**Supplementary material for “Do human capital and institutional quality contribute to Brazil’s long term real convergence/ divergence process? A Markov Regime-Switching Autoregressive approach”**

In this supplementary material we provide: in Appendix A, a brief narrative review of the Brazilian real convergence; in Appendix B, further tables complementary to the original document, and; in Appendix C, the robustness checks.

**Appendix A: A brief account of the real convergence of the Brazilian economy from 1822 to 2019**

****

Figure A1. Real convergence, 1822-2019, Brazil's GDP per capita relative series

*Source:* Authors' computation based on data from Maddison Project Database 2020 (Bolt and Luiten Van Zanden, 2020), Maddison (2003), and The Total Economy Database (TED).

To delve into the Brazilian economy's real convergence process of the Brazilian economy *vis-à-vis* a group of 6 LA EEs, Portugal, and the US, we resort to the time-division proposed by Doré and Teixeira (2022): 1) The Empire period (1822-1889); 2) The Oligarchic Republic (1889-1930); 3) The developmentalist era (1930-1980); 4) The Crisis period (1980-1990); and 5) The Neoliberalism phase (1990-2019). Based on the graphic visualization (Figure A1), these phases can be grouped according to Brazilian real convergence regimes. For instance, phases 1 and 2 are set by periods of clear divergence (Regime 2), whereas from phase 3 on, i.e., after 1930, Brazil embarked on a real convergence path (Regime 1). It is worth highlighting that for the pair Brazil/ Portugal, the regimes are not clearly defined, thus, this two-regime division should be considered cautiously.

 In the Empire (1822-1889), Brazil presented a modest per capita annual rate of 0.35% and a clear divergent path (Regime 2) towards some other LA EEs and the US. In 1822, the standard of living of Brazilian citizens was 28% and 67% of those from the US and the average of other six LA countries, respectively. At the end of the period (1889), probably due to the economic growth of Argentina (1.47%), Chile (1.78%), and Uruguay (1.07%), Brazil widened the gap between the average of the six LA countries and its relative GDP per capita fell from 67% to 40%. Concerning the frontier country, the US, Brazil lagged even further, and in 1889 Brazil's GDP per capita represented only 15% of the North American nation.

 Apparently, the independence from Portugal (1822) brought more economic advantages to the ex-colony, at least until 1868. Between 1822 and 1868, Brazil narrowed the gap with Portugal increasing the relative income per capita from 48% to 78%. The following years were set by a depression in the Brazilian economy, contributing to the divergence pattern observed from 1870 to 1889.

 The end of the monarchy in 1889 gave birth to the Oligarchic Republic in Brazil after a military coup. The economic performance of the new regime (1889-1930) was not sufficient to present a real convergence path towards LA, Portugal, and the US. Accordingly, the Brazilian GDP per capita represented only 35%, 53%, and 12%, on average, of LA's, Portugal's, and the US' GDP per capita between 1889 and 1930.

 Between 1930 and 1980 was the period of most economic success throughout Brazilian history, when the country shifted from regime 2 to 1. In the developmentalist era, as it is commonly known, Brazil recorded a GDP per capita growth rate of 3.69%, surpassing the mean of the other six LA countries (1.67%), Portugal (3.32%), and the US (2.06%).

 Until 1970 the annual convergence rate of Brazil towards the average of the six LA countries was about 1.5%, and the standard of living of Brazilian citizens increased from 33% (1930) to 61% (1970) of LA's. During the decade that followed, the pace of convergence accelerated (3.8% a.a. on average), and there was a sharp catch-up path where Brazil could reach, at the end of the period, 88% of relative GDP per capita.

 After World War II, Brazil experienced a real convergence path (Regime 1) towards the US. Limiting the relative GDP per capita to around 14% from 1930 to 1950, we can consider this subperiod null convergent. Although presenting a convergence path if considering the entire period (1930-1980), the standard of living of Brazilian citizens was far from those observed by US citizens at the end of the developmentalist phase (28%).

 With respect to Portugal, Brazil presented a smooth convergence path until the 1960s, when the former country started to experience high growth rates, even compared to other developed European countries, from 1961 to 1973 (Aguiar and Figueiredo, 1999). After 1970, the real convergence process regained power due to Brazilian economic performance, and in 1980 Brazil's GDP per capita was about 64% of Portugal's GDP per capita.

During the Crisis period (1980-1990), not only Brazil but other LA countries started to lose steam, facing a decade of transition and austerity (de Medeiros and Trebat, 2021). Apart from Chile and Colombia, all LA countries under analysis (including Brazil) presented negative growth rates during these years. Moreover, due to the similar economic path, one can observe real null convergence of Brazil towards the other six LA countries from 1980 to 1990.

 Widely known as the "lost decade", between 1980 and 1990, the Brazilian economy shrank (GDP per capita decreased by 0.5%, on average), and the falling behind process took place, especially with those developed countries, namely Portugal and the US. Indeed, the decrease of relative Brazil's GDP per capita from these economies was 64% to 45% and 28% to 21%, respectively.

 In the last and the most recent phase, neoliberalism (1990-2019), the Brazilian economic recovery seemed evident, especially between 2000 and 2015, when one can observe a catching-up process towards Portugal and the US. At the end of 2015, the standard of living in Brazil reached the highest level compared to the US, 30%, while compared to Portugal, the ratio was 64%. Some political events, economic crises, and institutional instabilities changed the positive economic trend in Brazil from 2015 on, which seem to be contributed to a clear divergence from all countries under analysis.

**Appendix B: Robustness check**

**Table B1. Variables description and source of data**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Description** | **Source of data** | **Mean** | **Std. dev.** | **Min** | **Max** |
| YBR | Real GDP per capita,in constant 2011 US$ | Maddison Project 2020;Maddison (2003); TED | 3502.87 | 4025.51 | 818.00 | 15306 |
| YLA6 | 5096.43 | 4187.93 | 1162.31 | 17199.37 |
| YPT | 6478.76 | 7850.92 | 1407.00 | 27754.14 |
| YUS | 16589.24 | 15163.87 | 2760.18 | 56344.07 |
| *Main variables* |  |  |  |  |  |
| HC | Average years of schooling (of the population aged 15-64) | Barro and Lee (2015)Barro and Lee (2015); Lee and Lee (2016) | 2.044 | 2.42 | 0.020 | 8.17 |
| IQ | Electoral Democracy Index (Dem) | V-Dem(Coppedge et al., 2022) | 0.320 | 0.240 | 0.065 | 0.878 |
| Polity Score (Pol) | Polity5 Project | -1.788 | 5.636 | -9 | 8 |
| Index of Democracy (ID) | Vanhanen (2019) | 5.269 | 10.362 | 0 | 37.750 |
| Contract-Intensive Money (Cim) | IBGE | 0.542 | 0.299 | 0.018 | 0.944 |
| *Control and other variables* |
| COR | Political Corruption Index | V-Dem(Coppedge et al., 2022) | 0.704 | 0.092 | 0.480 | 0.771 |
| PPR | Property Rights | 0.705 | 0.098 | 0.634 | 0.887 |
| RUL | Rule of Law Index | 0.395 | 0.160 | 0.238 | 0.797 |
| URB | Urbanization | V-Dem; World Bank | 0.387 | 0.232 | 0.180 | 0.868 |
| LIF | Life Expectancy | Clio Infra | 43.4 | 16.0 | 26.2 | 75.8 |
| INF | Inflation Rate | Clio Infra; V-Dem | 0.660 | 3.174 | -0.459 | 29.477 |
| POV | Extreme Poverty Rate | Clio Infra | 0.655 | 0.312 | 0.028 | 0.955 |

*Source*: Authors’ elaboration.

Table B2. Potential break dates reported by Bai-Perron (1998) test

|  |  |
| --- | --- |
| **Brazil** *vs* |  |
| **LA6** | 1884 | 1942 | 1971 |
| **Portugal** | 1856 | 1885 | 1987 |
| **US** | 1879 | 1931 | 1969 |

*Source:* Authors’ computation using STATA 17.1©.

Table B3. Likelihood-ratio (LR) linearity test

|  |  |
| --- | --- |
| **Variable** | **Chi2** |
| Model I: Brazil/LA6 | 15.92 (0.001) |
| Model II: Brazil/Portugal | 12.04 (0.007) |
| Model II: Brazil/US | 16.42 (0.001) |

**Note.** The LR test is computed on the basis of the null that there is no regime switching in the data, i.e. μ1 = μ2, β1 = β2, δ1 = δ2, γ1 = γ2, and the alternative that there are two regimes in the data.

*Source*: Authors’ computation using STATA 17.1®.

Table B4. Correlation matrix

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (a) | **Br\_La** | **HC** | **IQ****(Dem)** | **IQ****(Pol)** | **IQ** **(ID)** | **IQ****(Cim)** | **COR** | **RUL** | **PRR** | **URB** | **LIF** | **INF** | **POV** |
| **Br\_La** | 1.000 |  |  |  |  |  |  |  |  |  |  |  |  |
| **HC** | 0.188 | 1.000 |  |  |  |  |  |  |  |  |  |  |  |
| **IQ (Dem)** | 0.609 | 0.468 | 1.000 |  |  |  |  |  |  |  |  |  |  |
| **IQ (Pol)** | 0.219 | 0.544 | 0.741 | 1.000 |  |  |  |  |  |  |  |  |  |
| **IQ (ID)** | 0.420 | 0.659 | 0.845 | 0.776 | 1.000 |  |  |  |  |  |  |  |  |
| **IQ (Cim)** | -0.031 | 0.878 | 0.231 | 0.396 | 0.443 | 1.000 |  |  |  |  |  |  |  |
| **COR** | -0.636 | -0.758 | -0.724 | -0.562 | -0.826 | -0.517 | 1.000 |  |  |  |  |  |  |
| **RUL** | 0.611 | 0.497 | 0.940 | 0.754 | 0.898 | 0.282 | -0.814 | 1.000 |  |  |  |  |  |
| **PRR** | 0.631 | 0.847 | 0.679 | 0.553 | 0.778 | 0.613 | -0.929 | 0.726 | 1.000 |  |  |  |  |
| **URB** | 0.538 | 0.917 | 0.622 | 0.524 | 0.711 | 0.712 | -0.890 | 0.643 | 0.954 | 1.000 |  |  |  |
| **LIF** | 0.699 | 0.802 | 0.719 | 0.518 | 0.753 | 0.566 | -0.904 | 0.720 | 0.975 | 0.943 | 1.000 |  |  |
| **INF** | 0.273 | 0.490 | 0.325 | 0.315 | 0.282 | 0.464 | -0.332 | 0.304 | 0.476 | 0.506 | 0.482 | 1.000 |  |
| **POV** | -0.687 | -0.738 | -0.760 | -0.594 | -0.783 | -0.504 | 0.944 | -0.819 | -0.906 | -0.890 | -0.905 | -0.332 | 1.000 |
| (b) | **Br\_Pt** | **HC** | **IQ****(Dem)** | **IQ****(Pol)** | **IQ** **(ID)** | **IQ****(Cim)** | **COR** | **RUL** | **PRR** | **URB** | **LIF** | **INF** | **POV** |
| **Br\_Pt** | 1.000 |  |  |  |  |  |  |  |  |  |  |  |  |
| **HC** | 0.188 | 1.000 |  |  |  |  |  |  |  |  |  |  |  |
| **IQ (Dem)** | 0.609 | 0.468 | 1.000 |  |  |  |  |  |  |  |  |  |  |
| **IQ (Pol)** | 0.219 | 0.544 | 0.741 | 1.000 |  |  |  |  |  |  |  |  |  |
| **IQ (ID)** | 0.420 | 0.659 | 0.845 | 0.776 | 1.000 |  |  |  |  |  |  |  |  |
| **IQ (Cim)** | -0.031 | 0.878 | 0.231 | 0.396 | 0.443 | 1.000 |  |  |  |  |  |  |  |
| **COR** | -0.636 | -0.758 | -0.724 | -0.562 | -0.826 | -0.517 | 1.000 |  |  |  |  |  |  |
| **RUL** | 0.611 | 0.497 | 0.940 | 0.754 | 0.898 | 0.282 | -0.814 | 1.000 |  |  |  |  |  |
| **PRR** | 0.631 | 0.847 | 0.679 | 0.553 | 0.778 | 0.613 | -0.929 | 0.726 | 1.000 |  |  |  |  |
| **URB** | 0.538 | 0.917 | 0.622 | 0.524 | 0.711 | 0.712 | -0.890 | 0.643 | 0.954 | 1.000 |  |  |  |
| **LIF** | 0.699 | 0.802 | 0.719 | 0.518 | 0.753 | 0.566 | -0.904 | 0.720 | 0.975 | 0.943 | 1.000 |  |  |
| **INF** | 0.273 | 0.490 | 0.325 | 0.315 | 0.282 | 0.464 | -0.332 | 0.304 | 0.476 | 0.506 | 0.482 | 1.000 |  |
| **POV** | -0.687 | -0.738 | -0.760 | -0.594 | -0.783 | -0.504 | 0.944 | -0.819 | -0.906 | -0.890 | -0.905 | -0.332 | 1.000 |
| (c) | **Br\_Us** | **HC** | **IQ****(Dem)** | **IQ****(Pol)** | **IQ** **(ID)** | **IQ****(Cim)** | **COR** | **RUL** | **PRR** | **URB** | **LIF** | **INF** | **POV** |
| **Br\_Us** | 1.000 |  |  |  |  |  |  |  |  |  |  |  |  |
| **HC** | 0.188 | 1.000 |  |  |  |  |  |  |  |  |  |  |  |
| **IQ (Dem)** | 0.609 | 0.468 | 1.000 |  |  |  |  |  |  |  |  |  |  |
| **IQ (Pol)** | 0.219 | 0.544 | 0.741 | 1.000 |  |  |  |  |  |  |  |  |  |
| **IQ (ID)** | 0.420 | 0.659 | 0.845 | 0.776 | 1.000 |  |  |  |  |  |  |  |  |
| **IQ (Cim)** | -0.031 | 0.878 | 0.231 | 0.396 | 0.443 | 1.000 |  |  |  |  |  |  |  |
| **COR** | -0.636 | -0.758 | -0.724 | -0.562 | -0.826 | -0.517 | 1.000 |  |  |  |  |  |  |
| **RUL** | 0.611 | 0.497 | 0.940 | 0.754 | 0.898 | 0.282 | -0.814 | 1.000 |  |  |  |  |  |
| **PRR** | 0.631 | 0.847 | 0.679 | 0.553 | 0.778 | 0.613 | -0.929 | 0.726 | 1.000 |  |  |  |  |
| **URB** | 0.538 | 0.917 | 0.622 | 0.524 | 0.711 | 0.712 | -0.890 | 0.643 | 0.954 | 1.000 |  |  |  |
| **LIF** | 0.699 | 0.802 | 0.719 | 0.518 | 0.753 | 0.566 | -0.904 | 0.720 | 0.975 | 0.943 | 1.000 |  |  |
| **INF** | 0.273 | 0.490 | 0.325 | 0.315 | 0.282 | 0.464 | -0.332 | 0.304 | 0.476 | 0.506 | 0.482 | 1.000 |  |
| **POV** | -0.687 | -0.738 | -0.760 | -0.594 | -0.783 | -0.504 | 0.944 | -0.819 | -0.906 | -0.890 | -0.905 | -0.332 | 1.000 |

**Note:** (a), (b), and (c) reports the pairwise correlation using Brazil-LA6, Brazil-Portugal, and Brazil-US real convergence as dependent variable, respectively.

*Source*: Authors’ elaboration.

**Appendix C: Robustness check**

We investigate the robustness of our results through three different approaches. First, we re-estimate our models considering other measures and forms of institutional quality namely: (i) the Polity Score variable, from the Polity5 Project,[[1]](#footnote-1) captures the degree to which a country is considered more democratic or more autocratic according to the executive recruitment, the independence of executive authority, and political competition and opposition; (ii) the Index of democracy,[[2]](#footnote-2) developed by Vanhanen (2019), is the combination of the degree of competition and the degree of participation, and; (iii) the Contract-Intensive Money (CIM), introduced by Clague et al. (1999), a measure of the enforceability of contract and the security of property rights, which tries to capture the quality of economic institutions.[[3]](#footnote-3) Second, we reproduce our baseline analysis looking at the relative human capital and institutional quality series. Finally, we add some variables to evaluate which channels potentially drive the positive effect of institutional quality on Brazil’s real convergence.

 As can be checked in the outcomes presented in Table C1, the institutional quality is affected differently depending on the instrument used to define the main variable. The explanation can be found on the foundation of the respective proxies. Therefore, the positive effect of institutional quality on Brazil’s real convergence is only validated when the electoral democracy index is considered. Such results emphasize the relevance of defining the proxied used to represent the core variable under study and show how the same variable may play different roles depending on the definition it stands for.

As a second robustness check, Table C2 reproduces the results for the model with relative variables. This analysis allows us to infer how closing the gaps in human capital formation and institutional quality may contribute to diminishing the gap in real GDP terms. According to the results, it is possible to conclude that the absolute and relative evolution of the explanatory variables have the same impact, thus reinforcing our previous results.

Table C1. Estimated MSI-AR model considering other IQ measures

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Brazil/LA6** | **Brazil/Portugal** | **Brazil/US** |
| **[IQ] =** | ***Pol*** | ***ID*** | ***Cim*** | ***Pol*** | ***ID*** | ***Cim*** | ***Pol*** | ***ID*** | ***Cim*** |
| *Regime 1 (Real convergence/ catching up)* |
| \_cons1 | **-2.769\*\*\*** | **-1.956\*\*** | **-2.312\*\*\*** | 0.190 | -0.082 | **-0.096\*\*\*** | **-3.059\*\*\*** | **-3.351\*\*\*** | **-2.974\*\*\*** |
| IQ1 | -0.083 | **-2.007\*\*\*** | -0.092 | **-0.080\*\*\*** | -0.012 | 0.023 | 0.005 | -0.006 | **0.080\*\*\*** |
| HC1 | **-0.380\*\*\*** | 0.033 | -0.178 | -0.006 | 0.005 | -0.013 | **-0.346\*\*\*** | **-0.336\*\*\*** | **-0.396\*\*\*** |
| AR(1)1 | 0.129 | **-2.183** | -2.459 | **0.640\*\*\*** | **0.900\*\*\*** | 0.866 | **0.707\*\*\*** | **1.089\*\*\*** | **1.452\*\*\*** |
| AR(2)1 |  |  |  |  |  |  | 0.263 | **-0.264\*\*\*** | **-0.665\*\*\*** |
| *Regime 2 (Real divergence/ falling behind)* |
| \_cons2 | **-2.785\*\*\*** | **-2.559\*\*\*** | **-2.606\*\*\*** | 0.065 | -0.123 | -0.198 | **-3.063\*\*\*** | **-3.427\*\*\*** | **-3.070\*\*\*** |
| IQ2 | 0.009 | -0.001 | -0.006 | **0.032\*\*\*** | 0.020 | -0.040 | 0.012 | **0.083\*\*\*** | **0.021\*\*** |
| HC1 | **-0.344\*\*\*** | **-0.343\*\*\*** | **-0.329\*\*\*** | **-0.039\*\*\*** | 0.004 | 0.022 | **-0.343\*\*\*** | **-0.500\*\*\*** | **-0.368\*\*\*** |
| AR(1)2 | **0.866\*\*\*** | **0.847\*\*\*** | **0.848\*\*\*** | **0.652\*\*\*** | **0.962\*\*\*** | **0.883\*\*\*** | **1.095\*\*\*** | **0.641\*\*** | **1.245\*\*\*** |
| AR(2)2 |  |  |  |  |  |  | -0.308\*\*\* | 0.343 | **-0.285\*** |
| *inf* | 0.006 | 0.007 | 0.004 | -0.002 | -0.007 | -0.006 | -0.006 | -0.007 | -0.002 |
| *urb* | **0.692\*\*\*** | **0.685\*\*\*** | **0.755\*\*\*** | **0.092\*\*** | -0.026 | -0.013 | **0.641\*\*\*** | **0.606\*\*\*** | **0.681\*\*\*** |
| *pov* | **-0.078\*\*\*** | **-0.083\*\*** | **-0.074\*\*** | 0.012 | -0.005 | -0.003 | **-0.089\*\*\*** | **-0.082\*\*\*** | **-0.101\*\*\*** |
| *lif* | **0.753\*\*\*** | **0.763\*\*\*** | **0.721\*\*\*** | -0.045 | 0.005 | 0.009 | **0.518\*\*\*** | **0.594\*\*\*** | **0.529\*\*\*** |
| σ | 0.040 | 0.041 | 0.042 | 0.042 | 0.044 | 0.045 | 0.048 | 0.044 | 0.032 |
| P11 | 0.751 | 0.588 | 0.658 | 0.927 | 0.709 | 0.879 | 0.908 | 0.976 | 0.565 |
| P21 | 0.249 | 0.412 | 0.342 | 0.073 | 0.291 | 0.121 | 0.092 | 0.024 | 0.435 |
| P12 | 0.020 | 0.007 | 0.005 | 0.090 | 0.550 | 0.380 | 0.028 | 0.152 | 0.302 |
| P22 | 0.980 | 0.993 | 0.995 | 0.910 | 0.450 | 0.620 | 0.972 | 0.848 | 0.698 |
| AIC | -3.284 | -3.283 | -3.282 | -2.990 | -2.900 | -2.917 | -2.990 | -3.028 | -3.092 |
| LogLike | 338.516 | 338.353 | 338.224 | 309.498 | 300.646 | 302.283 | 310.059 | 313.751 | 320.030 |

**Note.**\*\*\* (\*\*)[\*] statistically significant at 1% (5%) [10%]; the number below the coefficient estimates are standard errors; 1 and 2 in subscripts indicate the Regimes of convergence and divergence, respectively; IQ: Electoral democracy index; *HC*: Average years of schooling; *inf*: Inflation rate; *urb*: Urbnazination; *pov*: Extreme poverty rate; and *lif*: Life expectancy.

Finally, we include in our models three potential mechanisms through which democracy may influence economic convergence (Table C3). In performing this analysis, it is expected that the institutional quality parameter effects became non-significant after including the transmission channels, i.e., the corruption index, the rule of law, and the property rights index. For the pair Brazil/LA6, property rights (under Regime 1) and corruption (under Regime 2) appear as the mechanisms through which democracy may influence real convergence in the respective regimes. For Brazil/Portugal, the estimated effect-modifying influence of property rights is also positive and significant under Regime 1. At last, the chosen mechanisms were not sufficient to explain the impact of democracy on the real convergence path of Brazil towards the US.

Table C2. Estimated MSI-AR models considering the relative series for human capital and institutional quality

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Model I (Brazil/LA6)** | **Model II (Brazil/PT)** | **Model III (Brazil/US)** |
| *Regime 1 (Real convergence/ catching up)* |
| \_cons1 | **-1.891\*\*\*** | 0.285 | **-2.074\*\*** |
| $$¯$$ | 0.010 | **0.028\*\*\*** | 0.023 |
| $$¯$$ | **-0.296\*\*\*** | **-0.021\*\*\*** | **-0.752\*\*\*** |
| AR(1)1 | **0.895\*\*\*** | **0.620\*\*\*** | **1.144\*\*\*** |
| AR(2)1 |  |  | **-0.290\*\*\*** |
| *Regime 2 (Real divergence/ falling behind)* |
| \_cons2 | **-1.982\*\*\*** | 0.257 | **-2.850\*\*\*** |
| $$¯$$ | 0.025 | -0.008 | **0.155\*\*\*** |
| $$¯$$ | **-0.249\*\*\*** | **-0.023\*\*\*** | **-0.351\*** |
| AR(1)2 | 0.244 | **0.736\*\*\*** | **0.886\*\*\*** |
| AR(2)2 |  |  | -0.126 |
| *inf* | 0.006 | -0.003 | -0.006 |
| *urb* | **0.707\*\*\*** | **0.128\*\*\*** | **0.280\*** |
| *pov* | **-0.070\*\*** | -0.017 | **-0.073\*\*** |
| *lif* | **0.556\*\*\*** | 0.082 | **0.582\*\*\*** |
| σ | 0.041 | 0.042 | 0.045 |
| P11 | 0.982 | 0.883 | 0.982 |
| P21 | 0.028 | 0.117 | 0.018 |
| P12 | 0.329 | 0.082 | 0.070 |
| P22 | 0.671 | 0.918 | 0.930 |
| AIC | -3.258 | -2.939 | -3.033 |
| LogLike | 335.921 | 304.445 | 314.212 |

**Note.**\*\*\* (\*\*)[\*] statistically significant at 1% (5%) [10%]; the number below the coefficient estimates are standard errors; 1 and 2 in subscripts indicate the Regimes of convergence and divergence, respectively; *IQ*: Electoral democracy index; *HC*: Average years of schooling; *inf*: Inflation rate; *urb*: Urbnazination; *pov*: Extreme poverty rate; and *lif*: Life expectancy; The relative variables $¯$ are calculated by ($var^{BR}-var^{i}$), where $var^{BR}$ stands for Brazil’s logarithm value, and $var^{i}$ is the other country’s; *i* (*i* = LA6; Portugal; the US).

Table C3. Estimated MSI-AR model considering transmission channels variables through which IQ impacts real convergence

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Brazil/LA6** | **Brazil/Portugal** | **Brazil/US** |
| *Regime 1 (Real convergence/ catching up)* |
| \_cons1 | **-2.592\*\*\*** | **-0.755** | **-1.934\*\*\*** | **0.920\*\*\*** | -0.174 | 0.038 | **-2.506\*\*\*** | -3.482\*\*\* | -3.122\*\*\* |
| *Dem1* | -0.018 | 0.169 | -0.017 | **0.037\*** | -0.005 | -0.017 | **0.140\*\*\*** | **0.147\*\*** | 0.044 |
| *Cor1* | 0.539 |  |  | **1.143\*\*\*** |  |  | 0.085 |  |  |
| *Rul1* |  | 0.374 |  |  | -0.0001 |  |  | -0.063 |  |
| *Prr1* |  |  | **1.247\*\*\*** |  |  | **1.247\*\*\*** |  |  | 0.329 |
| HC1 | **-0.225\*\*\*** | -0.312 | **-0.400\*\*\*** | **0.022\*** | -0.004 | -0.009 | -0.381 | -0.362 | -0.355 |
| AR(1)1 | 0.217 | -18.656 | 0.181 | **0.598\*\*\*** | **0.928\*\*\*** | **0.944\*\*\*** | **0.694\*\*\*** | **0.737\*\*\*** | **0.906\*\*\*** |
| AR(2)1 |  |  |  |  |  |  | **0.307\*** | **-0.467\*\*** | 0.002 |
| *Regime 2 (Real divergence/ falling behind)* |
| \_cons2 | **-2.636\*\*\*** | **-1.475\*** | **-2.179\*\*\*** | **0.426\*\*\*** | **-0.612\*** | **-0.191\*\*\*** | **-2.642\*\*\*** | **-3.605\*\*\*** | **-3.393\*\*\*** |
| *Dem2* | -0.006 | -0.011 | -0.006 | -0.037 | 0.050 | -0.023 | 0.042 | 0.026 | -0.033 |
| *Cor2* | **0.248\*** |  |  | 0.154 |  |  | 0.144 |  |  |
| *Rul2* |  | 0.075 |  |  | -0.455 |  |  | -0.026 |  |
| *Prr2* |  |  | 0.305 |  |  | -0.414 |  |  | -0.627 |
| HC1 | **-0.325\*\*\*** | -0.161 | **-0.349\*\*\*** | **-0.024\*\*\*** | 0.035 | 0.024 | **-0.299\*\*\*** | **-0.358\*\*\*** | **-0.297\*\*\*** |
| AR(1)2 | **0.866\*\*\*** | **0.965\*\*\*** | **0.860\*\*\*** | **0.694\*\*\*** | **0.687\*\*** | **0.866\*\*\*** | **1.318\*\*\*** | **1.067\*\*\*** | **1.566\*\*\*** |
| AR(2)2 |  |  |  |  |  |  | **-0.509\*\*\*** | -0.160 | **-0.769\*\*\*** |
| *inf* | 0.009 | 0.003 | 0.005 | 0.009 | -0.006 | -0.005 | -0.006 | -0.007 | -0.009 |
| *urb* | **0.701\*\*\*** | **0.504\*** | **0.725\*\*\*** | 0.062 | -0.010 | -0.002 | **0.594\*\*\*** | **0.609\*\*\*** | **0.572\*\*** |
| *pov* | **-0.097\*\*\*** | **-0.077\*** | **-0.085\*\*** | **-0.089\*\*\*** | -0.004 | -0.007 | **-0.083\*\*** | **-0.080\*\*** | **-0.079\*** |
| *lif* | **0.742\*\*\*** | **0.355\*** | **0.631\*\*\*** | **-0.164\*** | 0.029 | -0.011 | **0.433\*\*** | **0.661\*\*\*** | **0.560\*\*\*** |
| σ | 0.040 | 0.042 | 0.038 | 0.045 | 0.049 | 0.048 | 0.039 | 0.044 | 0.039 |
| P11 | 0.729 | 0.663 | 0.682 | 0.951 | 0.959 | 0.683 | 0.838 | 0.887 | 0.922 |
| P21 | 0.271 | 0.337 | 0.318 | 0.049 | 0.041 | 0.317 | 0.162 | 0.113 | 0.078 |
| P12 | 0.020 | 0.005 | 0.037 | 0.026 | 1.000 | 1.000 | 0.089 | 0.031 | 0.229 |
| P22 | 0.980 | 0.995 | 0.963 | 0.974 | 0.000 | 0.000 | 0.911 | 0.969 | 0.771 |
| AIC | -3.275 | -3.240 | -3.276 | -2.977 | -2.896 | -2.914 | -3.041 | -3.062 | -3.095 |
| LogLike | 339.609 | 335.159 | 339.716 | 310.267 | 302.226 | 303.030 | 317.001 | 319.087 | 322.270 |

**Note.**\*\*\* (\*\*)[\*] statistically significant at 1% (5%) [10%]; the number below the coefficient estimates are standard errors; 1 and 2 in subscripts indicate the Regimes of convergence and divergence, respectively; *Dem*: Electoral democracy index; *Pol*: Polity Score; *ID*: Index of democracy (Vanhanen); *Cim*: Contract Intensive Money; *HC*: Average years of schooling; *inf*: Inflation rate; *urb*: Urbnazination; *pov*: Extreme poverty rate; and *lif*: Life expectancy.

**References**

Bolt, J., & Luiten Van Zanden, J. (2020) ‘The Maddison Project: Maddison style estimates of the evolution of the world economy. A new 2020 update’. *Maddison Project Database, Version 2020*, 44. Retrieved from https://www.rug.nl/ggdc/historicaldevelopment/maddison/publications/wp15.pdf

Clague, C., Keefer, P., Knack, S., and Olson, M. (1999) ‘Contract-intensive money: Contract enforcement, property rights, and economic performance’. *Journal of Economic Growth*, *4*(2), 185–211.

Doré, N. I., and Teixeira, A. A. C. (2022) ‘Brazil’s economic growth and real (div)convergence from a very long-term perspective (1822-2019): An historical appraisal’. *Brazilian Journal of Political Economy*, *42*(4), 934–956.

Maddison, A. (2003) *The World Economy: Historical Statistics*.

Vanhanen, T. (2019) ‘Measures of democracy, 1810-1998’ [dataset] Version 8.0. *Finnish Science Data Archive [Distributo]*. Retrieved from http://urn.fi/urn:nbn:fi:fsd:T-FSD1289

1. In <http://www.systemicpeace.org/inscrdata.html>, last accessed in April 2023. [↑](#footnote-ref-1)
2. In https://services.fsd.tuni.fi, last accessed in January 2023. [↑](#footnote-ref-2)
3. Due to data availability, it was not able to include another type of institution, i.e., the social institution. [↑](#footnote-ref-3)