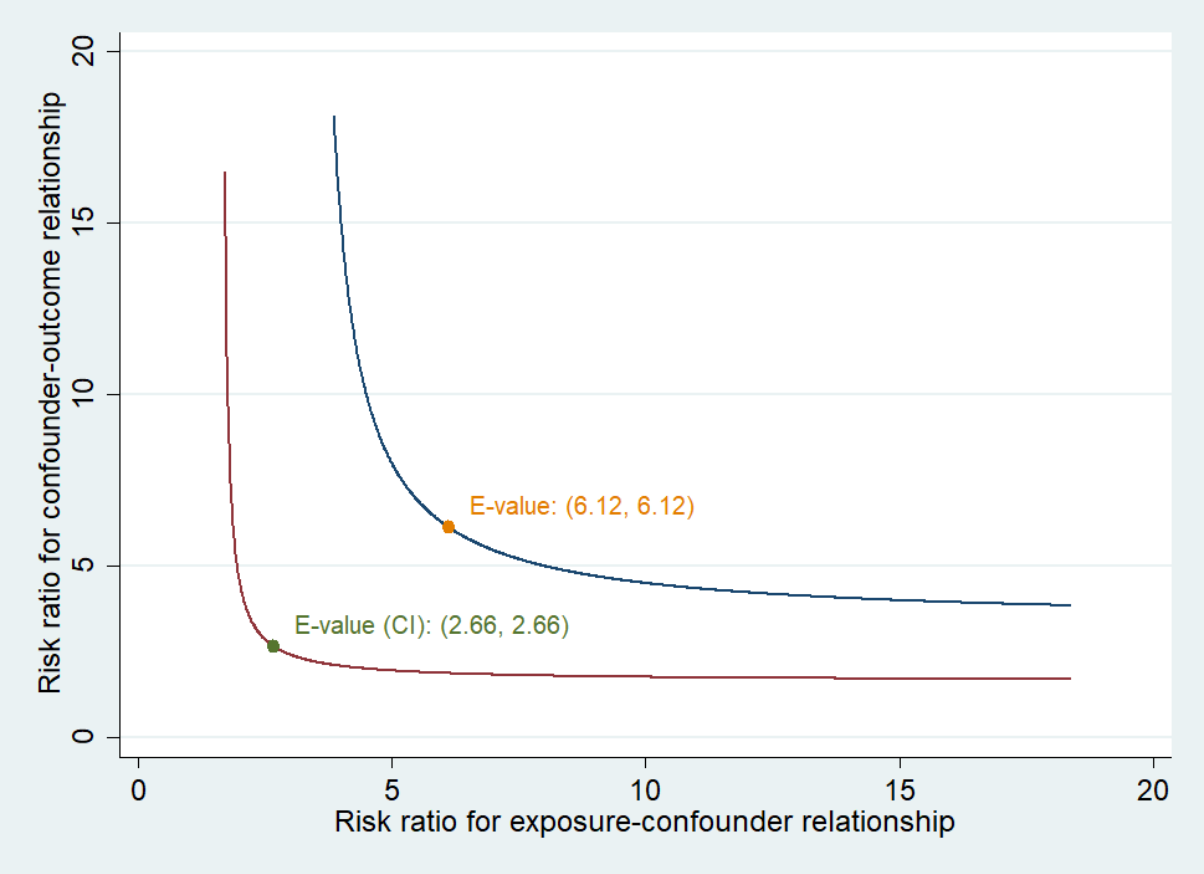
Appendix

Contents

1 Sensitivity Analysis

Figure A1: Sensitivity Analysis



2 Instrumental Variable Approach

2.1 Rationale for Measuring Diffusion Pressure

The instrumental variable (IV) approach relies on the diffusion pressure of vertical succession norms (VSNs) from neighboring states. This measure captures the extent to which a state is exposed to neighbors slow in adopting VSNs. The underlying assumption is that succession practices do not evolve in isolation–neighboring states shape each other's political norms and institutional choices.

One mechanism for diffusion is regional norm convergence. As DiMaggio, Powell, et al. (1983, p. 148) argues, institutions tend to diffuse through normative and legitimacy pressures. If VSNs become widely adopted in a region, rulers may face growing expectations to align with this prevailing practice. Deviations from the regional norm may be perceived as outdated or destabilizing, incentivizing elites to conform. Additionally, transitioning to VSNs is likely smoother when neighboring states have already adopted similar succession norms, as political actors are more familiar with the practice.

A second, less common mechanism is strategic influence from external powers. In some cases, dominant states intervened in the succession politics of neighboring polities to maintain or restore what they perceived as the rightful order (e.g., Qi sometimes intervened in Lu's succession politics).

Given these mechanisms, diffusion pressure serves as a reasonable proxy for regional resistance to VSN adoption. It is defined as:

$$\text{Diffusion Pressure}_{it} = \frac{\text{Neighbors with Short Ancestral Distance to Shang or Zhou}_{it}}{\textit{Number of Neighbors}_{it}} \tag{1}$$

where Diffusion Pressure$_{it}$ represents the proportion of a state' s neighbors that have short ancestral distances to the Shang or Zhou dynasties. A state is classified as having a short ancestral distance if its founding fathers shared the same family name as the royal

families of these dynasties.[1] Historical sources, such as the Zuo Commentary, suggest that states with ancestral ties to Shang and Zhou also shared broader cultural and political similarities. For example, in《Zuo Commentary. Second Year of Duke Zhao of Lu》, it says that "the rituals of the Zhou Dynasty are fully embodied in the state of Lu." And Lu's founding father was direct descendants of the royal families of Zhou. Thus, we expect thee shared cultural and political similarities extend to their succession norms, which is confirmed by the data.

2.2 Relevance and Exclusion Restriction

A valid instrument must be both relevant and satisfy the exclusion restriction. Relevance requires that the instrument strongly predicts the endogenous variable, while the exclusion restriction ensures that it affects the dependent variable only through its effect on VSN institutionalization.

Empirically, ancestral distance is a significant predictor of VSN institutionalization. However, since it remains constant over time, its first-stage F-statistic falls slightly below 10, raising concerns about weak instrument bias. To strengthen identification, we refine the instrument by incorporating diffusion pressure across two historical periods (Spring-Autumn and Warring States), improving the first-stage F-statistic to 20.

The exclusion restriction requires that ancestral distance influences monarch survival only through its effect on succession norms. A potential concern is that vassal states with closer ancestral ties to Shang/Zhou may have received larger or more fertile territories, which could directly impact their stability. However, historical evidence suggests that this concern is minimal. The original territorial designations of vassal states were often disrupted by migrations and conquests, with many states relocating hundreds or thousands of miles from their initial settlements (Yang, 2003, p. 154). Moreover, by the Warring States period, most of these early vassal states had already ceased to exist, suggesting that land assignments at the time of their founding did not determine long-term

[1]These family names include Zi, Ji, and Jiang. Jiang is included because Jiang Ziya, who helped King Wu of Zhou overthrow the Shang Dynasty, was appointed as the prime minister of Zhou, making the Jiang family part of the Zhou ruling elite.

survival. When controlling for state capacity, external threats, and other confounders, it is plausible that ancestral distance in 1000 BCE affects autocratic survival three centuries later solely through its impact on VSN institutionalization.

Table A1: Vertical Succession Norms and Autocratic Survival: Instrumental Variable Approaches

	(1) First Stage	(2) 2SLS	(3) First Stage	(4) 2SLS
Diffusion Pressure	0.774***		0.848***	
	(0.176)		(0.181)	
Institutionalization of VSN		-0.011*		-0.016+
		(0.005)		(0.009)
Length of ruling (t-1)			0.001	0.000
			(0.002)	(0.000)
Exit mode (t-1)			-0.107+	0.006
			(0.063)	(0.004)
External threat			0.039	0.001
			(0.048)	(0.002)
Number of counties			-0.030	0.001
			(0.065)	(0.002)
t			0.007**	-0.002**
			(0.002)	(0.001)
t^2			-0.000*	0.000*
			(0.000)	(0.000)
t^3			0.000	-0.000*
			(0.000)	(0.000)
F-statistics	19.31		22.04	
Country RE	YES	YES	YES	YES
Observations	6744	6744	6176	6176
Clusters	17	17	17	17

Robust standard errors in parentheses, clustered by country.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

2.3 Alternative Instruments Considered

We explored several alternative instrumental variables, but they were ultimately unsuitable. One potential IV was the sex of a monarch' s first-born child, which, if randomly assigned, would provide exogenous variation in succession norms. However, historical records do not consistently document the first-born child's sex, making it infeasible as an

instrument. Another possibility was geographical distance to the capital of the Eastern Zhou Dynasty, but it was not a significant predictor of VSN institutionalization. Finally, we considered Confucius' travels (497–484 BCE) as a proxy for exposure to Confucian ideas about governance and hierarchy, yet this variable also failed to predict the institutionalization of VSNs.

3 Robustness Checks

3.1 Alternative Measurements

In the baseline model, VSN institutionalization is coded as 1 if five consecutive monarchs were succeeded by their sons. As robustness checks, we code VSN institutionalization as 1 if four consecutive monarchs are succeeded by their sons; if 1 out of four consecutive monarchs are succeeded by their sons; if the monarch took office during the Warring States period (according to the broad consensus among historians (Wang, 1980; Li, 1987)). All the results remain consistent.

Table A2: Alternative Measures of VSN Institutionalization

	(1) 4 out of 5	(2) 4 out of 5	(3) 4 Consecutive	(4) 4 Consecutive	(5) Historian measure	(6) Historian measure
VSN Institutionalization	-0.821^{***}	-0.013^{**}	-1.202^{***}	-0.017^{**}	-0.514^{+}	-0.008^{+}
	(0.198)	(0.003)	(0.286)	(0.005)	(0.281)	(0.004)
Length of ruling (t-1)	0.004	0.000	0.008	0.000	0.004	0.000
	(0.007)	(0.000)	(0.008)	(0.000)	(0.007)	(0.000)
Exit mode (t-1)	0.210	0.003	0.123	0.001	0.249	0.004
	(0.292)	(0.005)	(0.278)	(0.005)	(0.295)	(0.005)
External threat	0.150	0.002	0.216	0.003	0.072	0.001
	(0.206)	(0.002)	(0.209)	(0.002)	(0.194)	(0.002)
Number of counties	0.161	0.002	0.054	0.001	0.127	0.002
	(0.191)	(0.002)	(0.213)	(0.002)	(0.177)	(0.002)
cubic1	-0.165^{**}	-0.002^{**}	-0.157^{*}	-0.002^{*}	-0.164^{**}	-0.002^{*}
	(0.060)	(0.001)	(0.062)	(0.001)	(0.062)	(0.001)
cubic2	0.006^{*}	0.000^{*}	0.005^{*}	0.000^{*}	0.005^{*}	0.000^{*}
	(0.003)	(0.000)	(0.003)	(0.000)	(0.003)	(0.000)
cubic3	-0.000^{+}	-0.000^{*}	-0.000	-0.000^{*}	-0.000^{+}	-0.000^{*}
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	5661	6176	5661	6176	5661	6176
Clusters	14	17	14	17	14	17

Robust standard errors in parentheses, clustered by states.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.2 Rare Event Logit Models

Table A3: Rare Event Logit Models

	(1) removal	(2) removal
VSN Institutionalization	-1.135^{***}	-1.149^{**}
	(0.296)	(0.372)
Length of ruling (t-1)		0.006
		(0.007)
Exit mode (t-1)		0.435
		(0.267)
External threat		0.089
		(0.150)
Number of counties		0.056
		(0.122)
cubic1		-0.150^{*}
		(0.062)
cubic2		0.004
		(0.003)
cubic3		-0.000
		(0.000)
Observations	6744	6176
Clusters	17	17

Robust standard errors in parenthesis, clustered by states.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.3 Survival Models

Table A4: Cox Proportional Hazards Models

	(1) Model 1	(2) Model 2
VSN Institutionalization	-0.768^{+}	-1.014^{*}
	(0.411)	(0.440)
Length of ruling (t-1)		0.003
		(0.011)
Exit mode (t-1)		-0.038
		(0.370)
External threat		0.032
		(0.187)
Number of counties		0.146
		(0.173)
Country Stratification	Yes	Yes
Observations	6386	5835

Robust standard errors in parentheses.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.4 Leader as the Unit of Analysis

Table A5: Leader as the Unit of Analysis

	(1) Conditional Logit	(2) Conditional Logit	(3) Linear	(4) Linear
VSN Institutionalization	-2.857^{**}	-3.514^{**}	-0.140^{*}	-0.141^{*}
	(0.892)	(1.235)	(0.048)	(0.062)
Length of ruling (t-1)	0.013	0.008	0.001	0.000
	(0.013)	(0.015)	(0.001)	(0.001)
Exit mode (t-1)	0.673^{+}	0.379	0.052	0.042
	(0.391)	(0.489)	(0.044)	(0.046)
External threat	0.396^{*}	1.022	0.017	0.025
	(0.179)	(0.639)	(0.011)	(0.021)
Number of counties	-0.066	-0.593	0.004	-0.004
	(0.460)	(0.592)	(0.011)	(0.016)
Country FE	Yes	Yes	Yes	Yes
Century FE	No	Yes	No	Yes
Observations	238	238	341	341
Clusters	10	10	17	17

Robust standard errors in parenthesis, clustered by states.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.5 Century/Decade Fixed Effects

Table A6: Century and Decade Fixed Effects

	(1) Conditional Logit	(2) Linear	(3) Conditional Logit	(4) Linear
VSN Institutionalization	-1.253^{*}	-0.015^{+}	-2.105^{**}	-0.016^{+}
	(0.513)	(0.007)	(0.705)	(0.008)
Length of ruling (t-1)	0.004	0.000	0.002	0.000
	(0.007)	(0.000)	(0.010)	(0.000)
Exit mode (t-1)	0.102	0.002	−0.530	−0.003
	(0.297)	(0.005)	(0.463)	(0.006)
External threat	0.491	0.003	0.380	0.002
	(0.355)	(0.003)	(0.295)	(0.003)
Number of counties	−0.025	0.001	0.310	0.003
	(0.251)	(0.002)	(0.218)	(0.002)
t	-0.157^{*}	-0.002^{*}	-0.140^{*}	-0.002^{*}
	(0.063)	(0.001)	(0.067)	(0.001)
t^2	0.005^{*}	0.000^{*}	0.006^{+}	0.000^{*}
	(0.003)	(0.000)	(0.003)	(0.000)
t^3	−0.000	-0.000^{*}	−0.000	-0.000^{*}
	(0.000)	(0.000)	(0.000)	(0.000)
Country FE	YES	YES	YES	YES
Century FE	YES	YES	NO	NO
Decade FE	NO	NO	YES	YES
Observations	5661	6176	5661	6176
Clusters	14	17	14	17

Robust standard errors in parentheses, clustered by states.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.6 Exclude Short-lived Monarchs

Table A7: Exclude Short-Lived Monarchs

	Conditional Logit Tenure>1	Linear Tenure>1	Conditional Logit Tenure>5	Linear Tenure>5
VSN Institutionalization	-0.737^{+}	-0.008^{*}	-1.021^{**}	-0.011^{+}
	(0.386)	(0.003)	(0.378)	(0.005)
Length of ruling (t-1)			0.000	0.000
			(0.012)	(0.000)
Exit mode (t-1)			−0.147	−0.002
			(0.321)	(0.003)
External threat			0.066	0.001
			(0.264)	(0.002)
Number of counties			0.106	0.001
			(0.200)	(0.002)
t			0.041	0.000
			(0.072)	(0.001)
t^2			−0.003	−0.000
			(0.003)	(0.000)
t^3			0.000	0.000
			(0.000)	(0.000)
Observations	6134	6717	5634	6149
Clusters	14	17	14	17

Robust standard errors in parenthesis, clustered by states.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.7 Exclude Leaders After 250 BCE

Table A8: Exclude the "Jump"

	(1) Conditional Logit	(2) Linear	(3) Conditional Logit	(4) Linear
VSN Institutionalization	-1.006^{**}	-0.012^{**}	-1.237^{***}	-0.016^{*}
	(0.363)	(0.004)	(0.359)	(0.006)
Length of ruling (t-1)			0.006	0.000
			(0.007)	(0.000)
Exit mode (t-1)			0.174	0.002
			(0.292)	(0.005)
External threat			0.168	0.002
			(0.192)	(0.002)
Number of counties			0.076	0.001
			(0.227)	(0.002)
t			-0.148^{*}	-0.002^{*}
			(0.060)	(0.001)
t^2			0.005^{+}	0.000^{*}
			(0.003)	(0.000)
t^3			-0.000	-0.000^{*}
			(0.000)	(0.000)
Country FE	YES	YES	YES	YES
Observations	6102	6641	5602	6073
Clusters	14	17	14	17

Robust standard errors in parentheses, clustered by states.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.8 Control For The Relationship with Previous Monarch

Table A9: Control For Relationship With Previous Monarchs

	(1) Conditional Logit	(2) Linear	(3) Conditional Logit	(4) Linear
VSN Institutionalization	-0.837^{+}	-0.010^{*}	-1.108^{*}	-0.014^{+}
	(0.440)	(0.005)	(0.435)	(0.007)
Son of predecessor	-0.534^{+}	-0.007^{+}	-0.525	-0.006
	(0.299)	(0.004)	(0.504)	(0.007)
Length of ruling (t-1)			0.008	0.000
			(0.006)	(0.000)
Exit mode (t-1)			-0.131	-0.001
			(0.472)	(0.007)
External threat			0.186	0.002
			(0.204)	(0.002)
Number of counties			0.081	0.001
			(0.207)	(0.002)
t			-0.158^{*}	-0.002^{*}
			(0.062)	(0.001)
t^2			0.005^{*}	0.000^{*}
			(0.003)	(0.000)
t^3			-0.000^{+}	-0.000^{*}
			(0.000)	(0.000)
Country FE	*Yes*	*Yes*	*Yes*	*Yes*
Observations	6161	6744	5661	6176
Clusters	14	17	14	17

Robust standard errors in parentheses, clustered by states.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4 Terminologies

Terminologies

"Ancient China": I use the word "ancient China" to refer to "an era within the geographical confines of modern China that was the cradle of Chinese culture and civilization (Zhao, 2015, p. 51)."

"Primogeniture": the concept of primogeniture was created to depict European phenomena, and it imposes inaccuracies when applied to the Chinese context. I should clarify that in the Chinese context, a monarch can have multiple concubines but he can only have one legal wife, and primogeniture specifies that succession right goes to the eldest son of the monarch's legal wife. I use the same term to depict similar succession rules across cultures because it facilitates comparison.

"Feudal system": the concept of feudalism was created to depict European phenomena, and it imposes inaccuracies when applied to the Chinese context. I fully acknowledge that there is a debate on whether it is appropriate to use the term "feudalism" to describe the political and economic system of the Western Zhou.

5 Historical Cases of Informal Succession Rules

However, throughout human history, informal succession rules have featured an important political landscape for various dynasties and empires. Among Arabian dynasties, "no firm principle specified which member of the ruling family had the right to rule (Herb, 1999, p. 22)." The vast majority of dynasties in the Middle East had the same principle. For example, though primogeniture became the de facto succession order in the Ottoman Empire after 1617, it was not formalized legally (Alderson, 1956). Empires in Asia had the same pattern. The Mughal Empire in India had no formal succession rules. In Japan, there were no formal rules governing succession to the throne until the 1889 Meiji Constitution. Also, succession rules were never formalized in ancient and imperial China (Li, 1987). While most European states have witnessed the development of formal succession rules since 1500 CE, most polities did not have a clear succession rules for female heirs during the medieval period (Acharya & Lee, 2019).

6 Lineage Law in Ancient China

The core concepts of lineage law are Major Lineage (dazong) and Minor Lineage (xiaozong). The king of Zhou was the head of the Major Lineage for the whole kingdom and the eldest son of his legal wife was supposed to inherit the throne. The king's younger sons or sons of concubines became vassals or nobles who belonged to the Minor Lineage relatives to the king of Zhou. However, vassals were the head of the Major Lineage in their own territories and similarly, the eldest sons of their legal wives were supposed to succeed the lordship and younger sons or sons of concubines became nobles who belonged to the Minor Lineage relative to the vassals. Under lineage law, not only the state became

a private entity of the royal family, but the political order was seen as dictated by lineage principles (Zhao, 2015).

7 State Founders

Wey: the founder of Wey was one of the sons of the King Wen of Zhou.

Wu: the founder of Wu was one of the sons of the King Tai of Zhou.

Song: the founder of Song was one of the brothers of the King Zhou of Shang.

Jin: the founder of Jin was one of the sons of the King Wu of Zhou.

Cao: the founder of Cao was one of the sons of the King Wen of Zhou.

Chu: the founder of Chu was not descendant of the royal families of the Shang or the Zhou Dynasties.

Yan: the founder of Yan was one of the sons of Duke of Shao, and Duke of Shao was one of the brothers of the King Wu of Zhou.

Qin: the founder of Qin was not descendant of the royal families of the Shang or the Zhou Dynasties.

Cai: the founder of Cai was one of the sons of the King Wen of Zhou.

Zhao: Zhao was created from the three-way Partition of Jin, and its founder was not directly related to the royal families of the Shang or the Zhou Dynasties.

Yue: the founder of Yue was one of the sons of Wuyu, and Wuyu was one of the sons of the sixth king of the Xia dynasty.

zheng: the founder of Zheng was one of the brothers of the King Xuan of Zhou.

Chen: the founder of Chen is the son in law of the King Wu of Zhou.

Han: Zhao was created from the three-way Partition of Jin, and its founder was not directly related to the royal families of the Shang or the Zhou Dynasties.

Wei: Wei was created from the three-way Partition of Jin, and its founder was not directly related to the royal families of the Shang or the Zhou Dynasties.

Lu: the founder of Lu was one of the sons of Duke Wen of Zhou.

Qi: the founder of Qi was Jiang Ziya. While Jiang Ziya was not related to the king of

Zhou by blood, he served as the de facto prime minister for the King Wen of Zhou and the King Wu of Zhou. And therefore it is fair to say Jiang Ziya was very close to the royal families of Zhou or he himself belonged to the royal families of Zhou.

Sources: Yang (2003)

8 Data on Aristocratic Lineages

Data on the aristocratic lineages are from He (1996, p. 202-203). In the book, the author lists all the names of the aristocratic lineages for 10 states during the Spring and Autumn Period. And the author classifies aristocratic lineages into three groups according to how long they lasted: those that lasted 3-4 generations, 5-8 generations, and 9 generations and above.

This measure of elite competition matches history well. Jin, Lu, and Qi had the highest values of the total number of generations of the aristocratic lineages, and elite competition in these states were most acute (Zhao, 2015, p. 147). Qin had one of the lowest values of this measure, and it unified China eventually. There is no evidence that this measure correlates with the size of a state, as small states such as Song and Wey also had large values for this measure of elite competition.

9 China VS. European States

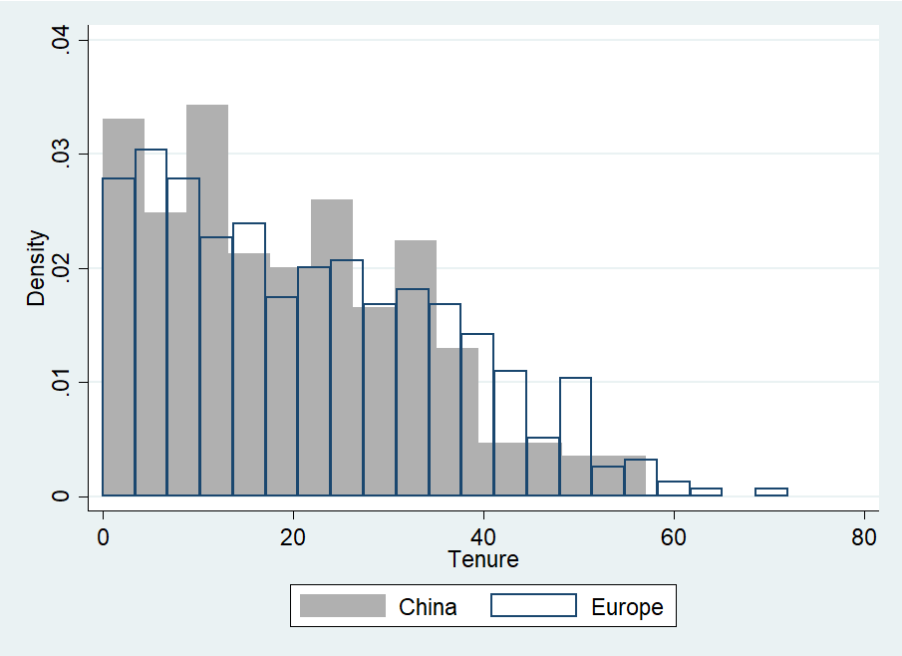


Figure A2: Distribution of Leader Tenure: China VS. Europe

Table A10: Comparison With European States: Leader as the Unit of Analysis

	(1) Logit	(2) Linear	(3) Logit	(4) Linear
China	−0.390	−0.041	−0.416	−0.047
	(0.324)	(0.039)	(0.300)	(0.034)
Foreign threat			0.189	0.022
			(0.194)	(0.024)
Exit Mode (t-1)			1.217***	0.197***
			(0.269)	(0.055)
Observations	644	644	610	610
Clusters	45	45	44	44

Robust standard errors in parentheses, clustered by states.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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