Democratic Capital:
The nexus of political and economic change

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Two related questions

- What makes democracies appear / consolidate?
- How does democracy influence economic development?

Long debate, no consensus

Some: D => Y Some: Y => D Some: D <=> Y

Others: no link, both reflect omitted variable

This paper: D ⇔ Y

Two ideas

- D => Y through expectations, not just through current regime
  - Omission of expectations => under-estimate effect of D
  - Evidence: **Stable** D boosts Y

- What makes D stable? “Democractic capital” (DK)
  - DK cumulates in D, depreciates when out of D
  - DK cumulates by having D neighbors
    - Eg. culture; independent media
  - Data also suggest that Y => D more stable

D ⇔ Y: a virtuous circle

- As D persists, Y rises
- As Y rises, D more stable

- DK adds a “multiplier effect”
  As D persists, D more stable => more Y

- Autocracies trapped in low Y equilibrium, vulnerable to political shocks

- But: puzzling asymmetry between D / Non-D
  DK => Y only under D

Outline

1. Theory
2. Data
3. Political transitions
4. Economic growth

Theory: key ingredients

formulate predictions, identification

- *Growth*:

  depends on both **actual** & **expected** political regime (through investment)

- *Political transitions*:

  global game, where citizens fight for D

- Willingness to fight for D depends on "democratic capital", *d*

OLG economy and polity

$a_t = [0, 1]$ indicator of autocracy (1) or democracy (0)

Production per worker

$$y_t = A(a_t) f(k_t)$$

Democracy good or bad for productivity:

$$A(1) = 1, \qquad A(0) = 1 + \alpha, \qquad \alpha \gtreqless 0$$

Young in $t-1$ choose investment k_t to maximize

$$V(w_{t-1} - k_t) + E_{t-1}[r_t k_t]$$

Expectations about political regime crucial

$$r_t = A(a_t) f_k(k_t^*)$$

Timing in period t

1. Attempted coup against democracy (uprise against autocracy) with some exogenous probability $\chi(a_{t-1})$

2. Each old chooses whether to participate in defense of democracy

3. Political regime a_t realized depending on s_t share of old who participate, and $A(a_t)$ is determined

4. Young invest, based on $E_t[r_{t+1}]$

Olds' participation decision

Noisy signal about cost

$$m_t^i = \mu_t + \nu_t^i$$

μ_t true cost: uniform over real line, ν_t^i normally distributed noise

Benefit of participation:

b_t if democracy succeeds (coup fails or uprise succeeds),
which happens with prob s_t, 0 otherwise

Net expected benefit

$$E[b_t - \mu_t] = b_t s_t - m_t^i$$

Strategic complementarity: expected benefit $\Uparrow$ if $s_t \Uparrow$

Global game uniquely determines equilibrium participation: $s_t^* = S(b_t)$

Equilibrium political transitions

Benefit of participation?

$$b_t = (1-\gamma)d_{t-1} + \gamma\alpha f_k(k_t^*)k_t^*$$

democratic capital, d_{t-1}: value of living in democratic society

economic stakes, $\alpha f_k(k_t^*)k_t^*$: gain of democracy to fellow old

Probability of *autocracy* in t as seen by young at $t-1$

$$p_t^* = 1 - s_t^* = 1 - S(b_t) = P(k_t^*, d_{t-1}, a_{t-1})$$

$P_d < 0$ larger population share defends democracy

$P_k < 0$ ditto, *if* democracies more efficient (i.e., $\alpha > 0$)

a_{t-1} reflects regime-dependent hazard rates

Equilibrium capital accumulation

Optimal investment of young in $t-1$

first-order condition plus $k_t = k_t^*$ can be written

$$k_t^* = K(p_t^*, k_{t-1}, a_{t-1})$$

$K_k > 0$ higher wages, more accumulation

$K_p < 0$ if democracies more efficient ($\alpha > 0$)

a_{t-1} due to regime-specific productivity effect on wages

Summarize equilibrium

Two structural forms

$$\begin{aligned} p_t^* &= P(k_t^*, d_{t-1}, a_{t-1}) \\ k_t^* &= K(p_t^*, k_{t-1}, a_{t-1}) \end{aligned}$$

can also write P in terms of regime-specific *hazard rates* h_t^{a*}

note exclusion restriction: d_{t-1} does *not* appear in K

effect on capital accumulation indirect, via expected regime

Two reduced (recursive) forms

$$\begin{aligned} p_t^* &= \widetilde{P}(k_{t-1}, d_{t-1}, a_{t-1}) \\ k_t^* &= \widetilde{K}(k_{t-1}, d_{t-1}, a_{t-1}) \\ a_t^* &= \begin{cases} 1 \text{ with prob } p_t^* \\ 0 \text{ with prob } (1 - p_t^*) \end{cases} \end{aligned}$$

Data (1800-2000, 150 countries)

y = per capita income (Maddison)

D if polity2 > 0 or from Boix-Rosato / Prezworski

Democratic capital:

domestic: $z_{it} = (1 - a_{it}) + \delta z_{it-1}$

Initial value at 0 (1800 / year of independence)

Estimate δ by ML $\delta = [0.94, 0.99]$

foreign: f_{it} = weighted sum of polity2 in neighbors within radius ρ (weights decreasing in distance)

Estimate ρ by ML $\rho = 1$

Figure 1 Domestic democratic capital

Spain vs. Sweden

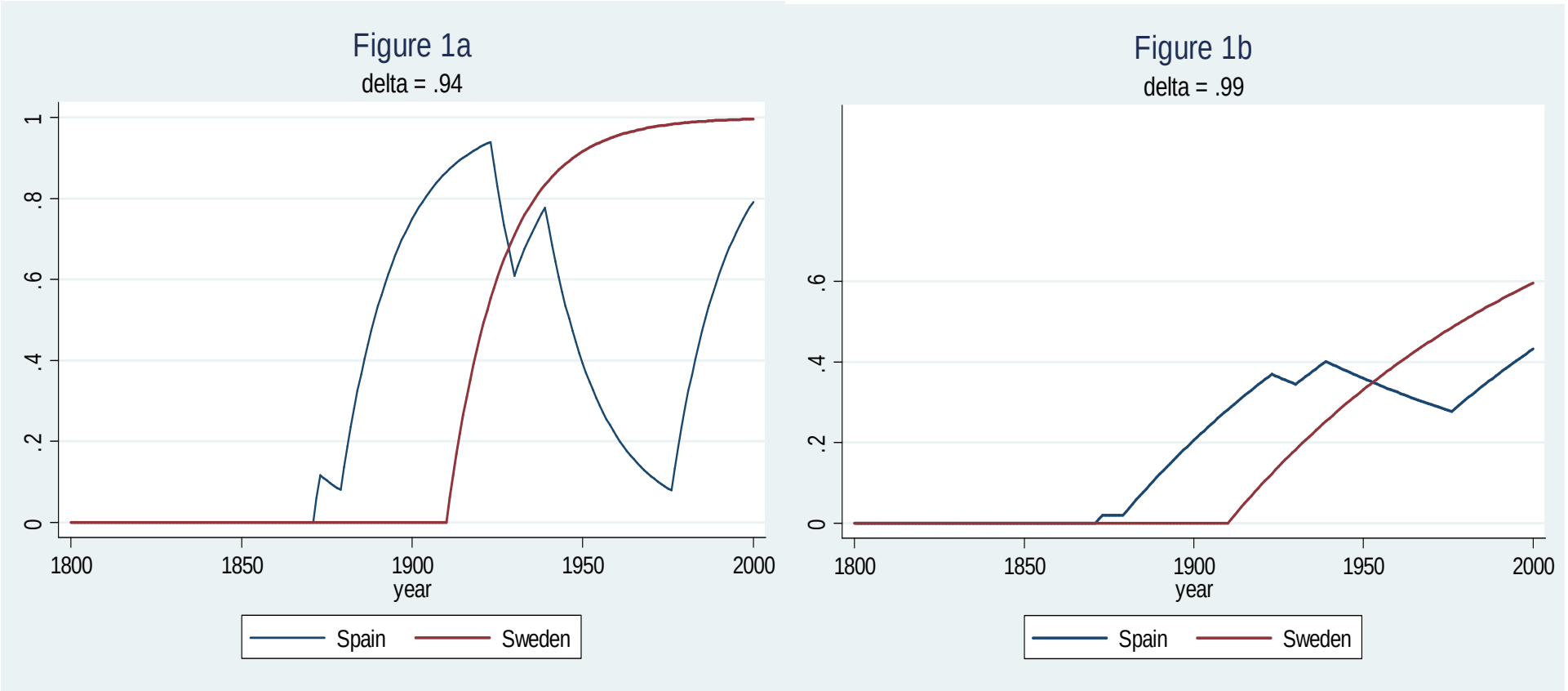
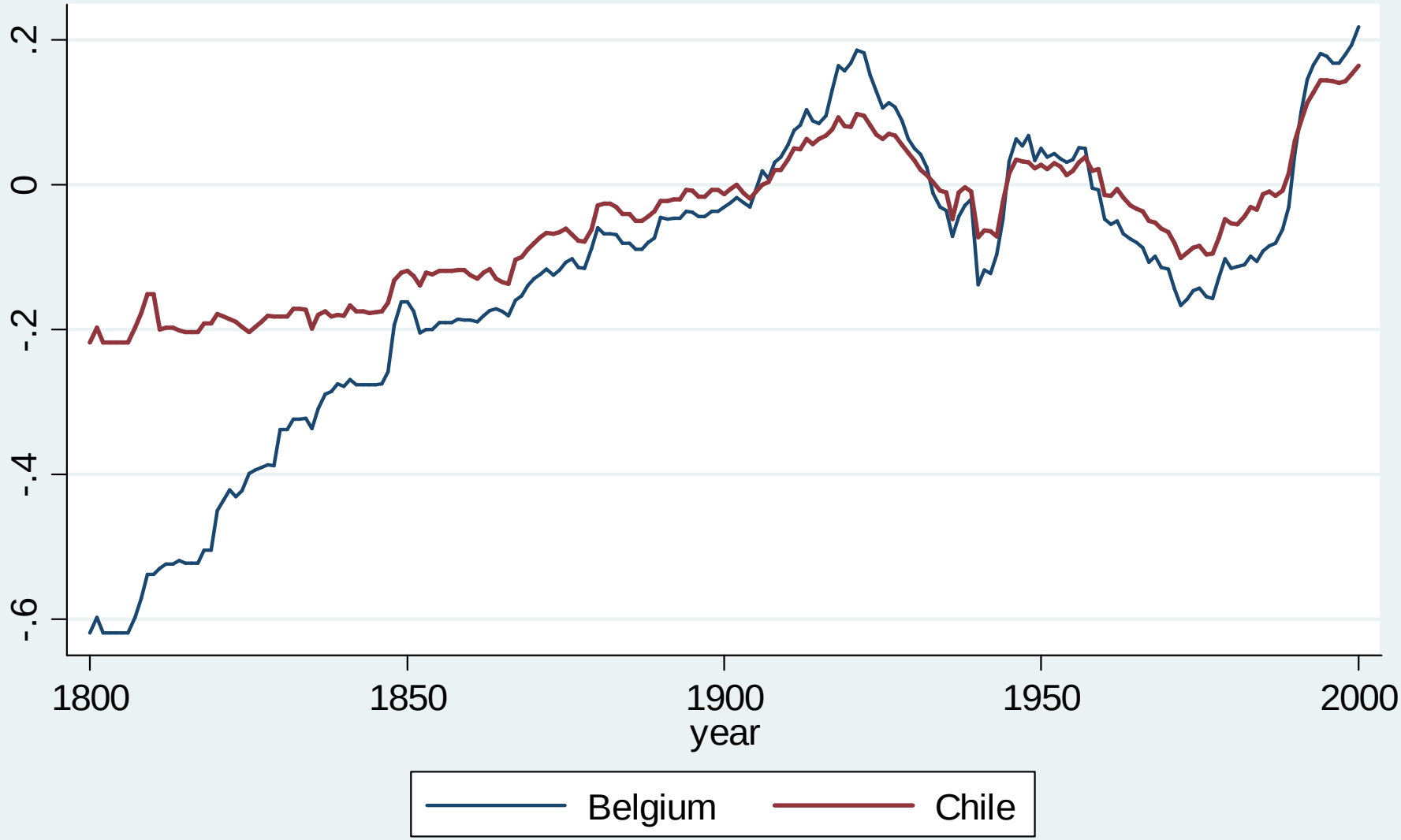


Figure 2 Foreign Democratic Capital



Democratic capital & survey evidence

Attitudes towards democracy in WWS?

"Democracy has many problems, but is best form of government"
average rate of agreement (1-4 scale) in 1999 $\sim$ 60 countries

hold constant income, democracy and human capital

Table 1 Democratic capital and perceptions of democracy and of protection of property rights

	(1) Thinks democracy is best system	(2) Thinks democracy is best system	(3) Thinks democracy is best system	(4) Thinks democracy is best system	(5) Thinks democracy is best system
Domestic dem. capital	29.14***	42.93**	43.52***	46.22***	46.08***
	(10.93)	(16.10)	(11.58)	(15.51)	(13.98)
Foreign dem. capital	263.57**	345.63**	288.26**	321.40**	396.89***
	(114.77)	(136.94)	(110.58)	(131.83)	(128.84)
Per capita income		- 6.23		- 2.29	- 1.14
		(4.92)		(5.01)	(5.82)
Democracy			- 20.92***	- 19.90**	- 3.50
			(7.77)	(8.34)	(9.42)
Human capital					- 19.87**
					(7.93)
Number of obs.	62	59	61	59	46
Adj. R-squared	0.17	0.17	0.26	0.23	0.33

Figure 3 Democratic capital and opinions on democracy

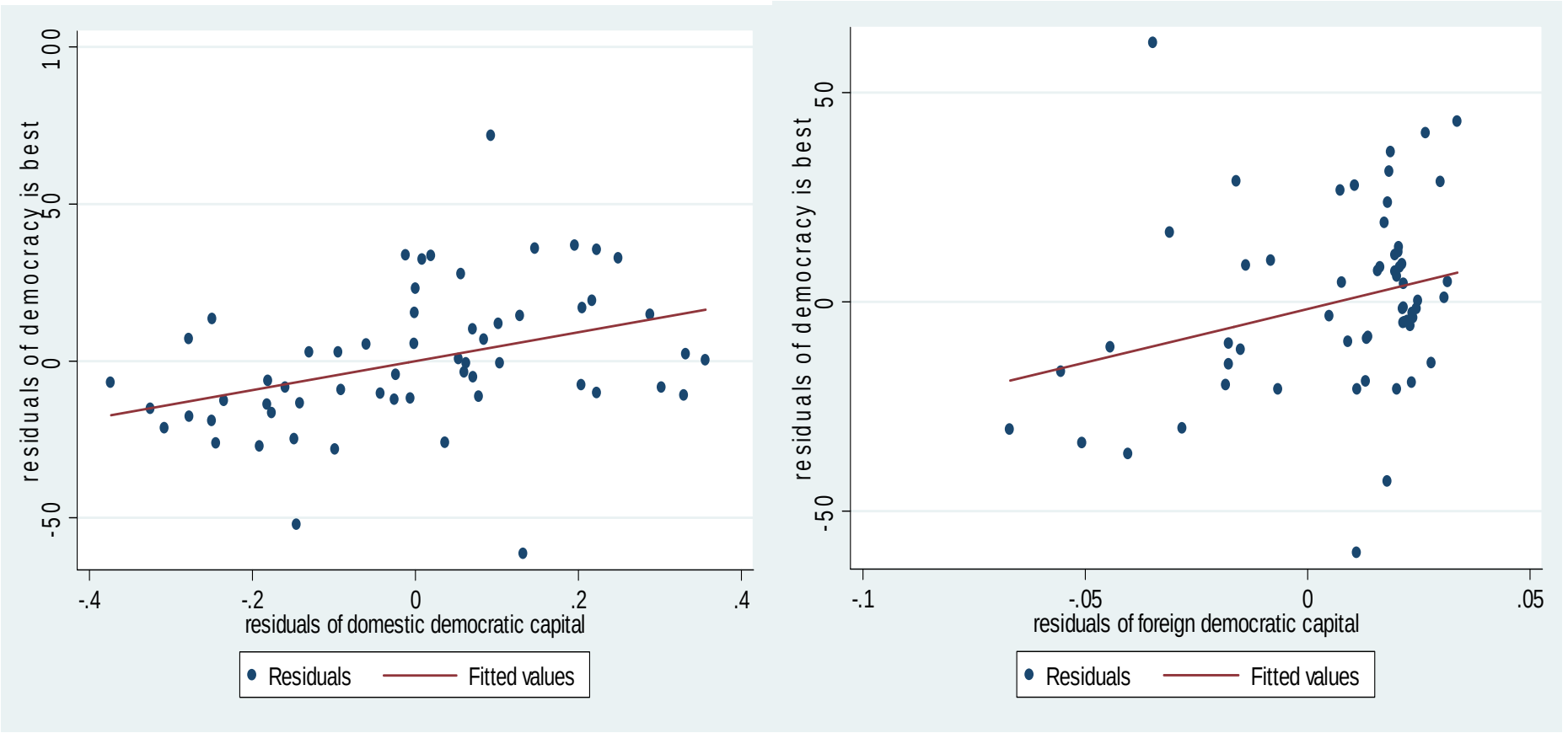


Table 1 Democratic capital and perceptions of democracy and of protection of property rights

	(1) Thinks democracy is best system	(2) Thinks democracy is best system	(3) Thinks democracy is best system	(4) Thinks democracy is best system	(5) Thinks democracy is best system	(6) Perception govt. anti diversion policies	(7) Perception govt. anti diversion policies
Domestic dem. capital	29.14***	42.93**	43.52***	46.22***	46.08***	4.35	2.79
	(10.93)	(16.10)	(11.58)	(15.51)	(13.98)	(5.44)	(5.22)
Foreign dem. capital	263.57**	345.63**	288.26**	321.40**	396.89***	- 61.76*	-49.29
	(114.77)	(136.94)	(110.58)	(131.83)	(128.84)	(32.93)	(32.18)
Per capita income		- 6.23		- 2.29	- 1.14	11.82***	9.36***
		(4.92)		(5.01)	(5.82)	(1.05)	(1.59)
Democracy			- 20.92***	- 19.90**	- 3.50	- 0.07	-0.12
			(7.77)	(8.34)	(9.42)	(2.30)	(2.50)
Human capital					- 19.87**		7.22**
					(7.93)		(2.96)
Number of obs.	62	59	61	59	46	113	90
Adj. R-squared	0.17	0.17	0.26	0.23	0.33	0.69	0.74

Political transitions

Econometric specification

Reduced form hazard rates *within* each regime

$$h^a_{i,t} = H^a(z(\delta)_{i,t-1}, f(\rho)_{i,t-1}, y_{i,t-1}, \mathbf{x}_{i,t}) + \mu_{i,t}, \quad a = 0, 1.$$

Prob. of exit from current regime

Estimate jointly by ML Probit, multiple spells

Impose equal (δ, ρ) across regimes: iterative estimation

Prediction

z, f, y reduce hazard in democracy, raise it in autocracy

Identification

state dependence, via $z_{i,t-1}$, *vs.* unobserved heterogeneity?

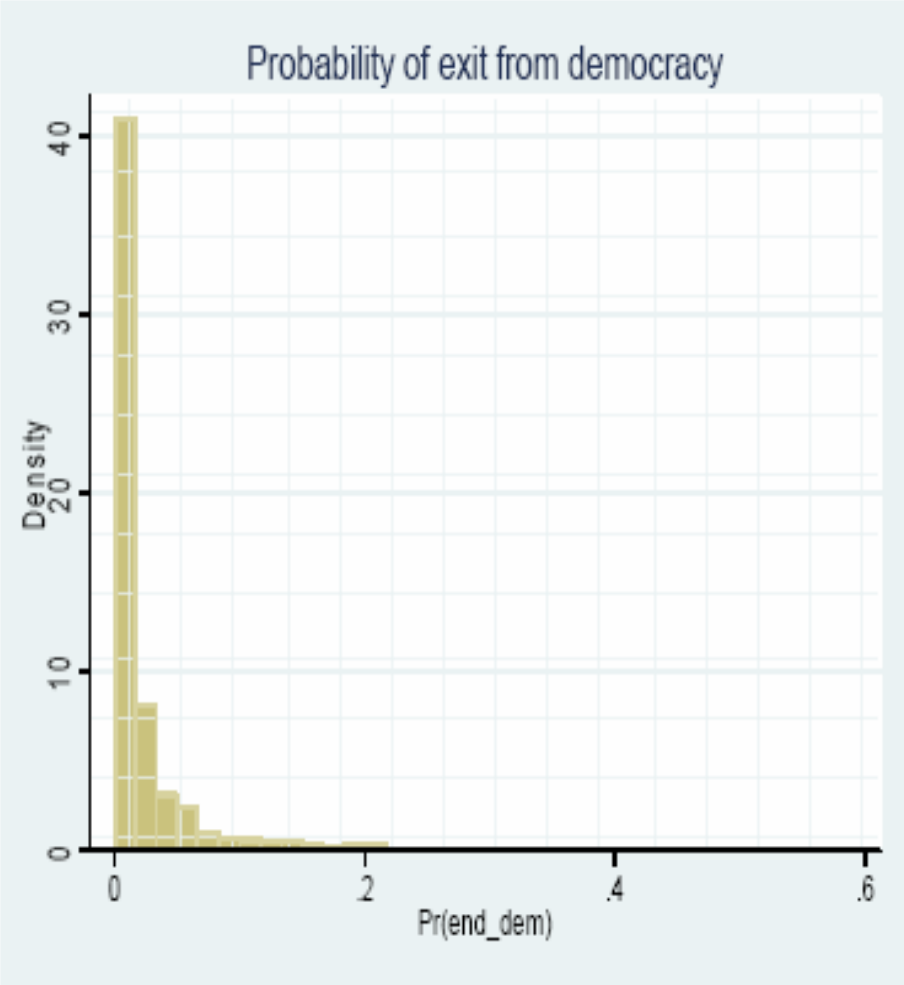
Hazard rates out of political regimes

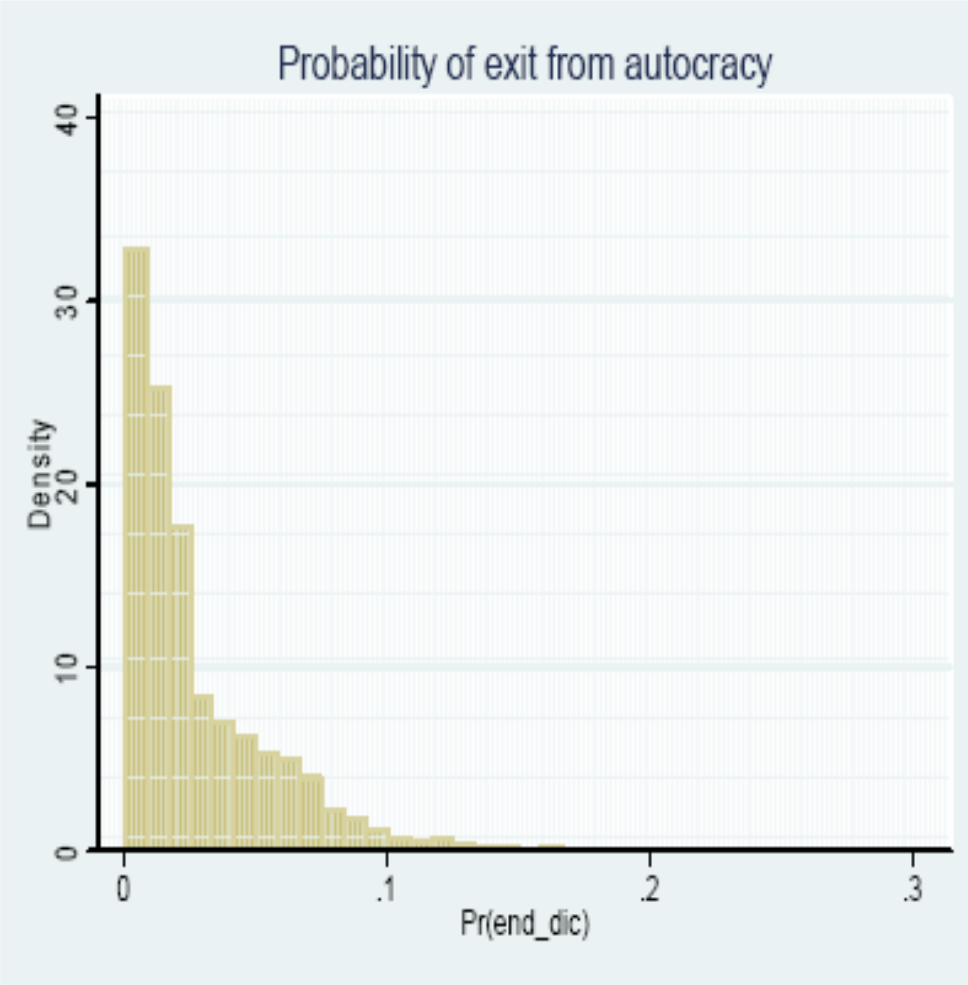
(ML estimates for ($\delta;\rho$) = (0,99; 1))

	Exit from democracy	Exit from autocracy
Domestic democratic capital	- 0.856*	1.058***
	(0.371)	(0.387)
Foreign democratic capital	- 2.359***	1.836***
	(0.702)	(0.384)
Lagged per capita income	- 0.412***	- 0.004
	(0.073)	(0.062)
LR-test (p-value)	0.37	0.14
Number of observations	3786	4349
Pseudo R-square	0.225	0.096

Controls: war, colonial origin, geography, time trend (squared), D at independence

Regime transitions are rare events





z from 0 to 1: cut hazard from Dem by 2%, raise hazard from Aut by 5%

State dependence or unobserved heterogeneity?

- LR test do not favor random coefficient model

- Conditional logit with country FE?
  - Loose long-lived democracies / autocracies
  - Robust effect of Foreign (but not Domestic) dem. cap.
  - Effect of Y on hazards varies with the specification

- Other robustness tests

Prob of exit from current regime

	(1) Exit from democracy	(2) Exit from autocracy	(3) Exit from democracy	(4) Exit from democracy	(5) Exit from autocracy
Domestic democratic capital	- 0.549*	1.091***		- 0.436	1.105**
	(0.303)	(0.272)		(0.560)	(0.467)
Foreign democratic capital	- 1.808**	2.137***	- 2.319***	- 2.299***	2.069***
	(0.750)	(0.492)	(0.700)	(0.701)	(0.455)
Lagged per capita income	- 0.343***	- 0.087	- 0.414***	- 0.412***	0.004
	(0.112)	(0.086)	(0.074)	(0.076)	(0.068)
Human capital	- 0.495*	0.338*			
	(0.261)	(0.187)			
Current democratic capital			-0.983**		
			(0.400)		
Past democratic capital			-0.539		
			(0.573)		
Duration of current spell				-0.432	0.000
				(0.368)	(0.001)
δ, ρ	0.94, 1	0.94, 1	0.99, 1	0.99, 1	0.99, 1
Covariates	No	No	Yes	Yes	Yes
Definition of democracy	Polity	Polity	Polity	Polity	Polity
Method	ML Probit	ML Probit	ML Probit	ML Probit	ML Probit
LR-test (p-value)	0.24	0.05	1.00	1.00	0.00
Number of observations	1947	1924	3786	3777	4329
Pseudo R-square	0.22	0.06	0.23	0.23	0.12

Economic growth
Within regimes – structural form

$$y^a_{i,t} - y^a_{i,t-1} = \beta y^a_{i,t-1} + \boldsymbol{\gamma}\mathbf{x}_{i,t} + \lambda^a \widehat{h}^a_{i,t} + \sigma_i + \theta_t + \epsilon_{i,t}, \;\; a = 0, 1$$

Control for: country-year FE (σ_i, θ_t), wars, "foreign income"

Predictions (given $\alpha > 0$)

$\lambda^0 < 0$ in democracy, $\lambda^1 > 0$ in autocracy

Identification of λ^a

only from within country time variation in $\widehat{h}^a_{i,t}$

exploit exclusion restriction: z, f no direct effect on y

include all other variables behind $\Delta\widehat{h}^a_{i,t}$ plus foreign y

Over-identified model

Two exluded variables, plus functional for restriction

Table 4 Growth rates within political regimes – structural estimates

	(1) Growth in democracies	(2) Growth in democracies	(3) Growth in autocracies	(4) Growth in autocracies
Hazard rate	- 12.20***	-12.31***	- 25.87*	- 26.94*
	(4.56)	(4.55)	(15.32)	(15.77)
Lagged income per capita	- 4.32***	- 4.41***	- 2.79***	- 2.70***
	(0.61)	(0.62)	(0.55)	(0.57)
Transition years	- 0.81*	- 0.80*	- 1.62***	- 1.59***
	(0.48)	(0.48)	(0.52)	(0.52)
Domestic democratic capital		1.75		0.16
		(1.62)		(3.64)
Foreign democratic capital		- 4.46		7.92
		(3.83)		(8.45)
Sargan-Hansen statistic	2.18		1.01	
F-statistic		1.15		0.44
Number of observations	3774	3774	4296	4296
(countries)	(111)	(111)	(117)	(117)
Adj. R-squared	0.20	0.20	0.12	0.12

Across regimes – structural specification

$$y_{i,t} - y_{i,t-1} = \beta y_{i,t-1} + \boldsymbol{\gamma}\mathbf{x}_{i,t} + \lambda \widehat{p}^{a}_{i,t} + \varphi(1 - a_{i,t}) + \sigma_i + \theta_t + \epsilon_{i,t}$$

$\widehat{p}^{a}_{i,t} = prob.$autocracy, obtained from estimated $\widehat{h}^{a}_{i,t}$

Predictions

$\lambda < 0$ and $\varphi > 0$

Identification

λ as within-regime case

φ (diff-in-diff) path of $\epsilon_{i,t}$ uncorrelated with $a_{i,t}$

strong correlation between $\widehat{p}^{a}_{i,t}$ and $1 - a_{i,t}$

hard to disentangle effects of actual and expected regimes

$a_{i,t}$ endogenous, according to model

Structural model: Growth across political regimes

	Growth		
Democracy	0.40*	0.64	0.94
	(0.22)	(0.64)	(0.62)
Probability of autocracy		-0.01	0.41
		(0.77)	(0.62)
Probability of autocracy in (lagged) democracy		-5.96***	-2.61
		(2.61)	(2.65)
Transition years	-1.80**		-1.61***
	(0.37)		(0.35)
Number of observations	8288	8055	8055
(countries)	(149)	(148)	(148)
R-square (within)	0.14	0.14	0.14

Controls: year & country FE, war, foreign Y, dummy for transition countries post 1989

Across regimes – reduced form specification

$$y_{i,t} - y_{i,t-1} = \beta y_{i,t-1} + \boldsymbol{\gamma}\mathbf{x}_{i,t} + \pi^z z_{i,t-1} + \pi^f f_{i,t-1} + \sigma_i + \theta_t + \epsilon_{i,t}$$

z, f affect growth via both *actual* and *expected* regime

Prediction

$\pi^z, \pi^f > 0$

Identification

π^z, π^f no problem, but cannot distinguish channels of influence

Reduced from: Growth across political regimes

	Growth		
Domestic democratic capital	3.34 ***	-0.24	-0.64
	(1.08)	(1.63)	(1.82)
Foreign democratic capital	-2.93	-2.22	-2.58
	(3.36)	(3.55)	(3.60)
Domestic democratic capital in (lagged) democracy		2.68**	3.16**
		(1.24)	(1. 51)
Foreign democratic capital in (lagged) democracy		2.61*	2.53*
		(1.39)	(1.43)
Lagged democracy			-0.16
			(0.29)
Observations	8379	8379	8127
(countries)	(149)	(149)	(149)
R-square (within)	0.14	0.14	0.14

Controls: year & country FE, war, foreign Y, dummy for transition countries post 1989

Summary of main findings

- What determines onset & consolidation of D?
  - domestic & foreign democratic capital
  - Y (but only under D)

- Does D => Y ? yes
  - risk of exit from D hurts growth
  - D is good for growth (?)
  - democratic capital is good for growth

Altogether, stable D good for growth.

But actual /expected regime difficult to disentangle

- Virtuous circle: D⇔ Y

Puzzles and caveats

- Why asymmetry beween D / ND?
  - In ND:
    - Y does not enter hazard rate
    - Risk of exit does not raise growth
    - DK has no effect on growth

- Two identifying assumptions:
  - no unobserved heterogeneity in hazards
  - democratic capital no direct effect on growth

    Cannot reject over-id tests, but how powerful?

What next?

- What is domestic democratic capital and how is it accumulated?
  - culture / education / rise of middle classes / media
- Why global developments of D and Y?
  - foreign spillovers vs domestic accumulation
- Allow for heterogeneity in D / ND
  - D - form of govt: Presidential vs Parliamentary
  - D - electoral rule: MAJ vs PR
  - ND: different types of autocracies