702 | 1.59 (k=5) | 1.76 (k=5) | 0.000000 |