

Appendices

A. Data

Our data come from multiple sources, which we describe below. The variables themselves are described in Table A1. Table A4 provides a list of the 130 countries in our base sample along with indicators of the availability of the innovation data for these countries. Note that these data sources are of different vintages and the country names and codes they use vary slightly. For example, they are affected by the creation of South Sudan, the renaming of Eswatini from Swaziland, the breakup of Czechoslovakia, and so forth. We have standardized the names and codes across them and done our best to ensure that each country does not change its geographic dimension during our time period of 1996 to 2014, leading to unbalanced data in some cases.

1. The Polity IV Project (**Polity IV**), Center for Systemic Peace, Marshall et al. (2019)

This data source contains a number of variables on regime characteristics and political systems. It is a yearly unbalanced panel for 1800-2018 with 22 countries in 1800 increasing to 167 in 2018. We use data from 1996 to 2014 for which there are 146 countries with good data for at least some years.

2. International Country Risk Guide (**ICRG**), PRS Group, Howell (2020)

The source of the corruption index, which is based on a number of political risk factors. This is a balanced panel of 146 countries for 1984-2017.

3. Global State of Democracy (**GSoD**), International IDEA, Tufis (2018)

This source contains a number of political regime variables, variables describing barriers to participation and media freedom. It is an unbalanced panel of 157 countries and 30 broader regions for 1975-2017. We use only the country data and the years 1996-2014, for a total of 157 countries. A very few variable values are missing in some countries and some years.

4. **IMF DATA**

IMF data is our source of export diversity for the years 1996-2014. On their website, the export diversification measure is available for 200 countries from 1962 to 2014.

<http://data.imf.org>

5. Atlas of Economic Complexity (**ECI**), Harvard Growth Laboratory.

From here we obtain the ECI, although our version of these data is somewhat older, containing more years (1962 to 2020) for 248 countries. <https://atlas.cid.harvard.edu/>

6. **UNESCO** (United Nations Educational, Scientific and Cultural Organization): World

Development Indicators (**WDI**)

From here we obtain R&D and scientific publication variables from many countries, including developing (this data source is broader than OECD coverage, but much the same as the OECD for developed countries). We also get the high tech export share from these data.

7. **WIPO** (World Intellectual Property Organization)

This is our source for patent application statistics, by residents and non-residents over time. We use only the resident (domestic) applications.

Data sources 1-5 define our basic sample of 130 countries. For the base sample, we require good data on all the variables for at least 4 years per country. Most countries have the full 19 years, as can be seen in Table A4. Because the innovation outcome variables are more often missing, we use different samples for those regressions rather than lose too many observations.

Table A1
Sources of variables

<i>Source</i>	<i>Variable</i>	<i>description</i>	<i>Countries</i>	<i>Years</i>
UNESCO Inst. for statistics	rd_gdp	GERD as a percentage of GDP	149	1996-2018
	rd_ppp05	GERD in \$1000 (PPP, in constant 2005 prices)	140	1996-2018
	rd_ppp_cur	GERD in \$1000 (PPP, current prices)	141	1996-2018
	rd_gdp	GERD as a percentage of GDP	149	1996-2018
	rd_gov_ppp05	GERD financed by govt. (in \$1000 PPP, in constant 2005 prices)	111	2012-2018
	rd_fte_ppp05	GERD per researcher, FTE (in \$1000 PPP, constant 2005 prices)	122	1996-2018
	rd_fte_ppp_cur	GERD per researcher, FTE (in \$1000 current PPP\$)	122	1996-2018
	rd_hc_ppp05	GERD per researcher, HC (in \$1000 PPP, constant 2005 prices)	134	1996-2018
	rd_hd_ppp_cur	GERD per researcher, HC (in \$1000 current PPP\$)	135	1996-2018
WDI	ex_hitech_share	Share of high-tech products in exports	129	1996-2018
WIPO IP	pat_noresid	Non-resident patent apps to country's office in year	171	1990-2020
Statistics Data	pat_resid	Resident patent apps to country's office in year	171	1990-2020
Center	pat_tot	Total patent apps to country's office in year	171	1990-2020
International Country Risk Guide (ICRG)	corruption	index of demands for bribes, exchange controls, or tax assessments for those in intl. trade; patronage and nepotism; ties between politics and business	146	1996-2014
The Polity IV Project, Center for Systemic Peace	autoc	Institutionalized autocracy	167	1996-2018
	comp_exec	Competitiveness of chief executive recruitment	167	1996-2018
	democ	Institutionalized democracy	167	1996-2018
	open_exec	Openness of chief executive recruitment	167	1996-2018
	parcomp	Competitiveness of participation in govt	167	1996-2018
	parreg	Regulation of participation in govt.	167	1996-2018
	reg_exec	Regulation of chief executive recruitment	167	1996-2018
Global State of Democracy	access_justice	Access to justice	157	1996-2014
	barriers_parties	Barriers to political parties	157	1996-2014
	clean_election	Freedom of elections from irregularities	157	1996-2014
	check_govern	Checks on government	157	1996-2014
	civil_Liberties	Civil liberties	157	1996-2014
	civil_part	Civil society participation	157	1996-2014
	comp_exec_g	Competitiveness of chief exec recruitment	157	1996-2014
	comp_part	Competitiveness of alternative policy participation	157	1996-2014
	court_indep	High court independence	157	1996-2014
	critical_print	Critical print and broadcast media	157	1996-2014
	harass_journ	Harassment of journalists	157	1996-2014
Atlas of Economic Complexity	eci	Economic complexity index	248	1962-2020
IMF	diversity	Index of export diversity	199	1996-2014

Abbreviations

GERD - Gross Domestic Expenditure on R&D

HC - headcount

Table A2
Correlation matrix for corruption and risk variables

Variables	corruptio n	autoc	comp_ex ec_p	democ	open_exe c	parcomp	parreg	reg_exec	access_ju stice	barriers_ parties	clean_ele ction
corruption	1.000										
autoc	0.191	1.000									
comp_exec_p	0.219	0.772	1.000								
democ	0.250	0.865	0.914	1.000							
open_exec	0.107	0.502	0.735	0.568	1.000						
parcomp	0.213	0.825	0.718	0.849	0.472	1.000					
parreg	0.131	-0.154	0.046	0.164	-0.058	0.202	1.000				
reg_exec	0.227	0.429	0.773	0.687	0.337	0.510	0.187	1.000			
access_justice	0.281	0.534	0.561	0.695	0.315	0.686	0.456	0.506	1.000		
barriers_parties	0.187	0.810	0.710	0.823	0.439	0.782	0.105	0.480	0.662	1.000	
clean_election	0.241	0.768	0.766	0.852	0.450	0.758	0.181	0.607	0.773	0.776	1.000
check_govern	0.262	0.767	0.716	0.850	0.416	0.811	0.250	0.558	0.859	0.805	0.884
civil_liberties	0.248	0.823	0.734	0.861	0.453	0.844	0.179	0.538	0.833	0.861	0.875
civil_participation	0.262	0.761	0.658	0.762	0.384	0.752	0.143	0.496	0.764	0.777	0.805
comp_exec_g	0.231	0.833	0.969	0.942	0.585	0.747	0.061	0.761	0.579	0.762	0.797
comp_participation	0.246	0.751	0.711	0.859	0.430	0.821	0.308	0.575	0.703	0.775	0.772
court_indep	0.216	0.645	0.647	0.756	0.366	0.714	0.239	0.513	0.769	0.690	0.764
critical_media	0.221	0.798	0.679	0.803	0.405	0.794	0.097	0.491	0.694	0.807	0.814
harass_journ	0.277	0.713	0.663	0.802	0.404	0.768	0.296	0.495	0.839	0.768	0.828

	check_go vern	civil_liber ties	civil_parti cipation	comp_ex ec_g	comp_pa rticipatio n	court_ind ep	critical_m edia	harass_jo urn
check_govern	1.000							
civil_liberties	0.925	1.000						
civil_participation	0.884	0.893	1.000					
comp_exec_g	0.754	0.779	0.704	1.000				
comp_participation	0.785	0.817	0.732	0.747	1.000			
court_indep	0.885	0.784	0.722	0.672	0.658	1.000		
critical_media	0.898	0.892	0.861	0.726	0.746	0.759	1.000	
harass_journ	0.896	0.921	0.854	0.702	0.784	0.742	0.830	1.000

Table A3
Correlation of Corruption variables and R&D/innovation variables

	<i>corruptio</i>		<i>comp_ex</i>		<i>open_exe</i>				<i>access_ju</i>	<i>barriers_</i>	<i>clean_ele</i>
	<i>n</i>	<i>autoc</i>	<i>ec_p</i>	<i>democ</i>	<i>c</i>	<i>parcomp</i>	<i>parreg</i>	<i>reg_exec</i>	<i>stice</i>	<i>parties</i>	<i>ction</i>
Log R&D	-0.215	0.116	-0.060	-0.123	-0.077	-0.135	-0.312	-0.127	-0.382	-0.218	-0.108
Log GDP	-0.169	0.056	-0.102	-0.153	-0.094	-0.128	-0.248	-0.176	-0.289	-0.248	-0.123
Log R&D/GDP	-0.305	-0.020	-0.187	-0.297	-0.104	-0.367	-0.556	-0.210	-0.708	-0.315	-0.317
Log resid. patents	-0.168	0.151	-0.012	-0.049	-0.101	-0.038	-0.183	-0.061	-0.256	-0.124	-0.019
Log res. pats per R&D	-0.048	0.127	0.046	0.053	-0.085	0.084	0.034	0.037	-0.012	0.030	0.086
Log sci tech articles	-0.219	0.132	-0.055	-0.143	-0.078	-0.158	-0.372	-0.140	-0.399	-0.200	-0.119
Log aritcles per R&D	-0.043	0.080	0.012	-0.094	-0.012	-0.112	-0.279	-0.067	-0.113	0.048	-0.057
Log researchers/pop	-0.266	-0.037	-0.220	-0.356	-0.161	-0.419	-0.650	-0.230	-0.749	-0.326	-0.385
Log hitech export share	-0.167	0.065	-0.114	-0.123	-0.164	-0.079	-0.213	-0.067	-0.334	-0.066	-0.084
Diversity/complexity	-0.214	-0.011	-0.151	-0.279	-0.122	-0.258	-0.407	-0.211	-0.393	-0.323	-0.177
					<i>comp_pa</i>						
	<i>check_go</i>	<i>civil_liber</i>	<i>civil_parti</i>	<i>comp_ex</i>	<i>rticipatio</i>	<i>court_ind</i>	<i>critical_m</i>	<i>harass_jo</i>			
	<i>vern</i>	<i>ties</i>	<i>cipation</i>	<i>ec_g</i>	<i>n</i>	<i>ep</i>	<i>edia</i>	<i>urn</i>			
Log R&D	-0.265	-0.197	-0.310	-0.050	-0.135	-0.207	-0.119	-0.357			
Log GDP	-0.238	-0.192	-0.276	-0.092	-0.128	-0.207	-0.147	-0.303			
Log R&D/GDP	-0.510	-0.433	-0.492	-0.182	-0.367	-0.380	-0.246	-0.616			
Log resid. patents	-0.191	-0.096	-0.200	0.005	-0.038	-0.125	-0.059	-0.242			
Log res. pats per R&D	-0.032	0.055	0.002	0.064	0.084	0.017	0.033	-0.016			
Log sci tech articles	-0.291	-0.204	-0.279	-0.045	-0.158	-0.268	-0.127	-0.385			
Log aritcles per R&D	-0.136	-0.049	0.091	0.015	-0.112	-0.270	-0.044	-0.156			
Log researchers/pop	-0.561	-0.481	-0.450	-0.207	-0.419	-0.434	-0.266	-0.656			
Log hitech export share	-0.210	-0.145	-0.238	-0.092	-0.079	-0.173	-0.005	-0.276			
Diversity/complexity	-0.288	-0.291	-0.286	-0.139	-0.258	-0.342	-0.239	-0.443			

Table A4
Countries used in estimation

<i>Country</i>	<i>Base sample</i>	<i>Number of years with R&D</i>		
		<i>R&D data</i>	<i>employee data</i>	<i>Export data</i>
Albania	19	2	0	19
Algeria	19	5	0	19
Angola*	19	0	0	0
Argentina	19	19	18	19
Armenia	19	18	0	17
Australia	19	18	15	19
Austria	19	19	14	19
Azerbaijan	19	19	0	19
Bangladesh	19	0	0	15
Belarus	19	19	0	17
Belgium	19	19	19	16
Bolivia	19	8	7	19
Botswana	19	3	2	15
Brazil	19	15	15	19
Bulgaria	19	19	19	19
Burkina Faso	19	12	0	18
Cameroon	19	0	0	17
Canada	19	19	19	19
Chile	19	8	8	19
China	19	19	19	19
Colombia	19	19	2	19
Congo	19	0	5	8
Congo, Dem. Rep.	9	4	0	0
Costa Rica	19	19	12	19
Croatia	19	16	17	19
Cuba	19	19	0	0
Cyprus	19	17	17	19
Czechia	19	19	19	19
Côte d'Ivoire	9	0	0	9
Denmark	19	19	19	19
Dominican Republic	19	0	0	16
Ecuador	19	19	19	19
Egypt	18	15	7	18
El Salvador	19	9	0	19
Eritrea*	19	0	0	0
Estonia	19	17	17	19
Finland	19	19	11	19
France	19	19	19	19
Gabon	19	3	0	14
Gambia	19	4	4	17
Germany	19	19	19	19
Ghana	19	4	4	17
Greece	19	18	15	19

Table A4 (cont.)				
Guatemala	19	10	10	19
Guinea	19	0	0	14
Guinea-Bissau*	19	0	0	0
Haiti	11	0	0	2
Honduras	19	5	0	17
Hungary	19	19	19	19
India	19	19	7	19
Indonesia	19	4	3	19
Iran	19	13	9	12
Iraq	12	5	5	0
Ireland	19	19	19	19
Israel	19	19	0	19
Italy	19	19	19	19
Jamaica	19	2	0	15
Japan	19	19	19	19
Jordan	19	2	0	18
Kazakhstan	19	18	8	19
Kenya	19	4	4	16
Korea, Dem. Rep.*	19	0	0	0
Korea, Republic of	19	19	19	19
Kuwait	19	18	18	0
Latvia	19	19	19	19
Lebanon*	10	0	0	0
Liberia*	15	0	0	0
Libya*	15	0	0	0
Lithuania	19	19	19	19
Madagascar	19	18	14	19
Malawi	19	0	4	19
Malaysia	19	19	19	19
Mali	19	4	2	16
Mexico	19	19	19	19
Moldova	19	14	12	19
Mongolia	19	18	0	0
Morocco	19	10	9	19
Mozambique	19	6	5	18
Myanmar	19	6	6	0
Namibia	19	2	0	0
Netherlands	19	19	19	19
New Zealand	19	17	18	19
Nicaragua	19	6	0	19
Niger	19	0	6	19
Nigeria	19	0	0	17
Norway	19	18	18	19
Oman	19	4	4	0
Pakistan	19	17	11	19
Panama	19	19	18	19
Papua New Guinea*	19	0	0	0
Paraguay	19	14	14	19

Table A4 (cont.)				
Peru	19	12	0	19
Philippines	19	12	13	19
Poland	19	19	19	19
Portugal	19	19	19	19
Qatar	19	0	3	0
Romania	19	19	19	19
Russian Federation	19	19	19	19
Saudi Arabia	19	11	0	0
Senegal	19	3	5	19
Serbia	9	9	8	9
Sierra Leone	14	0	0	2
Singapore	19	19	19	19
Slovakia	19	19	19	19
Slovenia	19	19	19	19
South Africa	19	15	15	19
Spain	19	19	19	19
Sri Lanka	19	13	13	16
Sudan	19	7	0	0
Sweden	19	18	18	19
Switzerland	19	5	7	19
Syrian Arab Republic	19	0	0	8
Taiwan*	19	0	0	0
Tanzania	19	7	4	18
Thailand	19	19	19	19
Togo	19	5	12	18
Trinidad and Tobago	19	19	0	15
Tunisia	16	10	5	16
Türkiye	19	19	19	19
Uganda	19	10	2	19
Ukraine	19	18	9	19
United Arab Emirates	19	4	0	0
United Kingdom	19	19	19	19
United States	19	19	19	19
Uruguay	19	16	11	19
Venezuela	19	10	17	17
Viet Nam	19	4	3	0
Yemen*	19	0	0	0
Zambia	19	9	5	19
Zimbabwe	19	0	0	17
Total	2399	1446	1134	1882

* Country has no innovation data other than ECI.

B. Additional regression tables

Table B1
Country OLS and FE estimates

<i>Dependent variable:</i>	<i>Log R&D spending</i>	<i>Log R&D/GDP</i>	<i>Log resident pat apps</i>	<i>Log resident pat apps per R&D</i>	<i>Log Sci & Tech articles</i>	<i>Log articles per R&D</i>	<i>Log R&D Research-ers</i>	<i>Log R&D Research-ers per pop.</i>	<i>Log Hi tech export share</i>	<i>Economic complexity index</i>
<i>Pooled OLS</i>										
Corruption	-0.417*** (0.121)	-0.180*** (0.055)	-0.421*** (0.144)	-0.004 (0.063)	-0.258** (0.124)	0.044 (0.048)	-0.190 (0.119)	-0.196** (0.091)	-0.223*** (0.078)	-0.170*** (0.041)
Standard error	2.598	1.140	3.208	1.863	2.308	0.855	2.122	1.571	2.122	1.017
R-squared	0.047	0.043	0.033	0.007	0.032	0.027	0.019	0.033	0.022	0.045
<i>OLS with Country effects</i>										
Corruption	-0.028** (0.013)	-0.001 (0.013)	-0.024 (0.037)	0.004 (0.036)	-0.021** (0.011)	0.013 (0.016)	0.001 (0.013)	0.002 (0.012)	-0.014 (0.031)	0.009 (0.012)
Standard error	0.314	0.303	0.879	0.893	0.214	0.324	0.260	0.246	0.789	0.258
R-squared	0.004	0.000	0.001	0.006	0.013	0.023	0.001	0.002	0.006	0.011
Observations	1446	1446	1446	1446	1199	1199	1134	1134	1882	2391
N of countries	106	106	106	106	106	106	88	88	107	130

Year fixed effects included in all regressions.

Standard errors are robust, clustered on country.

*** p<0.01, ** p<0.05, * p<0.1

Table B2
First stage estimates

<i>Variable</i>	<i>Without year effects</i>			<i>With year effects</i>			<i>Selected variables only</i>		
	<i>Coeff.</i>	<i>s.e.</i>	<i>p-value</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>p-value</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>p-value</i>
Autocracy	0.108	0.171	0.528	0.138	0.217	0.528			
Chief exec comp. (Polity)	-0.576	0.447	0.201	-1.816	1.416	0.202			
Democracy	0.147	0.172	0.394	0.080	0.259	0.757			
Chief exec openness	0.145	0.135	0.284	0.494	0.430	0.253			
Gov participation competitive	-0.025	0.085	0.772	0.013	0.137	0.926			
Gov participation regulated	0.006	0.059	0.913	-0.125	0.123	0.312			
Chief exec choice regulated	0.184	0.098	0.063	0.099	0.106	0.352	0.131	0.069	0.023
Access to justice	1.106	0.523	0.037	1.706	1.351	0.209	0.963	1.134	0.397
Barriers to parties	-0.366	0.301	0.227	-0.337	0.445	0.450			
Clean elections	-0.175	0.353	0.621	-0.159	0.372	0.671			
Checks on Gov	0.010	0.864	0.991	-2.132	1.149	0.066			
Civil liberties	-1.441	0.747	0.056	0.302	1.621	0.853			
Civil society participation	0.723	0.494	0.146	1.868	0.839	0.028	1.424	0.621	0.023
Chief exec comp. (GsoD)	0.819	0.852	0.338	3.476	2.775	0.213			
Alt policy competitiveness	0.015	0.291	0.960	-0.378	0.518	0.467			
High court independence	-0.129	0.263	0.624	-0.063	0.432	0.885			
Critical media	0.006	0.480	0.991	0.078	0.723	0.914			
Harassment of journalists	0.972	0.580	0.096	0.271	0.790	0.732	-0.032	0.683	0.963
Country effects		no			yes			yes	
Year effects		yes			yes			yes	
R-squared		0.119			0.053			0.098	
Standard error		0.888			0.776			0.780	

2,399 observations

Table B3
Country IV and IVFE estimates

	<i>Log R&D spending</i>	<i>Log R&D/GDP</i>	<i>Log resident pat apps</i>	<i>Log resident pat apps per R&D</i>	<i>Log Sci & Tech articles</i>	<i>Log articles per R&D</i>	<i>Log R&D Research-ers</i>	<i>Log R&D Research-ers per pop.</i>	<i>Log Hi tech export share</i>	<i>Economic complexity index</i>
<i>Pooled IV regression</i>										
Corruption	-4.362*** (0.824)	-2.119*** (0.340)	-4.091*** (0.890)	0.149 (0.189)	-4.091*** (0.901)	0.728*** (0.226)	-1.881*** (0.624)	-2.405*** (0.551)	-2.818*** (0.613)	-1.993*** (0.300)
Standard error	4.436	2.113	4.620	1.858	4.046	1.039	2.618	2.582	3.178	1.933
LM test for weak inst.	19.80	19.80	19.80	19.80	15.08	15.08	17.26	17.26	27.16	30.93
D. F. for weak inst test	18	18	18	18	18	18	18	18	18	18
p-value for LM test	0.344	0.344	0.344	0.344	0.656	0.656	0.505	0.505	0.076	0.029
Hansen (J) for overid.	13.45	14.98	21.30	20.92	11.97	24.14	14.69	24.39	12.11	16.41
D. F. for J test	17	17	17	17	17	17	17	17	17	17
p-value for J test	0.706	0.597	0.213	0.230	0.802	0.116	0.618	0.109	0.794	0.495
<i>IV with country effects</i>										
Corruption	-0.346 (0.235)	-0.225 (0.228)	-0.111 (0.267)	0.235 (0.400)	-0.271 (0.224)	0.261 (0.302)	-0.062 (0.170)	-0.059 (0.149)	0.020 (0.257)	0.052 (0.108)
Standard error	0.401	0.357	0.908	0.938	0.277	0.376	0.273	0.258	0.808	0.266
LM test for weak inst.	28.14	28.14	28.14	28.14	19.00	19.00	17.36	17.36	19.72	22.98
D. F. for weak inst test	18	18	18	18	18	18	17	17	18	18
p-value for LM test	0.060	0.060	0.060	0.060	0.392	0.392	0.430	0.430	0.349	0.192
Hansen (J) for overid.	12.13	18.38	14.13	8.66	19.26	13.78	19.32	18.48	12.17	14.76
D. F. for J test	17	17	17	17	17	17	16	16	17	17
p-value for J test	0.792	0.365	0.658	0.950	0.314	0.683	0.253	0.297	0.790	0.612
Pbervations	1446	1446	1446	1446	1199	1199	1134	1134	1882	2391
N of countries	106	106	106	106	106	106	88	88	107	130

Year fixed effects included in all regressions.

Standard errors are robust, clustered on country.

*** p<0.01, ** p<0.05, * p<0.1

Excluded instruments are the full set of Polity and GSoD variables.