Institutional Instability and Long-Run Development with Big Data, 1820-2016

Rok Spruk
Assistant Professor of Economics
University of Ljubljana
E: rok.spruk@ef.uni-lj.si

Joint work with: Simon Hartmann, WU Vienna

The Idea

- Scholars agree that sustained rates of growth are seldom possible in the absence of high-quality institutional framework (Mauro 1995, Rodrik 2000, Acemoglu and Johnson 2005)

- Variation in the quality of institutions is considerable while and their strength is considerable (Levitsky and Murillo 2009)

- The role of persistence has been overemphasized (Acemoglu and Robinson 2006, Wallis 2014, Austin 2008) while the strength and stability of institutions has been neglected with some exceptions (Londregan and Poole (1990), Barro (1991), Alesina et al. (1996), Campos et. al. (2002), Berggen et al. (2012)

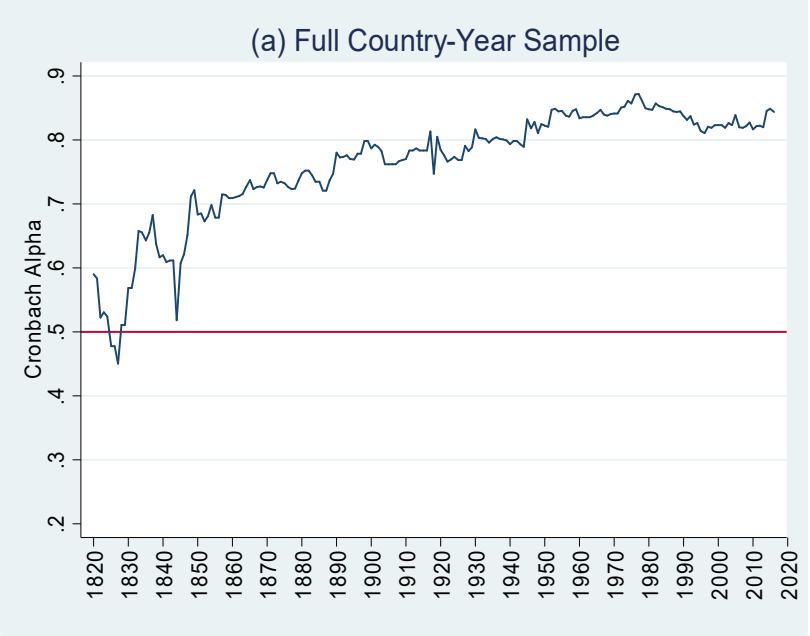
The Approach

- Distinguish between de jure/de facto institutional instability and isolate their effect on long-run growth and development
    - De jure dimension: formally specified electoral rules, the constitution and underlying legislation
    - De facto dimension: the ability of the non-elites to engage in various forms of collective action to alter the existing powerholders
- Use large-sample instrumental variables estimations in a large panel in terms of countries and years to address the reverse causation
- Use of lagged instability levels as an IV for the contemporaneous instability
- Separate the effects of institutional quality, institutional change and institutional instability

The Dataset

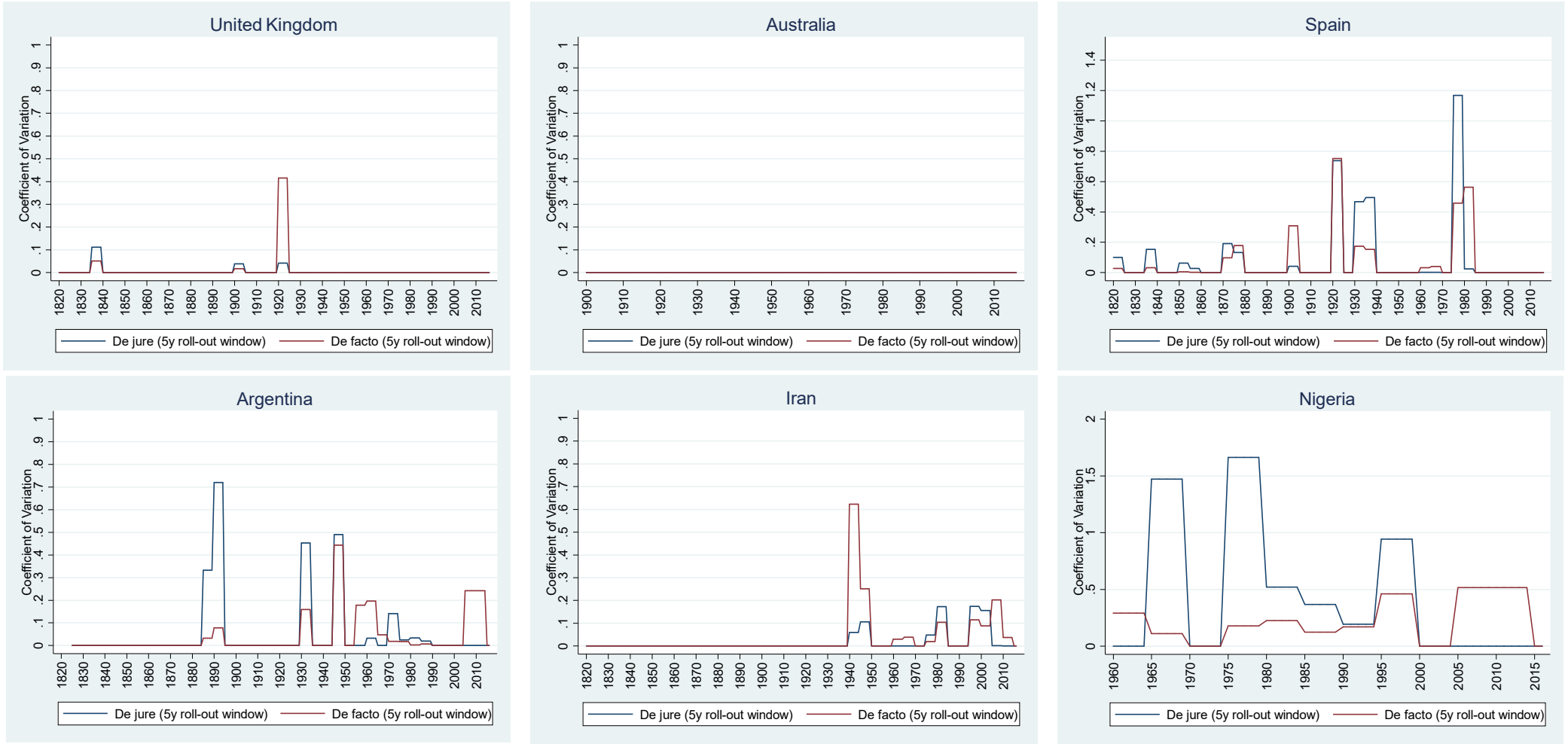
- Extracted de jure and de facto components of instability from several existing historical datasets
- A novel annual-frequency dataset tracking the evolution of de jure and de facto instability for 154 countries for the period 1820-2016 with roughly 17,118 matched country year observations
- Matched dataset with Inklaar et. al. (2018) revised estimates of GDP per capita for a large number of countries going back to early 19th century

Figure 1: Internal Consistency and Stability of De Jure and De Facto Institutional Components, 1820-2016



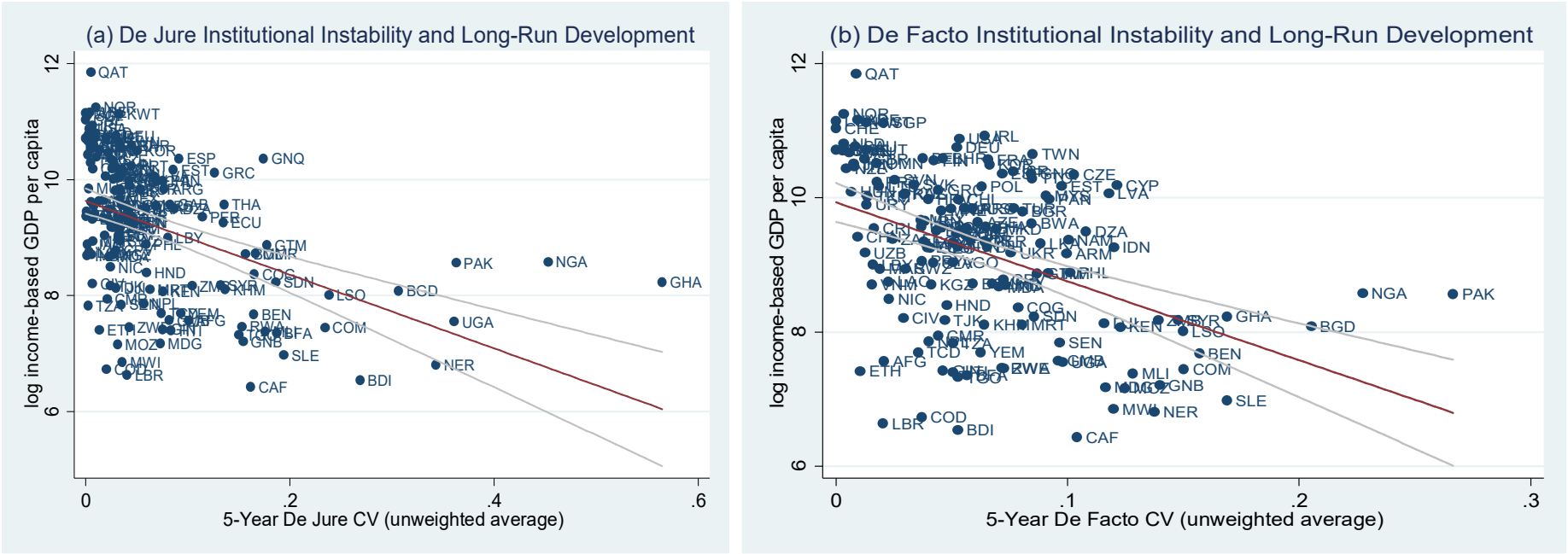
Charting Long-Run Institutional Instability

Figure 2: Institutional Instability in the Long Run Across and Within Selected Countries



Institutional Instability and Long-Run Growth

Figure 3: Institutional Instability and Long-Run Growth



The Results

- The negative effect of increasing de jure and de facto institutional instability on long-run growth and development appears to be modest but significant
- De facto institutional instability appears to be relatively more important than de jure instability for long-run development
- A modest increase in de facto instability (from zero to the median of the distribution) is associated with 25 percent drop in GDP per capita
- The effects do not seem to be driven by unobserved heterogeneity bias and common technology shocks
- IV estimated effects of institutional instability on long-run development are noticeably larger than the OLS estimates

The Results – IV Estimates

Table 1: IV Estimated Effects of Institutional Instability on Long-Run Development, 1820-2016

	5-Year Rolling Window		10-Year Rolling Window		15-Year Rolling Window		20-Year Rolling Window	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Income-Based	Growth-Based	Income-Based	Growth-Based	Income-Based	Growth-Based	Income-Based	Growth-Based
Panel A: Cameron-Gelbach-Miller Standard Errors with Country-Level Heterogeneity Bias and Common Technology Shocks								
De Jure CV	.112	-.408	-.087	-.172***	-.229**	-.264***	-.250**	-.261**
	(.819)	(.788)	(.083)	(.066)	(.106)	(.080)	(.121)	(.116)
De Facto CV	-1.131**	-1.066*	-.423***	-.346***	-.307**	-.361***	-.258*	-.353***
	(.590)	(.579)	(.110)	(.067)	(.146)	(.108)	(.153)	(.131)
Panel B: Heteroskedasticity and Autocorrelation Consistent (HAC) Estimates with Driscoll-Kraay Standard Errors								
De Jure CV	-2.383	-2.128	-.093	-.172***	-.230***	-.264***	-.250***	-.261***
	(1.833)	(1.765)	(.067)	(.066)	(.117)	(.102)	(.084)	(.069)
De Facto CV	.043	-.525	-.523***	-.346***	-.306***	-.360***	-.287***	-.384***
	(1.040)	(1.000)	(.106)	(.067)	(.109)	(.083)	(.083)	(.076)
# Observations	11,596	11,596	11,755	11,755	12,108	12,108	11,974	11,979
# Countries	151	151	153	153	151	151	151	151
# Years	187	187	187	187	187	187	187	187
Covariates	YES	YES	YES	YES	YES	YES	YES	YES
Wu-Hausman Endogeneity Test (p-value)	0.004	0.011	0.000	0.000	0.000	0.000	0.000	0.000
Cragg-Donald Weak Identification Test	62.18	96.84	1258.56	1258.56	2074.09	2074.09	3165.17	3165.17
(maximal IV relative bias)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Kleibergen-Paap Underidentification Test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Angrist-Pischke Excluded IVs Test for De Jure CV (p-value)	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Angrist-Pischke Excluded IVs Test for De Facto CV (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: the table presents the IV-2SLS estimated effects of de jure and de facto institutional instability on per capita GDP for 151 countries in the period 1820-2016. The dependent variable is the natural log of GDP per capita in 2011 Geary-Khamis constant prices. The standard errors are adjusted for within-country serially correlated disturbances and potentially heteroskedastic distribution of the random error variance in country-/year pairs to tackle multiple sources of aggregate uncertainty using Cameron, Gelbach and Miller (2011) non-nested multiway clustering scheme for finite-sample adjustment of the empirical distribution function, and for cluster-robust inference on the parameters to remove the consistencies arising from biased OLS variance-covariance matrix estimator with serially correlated stochastic disturbances. Country/year paired cluster-robust standard errors are denoted in the parentheses for each empirical specification. Asterisks denote statistically significant coefficients at 10% (*), 5% (**), and 1% (***), respectively.

The Results – First-Stage

Table 2: First-Stage Institutional Instability Specifications, 1820-2016

	5-Year Rolling Window		10-Year Rolling Window		15-Year Rolling Window		20-Year Rolling Window	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Income-Based	Growth-Based	Income-Based	Growth-Based	Income-Based	Growth-Based	Income-Based	Growth-Based
Panel C: First-Stage OLS Estimates of De Jure Coefficient of Variation (CV)								
De Jure CV	.053	.053	.683***	.683***	.743***	.743***	.807***	.807***
(t-5)	(.061)	(.061)	(.021)	(.021)	(.041)	(.041)	(.007)	(.007)
De Jure CV	.073*	.073*	-.292***	-.292***	-.201***	-.201***	-.135***	-.135***
(t-10)	(.047)	(.047)	(.019)	(.019)	(.035)	(.035)	(.017)	(.017)
Panel D: First-Stage OLS Estimates of De Facto Coefficient of Variation (CV)								
De Facto CV	.037	.037	.630***	.630***	.777***	.777***	.816***	.816***
(t-5)	(.039)	(.039)	(.022)	(.022)	(.031)	(.031)	(.011)	(.011)
De Facto	-.081***	-.081***	-.316***	-.316***	-.195***	-.195***	-.122***	-.122***
(t-10)	(.023)	(.023)	(.033)	(.033)	(.030)	(.030)	(.014)	(.014)
# Observations	11,596	11,596	11,755	11,755	12,108	12,108	11,974	11,979
# Countries	151	151	153	153	151	151	151	151
# Years	187	187	187	187	187	187	187	187
Covariates	YES	YES	YES	YES	YES	YES	YES	YES
Wu-Hausman Endogeneity Test (p-value)	0.004	0.011	0.000	0.000	0.000	0.000	0.000	0.000
Cragg-Donald Weak Identification Test	62.18	96.84	1258.56	1258.56	2074.09	2074.09	3165.17	3165.17
(maximal IV relative bias)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Kleibergen-Paap Underidentification Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(p-value)								
Angrist-Pischke Excluded IVs Test for De Jure CV	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(p-value)								
Angrist-Pischke Excluded IVs Test for De Facto CV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(p-value)								

Notes: the table presents the IV-2SLS estimated effects of de jure and de facto institutional instability on per capita GDP for 151 countries in the period 1820-2016. The dependent variable is the natural log of GDP per capita in 2011 Geary-Khamis constant prices. The standard errors are adjusted for within-country serially correlated disturbances and potentially heteroskedastic distribution of the random error variance in country-/year pairs to tackle multiple sources of aggregate uncertainty using Cameron, Gelbach and Miller (2011) non-nested multiway clustering scheme for finite-sample adjustment of the empirical distribution function, and for cluster-robust inference on the parameters to remove the consistencies arising from biased OLS variance-covariance matrix estimator with serially correlated stochastic disturbances. Country/year paired cluster-robust standard errors are denoted in the parentheses for each empirical specification. Asterisks denote statistically significant coefficients at 10% (*), 5% (**), and 1% (***), respectively.

The Results – Instability vs. Quality Interaction

- The evidence also implies that the inclusive de jure and de facto institutional changes together with decreasing institutional instability tend to stabilize the rates of growth substantially
- The effects appear to rise over time
- At higher values of de jure and de facto CV, we find notably higher standard deviation of the rates of growth
- This is consistent with Hausmann et. al. (2005) where de jure regime changes are found to be a significant predictor growth acceleration episodes.
- A drop in volatility a likely mechanism behind sustained growth rates

Institutional Instability, Institutional Change and Volatility

Table 7: Institutional Instability, Institutional Change and Long-Run Growth Volatility, 1820-2016

	5-Year Rolling Window		10-Year Rolling Window		15-Year Rolling Window		20-Year Rolling Window	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	Cameron-Gelbach-Miller S.E	Driscoll-Kraay S.E.	Cameron-Gelbach-Miller S.E	Driscoll-Kraay S.E.	Cameron-Gelbach-Miller S.E	Driscoll-Kraay S.E.	Cameron-Gelbach-Miller S.E	Driscoll-Kraay S.E.
Panel A: OLS and IV-2SLS Estimates								
De Jure CV	.0002	.014**	-.0002	.00004	-.0001***	-.0003	.00006	.0003***
	(.0005)	(.007)	(.0002)	(.00021)	(.0002)	(.0031)	(.00012)	(.0001)
De Facto CV	.001**	.016*	.00007	.0001	.0002***	-.0001**	-.0001***	.0001***
	(.0006)	(.009)	(.00016)	(.0001)	(.00003)	(.00001)	(.00003)	(.00002)
Δ De Jure	-.0005	-.00004	-.0006	.00004	.0006**	-.0002	-.0003**	-.0005***
	(.0005)	(.00028)	(.0016)	(.00051)	(.0003)	(.0002)	(.0001)	(.0001)
Δ De Facto	.0008	.00003	.0003	.00075	-.0004	.00027	-.0001***	-.0003***
	(.0051)	(.00007)	(.0009)	(.00082)	(.0005)	(.0008)	(.00004)	(.00007)
Country-Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Time-Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cragg-Donald Weak Identification Test		[0.035]		[0.035]				[0.000]
(p-value)								
Angrist-Pischke Excluded IVs Test		[0.000]		[0.000]				[0.000]
(p-value)								
Kleibergen-Paap Underidentification Test		[0.000]		[0.000]				[0.000]
(p-value)								
# Country Clusters	152		153		153		153	
# Year Clusters		187		186		180		175
# Observations	15,623	15,062	14,918	14,149	14,463	14,149	13,678	13,364

Notes: the table presents the IV-2SLS estimated effects of de jure and de facto institutional instability and institutional change on growth volatility. The dependent variable is the standard deviation of growth rate of the natural log of income-based/multiple-benchmark GDP per capita in 2011 Geary-Khamis constant prices. The standard errors are adjusted for within-country serially correlated disturbances and potentially heteroskedastic distribution of the random error variance in country-/year pairs to tackle multiple sources of aggregate uncertainty using Cameron, Gelbach and Miller (2011) non-nested multiway clustering scheme for finite-sample adjustment of the empirical distribution function, and Driscoll and Kraay (1998) covariance matrix estimator for cluster-robust inference on the parameters to remove the consistencies arising from biased OLS variance-covariance matrix estimator with serially correlated stochastic disturbances. Country/year paired cluster-robust standard errors are denoted in the parentheses for each empirical specification. Asterisks denote statistically significant coefficients at 10% (*), 5% (**), and 1% (***), respectively.

Conclusion

- High levels of consequential instability of institutions over longer time spans adversely affects long-run growth through higher transaction costs due to insecure property rights, and volatile and inconsistent policies
- A moderate increase in de jure institutional instability is associated with 14.5 percent drop in per capita income.
- The equivalent moderate increase in de facto instability is associated with 19 percent drop in per capita income
- Higher de facto instability appears to be relatively more important for long-run growth than de jure instability
- Both dimensions of instability affect long-run growth independently of institutional quality and possibly explain the evolution of growth and income levels since early 19th century onwards