On the Dynamics of Corruption

Costas Azariadis* and Yannis M. Ioannides**

Econometric Society World Congress, Milan, 2020

*Washington University in St. Louis
**Tufts University
Corruption: Definition

- Wikipedia: A form of dishonesty or criminal activity undertaken by a person or organization entrusted with a position of authority, often to acquire illicit benefit. ... May include bribery and embezzlement, ... it may also involve practices that are legal in many countries. Political corruption: office-holder or other governmental employee acts in an official capacity for personal gain. Petty corruption, small favors. Grand corruption: affecting government on a large scale ... and corruption so prevalent, part of the everyday structure of society, including ... organized crime. Corruption and crime: endemic social occurrences ... with regular frequency in virtually all countries, varying degree and scale.

What do we do?

Paper motivates corruption regarding enforcement of property rights over legitimate income: rent-seekers prey on incomes, are pursued by cops. Some of the cops may choose to go rogue, appropriate what belongs to the treasury.
Corruption: Definition, continued

Corruption and Rent-seeking lead to misallocation. Misallocation stunts growth, because:

- Corruption: defined differently by data sets. Measures widely available.

- Rent-seeking: elusive concept defies consistent measurement.

- bribery, embezzlement, nepotism, extortion and racketeering, illegal licensing, tax evasion, information misreporting

- rent-seeking, predation, appropriation, extraction, involuntary redistribution, property crime

- all distort incentives.

This paper defines corruption as dereliction of duty by enforcers pursuing rent seekers and appropriation of ill-gotten gains of rent seekers caught.
Outline of presentation

1. Highlights of Azariadis and Ioannides “On the Dynamics of Corruption”

2. Measurement of corruption, culture and institutions

3. Estimation of three dynamic equations:
   
   3.1 GDP per capita against culture, and lagged human capital, institutions and corruption
   
   3.2 Corruption against culture and lagged corruption, institutions and human capital
   
   3.3 Institutions against culture and lagged corruption, institutions and human capital
Overview of Azariadis and Ioannides

- Joint evolution of corruption and per capita GDP, enriched with accounting for personal morality, and culture moderating social interactions.

- Institutions enforce property rights to legitimate income, majority voting over “strong” vs. “weak” enforcement.

- Culture moderates social conventions, “norms,” similar to consumption externalities.

- Households choose: \{honest work, rent-seeking, corruption\}.

- Key predictions: societies with collectivist cultures and corruption-tolerant norms behave very differently from the individualistic ones of neoclassical growth theory:
  - highly nonlinear GDP and corruption dynamics;
  - dominant roles for culture and social norms as engines of institutional quality, corruption and growth;
  - majorities can favor weak property rights,
  - world economy: individualistic and collectivist convergence clubs with two distinct stable long-run states.
Key features of Azariadis and Ioannides, cont’d

- standard two-period OLG model of world growth [Diamond (1965)]
- many similar countries, common economic fundamentals (population, technology, tastes and endowment)
- different social structure (culture, history, politics)
- perfect capital mobility, zero labor mobility: common wage & interest rate, independent of social structure, antisocial behavior.
- world capital/labor ratio independent of any nation’s institutional choice
- Rent seekers prey on legitimate income. Government hires cops to enforce property rights.
  - $\mu\%$ less productive: at equilibrium between rent-seeking and production
  - $1 - \mu\%$ more productive: equilibrium between production and enforcement.
    - enforcers: at equilibrium, honest or corrupt?
  - $(\text{corrupt enforcers} = (1 - \mu)x_t; \text{rent-seekers} = \mu \rho_t)$. 
Key features of Azariadis and Ioannides, cont’d

- common neoclassical production function:
  \[ Y_{j,t} = K_{j,t}^\alpha N_{j,t}^{1-\alpha}, \quad j = 1, \ldots, J. \]

- rent-seekers preying on workers, enforcers policing rent-seekers: DMP-style CRS technologies describe matching

- individuals affected by social norms, via taste for conformism over
  \[ x_t^n = x_{t-1}, \quad \rho_t^n = \rho_{t-1}; \]

- productive workers “dislike” anti-social behavior \( 1 - \sigma x_{t-1} \)

- rent seekers “like” anti-social behavior \( 1 - (1 - \sigma)x_{t-1} \); and individual shock augments anti-social income.

- institutions proxied by enforcement intensity, policy
  \[ \theta_t := \frac{\text{enforcers}}{\text{rent seekers}} = \frac{D_t}{X_t}. \]
Key features of Azariadis and Ioannides, cont’d

- **Individualism (σ) Culture1 Collectivism [Hofstede]**
  
  Greif (1994): “Cultural beliefs are the ideas and thoughts common to several people that govern interaction — between these people and among them, ... which capture people’s expectations with respect to actions that others ...”

- **Social interaction effects: linked to antisocial behavior**
  
  - **Utility function:** \( v_{i,j,t} = (1 - \delta_{i,j,t})y_{i,j,t}R_{j,t+1}^\beta =: \hat{y}_{i,j,t}R_{t+1}^\beta \)
  
  - **Lagged endogenous social effect:** honest dislike, corrupt/rent-seekers like anti-social behavior:
    - **Honest:** \( \delta_{i,j,t} = \sigma x_{j,t-1} \)
    - **Corrupt & rent-seekers:** \( \delta_{i,j,t} = \sigma(1 - x_{j,t-1}) \).

  - **Additional individual social effect augments antisocial income.**

- **Institutions** North (1990): “the humanly devised constraints that structure human interactions ... rules, laws, constitutions,... and their enforcement characteristics.”
Key Highlights of Azariadis and Ioannides: World without Corruption

Utopia benchmark: no corruptible humans or externalities

- No wastage on enforcement. $\mathcal{J}$ nations, 1 unit labor each, saves fraction $\beta$ of total gross wage.

- Equilibrium: world saving $=$ world capital
  
  $$k_t : \text{capital p.c. } k_{t+1} = \beta(1 - \alpha)k_t^\alpha, \quad k_t \equiv \frac{K_t}{\mathcal{J}}$$

- World capital accumulation unaffected by social interactions!

Figure 1: Growth without corruption

Capital mobility: $\Rightarrow$ GDP per capita differences disappear at $t = 0$
Choice over Honest Work, Rent Seeking and Corrupt Enforcement

Given institutions: \( \theta_t \), rent seekers caught w.p. \( q(\theta_t) \).

Intensity of rent seeking: \( z_t = \frac{\text{rent seekers}_t}{\text{productive workers}_t} \).

- Choice: produce or seek rents; enforce laws or corrupt them.
- More productive: earn 1, pay tax, may be looted w.p. \( p(z_t) \);

\[
y_t^{HE} = (1 - \phi_t)[1 - p(z_t)](1 - \sigma x_{t-1}).
\]

Honest enforcers \( y_t^{HE} = (1 - \phi_t)[1 - p(z_t)](1 - \sigma x_{t-1}); \)

Corrupt enforcers \( y_t^{RE}(\varepsilon) = (1 - \phi_t)(1 - \pi)(1 - p(z_t))(1 - \sigma x_{t-1}) \)

\[
+ (1 - \phi_t) \frac{p(z_t) q(\theta_t)}{z_t} \frac{\theta_t}{\theta} [1 - \sigma (1 - x_{t-1})],
\]

\( \varepsilon \text{ ind. soc. effect} ; \)

\( \text{loot after social interactions "tax"} \)

- Less productive: earn \( \gamma y_t^{HE} \).

Rent seekers \( y_t^{RS}(\varepsilon) = (1 - \phi_t) p(z_t)[1 - x(\theta)\pi][1 - \sigma(1 - x_{t-1})], \)
Individual social effect augments antisocial income: \( \varepsilon \sim 1 - \left( \frac{\bar{\varepsilon}}{\varepsilon} \right)^{\zeta} \). Together with social norms define thresholds: \((\hat{\varepsilon}^1_t(x_{t-1}), \hat{\varepsilon}^2_t(\rho_{t-1}))\)

- \( x_t := \text{Prob}\{y^\text{RE}_t(\varepsilon) > y^\text{HE}_t\} \rightarrow \text{Law of motion: } x_t = \left( \frac{\varepsilon}{\hat{\varepsilon}^1_t(x_{t-1})} \right)^{\zeta}. \)

- \( \rho_t := \text{Prob}\{y^\text{RS}_t(\varepsilon) > \gamma y^\text{HE}_t\} \rightarrow \text{Law of motion: } \rho_t = \left( \frac{\varepsilon}{\hat{\varepsilon}^2_t(\rho_{t-1})} \right)^{\zeta} ; \)

Endogenous social effect: value aggregate incidence of corruption/rent-seeking, positively or negatively.

- Social interactions: equivalent to “taxes, subsidies” proportioned to the mass of retired producers and rent-seekers
Corruption, exogenous institutions: Summary

- Incidence of corruption and rent-seeking as equilibrium outcomes
- Long-run impact on net output and growth
- Corruption under exogenous institutions:
  - decreasing in lagged GDP per capita;
  - increasing in past corruption ("norm");
  - decreasing in institutional quality and human capital;
  - increasing (decreasing) in collectivism, if "poor" ("good") norms;

\[
x_{j,t} \left( y_{j,t-1}, x_{j,t-1}, \theta_{i,j,t-1}; \gamma_{j,t-1}; \text{culture} \right)
\]
Dynamics of corruption, given institutions: individualistic societies

Figure 2: Corruption vs. Norms at Low $\sigma$
Recall: World without Corruption

Figure 3: Growth without corruption

Capital mobility: ⇒ GDP per capita differences disappear at $t = 0$
Corruption: a deadweight loss!
Dynamics of corruption, given institutions: collectivist societies

Figure 4: Corruption vs. Norms at High $\sigma$ and Low $\theta$
Corruption vs. Institutions: CPI vs. ICRG_{ins}, WMO_{ex}

Figure 5: Culture (Hofstede) and Corruption vs. Institutions

Negative correlation of corruption and institutional quality

- Evidence consistent with theory: negative correlation stronger in more individualistic societies:
- Scatter of points for most individualistic societies (bottom 1/3 Hofstede index) steeper than for most collectivist (top 1/3).
- Institutions more effective in combatting corruption in individualistic societies.
Choosing Institutions by Majority

**Figure 6**: Role of Human capital, culture, history, and efficiency of predator-victim matching

- Individualist societies vote for strong institutions if:
  - skills of corruptible members are not too low;
  - predators are not easily matched with prey;
  - social interactions are weak;
Choosing Institutions by Majority

Figure 7: Role of Human capital, culture, history, and efficiency of predator-victim matching

- Conformist societies, on the other hand, become prisoners of their past which shapes current institutions through prevailing norms.
  - no enforcement if norms tolerate corruption, full enforcement otherwise.
- Strong social interactions split economies into convergence clubs with two distinct, and locally stable, steady states.
  - Conformist societies with a history of low corruption converge to a high-income state whereas those with a corruption-tolerant past head to a low-income state.
Stage 2: Politics endogenizes institutions: \{Full, No\} enforcement

- heterogeneous agents vote: median voter not too productive
- Voting only by the young matter, who make occupational choices potentially leaving them in different outcomes.
- explain persistence of status quo (good and bad governance)
- explain incidence of reform and populism (improvements and declines in governance)

Strengthens tendencies in results with exogenous institutions

Succinct view of endogenous institutions: threshold trades off preference for conformity against “norm” (lagged corruption), given human capital and technology of enforcement.

Partition space in terms of preference for conformity and norm lagged corruption.
Stage 2: Politics endogenizes institutions: \{Full, No\} enforcement

- heterogeneous agents vote: median voter not too productive
- Voting only by the young matter, who make occupational choices potentially leaving them in different outcomes.
- explain persistence of status quo (good and bad governance)
- explain incidence of reform and populism (improvements and declines in governance)

Strengthens tendencies in results with exogenous institutions
Formal Result 1: Laws of motion, corruption and rent-seeking, \((x_t, \rho_t)\)

For a specific CES matching technology for predators and victims, critical values are defined for sufficiently high moral scruples,

\[ \hat{\epsilon}_1^t = \max \left\{ \bar{\epsilon}, \frac{\pi A \theta_t}{q(\theta_t)} m(x_{t-1}) \right\}; \hat{\epsilon}_2^t = \max \left\{ \bar{\epsilon}, \frac{\gamma A}{1 - q(\theta_t)} m(x_{t-1}) \right\}. \]

(1)

with \( m(x) := \frac{1 - \sigma x}{1 - \sigma(1 - x)} \in [1 - \sigma, 1/(1 - \sigma)] \), decreasing and convex in \( x \); increasing in \( \sigma \) if \( x \leq 1/2 \), decreasing in \( \sigma \) if \( x \geq 1/2 \).

b. Given enforcement level \( \theta \in [0, b] \), and \( \lambda := \bar{\epsilon}/\gamma A \leq 1 \), the equilibrium paths of corruption and rent-seeking intensities are:

\[ x_t = J(x_{t-1}; \theta, \sigma) := \min \left\{ 1, \left[ \frac{B_1(\theta)}{m(x_{t-1})} \right]^{\zeta} \right\}; \rho_t = \min \left\{ 1, \left[ \frac{B_2(\theta)}{m(x_{t-1})} \right]^{\zeta} \right\}, \]

(2)

where

\[ B_1(\theta) := \frac{\lambda q(\theta) \gamma}{\pi} \quad \text{and} \quad B_2(\theta) := \lambda [1 - q(\theta)] \leq 1, \forall \theta \in [0, b]. \]

Aggregate corruption readily follows.
Formal Result 2: Properties of laws of motion

a. $\nu := \frac{\bar{\epsilon}}{\pi A} q'(0) < 1$: if $\sigma \in [0, 1 - \nu]$, society sufficiently individualistic, time map of eq. (2a) increasing convex in $x$ $\forall (\theta, \sigma) \in [0, b] \times [0, 1 - \nu]$ with unique, stable fixed point $x^*(\theta, \sigma)$; Figure 2.

b. $x^* = x^*\left(\frac{-1}{\theta}, \frac{-\gamma}{\sigma}\right); \forall \sigma \in [0, 1 - \nu]$. Decreasing (increasing) in $\sigma$, if $\sigma < (>) \frac{1}{2}$.

c. $\rho^* \left(\frac{-\gamma}{\theta}, \gamma\right)$.

d. If $\sigma \in [1 - \nu, 1]$ society sufficiently conformist, $\exists \theta = \hat{\theta} \in [0, b)$, eq. (2a) implies Fig. 2, $\forall \theta \in [\hat{\theta}, b]$.

e. If conformist $\sigma \in [1 - \nu, 1] \forall \theta \in [0, \hat{\theta}$, then (2a) sigmoid time map with three fixed points: a low stable steady state $x^*(\theta, \sigma) < \frac{1}{2}$; a high $x = 1$, and an unstable intermediate $\tilde{x}(\theta, \sigma) > \frac{1}{2}$. See Figure 4. Multiplicities common with strong social interactions [Ioannides (2013), p.32].
Formal Result 3: Choice of institutions by majority
\( \theta \in \{0, b\} \)

Define critical values for matching parameter \( A : (\hat{A}, \bar{A}, A \geq \max\{\hat{A}, \bar{A}\}; \)

\( \hat{x}(\sigma, \lambda) \) based on \((\bar{\sigma}, \hat{\sigma}, \lambda^*)\):

\[
\hat{x}(\sigma, \lambda) := \frac{\lambda^* - \lambda(1 - \sigma)}{\sigma(\lambda^* + \lambda)}; \hat{\sigma} := \frac{\lambda^*}{\lambda} - 1 > \bar{\sigma} := 1 - \frac{\lambda}{\lambda^*} \quad (3)
\]

a. A majority votes for \( \theta = b \), if \( x_{t-1} \leq \hat{x}(\sigma, \lambda); \theta = 0 \), otherwise.

b. If the human skills parameter \( \gamma \) is sufficiently small, the median voter opts for no enforcement for any social norm \( x_{t-1} \in [0, 1] \).

c. If \( \gamma \) is not small, then \( \theta = b \) if \( \sigma \in (0, \bar{\sigma}) \); regimes switch for \( x_{t-1} = \hat{x}(\sigma, \lambda) \) if \( \sigma \in (\bar{\sigma}, \hat{\sigma}) \), Figure 4. ??.

Critical norm \( \hat{x}(\sigma, \lambda) \):

\[\lambda := \frac{\bar{\varepsilon}}{\gamma^A}, \text{ great human capital and stronger scruples (lower } \bar{\varepsilon} \text{) shrink region } (\sigma, x_{t-1}) \text{ favoring no enforcement, encouraging factor misallocation and perpetuating underdevelopment.}\]
Three Estimation Equations

Three equations predicted by Azariadis and Ioannides:
Notation: $D_t$ : year dummy; $\gamma_{j,t}$ : human capital; $\varepsilon_{y,j,t}, \varepsilon_{x,j,t}, \varepsilon_{\theta,j,t}$ : random effect plus I.I.D. shock.

- **GDP pc Regressions**: Eq. (1)

$y_{j,t} = b + b_{y,x} \cdot x_{j,t-1} + b_{y,\theta} \cdot \theta_{i,j,t-1} + \beta_{y,\sigma} \cdot \sigma_j + b_{\gamma} \cdot y_{j,t-1} + D_t + \varepsilon_{y,j,t},$

- **Corruption Regressions**: Eq. (2)

$x_{j,t} = b + b_{x,x} \cdot \tanh(x_{j,t-1}) + b_{x,\theta} \cdot \theta_{j,t-1} + \beta_{x,\sigma} \cdot \sigma_j + b_{\gamma} \cdot x_{j,t-1} + D_t + \varepsilon_{x,j,t},$

$\tanh(\cdot) := \frac{e^{bx} - e^{-bx}}{e^{bx} + e^{-bx}},$ particularly flexible one-parameter function.

- **Institutions Regressions**: Eq. (3) $\theta_{i,j,t}$ [alternatively, vector form: $\Theta_{i,j,t}$]

$\theta_{i,j,t} = b + b_{i,x} \cdot x_{j,t-1} + b_{i,y} \cdot y_{j,t-1} + \beta_{,\sigma} \cdot \sigma_j + b_{i,\gamma} \cdot \gamma_{j,t-1} + D_t + \varepsilon_{\theta,j,t},$
**Measurement Issues: Corruption, Rent Seeking**

**Corruption Outcomes:** indices abound, aggregate and sectoral; **Rent seeking:** much talked about, only micro stories abound

- Transparency International: Corruption Perception Index (CPI)
- World Bank: Control of Corruption Index (CCI)
- PRS Group, International Country Risk Guide: ICRG$_c$ Corruption Index

All positively autocorrelated and quite persistent
Measurement: Culture

- *Hofstede* individualism vs. collectivism
  Acting predominantly as members of a cohesive, lifelong group or organization: conformism

- *Tabellini* trust

- *Michele Gelfand, Irem Uz*: Tightness vs. Looseness index.

  Negative reciprocity: sanctioning antisocial unfair behavior behavior, engaging in prosocial punishment

- *Inglehart and Welzel*: traditional versus secular-rational values, survival versus self-expression values. Component of World Values Survey.

- *Schwartz*: intellectual autonomy, affective autonomy, egalitarianism vs. hierarchy, and harmony vs. mastery.

- *Fisman and Miguel*: parking violations by UN diplomats in NY City.
Measurement: Institutions

- Quality of institutions, explored sources
- Fish out components of World Governance Indicators (IBRD), Quality of Governance (Univ. of Gothenburg), World Justice Project (WJP), Bertelsmann Transformation Index (BTI), International Country Risk Guide (ICRG), World Economic Forum (WEF)
- Experimented with numerous institutions, emphasized the following:
  - \( \text{ICRG}_{\text{ins}} \): Economic risk taking, higher values, safer
  - \( \text{WMO}_{\text{ex}} \): risk of expropriation, higher values, better
  - \( \text{ICRG}_{\text{lo}} \): law and order, higher values safer
  - \( \text{WEF}_{\text{pr}} \): enforcement of property rights
  - \( \text{WMO}_{\text{ex}} \) Global Insight Business Conditions and Risk Indicators, World Governance Indicators
  - What do empirics suggest about: Institutions and culture, substitutes or complements?
  - How design of institutions reacts to culture?
Indentification Strategy

Fend off the *identification police*, who are known to take no prisoners: Instrumental variable estimation strategy

- Three dynamic equations \((y_{jt}, x_{jt}, \theta_{i,j,t})\) estimated separately with IV.
  - 1. human capital: instrument with 5-year lag of population share of 15-64 years
  - 2. corruption: % share of women in parliament
  - 3. institutions equation used for IV in GDP and corruption equations.
- System of dynamic equations \((y_{jt}, x_{jt}, \theta_{i,j,t})\) cries out for estimation as system! Later!
Table 3: GDP per capita 1. Culture: Hofstede Collectivism

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7) WMO ex</th>
<th>(8) WMO ex</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.cpi</td>
<td>-0.0254**</td>
<td>-0.0180</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.00547***</td>
<td>0.0157</td>
</tr>
<tr>
<td></td>
<td>(0.0124)</td>
<td>(0.0128)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.00206)</td>
<td>(0.0423)</td>
</tr>
<tr>
<td>L.hc</td>
<td>0.240**</td>
<td>0.0866</td>
<td>0.363***</td>
<td>0.200**</td>
<td>0.374***</td>
<td>0.199**</td>
<td>0.0248**</td>
<td>-1.143</td>
</tr>
<tr>
<td></td>
<td>(0.0948)</td>
<td>(0.0963)</td>
<td>(0.0880)</td>
<td>(0.0862)</td>
<td>(0.0767)</td>
<td>(0.0834)</td>
<td>(0.0122)</td>
<td>(5.619)</td>
</tr>
<tr>
<td>L.ICRG.ins</td>
<td>0.00501***</td>
<td>0.00466***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0281</td>
<td>(0.0301)</td>
</tr>
<tr>
<td></td>
<td>(0.00139)</td>
<td>(0.00122)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.00129)</td>
<td>(4.135)</td>
</tr>
<tr>
<td>col</td>
<td>-0.958***</td>
<td>-0.235</td>
<td>-0.451*</td>
<td></td>
<td></td>
<td>0.240**</td>
<td>0.852</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.237)</td>
<td>(0.183)</td>
<td>(0.243)</td>
<td></td>
<td></td>
<td>(0.249)</td>
<td>(4.135)</td>
<td></td>
</tr>
<tr>
<td>avg.cpi</td>
<td>0.00956</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0281</td>
<td>(0.0301)</td>
</tr>
<tr>
<td></td>
<td>(0.0290)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.00129)</td>
<td>(4.135)</td>
</tr>
<tr>
<td>avg.hc</td>
<td>0.374***</td>
<td></td>
<td>0.259**</td>
<td></td>
<td></td>
<td>0.240**</td>
<td>0.852</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.125)</td>
<td></td>
<td>(0.108)</td>
<td></td>
<td></td>
<td>(0.118)</td>
<td>(4.135)</td>
<td></td>
</tr>
<tr>
<td>avg.ICRG.ins</td>
<td>0.0472***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0281</td>
<td>(0.0301)</td>
</tr>
<tr>
<td></td>
<td>(0.0129)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.00129)</td>
<td>(4.135)</td>
</tr>
<tr>
<td>L.CCI</td>
<td>-0.0650*</td>
<td>-0.0245</td>
<td>-0.109***</td>
<td>-0.0697**</td>
<td></td>
<td></td>
<td>0.916***</td>
<td>0.833***</td>
</tr>
<tr>
<td></td>
<td>(0.0382)</td>
<td>(0.0401)</td>
<td>(0.0343)</td>
<td>(0.0321)</td>
<td></td>
<td></td>
<td>(0.0188)</td>
<td>(0.223)</td>
</tr>
<tr>
<td>L.WMO ex</td>
<td>0.300**</td>
<td>0.212*</td>
<td>0.372*</td>
<td>0.326</td>
<td>0.916***</td>
<td>0.833***</td>
<td>0.156</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.129)</td>
<td>(0.115)</td>
<td>(0.192)</td>
<td>(0.201)</td>
<td>(0.0188)</td>
<td>(0.223)</td>
<td>(0.786)</td>
<td></td>
</tr>
<tr>
<td>avg.CCI</td>
<td>-0.0174</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.253***</td>
<td>-0.0243</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.102)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.0933)</td>
<td>(0.207)</td>
<td></td>
</tr>
<tr>
<td>avg.WMO_ex</td>
<td>1.007*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.785</td>
<td>-0.0203</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.576)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.512)</td>
<td>(0.111)</td>
<td></td>
</tr>
<tr>
<td>patience</td>
<td>0.0694</td>
<td>-0.0924</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00579</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.116)</td>
<td>(0.130)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.111)</td>
<td></td>
</tr>
<tr>
<td>risktaking</td>
<td>-0.250*</td>
<td>-0.247*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00879</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.151)</td>
<td>(0.147)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.786)</td>
<td></td>
</tr>
<tr>
<td>posrecip</td>
<td>0.0340</td>
<td>0.00755</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00879</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.207)</td>
<td>(0.213)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.207)</td>
<td></td>
</tr>
<tr>
<td>negrecip</td>
<td>0.256***</td>
<td>0.352***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00879</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0970)</td>
<td>(0.110)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.552)</td>
<td></td>
</tr>
<tr>
<td>altruism</td>
<td>-0.0440</td>
<td>0.0617</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00579</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.143)</td>
<td>(0.148)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.773)</td>
<td></td>
</tr>
<tr>
<td>trust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00525</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.00599)</td>
<td></td>
</tr>
<tr>
<td>L.y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0159</td>
<td>0.611</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.0135)</td>
<td>(2.841)</td>
</tr>
<tr>
<td>avg.y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.287</td>
<td>(1.243)</td>
</tr>
</tbody>
</table>
Table 3: GDP pc against Culture, Corruption, Institutions, Human Capital, cont’d

<table>
<thead>
<tr>
<th></th>
<th>.cons</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(3.838***</td>
<td>1.238**</td>
<td>3.047***</td>
<td>1.889***</td>
<td>2.669***</td>
<td>3.092***</td>
<td>0.0811**</td>
<td>-0.0706</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.338)</td>
<td>(0.554)</td>
<td>(0.309)</td>
<td>(0.432)</td>
<td>(0.240)</td>
<td>(0.289)</td>
<td>(0.0367)</td>
<td>(1.344)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>219</td>
<td>219</td>
<td>179</td>
<td>179</td>
<td>133</td>
<td>133</td>
<td>595</td>
<td>595</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of id</td>
<td>51</td>
<td>51</td>
<td>56</td>
<td>56</td>
<td>40</td>
<td>40</td>
<td>61</td>
<td>61</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald Chi2</td>
<td>304.2662</td>
<td>405.3577</td>
<td>227.5384</td>
<td>271.0874</td>
<td>354.5237</td>
<td>437.9214</td>
<td>41893.92</td>
<td>338.0297</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald test</td>
<td>34.521</td>
<td>22.014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.334</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 within</td>
<td>0.654</td>
<td>0.671</td>
<td>0.496</td>
<td>0.551</td>
<td>0.508</td>
<td>0.562</td>
<td>0.288</td>
<td>0.206</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 between</td>
<td>0.649</td>
<td>0.796</td>
<td>0.696</td>
<td>0.747</td>
<td>0.850</td>
<td>0.861</td>
<td>0.998</td>
<td>0.615</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 overall</td>
<td>0.664</td>
<td>0.779</td>
<td>0.731</td>
<td>0.765</td>
<td>0.861</td>
<td>0.864</td>
<td>0.971</td>
<td>0.594</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country random effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Robust standard error in parentheses.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ Institution

instrumented by eq 79

Human capital IV: 5-year-lagged age composition

Corruption IV: share of women in parliament
Table 4: Corruption Autoregressions: Culture, Institutions, Human Capital, linear

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICRG c</td>
<td>ICRG c</td>
<td>CCI</td>
<td>CCI</td>
<td>CCI</td>
<td>CCI</td>
</tr>
<tr>
<td>main</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.hc</td>
<td>0.568***</td>
<td>0.870**</td>
<td>-0.161**</td>
<td>0.0368</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.210)</td>
<td>(0.408)</td>
<td>(0.0762)</td>
<td>(0.148)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.ICRG lo</td>
<td>0.174***</td>
<td>0.147***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0485)</td>
<td>(0.0518)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>col</td>
<td>-1.930***</td>
<td>-1.288***</td>
<td>0.863***</td>
<td>0.268</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.458)</td>
<td>(0.436)</td>
<td>(0.250)</td>
<td>(0.215)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.tanh.ICRG c</td>
<td>6.365***</td>
<td>6.364***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.856)</td>
<td>(0.865)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>avg hc</td>
<td>-0.758*</td>
<td></td>
<td></td>
<td>0.0131</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.416)</td>
<td></td>
<td></td>
<td>(0.150)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>avg ICRG lo</td>
<td>0.352***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0955)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.WMO ex</td>
<td></td>
<td>-0.559**</td>
<td>0.699**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.223)</td>
<td>(0.287)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.tanh.CCI</td>
<td></td>
<td>1.865***</td>
<td>1.689***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.164)</td>
<td>(0.150)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>avg WMO ex</td>
<td></td>
<td></td>
<td></td>
<td>-2.970***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.361)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.CCI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.071***</td>
<td>2.111***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.228)</td>
<td>(0.236)</td>
</tr>
<tr>
<td>_cons</td>
<td>-3.264***</td>
<td>-3.947***</td>
<td>-0.877**</td>
<td>0.166</td>
<td>1.445***</td>
<td>1.472***</td>
</tr>
<tr>
<td></td>
<td>(1.004)</td>
<td>(1.047)</td>
<td>(0.353)</td>
<td>(0.364)</td>
<td>(0.209)</td>
<td>(0.215)</td>
</tr>
</tbody>
</table>
Table 4: Corruption Autoregressions: Culture, Institutions, Human Capital, nonlinear

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.693***</td>
<td>0.730***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.p.CCI.col.ICRG.lo</td>
<td>(0.0924)</td>
<td>(0.0919)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.p.CCI.col.ICRG.lo_mre</td>
<td>-0.336***</td>
<td>-0.324***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0377)</td>
<td>(0.0379)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.p CCI col ICRG lo</td>
<td>-0.237***</td>
<td>-0.229***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0140)</td>
<td>(0.0137)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.p CCI col ICRG lo mre</td>
<td>0.400***</td>
<td>0.312**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.152)</td>
<td>(0.151)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sigma</td>
<td>0.397***</td>
<td>0.399***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_cons</td>
<td>(0.0101)</td>
<td>(0.0101)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>1945</td>
<td>1945</td>
<td>720</td>
<td>720</td>
<td>779</td>
<td>779</td>
</tr>
<tr>
<td>Number of id</td>
<td>75</td>
<td>75</td>
<td>80</td>
<td>80</td>
<td>779</td>
<td>779</td>
</tr>
<tr>
<td>Wald Chi2</td>
<td>756.1127</td>
<td>888.9588</td>
<td>740.1337</td>
<td>1580.758</td>
<td>82.57317</td>
<td>79.90359</td>
</tr>
<tr>
<td>Wald test</td>
<td>13.856</td>
<td>68.921</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 within</td>
<td>0.434</td>
<td>0.434</td>
<td>0.227</td>
<td>0.227</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 between</td>
<td>0.729</td>
<td>0.802</td>
<td>0.915</td>
<td>0.941</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 overall</td>
<td>0.656</td>
<td>0.704</td>
<td>0.907</td>
<td>0.932</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country RE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Robust standard error in parentheses.

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

Institution instrumented by eq 79

Human capital IV: 5-year-lagged age composition

Corruption IV: share of women in parliament
Going forward

Anti-social behavior in the form of rent-seeking and corruption have profound effects on welfare.

- Nonlinearities cry out for more direct econometric treatment, acknowledges multiplicity of equilibria. Working on that.

- Nagging question: why is successful reform so rare?
  Menu of Policies, influence preferences and norm-setting, deeper analysis of politics.

- From small open economies to the global economy
  Reform in many countries:
  - Spillover effects via interdependent preferences?
  - Policy spillovers
  - Effects on capital accumulation and growth?