Fundamentals of Institutional Quality and Economic Freedom

SUPPLEMENTARY MATERIALS

The following are supplementary materials to “Fundamentals of Institutional Quality and Economic Freedom.”

A. Literature in Support of Variables Selected for Inclusion

 Following Murphy (2021), we include absolute latitude (Hansson 2009; Anderson et al. 2016; Faria et al. 2016), the natural log of country size (Easterly and Kraay 2000; Alesina 2003; Alesina and Spolaore 2005), whether the country is in Eurasia (Diamond 1997; Olsson and Hibbs 2005; Bologna Pavlik and Young 2019), whether the country is an island (see Fors [2004] for a literature review), and British legal origins (Mahoney 2001; La Porta et al. 2008; Bradford et al. 2021). Larger countries are seen as being more difficult to govern, while Eurasia is seen as possessing an East-West axis that facilitates the spread of technology, the geography of an island promotes social cohesion, and British legal origins promote institutional quality through multiple mechanisms. Table S1 contains descriptive statistics of all variables in question.

Three additional variables are added that are meant to broadly capture important potential determinants of institutional quality. The first of these is ethnic fractionalization (Alesina et al. 2003), as a lack of social cohesion appears to have harmful effects on institutions (e.g., Alesina et al. 2001), although its relationship with economic freedom is blurrier (Murphy 2021b) and fractionalization itself may be the effect of lagged poor institutions (Leeson 2005; Pardelli and Kustov 2022). This variable is the only one that can be described as a cultural characteristic (unless one counts legal origins), and it certainly should be considered a fundamental determinant of institutions, an argument which is “[o]ne of the most powerful hypotheses in political economy” (Banerjee et al. 2005: 639). Fractionalization data, which is now available in panel form, is sourced from Drazanova (2020). Where it was unavailable, Alesina et al. (2003) was consulted.

 The second of these is natural resource rents. Although scholarship concerning the (institutional) resource curse has focused on oil rents, the World Bank’s *World Development Indicators* now contains strong data coverage for rents from all natural resources, which constitutes a better operationalization of the resource curse hypothesis. Recent literature on the resource curse has tended primarily to muddy the picture for the resource curse (e.g., Orihuela 2018; Hartwell et al. 2019; Vasilyeva and Libman 2020) rather than giving any clear picture, while empirical studies using economic freedom as a dependent variable are mixed (March et al. 2016; O’Reilly and Murphy 2017).

 The last of these variables is whether the country is in the Americas (i.e, in the Western Hemisphere[[1]](#footnote-1)). The intention of this variable is to capture the difference in character of institutions in this region of the world, whether this difference is caused by Spanish Colonialism (c.f. Grier 1997; Feyrer and Sacerdote 2009; Dell 2010), the constant interventions by the United States since the Monroe Doctrine, or more recent interventions related to the War on Drugs (Joyce and Malamud 1998). These interventions are potentially harmful for where interventions take place (Coyne 2008) and in the United States itself (Balko 2013; Coyne and Hall 2018). One does not need to invoke Noam Chomsky to recognize this point.

TABLE S1. Descriptive Statistics
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 n Mean St. Dev. Min Max

Fractionalization 171 0.450 0.253 0.019 0.889

LnPopulation 172 16.184 1.678 11.517 21.068

Absolute 172 26.709 16.846 0 64
Latitude

Natural Resource 170 7.86 10.779 0 61.0
Rents (%GDP)

Americas 172 0.163 0.370 0 1

Eurasia 172 0.494 0.501 0 1

British Legal 172 0.145 0.353 0 1
Origins

Island 172 0.163 0.370 0 1
Geography

Fundamentals 169 5.275 1.671 1.435 9.445
Score

Low State Capacity 163 6.992 2.006 1.261 9.656
Size of Government

High State Capacity 165 6.608 1.589 1.910 9.795
Size of Government

Other Dimensions of 165 6.920 1.234 2.185 9.120
Economic Freedom

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B. Justification of the Use of a Single Index

We do not want to separately enter these in regressions because our research question is not about testing these individual hypotheses. We are rather trying to draw from the literature what characteristics, in general, are thought of as promoting institutional quality. What we want is a summary variable of these characteristics, not to fit each variable to maximize the in-sample explanatory power of a model (where some variables may even take the “wrong” sign). We show how this plays out below.

In Table S2, regressions are reported with each of the eight fundamental variables entering separately, instead of the single composite index. Latitude is the only variable that is robust with statistical significance across the three specifications. But as we saw, each of the results was robust to the removal of latitude. If we credulously interpret the regression using Hight State Capacity Size of Government as the dependent variable, only latitude and Eurasia are statistically significant. Does this mean that the results are only being driven by these two variables?

 Eurasia is statistically significant, but it is actually with the “wrong” sign. And if we remove *both* latitude and Eurasia from the Fundamentals score, it actually remains statistically significant by conventional standards (*t* = -3.11). And if we disaggregate again with only fractionalization, LN population, Americas, British legal origins, island geography, and natural resource rents separately entering the regression, fractionalization and Americas become statistically significant, this time with fractionalization with the “wrong” sign.

 This gets to the point that keeping these data disaggregated is a poor approach for the research question. If we are to simply use the fitted values from a regression with all of them on the right-hand side, then the weights will be arbitrary and signs will sometimes be flipped. That is not a good way of drawing on the literature of what causes institutional quality. An index that simply captures the variation across countries and aggregates in some sensible way does not impose a structure that is contrary to what is claimed in the literature in order to maximize fit.

 The intuition for why disaggregating fully and tossing all variables into a regression just makes a mess of things is actually consistent with the history of scholarship using *Economic Freedom of the World*. Earlier approaches to testing the effects of economic freedom while disaggregating, such as Heckelman and Stroup (2000), Carlsson and Lundstrom (2002), and Justesen (2008), were not particularly influential and at times even actively criticized (Sturm et al. 2002). We all like microfoundations, but sometimes disaggregating just makes a mess of things.

 One final point to note is that, if we wish to give any of these findings a theoretical interpretation, neither of the variables that are “closest” conceptually to culture, fractionalization and British legal origins, perform well at all. The closest “result” is that British legal origins are just outside the lowest standard of statistical significance for predicting Low State Capacity Size of Government. This lack of significance is not because of “overcontrolling” as, if anything, including fractionalization and legal origins into these regressions is to provide excessive control for the environmental variables, not the other way around. Culture does not impact institutional quality *through* the environment, at least in any theoretical mechanism typically raised in the literature. These findings push back against the view, which in this paper we consciously do not take a position on, that environmental variables impact institutions through culture, rather than having a direct effect on institutions.

Setting aside the question of having each individual variable enter individually, we do not want principal component analysis or factor analysis to find specific common factors across these variables; “British legal origins” and “small population size” are thought to be two separate things additively supporting institutional quality (directly or indirectly) – they are not even necessarily correlated positively with one another. We also are not conceptualizing them as each proxying a latent third variable which actually supports institutional quality. An index such as what was constructed here makes more sense because we want to create is a variable that is constitutive (or to be technical, “formative”) of what the literature says supports institutional quality, not reflective of something else in the data.[[2]](#footnote-2)

APPENDIX TABLE S2. Multivariate Results of Individual Fundaments and Dimensions of Economic Freedom
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 Low State Capacity High State Capacity Other Dimensions Size of Government Size of Government of Economic Freedom

Ethnic 1.158 -0.166 0.009
Fractionalization (0.717) (0.487) (0.357)

LN Population 0.074 0.050 -0.111\*\*\*
 (0.086) (0.065) (0.041)

Americas 0.748 0.276 0.319
 (0.516) (0.277) (0.279)

Eurasia -0.231 0.479\*\* 0.475\*\*
 (0.429) (0.239) (0.222)

British Legal 0.374 0.261 0.151
Origins (0.252) (0.274) (0.277)

Island 0.791\*\* -0.128 0.532\*\*
Geography (0.343) (0.335) (0.205)

Latitude 0.037\*\*\* -0.063\*\*\* 0.027\*\*\*
 (0.009) (0.008) (0.006)

Natural Resource -0.062\*\*\* -0.009 -0.030\*\*\*
Rents (0.017) (0.010) (0.006)

Constant 4.568\*\*\* 7.329\*\*\* 7.836\*\*\*
 (1.448) (1.139) (0.736)

$R^{2}$ 0.231 0.353 0.438

n 161 163 163
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\* denotes confidence at 10%. \*\* denotes confidence at 5%. \*\*\* denotes confidence at 1%. Standard errors are robust.

C. Listing of Fundamentals Score of All Countries

 Below, Table S3 alphabetically lists all countries and their overall fundamentals score.

TABLE S3. Fundamentals Score of All Countries

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Country Score Country Score

Albania 7.615 Central Afr. Rep. 3.171

Algeria 3.934 Chad 2.198

Angola 1.435 Chile 3.790

Argentina 5.207 China 5.987

Armenia 7.379 Colombia 2.597

Australia 5.906 Comoros 7.150

Austria 7.263 Congo, Dem. Rep. 3.017

Azerbaijan 5.255 Congo, Rep. 4.048

The Bahamas 6.923 Costa Rica 4.552

Bahrain 5.632 Cote d’Ivoire 3.196

Bangladesh 6.264 Croatia 7.656

Barbados 7.139 Cyprus 7.860

Belarus 7.222 Czechia 6.723

Belgium 6.426 Denmark 7.841

Belize 5.372 Djibouti 5.142

Benin 3.546 Dominican Rep. 4.881

Bhutan 6.668 Ecuador 3.115

Bolivia 3.504 Egypt 5.299

Bosnia-Herzegovina 6.458 El Salvador 5.214

Botswana 5.922 Estonia 7.584

Brazil 2.703 Ethiopia 2.591

Brunei 4.729 Fiji 6.593

Bulgaria 7.039 Finland 7.959

Cabo Verde 5.310 France 6.929

Cambodia 5.831 Gabon 2.956

Cameroon 2.792 The Gambia 4.398

Canada 4.564 Georgia 6.972

TABLE S3. Score of All Countries

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Country Score Country Score

Germany 6.784 Latvia 7.274

Ghana 2.557 Lebanon 7.198

Guatemala 3.951 Lesotho 6.084

Guinea 3.632 Liberia 2.898

Guinea-Bissau 3.884 Libya 6.261

Guyana 4.960 Lithuania 7.842

Haiti 5.877 Macedonia 6.830

Honduras 4.885 Madagascar 5.501

Hong Kong 7.298 Malawi 3.468

Hungary 7.222 Malaysia 3.777

Iceland 9.445 Mali 3.537

India 4.880 Malta 8.775

Indonesia 3.373 Mauritania 3.936

Iran 4.716 Mauritius 6.353

Iraq 5.622 Mexico 3.056

Ireland 8.858 Moldova 7.230

Israel 6.767 Mongolia 7.460

Italy 6.685 Morocco 4.872

Jamaica 6.588 Mozambique 3.326

Japan 6.809 Myanmar 4.560

Jordan 7.030 Namibia 4.697

Kazakhstan 4.594 Nepal 4.999

Kenya 2.811 Netherlands 6.890

Korea, South 6.622 New Zealand 7.004

Kuwait 3.528 Nicaragua 3.977

Kyrgyz Rep. 5.802 Niger 3.956

Laos 4.840 Nigeria 2.148

TABLE S3. Score of All Countries

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Country Score Country Score

Norway 7.293 Suriname 3.758

Oman 3.734 Swaziland 6.099

Pakistan 4.864 Sweden 7.463

Panama 3.855 Switzerland 6.941

Papua New Guinea 4.403 Syria 6.056

Paraguay 5.529 Tajikistan 6.005

Peru 2.600 Tanzania 3.102

Philippines 4.006 Thailand 4.819

Poland 7.286 Timor-Leste 5.552

Portugal 6.916 Togo 3.120

Qatar 3.810 Trinidad & Tobago 4.970

Romania 6.870 Tunisia 7.075

Russia 4.974 Turkey 5.385

Rwanda 4.539 Uganda 2.932

Saudi Arabia 4.243 United Arab Emirates 4.056

Senegal 3.688 United Kingdom 7.256

Serbia 6.783 United States 4.624

Seychelles 6.686 Uruguay 6.164

Sierra Leone 3.234 Venezuela 2.929

Singapore 6.343 Vietnam 5.120

Slovakia 7.466 Yemen 5.472

Slovenia 7.694 Zambia 4.034

Somalia 4.104 Zimbabwe 4.557

South Africa 3.514

Spain 5.270

Sri Lanka 5.133

Sudan 2.814

D. Extensions to Implications of Results

How serious should these measures of “fundamentals” be treated as fundamentals in the sense of predicting the long run value of the variable? For example, a placement high on the list of overperforming countries could be something of warning to them. Indeed, it doesn’t seem like a stretch to suggest that Chile and Hong Kong could be in the process of regressing to the mean as we write this. But to systematically address this question, we perform one final small regression. Using economic freedom data for 1975 (instead of 1970 to increase the sample size) and the measure of fundamentals, we predict the 2019 value of EFW. The results of this regression are found in Table S4. A one standard deviation increase in EFW in 1975 corresponds to 0.375 more 2019 economic freedom, while a one standard deviation increase in fundamentals corresponds to a 0.361 increase in 2019 EFW, giving a somewhat strong basis for interpreting the fundamentals score as what countries may regress towards over time: over the long run, fundamentals are just as important as the initial value of economic freedom.

 Suppose we were to take the regression coefficients from Table S4 and input the score of the United States in 2019 and its fundamentals score to create a “projection” for where the United States might be expected to be headed in the long run. The fitted value is 7.74, a decline in 0.51 relative to 2019. As a standard deviation in economic freedom is roughly one full point, that does not sound like a momentous change, but the period from 1975 to 2019 also saw a drastic global increase in economic freedom. Of the countries scored in both 1975 and 2019, the average economic freedom score in 1975 was 5.33 and the average economic freedom score in 2019 was 6.99. This global increase of 1.66 (which actually understates the global increase in economic freedom[[3]](#footnote-3)) is captured in the constant term of the regression. If we do not think that this global increase will happen again (and the rising tide will not raise the United States again), it likely makes sense to subtract 1.66 from the “projection” for the United States, which would now be 6.08 instead of 7.74. A country in 2019 that receives a score of 6.08 would be ranked 131st out of 165 countries, with neighboring countries being Liberia (6.16), Eswatini (6.14), Togo (6.07), and Bangladesh (6.04).

TABLE S4. Predicting 2019 EFW with Fundamentals Score and 1975 EFW
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 EFW1975 Fundamentals Constant $R^{2}$ *n*

 0.301\*\*\* 0.216\*\*\* 4.259\*\*\* 0.382 105
 (0.080) (0.059) (0.363)
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WORKS CITED

Alesina, Alberto. 2003. “The Size of Countries: Does It Matter?” *Journal of the European Economic Association* 1, no. 2-3: 301-316.

Alesina, Alberto, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat, and Romain Wacziarg. 2003. “Fractionalization.” *Journal of Economic Growth* 8, no. 2: 155-194.

Alesina, Alberto, Edward Glaeser, and Bruce Sacerdote. 2001. “Why Doesn’t the United States Have a European Style Welfare State?” *Brookings Papers on Economic Activity* 2: 187-254.

Alesina, Alberto and Enrico Spolaore. 2005. *The Size of Nations*. Cambridge: MIT Press.

Anderson, John E. 2017. “Trust in Government and Willingness to Pay Taxes in Transition Countries.” *Comparative Economic Studies* 59: 1-22.

Balko, Radley. 2013. *The Rise of the Warrior Cop: The Militarization of America’s Police Forces*. New York: PublicAffairs.

Banerjee, Abhijit, Lakshmi Iyer and Rohini Somanathan. 2005. “History, Social Divisions, and Public Goods in Rural India.” *Journal of the European Economic Association* 3, no. 2-3: 639-647.

Bologna Pavlik, Jamie and Andrew Young. 2019. “Did Technology Transfer More Rapidly East-West than North-South?” *European Economic Review* 119 (October): 216-235.

Bradford, Anu, Yun-chien Chang, Adam Cilton, and Nuno Garoupa. 2021. “Do Legal Origins Predict Legal Substance?” *Journal of Law & Economics* 64, no. 2: 207-231.

Carlsson, Fredrik and Susanna Lundstrom. 2002. “Economic Freedom and Growth: Decomposing the Effects.” *Public Choice* 112: 335-344.

Coyne, Christopher. 2008. *After War: The Political Economy of Exporting Democracy*. Stanford: Stanford University Press.

Coyne, Christopher and Abigail Hall. 2018. *Tyranny Comes Home: The Domestic Fate of U.S. Militarism*. Stanford: Stanford University Press.

Dell, Melissa. 2010. “The Persistent Effects of Peru’s Mining *Mita*.” *Econometrica* 78. No. 6: 1863-1903.

Diamond, Jared. 1997. *Guns, Germs, and Steel: The Fates of Human Societies*. New York: Norton.

Drazanova, Lenka. 2020. “Introducing the Historical Index of Ethnic Fractionalization (HIEF) Dataset: Accounting for Longitudinal Changes in Ethnic Diversity.” *Journal of Open Humanities Data* 6, no. 1.

Easterly, William and Aart Kraay. 2000. “Small States, Small Problems? Income, Growth, and Volatility in Small States.” *World Development* 28, no. 11: 2013-2027.

Faria, Hugo J., Hugo M. Montesinos-Yufa, Daniel R. Morales, and Carlos E. Navarro. 2016. “Unbundling the Roles of Human Capital and Institutions in Economic Development.” *European Journal of Political Economy* 45 (Supplement): 108-128.

Feyer, James and Bruce Sacerdote. 2009. “Colonialism and Modern Income: Islands as Natural Experiments.” *Review of Economics and Statistics* 91, no. 2: 245-262.

Fors, Heather Congdon. 2014. “Do Island States Have Better Institutions?” *Journal of Comparative Economics* 42, no. 1: 34-60.

Grier, Robin. 1997. “The Effects of Religion on Economic Development: A Cross National Study of 63 Former Colonies.” *Kyklos* 50, no. 1: 47-62.

Hansson, Gustav. 2009. “What Determines Rule of Law? An Empirical Investigation of Rival Models.” *Kyklos* 62, no. 3: 371-393.

Hartwell, Christopher A., Roman Horvath, Eva Horvathova, and Olga Popova. 2019. “Democratic Institutions, Natural Resources, and Income Inequality.” *Comparative Economic Studies* 61: 531-550.

Heckelman, Jac and Michael D. Stroup. 2000. “Which Economic Freedoms Contribute to Growth?” *Kyklos* 53, no. 4: 527-544.

Joyce, Elizabeth and Carlos Malamud, eds. 1998. *Latin American and the Multinational Drug Trade*. New York: St. Martin’s Press.

Justesen, Morgens. 2008. “The Effect of Economic Freedom on Growth Revisited: New Evidence on Causality from a Panel of Countries, 1970-1999.” *European Journal of Political Economy* 24, no. 3: 642-660.

La Porta, Rafael, Florencio Lopez-De-Silanes, and Andrei Shleifer. 2008. “The Economic Consequences of Legal Origins.” *Journal of Economic Literature* 46, no. 2: 285-332.

Leeson, Peter. 2005. “Endogenizing Fractionalization.” *Journal of Institutional Economics* 1, no. 1: 75-98.

Mahoney, Paul G. 2001. “The Common Law and Economic Growth: Hayek Might Be Right.” *Journal of Legal Studies* 30, no. 2: 503-525.

March, Raymond, Conrad Lyford, and Benjamin Powell. 2017. “Causes and Barriers to Increases in Economic Freedom.” *International Review of Economics* 64: 87-103.

Murphy, Ryan H. “Economic Freedom, 1950-2020.” In *Handbook of Research on Economic Freedom*, Niclas Berggren, ed. Edward Elgar. Forthcoming.

---. 2021. “Plausibly Exogenous Causes of Economic Freedom.” *Journal of Bioeconomics* 23: 85-105.

---. 2021b. “The Soft Stuff of Institutional Development.” *Journal of Private Enterprise* 36, no. 2: 37-66.

---. 2022b. “On Whether the Size of Government Belongs in Economic Freedom Indices.” *Econ Journal Watch* 19, no. 1: 47-57.

Olsson, Ola and Douglas A. Hibbs, Jr. 2005. “Biogeography and Long-Run Economic Development.” *European Economic Review* 49, no. 4: 909-938.

O’Reilly, Colin and Ryan H. Murphy. 2017. “Exogenous Resource Shocks and Economic Freedom.” *Comparative Economic Studies* 59, no. 3: 243-260.

Orihuela, Jose Carlos. 2018. “Institutions and Place: Bringing Context Back into the Study of the Resource Curse.” *Journal of Institutional Economics* 14, no. 1: 157-180.

Pardelli, Giuliana and Alexander Kustov. 2022. “When Coethnicity Fails.” *World Politics* 74, no. 2: 249-284.

Sturm, Jan-Egbert, Erik Leertouwer, and Jakob de Haan. 2002. “Which Economic Freedoms Contribute to Growth? A Comment.” *Kyklos* 55, no. 3: 403-416.

Vasilyeva, Olga and Alexander Libman. 2020. “Varieties of Authoritarianism Matter: Elite Fragmentation, Natural Resources, and Economic Growth.” *European Journal of Political Economy* 63 (June): 101869.

1. We are not including any edge cases, such as “France is in the Western Hemisphere” because of the existence of French Guiana. [↑](#footnote-ref-1)
2. C.f. Murphy (2022b). [↑](#footnote-ref-2)
3. Countries that started at a high level of economic freedom were more likely to be scored in earlier years because they were more likely to have functional institutions in general (and throughout much of this period, less likely to be communist). When this bias is accounted for through chain-linking countries as they enter the index, the trend for increasing economic freedom is clearer. See Murphy (forthcoming). [↑](#footnote-ref-3)