Foreign Faith and Rising State: An Examination of State-Building Dynamics in Late 16th Century Japan

Online Appendix

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1 Details of Outcome and Control Variables

Table A.1 presents the years from 1582 to 1598 along with the corresponding provinces being surveyed. The data are collected from Morisue and Ozawa (1965, p.228). One small island province, Sado, which is not plotted in Figure 1c of the main text and not included in our estimation sample, was surveyed once in 1592. Totomi and Mikawa were both surveyed twice in 1590, Shinano was surveyed twice in 1591, and Chikuzen was surveyed twice in 1595. This brings the total number of surveys to 166.

Table A.1: Provinces under Survey in 1582-1598

Year	Survey Count	Inspected Province
1582	3	Yamashiro, Omi, Noto
1583	4	Omi, Shinano, Kaga, Noto
1584	7	Yamashiro, Omi, Kawachi, Harima, Echizen, Kaga, Mino
1585	5	Yamashiro, Omi, Kii, Yamato, Awa-2
1586	2	Yamato, Kawachi
1587	6	Yamato, Iyo, Higo, Noto, Shinano, Tosa
1588	8	Yamashiro, Higo, Iyo, Wakasa, Etchu, Aki, Tosa, Shinano
1589	16	Yamashiro, Mino, Awa-2, Chikuzen, Higo, Noto, Bizen, Iwami, Suo, Suruga, Nagato, Tosa, Mikawa, Kai, Shinano, Totomi
1590	19	Mutsu, Dewa, Shimosa, Awa-1, Sagami, Suruga, Totomi (twice), Mikawa (twice), Mino, Kii, Shinano, Musashi, Izu, Bizen, Iwami, Suo, Tosa
1591	20	Omi, Yamashiro, Yamato, Settsu, Mutsu, Chikuzen, Bungo, Buzen, Shinano (twice), Musashi, Sagami, Kozuke, Shimotsuke, Kazusa, Shimosa, Kaga, Bitchu, Izumo, Suo
1592	10	Omi, Yamashiro, Mikawa, Owari, Sado, Musashi, Sagami, Izu, Noto, Bitchu
1593	9	Mutsu, Owari, Bungo, Satsuma, Hyuga, Osumi, Tosa, Sagami, Dewa
1594	14	Hitachi, Mutsu, Ise, Settsu, Izumi, Kawachi, Satsuma, Hyuga, Osumi, Musashi, Sagami, Awa-1, Shimosa, Izu
1595	20	Yamato, Harima, Kawachi, Owari, Shinano, Echigo, Chikuzen (twice), Chikugo, Hizen, Higo, Hyuga, Satsuma, Osumi, Mutsu, Dewa, Musashi, Izu, Etchu, Bizen
1596	8	Tanba, Higo, Kai, Musashi, Sagami, Bizen, Bingo, Chikugo
1597	5	Yamashiro, Awa-1, Musashi, Tosa, Echigo
1598	10	Hitachi, Echizen, Echigo, Shinano, Kaga, Bungo, Musashi, Sagami, Izu, Tosa

Two provinces share the same spelling of Awa, which we have distinguished as Awa-1 and Awa-2. Sado (1592) is listed here but is not in our data.

In addition, we provide a more detailed description of the justification, measurement, and data sources for the control variables below.

In pre-modern societies, economic output predominantly hinged on the agricultural suitability of the land and population size. These characteristics may also determine the location of churches because the missionaries may have wanted to locate in localities which had greater economic resources and were geographically more accessible. Hence, we control for covariates that are widely considered to affect the economic value as well as accessibility of a province, which represents the potential benefits that Hideyoshi could derive from it through land surveys.

Agricultural suitability. We directly measure each province's economic productivity by employing the provincial mean of the rice suitability index, derived from version 3.0 of the Global Agro-ecological Zones (GAEZ) published by the Food and Agriculture Organization of the United Nations (Fischer et al., 2012). This index represents the suitability of an area for rice cultivation, assuming a *pre-modern* technology level and accounting for local geographical features (Fischer, van Velthuizen and Nachtergaele, 2000). We construct this variable in accordance with the approach outlined by Yamasaki (2020).

Area of a Province. We incorporate the area for each province to account for the potentially confounding effect of total economic output. Larger provinces had greater economic potential and therefore may have been more valuable for inspections. The area variable is measured in 10,000 square kilometers. The data are collected from (Fischer et al., 2012).

Population. The size of population also matters for the potential agricultural output of a province. While year-specific estimates for the period 1582-1598 are not available, these values should be close to the 1600 estimate in Kito (1996) since the population growth in a pre-modern society for such a short period should be negligible. The population variable is measured in millions.

Elevation mean and *elevation standard deviation.* Provinces with higher elevations and greater changes in elevation would have been more difficult to travel to. Foreign missionaries may have avoided these places because they sought to spread their faith broadly. Similarly, land inspections would have been more difficult and may have occurred less frequently. Data for elevation are from (Fischer et al., 2012).

Distance to Yamashiro. The distance to the regime's capital might weaken its political and military strength within a locality, which in turn, could impede its centralization efforts. Missionaries were also interested in establishing churches near the capital to expand its influence (Ellis, 2003). Yamashiro, which corresponds to present-day Kyoto, served as the capital of the Toyotomi regime. The empirical analysis below controls for the log distance to Yamashiro (in kilometers) with data collected from Berman (2017).

Longitude and latitude. These variables account for the effect of climate, which influences agricultural potential. Longitude and latitude also affect the likelihood that foreign missionaries reached a province as the Portuguese sailed east to Japan from the Philippines, India, and Macau. Longitude and latitude are measured at the province centroid using the data from Berman (2017).

Additionally, we control for several context-specific factors relevant to our analysis.

Korea invasion. This variable accounts for external conflicts during the time period. The measure is coded as 1 if any daimyo within the province were sent to the invasion, and 0 if no daimyos within the province were sent. We retrieve information on whether a daimyo had been involved in the invasion of Korea from the *Account of Korea Expeditions* (*Chosenkoku Go Shinpatsu No Ninzu Cho*) compiled by a contemporaneous scholar (Oze, Unknown). This Account lists 177 daimyos across the entire country, including those who were not sent to Korea. It is important to note that Hideyoshi launched two invasions in 1592 and 1597, respectively, and the military compositions were exactly the same across both invasions. While peace talks between Japan and China/Korea took place during 1593-1597, the invasion variable still assumes the value of 1 for provinces directly involved in the invasion of Korea during these years. This is because the same set of daimyos went to Korea in both invasions, and they were actively preparing for the second invasion during the truce.

Years under Toyotomi. The starting year of Toyotomi's occupation of a province is collected from Morioka (2013), which provides information on the specific time when a daimyo was conquered by or became a subject of Hideyoshi. Based on the starting year of occupation, we calculate the length of Toyotomi rule. This variable reflects both the feasibility and necessity of survey implementation in a province, and helps to subset the sample.

Contemporaneous and recent battles. Concurrent battles and those that occurred in recent years can negatively affect the feasibility of implementing a land survey while deterring foreign missionaries from establishing churches. Therefore, we include two dummy variables, *battle* and *past battle*, to capture the effect of war. These two variables take the value of 1 if a battle occurred in the current period or within the past three years, respectively, and 0 if no battle took place. The data are collected from Anderson (2023), a data set for historical battles in the Sengoku Period.

2 Summary Statistics

Table A.2: Summary statistics for the outcome variable and covariates, partial sample

	count	mean	sd	min	max
Land Survey	887	0.18	0.39	0.00	1.00
Catholic Church	887	0.40	0.49	0.00	1.00
Agricultural Suitability	887	9.54	6.58	0.47	35.87
Area of Province	887	0.41	0.55	0.03	5.06
Population in 1600	887	0.19	0.16	0.03	0.86
Elevation Mean	887	0.35	0.22	0.02	1.11
Elevation Standard Deviation	887	0.26	0.14	0.01	0.70
Distance to Yamashiro	887	4.77	3.66	-20.77	6.46
Longitude	887	135.25	2.78	130.03	140.85
Latitude	887	34.95	1.31	31.29	39.14
Korea Invasion	887	0.29	0.45	0.00	1.00
Years under Toyotomi	887	7.19	4.90	0.00	28.00
Battle	887	0.06	0.24	0.00	1.00
Battle in Past 3 Years	887	0.22	0.41	0.00	1.00
Years since Last Inspection	887	4.30	3.99	0.00	16.00

Table A.3: Summary statistics for the outcome variable and covariates, full sample

	count	mean	sd	min	max
Land Survey	1071	0.15	0.36	0.00	1.00
Catholic Church	1071	0.38	0.49	0.00	1.00
Agricultural Suitability	1071	9.91	6.97	0.47	35.87
Area of Province	1071	0.45	0.66	0.03	5.06
Population in 1600	1071	0.20	0.17	0.03	0.86
Elevation Mean	1071	0.35	0.22	0.02	1.11
Elevation Standard Deviation	1071	0.26	0.14	0.01	0.70
Distance to Yamashiro	1071	4.94	3.36	-20.77	6.46
Longitude	1071	135.49	3.01	130.03	140.85
Latitude	1071	34.97	1.42	31.29	39.14
Korea Invasion	1071	0.24	0.43	0.00	1.00
Years under Toyotomi	1071	5.95	5.22	0.00	28.00
Battle	1071	0.10	0.30	0.00	1.00
Battle in Past 3 Years	1071	0.27	0.45	0.00	1.00
Years since Last Inspection	1071	3.96	3.81	0.00	16.00

Table A.4: Summary statistics for the outcome variable and covariates, cross-sectional sample

	count	mean	sd	min	max
Total No. of Land Surveys	63	2.56	2.10	0.00	8.00
Catholic Church	63	0.38	0.49	0.00	1.00
No. of Battles by 1550	63	11.59	9.92	0.00	49.00
Agricultural Suitability	63	9.91	7.02	0.47	35.87
Area of Province	63	0.45	0.67	0.03	5.06
Population in 1600	63	198.02	167.81	28.90	858.10
Elevation Mean	63	0.35	0.23	0.02	1.11
Elevation Standard Deviation	63	0.26	0.14	0.01	0.70
Distance to Yamashiro	63	4.94	3.38	-20.77	6.46
Longitude	63	135.49	3.04	130.03	140.85
Latitude	63	34.97	1.43	31.29	39.14
Years under Toyotomi by 1598	63	13.38	3.55	8.00	28.00

3 Additional Results for Logit Models

Table A.5: Explaining Toyotomi land surveys with random-effects

	(1)	(2)	(3)	(4)
Sample	Full	Full	Partial	Partial
Catholic Church	0.8123***	0.8450***	0.8338**	0.8051**
	(0.3153)	(0.3118)	(0.3309)	(0.3299)
Agricultural Suitability	0.0275	0.0229	0.0350	0.0366
	(0.0249)	(0.0230)	(0.0266)	(0.0262)
Area of Province	0.6462***	0.3342	0.7996***	0.7073**
	(0.2435)	(0.2290)	(0.2750)	(0.2894)
Elevation Mean	0.0715	0.4814	-0.1667	0.0052
	(0.9645)	(0.8824)	(1.0332)	(1.0204)
Elevation Standard Deviation	1.2532	0.6761	1.5990	1.3859
	(1.3977)	(1.2921)	(1.5016)	(1.4852)
Distance to Yamashiro	-0.0387	-0.0402	-0.0293	-0.0317
	(0.0327)	(0.0294)	(0.0349)	(0.0335)
Longitude	0.2136***	0.1462*	0.2503***	0.2358**
	(0.0828)	(0.0797)	(0.0870)	(0.0925)
Latitude	-0.4915***	-0.3270**	-0.5409***	-0.4771***
	(0.1566)	(0.1500)	(0.1618)	(0.1719)
Korea Invasion	-0.8010***	-0.6772*	-0.5419*	-0.2754
	(0.3075)	(0.3480)	(0.3126)	(0.3783)
Years under Toyotomi	0.0674**	-0.0189	-0.0144	-0.0352
	(0.0284)	(0.0418)	(0.0325)	(0.0429)
Battle in Current Year	0.1352	0.5967	0.5049	0.5966
	(0.3314)	(0.3726)	(0.3738)	(0.4210)
Battle in Past 3 Years	-0.0438	0.2853	-0.1931	0.0808
	(0.2548)	(0.2766)	(0.2737)	(0.2935)
Population in 1600	0.0606	0.4070	0.0623	0.0778
	(0.9832)	(0.8931)	(1.0568)	(1.0330)
Years since Last Inspection	-0.8338***	-0.8812***	-0.7260***	-0.7238***
	(0.1499)	(0.1773)	(0.1585)	(0.1798)
t^2	0.1559***	0.1401***	0.1287***	0.1173***
	(0.0300)	(0.0344)	(0.0305)	(0.0345)
t^3	-0.0069***	-0.0057***	-0.0054***	-0.0046***
	(0.0015)	(0.0017)	(0.0015)	(0.0017)
Constant	-14.4688*	-12.9181*	-17.2152**	-18.1313**
	(7.8099)	(7.4534)	(8.3446)	(8.5692)
Year Fixed-effects	No	Yes	No	Yes
N	1071	1071	887	887
AIC	850.9339	820.3373	771.8445	770.2385
BIC	940.5082	989.5332	858.0257	933.0252
Provinces	63	63	63	63

The table displays random effects logit estimates and standard errors clustered by province (in parentheses). Two-tail tests. Year fixed-effects and cubic polynomial approximations are omitted from the table.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4 Additional Results for Spatial Models

Table A.6: Explaining Toyotomi land surveys, spatial panel models with inverse-distance matrix

	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Catholic Church	0.0572*	0.0534*	0.0560*	0.0572*	0.0512	0.0555*	0.0530*
	(0.0302)	(0.0308)	(0.0302)	(0.0303)	(0.0317)	(0.0300)	(0.0311)
Agricultural Suitability	0.0020	0.0022	0.0020	0.0020	0.0023	0.0020	0.0022
	(0.0026)	(0.0027)	(0.0026)	(0.0026)	(0.0027)	(0.0026)	(0.0027)
Area of Province	0.0274	0.0400	0.0264	0.0276	0.0436	0.0230	0.0429
	(0.0300)	(0.0295)	(0.0295)	(0.0300)	(0.0295)	(0.0292)	(0.0292)
Population in 1600	0.1419	0.1043	0.1380	0.1417	0.0832	0.1401	0.0972
	(0.1130)	(0.1129)	(0.1123)	(0.1130)	(0.1145)	(0.1115)	(0.1132)
Elevation Mean	0.1208	0.0929	0.1109	0.1202	0.0749	0.1149	0.0865
	(0.1021)	(0.1027)	(0.1022)	(0.1021)	(0.1061)	(0.1014)	(0.1033)
Elevation Standard Deviation	-0.0824	-0.0276	-0.0777	-0.0824	-0.0016	-0.0762	-0.0199
	(0.1521)	(0.1514)	(0.1522)	(0.1522)	(0.1551)	(0.1511)	(0.1523)
Distance to Yamashiro	-0.0115***	-0.0101**	-0.0114***	-0.0115***	-0.0095**	-0.0113***	-0.0100**
	(0.0042)	(0.0042)	(0.0041)	(0.0042)	(0.0042)	(0.0041)	(0.0042)
Longitude	0.0065	0.0106	0.0031	0.0062	0.0065	0.0051	0.0095
	(0.0091)	(0.0090)	(0.0083)	(0.0088)	(0.0085)	(0.0081)	(0.0088)
Latitude	-0.0296*	-0.0316*	-0.0239	-0.0293*	-0.0240	-0.0248	-0.0302*
	(0.0163)	(0.0168)	(0.0158)	(0.0161)	(0.0166)	(0.0156)	(0.0167)
Korea Invasion	-0.0897**	-0.0882**	-0.0823**	-0.0895**	-0.0788**	-0.0840**	-0.0869**
	(0.0415)	(0.0419)	(0.0393)	(0.0414)	(0.0397)	(0.0393)	(0.0416)
Years under Toyotomi	0.0006	-0.0016	-0.0015	0.0005	-0.0058	-0.0016	-0.0025
	(0.0054)	(0.0056)	(0.0053)	(0.0054)	(0.0052)	(0.0053)	(0.0054)
Battle	0.0331	0.0326	0.0372	0.0332	0.0369	0.0391	0.0327
	(0.0391)	(0.0392)	(0.0388)	(0.0391)	(0.0389)	(0.0389)	(0.0392)
Battle in Past 3 Years	0.0340	0.0332	0.0354	0.0342	0.0347	0.0344	0.0338
	(0.0289)	(0.0290)	(0.0285)	(0.0289)	(0.0286)	(0.0285)	(0.0290)
Years since Last Inspection	-0.0055	-0.0055	-0.0061*	-0.0055	-0.0059	-0.0063*	-0.0054
	(0.0037)	(0.0037)	(0.0037)	(0.0037)	(0.0037)	(0.0037)	(0.0037)
Constant	0.1918	-0.3766	0.4736	0.2240	-0.0865	0.2220	-0.2756
	(0.9231)	(0.8776)	(0.8293)	(0.8872)	(0.8145)	(0.8081)	(0.8541)
Spatial lags							
Catholic Church	-0.3139		-0.3643*	-0.3212		-0.2972	
	(0.2078)		(0.1901)	(0.1997)		(0.1841)	
Land Survey	-0.0372	-0.1630	0.2989		0.2274		
	(0.2821)	(0.2877)	(0.1885)		(0.1917)		
Error	0.6026**	0.6739***		0.5818***			0.5842***
	(0.2552)	(0.2505)		(0.2025)			(0.2046)
Year Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1071	1071	1071	1071	1071	1071	1071
AIC	766.7181	766.8932	769.6883	764.7358	771.1108	769.9893	765.2318
BIC	945.8667	941.0654	943.8604	938.9079	940.3067	939.1852	934.4276
No. of Provinces	63	63	63	63	63	63	63

The table displays random-effects spatial regression estimates and standard errors (in parentheses). Two-tail tests. Year fixed-effects are included in estimation. The spatial weights matrix used in estimation is the spectral-normalized inverse-distance weighting matrix with min-max normalization. To ensure a strongly balanced panel required for the estimation of spatial panel models, the sample includes provinces not yet ruled by the Toyotomi regime. These observations take a value of 0 for the Years under Toyotomi variable.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5 Further Analysis for the Instrumental Variable Approach

5.1 Instrumental Variable Probit Model with the Partial Sample

We re-estimate the IV models with a sample that consists of only those province-years in which Hideyoshi ruled. The results are robust to this sample selection. The average marginal effects are consistent with those estimated from a full sample and all models yield statistical significance between the 90-99% levels.

Table A.7: Instrumental variable probit models with partial sample

	(12)	(13)	(14)	(15)	(16)	(17)
Second stage: Dependent variable is survey implantation						
Catholic Church	0.9873***	0.9464***	0.8432*	0.8732*	1.1286*	1.2095*
	(0.2697)	(0.2875)	(0.4592)	(0.4558)	(0.5947)	(0.6654)
Battle in 1550-1582			0.0111	-0.0099	-0.0068	-0.0050
			(0.0182)	(0.0204)	(0.0189)	(0.0195)
Agricultural Suitability				0.0254**	0.0103	0.0120
				(0.0119)	(0.0119)	(0.0163)
Area of Province				0.5222***	0.5850***	0.5981***
				(0.1859)	(0.1624)	(0.1662)
Population in 1600				-0.0004	-0.0008	-0.0008
				(0.0009)	(0.0010)	(0.0010)
Elevation Mean						0.3226
						(0.7643)
Elevation Standard Deviation						-0.4334
						(1.2099)
Distance to Yamashiro			0.0030	-0.0137	-0.0129	-0.0128
			(0.0159)	(0.0161)	(0.0173)	(0.0175)
Longitude					0.2087***	0.1985***
					(0.0617)	(0.0706)
Latitude					-0.3059***	-0.3063***
					(0.0923)	(0.0958)
Korea Invasion						-0.2338
						(0.1810)
Years under Toyotomi						-0.0153
						(0.0196)
Battle in Current Year					0.2945*	0.1965
					(0.1710)	(0.1765)
Battle in Past 3 Years					-0.0001	-0.1243
					(0.1297)	(0.1702)
Years since Last Inspection		-0.0151	-0.0166	-0.0071	0.0049	0.0115
		(0.0147)	(0.0154)	(0.0163)	(0.0193)	(0.0225)
Constant	-1.2277***	-1.1592***	-1.2375***	-1.4586***	-19.0131***	-17.5183**
	(0.1049)	(0.1555)	(0.2132)	(0.2264)	(7.0268)	(8.0851)
First stage: Dependent variable is church presence						
Battles by 1550	0.0198***	0.0185***	0.0209***	0.0200**	0.0151**	0.0152**
	(0.0044)	(0.0046)	(0.0078)	(0.0081)	(0.0074)	(0.0075)
Battle in 1550-1582			-0.0045	-0.0003	-0.0019	-0.0080
			(0.0132)	(0.0139)	(0.0128)	(0.0127)
Agricultural Suitability				-0.0017	0.0068	0.0075
				(0.0085)	(0.0085)	(0.0103)
Area of Province				-0.2166***	-0.1751**	-0.1672**
				(0.0637)	(0.0769)	(0.0816)
Population in 1600				0.0003	0.0006	0.0005
				(0.0004)	(0.0004)	(0.0004)
Elevation Mean						-0.4782
						(0.3288)
Elevation Standard Deviation						1.0615*
						(0.6115)
Distance to Yamashiro			0.0058	0.0149	0.0092	0.0062
			(0.0099)	(0.0093)	(0.0087)	(0.0096)
Longitude					-0.0913***	-0.0924***
					(0.0291)	(0.0304)
Latitude					0.0881	0.0836
					(0.0775)	(0.0770)
Korea Invasion						0.0514
						(0.0764)
Years under Toyotomi						0.0088
						(0.0075)
Battle in Current Year					0.0159	0.0568
					(0.0387)	(0.0552)
Battle in Past 3 Years					0.0247	0.0689
					(0.0395)	(0.0541)
Years since Last Inspection		-0.0153**	-0.0157**	-0.0182**	-0.0209***	-0.0220***
		(0.0074)	(0.0073)	(0.0071)	(0.0069)	(0.0079)
Constant	0.1717**	0.2528**	0.2341*	0.2297	9.4563***	9.6185***
	(0.0836)	(0.1066)	(0.1394)	(0.1475)	(2.6901)	(3.0114)
AME of Church	0.2652***	0.2525***	0.2232*	0.2245*	0.2857*	0.3058*
	(0.0776)	(0.0809)	(0.1303)	(0.1253)	(0.1626)	(0.1804)
F	20.0045	18.5873	18.5922	17.4034	31.2302	17.3257
P-value for F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	887	887	887	887	887	887
AIC	1921.9851	1903.6378	1908.0423	1854.8581	1713.5376	1671.1981
BIC	1950.7121	1941.9406	1965.4965	1941.0393	1838.0216	1833.9848

The table displays instrumental variable probit estimates obtained through maximum likelihood and standard errors clustered by province (in parentheses). Two-tail tests. The sample only includes provinces that had been ruled by the Toyotomi regime. The upper panel presents the second-stage results while the bottom panel presents the first-stage results.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.2 Two-stage Least-squares IV Results

Table A.8: Two-stage least-squares IV results, second-stage

	(18)	(19)	(20)	(21)	(22)	(23)
Second stage: Dependent variable is survey implementation						
Catholic Church	0.2975***	0.2996**	0.2251*	0.2211*	0.3238	0.2577
	(0.1116)	(0.1186)	(0.1299)	(0.1178)	(0.2086)	(0.1779)
Battle in 1550-1582			0.0024	-0.0020	-0.0004	-0.0010
			(0.0039)	(0.0045)	(0.0045)	(0.0042)
Agricultural Suitability				0.0048*	0.0009	0.0024
				(0.0027)	(0.0029)	(0.0029)
Area of Province				0.0940**	0.1127**	0.1081***
				(0.0450)	(0.0463)	(0.0382)
Population in 1600				-0.0001	-0.0002	-0.0001
				(0.0002)	(0.0003)	(0.0002)
Elevation Mean						0.1053
						(0.1870)
Elevation Standard Deviation						-0.0770
						(0.2780)
Distance to Yamashiro			-0.0039	-0.0076*	-0.0067	-0.0069
			(0.0045)	(0.0043)	(0.0051)	(0.0046)
Longitude					0.0455*	0.0367*
					(0.0233)	(0.0188)
Latitude					-0.0560**	-0.0584***
					(0.0251)	(0.0216)
Korea Invasion						-0.0853*
						(0.0441)
Years under Toyotomi						0.0059
						(0.0045)
Battle in Current Year					-0.0179	-0.0069
					(0.0379)	(0.0360)
Battle in Past 3 Years					-0.0273	-0.0171
					(0.0285)	(0.0346)
Years since Last Inspection		0.0005	-0.0003	0.0011	0.0042	0.0027
		(0.0037)	(0.0034)	(0.0035)	(0.0052)	(0.0053)
Constant	0.0370	0.0340	0.0656	0.0361	-4.1734	-2.9251
	(0.0393)	(0.0545)	(0.0702)	(0.0659)	(2.6653)	(2.1553)
N	1071	1071	1071	1071	1071	1071
Anderson-Rubin (AR) statistic	5.58	6.04	4.95	6.06	5.03	5.10
P-value for AR	0.0181	0.0140	0.0261	0.0138	0.0249	0.0240

The table displays the second-sage IV estimates obtained through two-stage least-squares regression. Standard errors clustered by province (in parentheses). Two-tail tests.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.9: Two-stage least-squares IV results, first-stage

	(24)	(25)	(26)	(27)	(28)	(29)
First stage: Dependent variable is church presence						
Battles by 1550	0.0196***	0.0186***	0.0213***	0.0205**	0.0141**	0.0140**
	(0.0044)	(0.0046)	(0.0076)	(0.0079)	(0.0070)	(0.0070)
Battle in 1550-1582			-0.0069	0.0001	-0.0032	-0.0074
			(0.0126)	(0.0133)	(0.0117)	(0.0118)
Agricultural Suitability				-0.0068	0.0043	0.0041
				(0.0075)	(0.0075)	(0.0091)
Area of Province				-0.1984***	-0.1602**	-0.1441*
				(0.0606)	(0.0726)	(0.0760)
Population in 1600				0.0003	0.0005	0.0005
				(0.0005)	(0.0004)	(0.0004)
Elevation Mean						-0.4373
						(0.2962)
Elevation Standard Deviation						0.8401
						(0.5923)
Distance to Yamashiro			0.0038	0.0126	0.0055	0.0034
			(0.0105)	(0.0102)	(0.0093)	(0.0096)
Longitude					-0.0978***	-0.0927***
					(0.0270)	(0.0280)
Latitude					0.0931	0.0804
					(0.0733)	(0.0725)
Korea Invasion						0.0316
						(0.0743)
Years under Toyotomi						0.0106
						(0.0070)
Battle in Current Year					0.0293	0.0688
					(0.0305)	(0.0414)
Battle in Past 3 Years					0.0222	0.0653
					(0.0385)	(0.0474)
Years since Last Inspection		-0.0142**	-0.0149**	-0.0172***	-0.0207***	-0.0229***
		(0.0064)	(0.0064)	(0.0063)	(0.0063)	(0.0072)
Constant	0.1535*	0.2217**	0.2300*	0.2530*	10.2052***	9.8639***
	(0.0787)	(0.0972)	(0.1333)	(0.1432)	(2.4271)	(2.6753)
N	1071	1071	1071	1071	1071	1071
F	19.8042	18.2175	16.5422	16.9850	31.3266	21.4625
P-value for F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

The table displays the first-sage IV estimates obtained through two-stage least-squares regression. Standard errors clustered by province (in parentheses). Two-tail tests.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.3 Defending the Exclusion Restriction: Additional Results

The instrumental variable we adopt in the main text is the count of battles before 1550 because these events occurred a full thirty years before the implementation of land surveys. We argue that this variable plausibly meets the exclusion restriction because of such long differences in time. If it is the case that the exclusion restriction is violated, then one possibility is that battles before 1550 might be associated with battles during the land survey sample period. According to Table A.10,

battles prior to 1550 do not predict battle occurrence in 1582-1598, which suggests that there is no association between our IV and battles during the survey period.

Table A.10: The effect of battles prior to 1550 on battles during survey implementation

	(30)	(31)	(32)	(33)	(34)	(35)
Battles by 1550	0.009*	0.006	0.009	0.009	0.005	0.017
	(0.005)	(0.005)	(0.006)	(0.007)	(0.007)	(0.011)
Distance to Yamashiro			0.014	0.014	0.010	-0.007
			(0.012)	(0.012)	(0.011)	(0.020)
Agricultural Suitability		0.004	0.004	0.003	0.006	0.019
		(0.005)	(0.005)	(0.006)	(0.007)	(0.012)
Population in 1600				0.000	0.000	0.000
				(0.000)	(0.000)	(0.001)
Area of Province		0.235***	0.224***	0.221***	0.253***	0.251**
		(0.048)	(0.048)	(0.061)	(0.074)	(0.115)
Longitude					-0.016	-0.143**
					(0.026)	(0.057)
Latitude					-0.010	0.193*
					(0.054)	(0.101)
Elevation Mean						0.250
						(0.443)
Elevation Standard Deviation						0.990
						(0.616)
Years under Toyotomi						-0.257***
						(0.090)
t	-0.754***	-0.727***	-0.726***	-0.726***	-0.725***	-0.582***
	(0.119)	(0.115)	(0.115)	(0.116)	(0.117)	(0.137)
t^2	0.127***	0.121***	0.121***	0.121***	0.121***	0.126***
	(0.030)	(0.029)	(0.029)	(0.029)	(0.029)	(0.027)
t^3	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-0.427***	-0.603***	-0.698***	-0.699***	1.876	11.510**
	(0.123)	(0.128)	(0.155)	(0.154)	(2.357)	(5.303)
N	1071	1071	1071	1071	1071	1071

The table displays probit estimates with standard errors clustered by province (in parentheses). Two-tail tests. The outcome is whether or not a battle occurs in a province-year. Temporal serial correlation is accounted for using cubic polynomial approximation.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

An additional potential threat to the exclusion restriction is that past battles may have created major daimyos that Hideyoshi would have needed to manage during the survey period. If this argument is correct, large and politically influential clans who won their lands during the pre-1550 period by force must persist until the survey period. Of the 10 largest daimyos during the survey period, only three clans were in existence before 1550: Mori, Nagao/Uesugi, and Oda clans. These clans provide an opportunity to test whether this alternative potential causal pathway, which violates the exclusion restriction, exists or not. We create a major daimyo variable, which is equal to 1 for each of these clans, and 0 otherwise. Table A.11 presents the results for these tests. The results indicate there is no threat to the exclusion restriction, since battles by 1550 did not predict the rise of large daimyos.

A closer examination of the data also suggests that there is no association between the number of battles before 1550 and the likelihood for a large daimyo to emerge. The average number of battles per province before 1550 stands at 11.59. However, Owari, the stronghold of the Oda clan, saw only 6 battles. Aki, the pre-1550s base of the Mori clan, and Echigo, the original base of the Nagao/Uesugi, encountered 27 and 17 battles, respectively, before 1550. Many other provinces experienced over 30 or 40 battles. In conclusion, the battles before 1550 do not predict the existence of major daimyos, further defending our choice of the IV estimate.

Table A.11: The effect of battles prior to 1550 on the existence of large daimyos

	(36)	(37)	(38)	(39)
Battles by 1550	0.023	0.031	0.073	0.074
	(0.021)	(0.045)	(0.063)	(0.063)
Battle in 1550-1582		0.008	-0.030	-0.024
		(0.068)	(0.084)	(0.081)
Agricultural Suitability			0.108**	0.125*
			(0.053)	(0.074)
Area of Province			-0.417	-0.560
			(0.462)	(0.433)
Population in 1600			-0.000	0.000
			(0.002)	(0.001)
Elevation Mean				1.897
				(2.125)
Elevation Standard Deviation				-2.156
				(2.575)
Distance to Yamashiro		0.092	0.258	0.348
		(0.130)	(0.326)	(0.334)
Longitude			-0.458**	-0.526*
			(0.193)	(0.272)
Latitude			1.269***	1.456**
			(0.455)	(0.568)
Constant	-1.977***	-2.644***	12.266	14.072
	(0.400)	(0.839)	(19.182)	(22.795)
N	63	63	63	63
AIC	27.342	30.721	35.968	39.749
BIC	31.628	39.294	55.256	63.323

The table displays probit estimates and standard errors clustered by province (in parentheses). The outcome variable is whether the province hosted a large daimyo before 1550. Two-tail tests.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.4 Test of Unconfoundedness in the First-stage Estimation Using E-values

An instrument should be (conditionally) exogenous in the first-stage regression to be valid. In other words, the instrument in the first-stage regression should not be correlated with the error term to avoid bias in the IV estimate. The analysis in the main text has accounted for many factors that may have influenced the instrument and the endogenous variable but additional unobserved confounding factors could potentially exist. Therefore, we employ E-values again as a sensitivity analysis for the

first-stage results. Table A.12 below provides risk ratios and E-values for the instrument and some observed covariates in the first-stage estimation. The results indicate that an unobserved confounder must have a risk ratio above 2.663 in order to explain away the association between the instrument variable, battles before 1550, and the endogenous variable, Catholic church presence, in the first-stage estimation. For comparison, to explain away the explanatory power of agricultural suitability and province area, we only need risk ratios of 1.383 and 1.439, respectively. The corresponding E-values for these covariates are far lower than that associated with the instrument, which suggests the relationship between battles before 1550 and church presence is unlikely to be confounded by an unobserved factor.

Table A.12: Sensitivity analysis of first-stage results using E-values

	Table 5, Model 23 (main text)
Battles by 1550	
RR	1.639
E-value	2.663
Agricultural suitability	
RR	1.083
E-value	1.383
Area of province	
RR	0.907
E-value	1.439

6 Additional Results for the Discussion Subsection in the Main Text

6.1 Differentiating the First Survey and Re-surveys.

Survival analysis

We perform two survival analyses in which the outcome variable is the time until the occurrence of the first survey and that of the re-surveys, respectively. In the first exercise, the sample excludes all province-years that occurred after the first survey was implemented in the province. If a province had never received a survey throughout 1582-1598, all province-years of that province will remain in the sample. This set-up allows us to examine how church presence affected the duration until the *first* survey. In the second exercise, the sample only includes provinces that had received one survey before. Specifically, all province-years up to and including the year of the first survey are omitted, including those that had never received a survey. Using this sample, we could examine how church presence influenced the likelihood of being *re-surveyed*. It is important to note that this model exhibits relatively low statistical efficiency, as much of the information is not used in estimation.

The survival analysis results are presented in Table A.13, with the coefficients rather than the hazard ratios reported. In both models, the coefficients on church presence are positive and statistically significant at conventional levels. Moreover, the substantive effects are similar in magnitude. A coefficient of 0.9778 in Model 1 translates to a hazard ratio of approximately 2.66. This means that church presence is associated with about 166% increase in the hazard rate, relative to the baseline hazard of receiving a survey, holding other variables constant. In simpler terms, the "risk" of being surveyed for the first time is 2.66 times higher with the presence of a Catholic church in a province. Meanwhile, a coefficient of 0.9009 in Model 2 translates to a hazard ratio of approximately 2.46, which suggest that the "risk" of being resurveyed is 2.46 times higher if a church was located within a province. In conclusion, the survival analysis results confirm that our treatment

variable, Church presence, is not only affecting the likelihood of receiving the first survey, but also the likelihood of being re-surveyed.

It is important to note that temporal dependence may exist for the outcome variable in binary time-series cross-sectional data. For example, the likelihood of receiving a re-survey in year t may possibly be affected by whether there was a survey conducted in year $t-1$. This concern has been effectively addressed through the use of cubic polynomial approximations in our logit models Carter and Signorino (2010).

Table A.13: Differentiating the first survey and re-surveys, survival analysis

	(40)	(41)
Outcome	First Survey	Re-survey
Catholic Church	0.9778**	0.9009*
	(0.4224)	(0.4796)
Agricultural Suitability	-0.0258	-0.0007
	(0.0371)	(0.0234)
Area of Province	-0.1151	-0.2947
	(0.1825)	(0.1917)
Population in 1600	0.8315	2.0126***
	(0.8846)	(0.7569)
Elevation Mean	-0.3814	3.1762***
	(1.7468)	(1.1621)
Elevation Standard Deviation	1.0700	-3.8524**
	(2.3086)	(1.5436)
Distance to Yamashiro	-0.1498***	-0.0464**
	(0.0338)	(0.0227)
Longitude	-0.0795	-0.1767*
	(0.1062)	(0.1050)
Latitude	0.0654	0.0808
	(0.2026)	(0.1848)
Korea Invasion	-1.0667**	-1.7383***
	(0.4970)	(0.3676)
Years under Toyotomi	-0.2878***	-0.2633**
	(0.0706)	(0.1335)
Battle in Current Year	0.9656**	0.7073
	(0.3922)	(0.4392)
Battle in Past 3 Years	-0.2597	0.6065
	(0.3659)	(0.5376)
N	740	475
AIC	546.3643	1049.7497
BIC	606.2508	1103.8728

The table displays the coefficients from Cox proportional hazards model and the standard errors clustered by province (in parentheses). Two-tail tests.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

IV Estimation Using Cross-Sectional Data

Additionally, to investigate the effect of the Catholic Church on the frequency of land surveys, which directly reflects the intensity of state-building efforts, we employ an IV-probit model using

cross-sectional data. While the existence of such an effect does not *sufficiently* indicate that the presence of the Church stimulated both the initial survey and subsequent re-surveys, it is a *necessary* condition for this claim to hold; if Catholic churches not only encouraged the first survey but also the re-surveys, provinces with these churches are likely to experience more surveys in total, assuming other factors remain constant.

The unit of analysis for the cross-sectional data is the province. The dependent variable is the cumulative count of inspections received by a province during the reign of Toyotomi Hideyoshi from 1582 to 1598. The results of the IV estimation are presented in Table A.14. According to the first-stage results presented in the lower panel, the number of battles prior to 1550 is a statistically significant and positive predictor of Church presence. Adding additional control variables has a minimal impact on the coefficient magnitude. In fact, according to the last model, most of these control variables are not significant, thus they are irrelevant controls that reduce statistical power for a small sample. These first-stage results provide additional evidence that Catholic churches were indeed more likely to be established in provinces that had experienced a higher frequency of historical conflicts.

The second-stage estimation results reveal that the coefficient on the instrumented variable of church presence is positive and statistically significant at 99%, 95%, or 90% levels for the first four models. The addition of control variables again has a minimal impact on the magnitude of the coefficients for the endogenous variable. The coefficients on church presence in the last two models are even larger, despite a lack of statistical significance at conventional levels. The lack of stronger statistical significance can be attributed to the diminished statistical power resultant from our small sample size and the inclusion of multiple control variables. According to the second-stage estimates, provinces with church presence received approximately 4-5 additional land surveys between 1592 and 1598. The median number of surveys received by a province in the sample is only 2 and the average is 2.55. Given that the reign of Toyotomi Hideyoshi spanned only 16 years, this represents a substantively large effect.

Finally, the F-statistics in all models (except Model 42 without covariates) are smaller than 10, which implies that the estimation based on cross-sectional data has a weak-instruments problem.

Therefore, we employ the Anderson-Rubin (AR) test, which is robust to the presence of weak instruments, to jointly test the structural parameter (i.e., the coefficient on the endogenous variable) and the exogeneity of the instrument. The results suggest that the AR statistics are all significant at the 95% level, indicating that the Church presence truly affected survey implementation as measured as a count variable, which captures both the initial survey and the re-surveys.

Table A.14: Explaining Toyotomi land surveys, IV with cross-sectional data

	(42)	(43)	(44)	(45)	(46)	(47)
Second stage: Dependent variable is total number of surveys						
Catholic Church	5.0577***	4.5655**	3.8373*	3.7195*	5.3656	5.0874
	(1.8823)	(1.9820)	(2.0116)	(2.0415)	(3.3350)	(3.4164)
Battle in 1550-1582			0.0415	-0.0347	-0.0159	-0.0163
			(0.0666)	(0.0718)	(0.0741)	(0.0726)
Agricultural Suitability				0.0805	0.0104	0.0352
				(0.0534)	(0.0597)	(0.0763)
Area of Province				1.5806**	1.7486**	1.6218**
				(0.7601)	(0.8450)	(0.7858)
Elevation Mean						2.2919
						(2.8290)
Elevation Standard Deviation						-2.2813
						(4.9047)
Distance to Yamashiro		-0.0586	-0.0667	-0.1280	-0.1124	-0.1172
		(0.1142)	(0.1043)	(0.0976)	(0.1086)	(0.1087)
Longitude					0.7481**	0.6578*
					(0.3714)	(0.3666)
Latitude					-0.9032**	-0.8149*
					(0.4358)	(0.4246)
Years under Toyotomi						-0.0463
						(0.1230)
Population in 1600				-0.0009	-0.0032	-0.0027
				(0.0030)	(0.0041)	(0.0039)
Constant	0.6288	1.1058	1.0878	0.7228	-68.8392*	-59.4244
	(0.8041)	(1.1787)	(1.0801)	(1.0493)	(41.1091)	(41.7966)
First stage: Dependent variable is whether the province had a church						
battle_by1550	0.0196***	0.0200***	0.0220***	0.0212**	0.0150*	0.0148
	(0.0058)	(0.0067)	(0.0082)	(0.0088)	(0.0088)	(0.0093)
Battle in 1550-1582			-0.0057	0.0009	-0.0018	-0.0062
			(0.0134)	(0.0144)	(0.0134)	(0.0142)
Agricultural Suitability				-0.0060	0.0050	0.0059
				(0.0103)	(0.0101)	(0.0130)
Area of Province				-0.1892	-0.1404	-0.1039
				(0.1201)	(0.1232)	(0.1358)
Elevation Mean						-0.4850
						(0.4812)
Elevation Standard Deviation						0.9718
						(0.6967)
Distance to Yamashiro		0.0025	0.0038	0.0124	0.0052	0.0027
		(0.0196)	(0.0200)	(0.0210)	(0.0201)	(0.0206)
Longitude					-0.0936***	-0.0883**
					(0.0310)	(0.0368)
Latitude					0.0844	0.0657
					(0.0683)	(0.0786)
Years under Toyotomi						0.0115
						(0.0200)
Population in 1600				0.0003	0.0005	0.0005
				(0.0006)	(0.0005)	(0.0005)
Constant	0.1535*	0.1364	0.1525	0.1581	9.8374***	9.5688***
	(0.0881)	(0.1608)	(0.1663)	(0.1799)	(3.0000)	(3.5578)
N	63	63	63	63	63	63
First-stage F	11.4852	5.6581	3.7800	2.3525	3.3964	2.6267
P-value for F	0.0012	0.0056	0.0150	0.0427	0.0031	0.0098
Anderson-Rubin (AR) statistics	13.87	9.82	6.03	5.19	5.02	4.14
P-value for AR	0.0002	0.0017	0.0141	0.0227	0.0250	0.0419

The table displays IV estimates obtained through two-stage least-squares regression and standard errors (in parentheses). Two-tail tests. The top panel reports the second-stage estimates, and the bottom panel reports the first-stage estimates.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.2 Foreign Trade as an Alternative Mechanism for State-building

We have argued that Hideyoshi built state capacity by implementing cadastral surveys as a response to security threats posed by Catholic churches. Foreign trade is another potential mechanism by which the presence of foreigners might encourage state capacity, and which might explain the correlation between Catholic Church presence and land surveys. Missionaries indeed facilitated foreign trade with the Portuguese, a point that we have already mentioned in the main text. However, if the main motive for Hideyoshi to implement the land surveys was to maximize revenue instead of addressing security concerns, then we might expect that foreign trade hubs were more likely to surveyed.

While localities which have established Catholic churches are more likely to be foreign trade hubs, not all localities with Catholic churches were major foreign trade hubs. According to Namae (1931, pp.44-55), Murakami (1981, pp.138-139), Kishine (2004, pp.154-156), and Kanda (2016, pp.91-101), the major hubs for foreign trade with the Portuguese (*nanban boueki*) included cities in the provinces of Aki, Bungo, Chikuzen, Higo, Hizen, Oomi, Satsuma, Settsu, Suoo, and Yamashiro. Each of these provinces also had Catholic churches. However, many other provinces with Catholic churches did not have extensive foreign trade. These provinces include Bizen, Buzen, Chikugo, Etchizen, Etchu, Harima, Iyo, Izumi, Kaga, Kawachi, Kii, Mino, Noto, and Yamato.

Since some provinces with churches were major trading hubs while others were not, we are able to test whether or not foreign trade explains the correlation of church presence and the implementation of surveys. First, we test whether this argument is viable by including foreign trade in the model but excluding Church presence. The binary variable *Foreign trade* is measured as 1 if a province was defined as a hub for trade with the Portuguese, and 0 otherwise (Murakami, 1981). The results for this test are presented in Table A.15. The foreign trade variable has a positive coefficient in all models, and is statistically significant in three of four models.

Second, we control for foreign trade in a test of the association between church presence and survey implementation. If the foreign trade mechanism rather than the security mechanism explains the correlation of church presence and surveys, then we should find a positive and statistically significant coefficient on the foreign trade variable but not the Church presence variable. However,

we find in Table A.16 that the coefficient on foreign trade is not statistically significant while the Catholic Church coefficient is positive and statistically significant in each model. The magnitude of the Church presence coefficient is also relatively similar to those in the main text. Therefore, we conclude that foreign trade was not the reason for why Hideyoshi implemented surveys in provinces with Catholic Church presence. These results strengthen our argument that Catholic churches induced state-building policies during the late Sengoku Period due to their security threats.

Table A.15: Explaining Toyotomi land surveys, using trade hubs as the treatment

	(48)	(49)	(50)	(51)
Sample	Full	Full	Partial	Partial
Foreign trade	0.4889*	0.4280	0.6374**	0.5681**
	(0.2859)	(0.2855)	(0.2912)	(0.2891)
Agricultural Suitability	0.0265	0.0234	0.0341*	0.0370*
	(0.0201)	(0.0194)	(0.0196)	(0.0204)
Area of Province	0.4560***	0.2244	0.6092***	0.5601**
	(0.1765)	(0.1918)	(0.2231)	(0.2403)
Elevation Mean	0.0614	0.2244	-0.0975	-0.0552
	(1.1078)	(1.0642)	(1.0084)	(1.0265)
Elevation Standard Deviation	1.4400	1.1292	1.6584	1.5717
	(1.3229)	(1.2816)	(1.3127)	(1.3404)
Distance to Yamashiro	-0.0349**	-0.0364**	-0.0235	-0.0252
	(0.0156)	(0.0151)	(0.0172)	(0.0176)
Longitude	0.1437**	0.0895	0.1882**	0.1820**
	(0.0730)	(0.0645)	(0.0735)	(0.0740)
Latitude	-0.3721**	-0.2475	-0.4231***	-0.3752**
	(0.1725)	(0.1534)	(0.1622)	(0.1597)
Korea Invasion	-0.6727**	-0.5614*	-0.4530*	-0.1607
	(0.2639)	(0.3300)	(0.2522)	(0.3451)
Years under Toyotomi	0.0633***	0.0060	-0.0074	-0.0174
	(0.0179)	(0.0351)	(0.0212)	(0.0295)
Battle in Current Year	0.1231	0.6203*	0.5778**	0.6720*
	(0.2664)	(0.3479)	(0.2848)	(0.3592)
Battle in Past 3 Years	-0.0719	0.2726	-0.1377	0.1014
	(0.2711)	(0.3219)	(0.2854)	(0.3232)
Population in 1600	0.2873	0.5517	0.0500	0.0482
	(0.8953)	(0.9098)	(1.0182)	(1.0756)
Years since Last Inspection	-0.8360***	-0.8892***	-0.7701***	-0.7650***
	(0.1509)	(0.1740)	(0.1431)	(0.1664)
t^2	0.1502***	0.1365***	0.1292***	0.1170***
	(0.0289)	(0.0322)	(0.0265)	(0.0299)
t^3	-0.0067***	-0.0056***	-0.0055***	-0.0047***
	(0.0014)	(0.0015)	(0.0013)	(0.0014)
Constant	-8.6970	-7.6999	-12.4511*	-14.1216**
	(6.4437)	(5.3636)	(6.9330)	(6.4487)
Year Fixed-effects	No	Yes	No	Yes
N	1071	1071	887	887
AIC	857.1278	825.8486	776.7480	774.1620
BIC	941.7257	990.0681	858.1414	932.1609

The table displays logit estimates and standard errors clustered by province (in parentheses). Two-tail tests. Year fixed-effects are omitted from the table.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.16: Explaining Toyotomi land surveys, controlling for trade hubs

	(52)	(53)	(54)	(55)
Sample	Full	Full	Partial	Partial
Catholic Church	0.5923**	0.7237***	0.5709**	0.5995**
	(0.2942)	(0.2793)	(0.2897)	(0.2863)
Foreign trade	0.2614	0.1605	0.4218	0.3377
	(0.2913)	(0.2996)	(0.2957)	(0.2969)
Agricultural Suitability	0.0252	0.0215	0.0316*	0.0334*
	(0.0192)	(0.0181)	(0.0192)	(0.0194)
Area of Province	0.5380***	0.3065	0.7016***	0.6227**
	(0.1812)	(0.1995)	(0.2417)	(0.2560)
Elevation Mean	0.2200	0.4861	0.0465	0.1578
	(1.1631)	(1.1210)	(1.0597)	(1.0684)
Elevation Standard Deviation	1.0989	0.6371	1.2948	1.1263
	(1.3944)	(1.3364)	(1.3906)	(1.4015)
Distance to Yamashiro	-0.0328*	-0.0347**	-0.0217	-0.0245
	(0.0172)	(0.0159)	(0.0184)	(0.0180)
Longitude	0.2017***	0.1521**	0.2443***	0.2286***
	(0.0720)	(0.0692)	(0.0750)	(0.0774)
Latitude	-0.4402***	-0.3193**	-0.4891***	-0.4286***
	(0.1570)	(0.1393)	(0.1464)	(0.1473)
Korea Invasion	-0.7058**	-0.6487*	-0.4932*	-0.2701
	(0.2745)	(0.3490)	(0.2600)	(0.3602)
Years under Toyotomi	0.0580***	-0.0072	-0.0115	-0.0270
	(0.0200)	(0.0402)	(0.0224)	(0.0332)
Battle in Current Year	0.1045	0.6140*	0.5610**	0.6839*
	(0.2619)	(0.3451)	(0.2751)	(0.3539)
Battle in Past 3 Years	-0.0888	0.2726	-0.1596	0.1088
	(0.2748)	(0.3273)	(0.2895)	(0.3250)
Population in 1600	0.0431	0.3185	-0.1961	-0.1320
	(0.9686)	(0.9528)	(1.0740)	(1.1151)
Years since Last Inspection	-0.8481***	-0.9090***	-0.7857***	-0.7818***
	(0.1503)	(0.1704)	(0.1430)	(0.1640)
t^2	0.1537***	0.1422***	0.1332***	0.1218***
	(0.0287)	(0.0315)	(0.0264)	(0.0293)
t^3	-0.0068***	-0.0058***	-0.0056***	-0.0049***
	(0.0014)	(0.0015)	(0.0013)	(0.0014)
Constant	-14.3192**	-13.8786**	-17.8686**	-18.6867**
	(7.1549)	(6.5869)	(7.7643)	(7.3329)
Year Fixed-effects	No	Yes	No	Yes
N	1071	1071	887	887
AIC	853.7405	820.7575	773.9077	771.2948
BIC	943.3148	989.9533	860.0889	934.0815

The table displays logit estimates and standard errors clustered by province (in parentheses). Two-tail tests. Year fixed-effects are omitted from the table.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.3 The Role of Pre-Existing State Capacity

We use the logged number of castles and strongholds that existed in the Muromachi and Sengoku periods as a proxy variable for pre-existing state capacity, which may have influenced the survey quality. A larger number of castles and strongholds is an indication of weaker control from the center, and thus, weaker state capacity but stronger local capacity (Chen, Wang and Zhang, 2024). The data for castles and strongholds are collected from the Archaeological Site Database maintained by the Nara National Research Institute for Cultural Properties (1996), which contains the information for over 480,000 archaeological sites of Japan for all periods. In constructing the *castle* variable, we collect the items that are categorized as "castles and strongholds" (*jo kan*) with the principal period being Muromachi (62), Sengoku (63), Medieval-Subdivision Unknown (69), or Azuchi-Momoyama (70). A total of 8,703 castles and strongholds are included in our data.

We then estimate the logit, spatial, and IV-probit models with the full sets of controls. The estimation results are presented in A.17. In the logit model without interaction terms (Model 56), the average marginal effect of church presence is 0.083, with $p = 0.017$. When the interaction between Church presence and logged number of castles and strongholds are added to the logit model, the average treatment effect has a similar magnitude (0.0857) with $p = 0.012$. However, there is no evidence that the effect of church presence is moderated by pre-existing state capacity. The next model presents the spatial estimation results, with spatial lags of the treatment, outcome, and errors included, and weighted by the spectral-normalized contiguity matrix. The direct effect of church presence is estimated to be 0.065, with $p = 0.044$. When the interaction term is included in the spatial model, which again includes all three spatial lags, the direct effect of church presence is highly similar, substantially and statistically (0.064, $p = 0.048$). Again, there is no evidence that the treatment effect is moderated by pre-existing state capacity. Finally, the IV probit model estimates a larger treatment effect (0.308), with $p = 0.087$.

The results suggest that the presence of Catholic churches remains a predictor of land surveys when the level of pre-existing capacity is controlled for. Moreover, there is no evidence that the latter is a moderator for the relationship between church presence and survey implementation. In fact, in late 16th century Japan, strong pre-existing capacity did not necessarily lead to higher

quality survey results. For example, land surveys of the provinces controlled by Maeda Toshiie and Niwa Nagahide failed to adopt national uniform standards, despite the fact that Maeda and Niwa were among the first daimyos to submit to Hideyoshi and were most trusted by the central government (Ikegami, 2012, p.373).

Table A.17: Explaining Toyotomi land surveys, with castles and strongholds as proxy for state capacity

	(56)	(57)	(58)	(59)	(60)
Model	Logit	Logit	Spatial	Spatial	IV-probit
Sample	Partial	Partial	Full	Full	Partial
Catholic Church	0.6671**	-0.5118	0.0646**	0.0001	1.2164*
	(0.2826)	(1.5638)	(0.0325)	(0.1824)	(0.6628)
No. of Castles	0.0086	-0.0624	-0.0083	-0.0110	-0.0131
	(0.1860)	(0.2166)	(0.0158)	(0.0175)	(0.1175)
Catholic Church*No. of Castles		0.2598		0.0140	
		(0.3288)		(0.0390)	
Battle in 1550-1582					-0.0047
					(0.0204)
Agricultural Suitability	0.0333*	0.0372**	0.0036	0.0038	0.0123
	(0.0183)	(0.0188)	(0.0028)	(0.0028)	(0.0161)
Area of Province	0.6118**	0.6325**	0.0471	0.0484*	0.6050***
	(0.2680)	(0.2743)	(0.0290)	(0.0292)	(0.1802)
Population in 1600	0.0962	0.0689	0.1112	0.1068	-0.0008
	(1.0364)	(1.0474)	(0.1101)	(0.1108)	(0.0010)
Elevation Mean	0.2142	0.2634	0.1154	0.1150	0.3300
	(1.0527)	(1.0703)	(0.1044)	(0.1046)	(0.7676)
Elevation Standard Deviation	0.9956	0.9586	-0.0728	-0.0716	-0.4345
	(1.3748)	(1.3861)	(0.1520)	(0.1522)	(1.2166)
Distance to Yamashiro	-0.0293	-0.0274	-0.0098**	-0.0097**	-0.0130
	(0.0180)	(0.0178)	(0.0041)	(0.0041)	(0.0177)
Longitude	0.2092***	0.2019***	0.0059	0.0058	0.1984***
	(0.0772)	(0.0746)	(0.0104)	(0.0104)	(0.0708)
Latitude	-0.4321***	-0.4147***	-0.0268	-0.0261	-0.3056***
	(0.1480)	(0.1440)	(0.0175)	(0.0176)	(0.0950)
Korea Invasion	-0.2931	-0.3167	-0.0970**	-0.0979**	-0.2354
	(0.3594)	(0.3552)	(0.0426)	(0.0427)	(0.1845)
Years under Toyotomi	-0.0243	-0.0317	-0.0024	-0.0028	-0.0151
	(0.0406)	(0.0360)	(0.0052)	(0.0053)	(0.0202)
Battle in Current Year	0.7190**	0.7137**	0.0402	0.0395	0.1974
	(0.3528)	(0.3500)	(0.0397)	(0.0398)	(0.1755)
Battle in Past 3 Years	0.1510	0.1258	0.0435	0.0426	-0.1212
	(0.3437)	(0.3450)	(0.0299)	(0.0300)	(0.1815)
Years since Last Inspection	-0.7800***	-0.7837***	-0.0050	-0.0049	0.0118
	(0.1635)	(0.1639)	(0.0038)	(0.0038)	(0.0222)
t^2	0.1213***	0.1225***			
	(0.0291)	(0.0293)			
t^3	-0.0048***	-0.0049***			
	(0.0014)	(0.0014)			
Constant	-15.9828**	-15.3150**	0.1461	0.1448	-17.4891**
	(7.1976)	(7.1113)	(1.0577)	(1.0583)	(8.1277)
Spatial lags					
Catholic Church			-0.0596	-0.0559	
			(0.0525)	(0.0537)	
Land Survey			-0.0482	-0.0497	
			(0.1738)	(0.1737)	
Error			0.2343	0.2356	
			(0.1617)	(0.1614)	
N	887	887	1071	1071	887
AIC	772.2360	773.4872	753.8986	755.7691	1674.7882
BIC	935.0228	941.0618	938.0235	944.8703	1847.1506

The standard errors are clustered by province for the logit and IV probit models. Two-tail tests. Year fixed-effects are estimated but not reported for the logit models. Population in model 60 is scaled to the thousands instead of millions.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.4 The Role of Urbanization

The rate of urbanization for each province is proxied by the density of castle towns, which are calculated by dividing the number of castle towns (*jokamachi*) in the Muromachi and Sengoku periods with the size of the province. Castle towns are settlements built adjacent to castles or strongholds. The data are again collected from Nara National Research Institute for Cultural Properties (1996). The geographical distribution of the castle town density is provided in Figure A.1. Consistent with historical evidence that the area surrounding Kyoto was more urbanized, Izumi, Kawachi, Settsu, and Yamashiro are among the provinces with the highest density of castle towns in our data. Hitachi and its neighboring provinces had a relatively higher density in East Japan, partly because they were located at the historical borders between the Japanese and the northern minorities. As a result, these areas had established a larger number of castles and strongholds, which later nurtured the growth of many castle towns.

Urban areas may have increased demand for churches, which suggests that urban density should be included as a control variable. We re-test our models in Table A.18. According to the first two models, the correlation between Catholic Church and land surveys remains positive and statistically significant. We then estimate the logit models by interacting church presence and the density of castle towns. The results are reported in Table A.18 and the average marginal effects of Church presence along different levels of town densities are presented in Figure A.2. According to the last two models, the average treatment effect of Church presence is approximately $0.11 - 0.12$, a magnitude comparable to the baseline results. Moreover, the Catholic Church coefficient is positive and statistically significant when town density is not extremely large. Provinces with a large density of castle towns were *less* likely to be surveyed compared to those with a moderate rate of urbanization, possibly because these more urbanized areas produced *less* agricultural yields available for extraction.

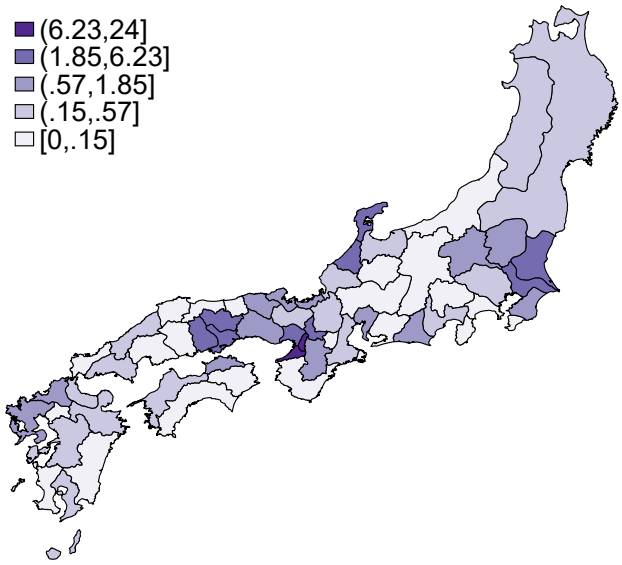

Figure A.1: Urban population density proxied by castle towns

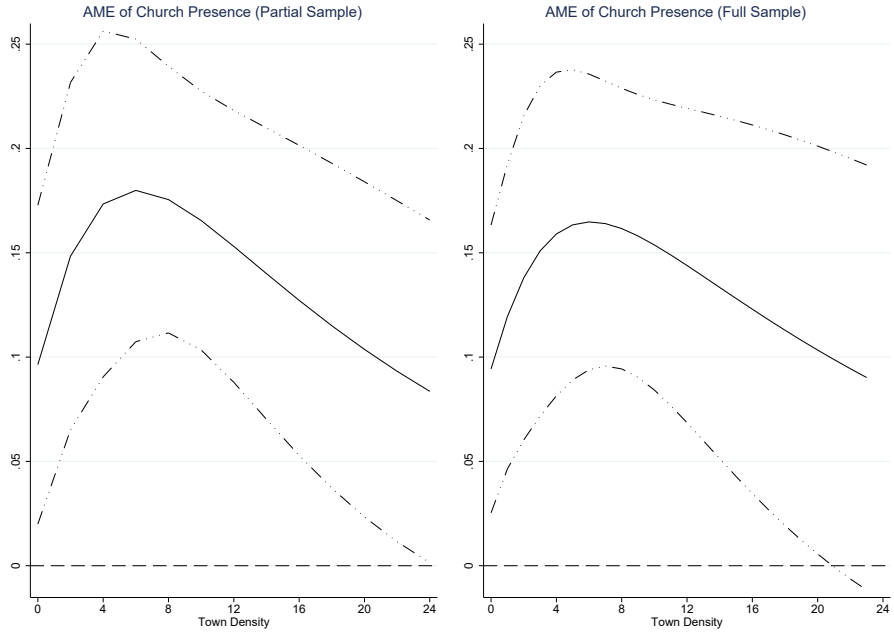

Figure A.2: Average marginal effect of church presence across different levels of town density

The figures represent the average marginal effect of church presence on the likelihood of receiving a survey with 95% confidence intervals, based on the estimation results in Table A.18.

Table A.18: Explaining Toyotomi land surveys, with town density as proxy for urbanization

	(61)	(62)	(63)	(64)
Sample	Partial	Full	Partial	Full
Catholic Church	0.8488***	0.9169***	0.7200**	0.7896***
	(0.3005)	(0.2968)	(0.2984)	(0.2924)
Density of Towns	-0.0789***	-0.0694**	-0.3923**	-0.3756**
	(0.0295)	(0.0352)	(0.1783)	(0.1661)
Catholic Church*Density of Towns			0.3216*	0.3162**
			(0.1700)	(0.1596)
No. of Castles	-0.0560	-0.0976	0.0133	-0.0280
	(0.1892)	(0.1828)	(0.2078)	(0.1961)
Agricultural Suitability	0.0488**	0.0363*	0.0660***	0.0552**
	(0.0201)	(0.0191)	(0.0233)	(0.0229)
Area of Province	0.6518**	0.3531*	0.6531**	0.3580*
	(0.2587)	(0.2066)	(0.2619)	(0.1985)
Elevation Mean	0.3457	0.6387	0.5591	0.8935
	(1.0657)	(1.1241)	(1.0407)	(1.1224)
Elevation Standard Deviation	0.7693	0.4314	0.3332	-0.0272
	(1.4387)	(1.4090)	(1.4372)	(1.4497)
Distance to Yamashiro	-0.0361**	-0.0437***	-0.0346**	-0.0422***
	(0.0169)	(0.0147)	(0.0166)	(0.0141)
Longitude	0.2156***	0.1457**	0.2216***	0.1504**
	(0.0742)	(0.0666)	(0.0731)	(0.0660)
Latitude	-0.4269***	-0.3105**	-0.4071***	-0.2904**
	(0.1440)	(0.1373)	(0.1409)	(0.1348)
Korea Invasion	-0.3725	-0.7417**	-0.2853	-0.6402*
	(0.3653)	(0.3502)	(0.3613)	(0.3448)
Years under Toyotomi	-0.0242	-0.0047	-0.0395	-0.0196
	(0.0333)	(0.0380)	(0.0375)	(0.0404)
Battle in Current Year	0.7503**	0.6431*	0.7376**	0.6149*
	(0.3491)	(0.3438)	(0.3475)	(0.3397)
Battle in Past 3 Years	0.1260	0.2885	0.1378	0.3084
	(0.3448)	(0.3405)	(0.3454)	(0.3431)
Population in 1600	-0.1025	0.2917	-0.4576	-0.1093
	(1.0268)	(0.9171)	(0.9685)	(0.8717)
Years since Last Inspection	-0.7845***	-0.9137***	-0.7641***	-0.8925***
	(0.1638)	(0.1701)	(0.1642)	(0.1701)
t^2	0.1236***	0.1445***	0.1206***	0.1415***
	(0.0292)	(0.0314)	(0.0293)	(0.0315)
t^3	-0.0050***	-0.0059***	-0.0048***	-0.0058***
	(0.0014)	(0.0015)	(0.0014)	(0.0015)
Constant	-16.7992**	-12.9939**	-18.5641**	-14.5935**
	(7.0370)	(6.3761)	(7.3095)	(6.6594)
N	887	1071	887	1071
AIC	770.0262	819.6445	768.2313	817.7846
BIC	937.6008	993.8167	940.5937	996.9332

The table displays logit estimates and standard errors clustered by province (in parentheses). Two-tail tests. Year fixed-effects are omitted from the table.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.5 Different Levels of Exposure to Christian Influence

We estimate the effects of strong Christian influence and moderate Christian influence, respectively. We discuss the measurement of these variables in the main text. Using the partial sample to estimate the logit models (Model 65), we find that the coefficients on both binary variables are positive and statistically significant at conventional levels. Moreover, provinces with strong Christian influence have a probability of receiving a survey that is 13 percentage points higher than those without, while provinces with moderate influence have a probability that is 10 percentage points higher. This result implies that, indeed, provinces with stronger Christian influence are more likely to be surveyed. In the model based on the full sample, which includes provinces not yet conquered by Hideyoshi, the coefficient on strong Christian influence is smaller than that of moderate influence. However, it is more appropriate to focus on the model based on the partial sample, as many of the provinces with strong influence—mostly located in Kyushu—were conquered later than those with moderate influence.

Table A.19: Explaining Toyotomi land surveys, with different exposure to Christian influence

	(65)	(66)
Sample	Partial	Full
Strong Christian Influence	1.0503**	0.7577*
	(0.4139)	(0.4124)
Moderate Christian Influence	0.7968***	0.9565***
	(0.3074)	(0.2974)
No. of Castles	-0.0513	-0.0996
	(0.1913)	(0.1826)
Density of Towns	-0.0732**	-0.0739**
	(0.0303)	(0.0351)
Agricultural Suitability	0.0461**	0.0386**
	(0.0197)	(0.0194)
Area of Province	0.6492**	0.3576*
	(0.2574)	(0.2065)
Elevation Mean	0.3089	0.6661
	(1.0363)	(1.1350)
Elevation Standard Deviation	0.7844	0.4162
	(1.4233)	(1.4174)
Distance to Yamashiro	-0.0272	-0.0505***
	(0.0197)	(0.0186)
Longitude	0.2403***	0.1275
	(0.0862)	(0.0784)
Latitude	-0.4480***	-0.2965**
	(0.1566)	(0.1446)
Korea Invasion	-0.3667	-0.7415**
	(0.3652)	(0.3499)
Years under Toyotomi	-0.0156	-0.0118
	(0.0337)	(0.0423)
Battle in Current Year	0.7321**	0.6515*
	(0.3446)	(0.3415)
Battle in Past 3 Years	0.1028	0.3063
	(0.3545)	(0.3479)
Population in 1600	-0.0792	0.2656
	(1.0259)	(0.9292)
Years since Last Inspection	-0.7852***	-0.9109***
	(0.1644)	(0.1699)
t^2	0.1237***	0.1440***
	(0.0295)	(0.0313)
t^3	-0.0050***	-0.0059***
	(0.0014)	(0.0015)
Constant	-19.4244**	-10.9887
	(8.1046)	(7.4364)
N	887	1071
AIC	771.6934	821.4228
BIC	944.0558	1000.5714

The table displays logit estimates and standard errors clustered by province (in parentheses). Two-tail tests. Year fixed-effects are omitted from the table.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.6 Excluding the Capital Area from the Analysis

The results might be driven by a sub-sample consisting of provinces near the capital, as described in the main text. To address this concern, in addition to controlling for the distance to Yamashiro, we re-estimate our models by excluding Yamashiro and its six adjacent provinces in the sample. The results below suggest that provinces with churches were about 8 percentage points more likely to receive a survey each year, statistically significant at the 95% level (Model 70). The results are substantially similar to those of the main analysis, even after dropping provinces near the capital in our sample.

Table A.20: Explaining Toyotomi land surveys, excluding capital area

	(67)	(68)	(69)	(70)
Sample	Full	Full	Partial	Partial
Catholic Church	0.7080**	0.6528**	0.7058**	0.6531**
	(0.2891)	(0.2758)	(0.2859)	(0.2819)
Agricultural Suitability	-0.0020	-0.0023	0.0029	0.0081
	(0.0210)	(0.0196)	(0.0224)	(0.0239)
Area of Province	0.1031	-0.0133	0.1508	0.1496
	(0.2112)	(0.2193)	(0.2667)	(0.2867)
Elevation Mean	0.4570	0.5123	0.3544	0.2603
	(1.0873)	(1.2273)	(1.0471)	(1.0862)
Elevation Standard Deviation	0.0841	0.2690	0.2371	0.3229
	(1.3432)	(1.4815)	(1.3361)	(1.4131)
Distance to Yamashiro	0.7012***	0.2950	0.7002***	0.7290***
	(0.1892)	(0.2061)	(0.1904)	(0.2574)
Longitude	0.2407***	0.1349*	0.2585***	0.2877***
	(0.0662)	(0.0721)	(0.0673)	(0.0934)
Latitude	-0.4168***	-0.2421*	-0.4383***	-0.4337***
	(0.1347)	(0.1339)	(0.1282)	(0.1320)
Korea Invasion	-0.8454***	-0.5540	-0.5860**	-0.1461
	(0.3087)	(0.3500)	(0.2910)	(0.3903)
Years under Toyotomi	0.1048***	-0.0300	0.0007	0.0115
	(0.0254)	(0.0531)	(0.0288)	(0.0600)
Battle in Current Year	0.0798	0.4148	0.4007	0.4272
	(0.2929)	(0.3684)	(0.2894)	(0.4191)
Battle in Past 3 Years	0.0415	0.2751	-0.1500	0.0567
	(0.3050)	(0.3420)	(0.3334)	(0.3700)
Population in 1600	1.4502	1.4747	1.6936	1.6028
	(1.2541)	(1.2528)	(1.6542)	(1.7721)
Years since Last Inspection	-0.8999***	-0.9304***	-0.7822***	-0.7968***
	(0.1618)	(0.1936)	(0.1551)	(0.1958)
t^2	0.1648***	0.1429***	0.1332***	0.1219***
	(0.0319)	(0.0350)	(0.0295)	(0.0345)
t^3	-0.0074***	-0.0057***	-0.0056***	-0.0048***
	(0.0016)	(0.0016)	(0.0015)	(0.0016)
Constant	-24.3298***	-16.5589**	-25.2056***	-30.7499***
	(7.2951)	(7.4400)	(7.5630)	(9.8432)
N	952	896	772	734
AIC	728.0827	686.7183	653.9033	641.5921
BIC	810.6783	840.2524	732.9360	788.7444

The table presents results excluding Yamashiro and the six adjacent provinces from the sample. The table displays logit estimates and standard errors clustered by province (in parentheses). Two-tail tests. Year fixed-effects are omitted from the table.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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