Online Appendix for "The Christianization of War: How the Church Reform Movement Incentivized Armsbearing Elites to Conquer the Holy Land"

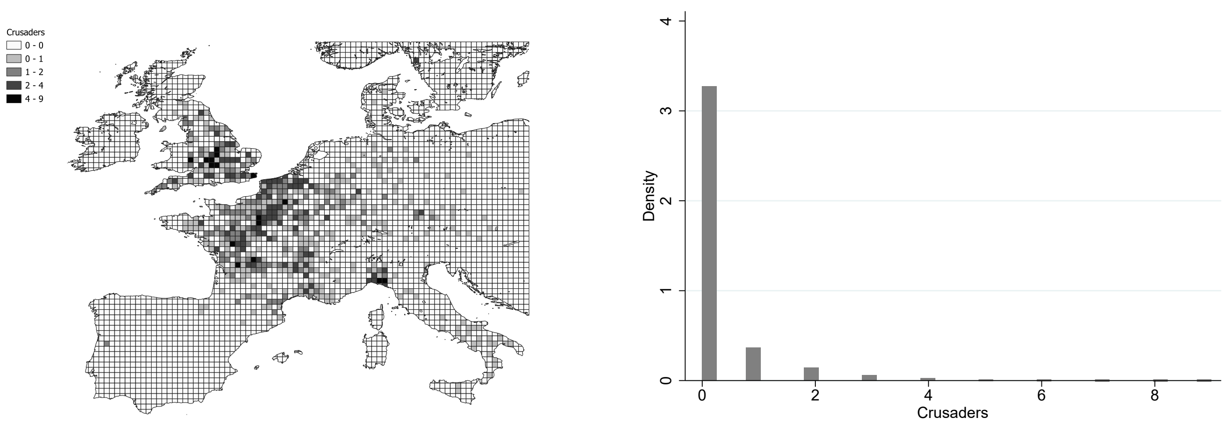
Contents

Data

Outcome

Our baseline outcome is the number of crusaders sent between 1095 and 1204 (data from Blaydes and Paik 2016) in each 25km by 25km grid cell. This data was coded and geolocated by Blaydes and Paik based on modern historical accounts (examples include Riley-Smith 1997; Slack 2001). The left graph in Figure A1 shows the spatial distribution of crusader participation across western Europe. It shows that participation was concentrated in what is today northern and eastern France, southern England, northern Italy, and western Germany. The right graph depicts a histogram of crusade participation. A majority of grids (84%) did not send a crusader. We also rerun our main analysis using an alternative outcome, the logged number of crusaders, which is less skewed (see Table A3).

Figure A1: Distribution of crusaders

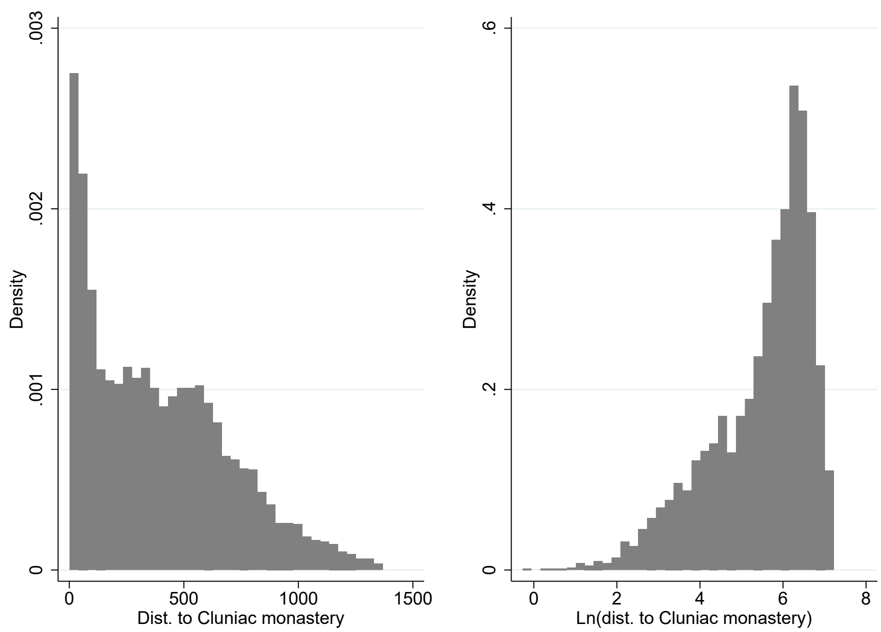


Explanatory variable

Our baseline explanatory variable is the logged distance from the nearest Cluniac monastery to the centroid of each grid around 1100. This dataset comes from Doucette and Møller (2021), it is based on information from the *Atlas zur kirchengeschichte* (Jedin et al. 1987).

There are approximately 270 monasteries by this time. Figure A2 shows the distribution of both the non-logged and logged distances to the nearest Cluniac monastery around 1100. The average logged distance is 5.5 and the standard deviation is 1.22. The average (non-logged) distance is 393km and the (non-logged) standard deviation is 306km. 22% of the grids in our sample are within 100km of a monastery. In Tables A1 and A2 we show that using either the non-logged distance or a dummy for being within 100km of a monastery does not alter our findings.

Figure A2: Distribution of proximity to the Cluniac reform movement



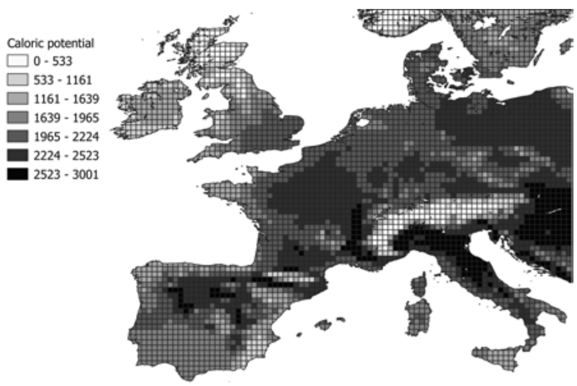
Controls

We provide an overview of our control variables in Figures A3 and A4, which depict the spatial variation for the geographic and climatic controls and the political, economic and ecclesiastical controls in our dataset respectively. Darker shades generally indicate higher intensity or presence. Looking at Figure A3, graph (a) measures the average elevation in each grid, while graph (b) captures the ruggedness of each grid using the standard deviation of elevation (both are based on EEA 2019). Graph (c) shows the average expected caloric potential of each grid in rainfed conditions and with pre-Columbian exchange crops (based on Galor and Ömer Özak 2016). Graph (d) presents the number of navigable rivers that intersect each grid (based on EEA 2018). Graph (e) shows the average drought severity in the century leading up to the first crusade (based on Cook et al. 2015). Finally, graph (f) plots the distance from each grid centroid to the nearest coast (based on Patterson and Kelso 2019).

Figure A4 presents pre-Cluniac measures of political, economic, and religious conditions. Graph (a) shows the grids that were part of the Carolingian empire prior to its dissolution (based on Lienhard and Morice 2016). Graph (b) depicts the number of Roman roads that intersect each grid (based on McCormick et al. 2013). Graph (c) presents the grids that were the seat of a bishop before the First Crusade (based on Chow 2018). Graph (d) plots the number of monasteries in each grid that were attested in Carolingian times (based on Aahlfeldt 2011). Finally, graph (e) shows the logged (plus one) sum of town sizes in each grid in 1100 (based on Nüssli and Nüssli 2008). Moreover, we also plot our grid and political unit fixed effects as colored squares in Figure A5. Models that include grid effects essentially investigate whether within-square variation in Cluniac proximity is related to within-square differences in crusading, while models that include political unit fixed effects examine differences in proximity within the individual realms.

(a) Elevation

(b) Ruggedness



(c) Caloric potential

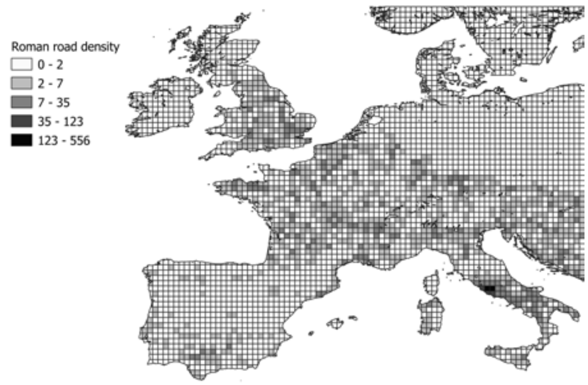
(d) Rivers

(e) Mean drought index, 1000-1095

(f) Distance to the sea

Figure A3: Geographic and climatic controls

(a) Carolingian legacy



(b) Roman road density

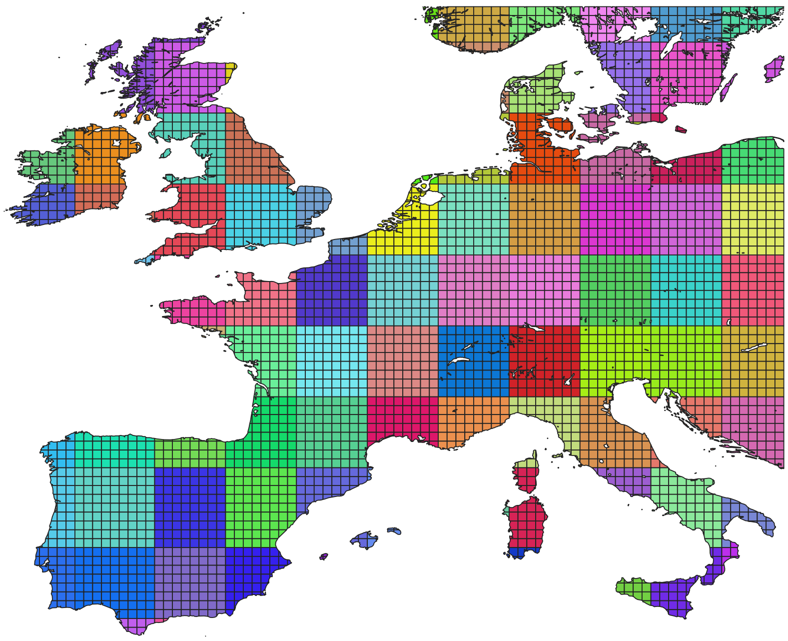
(c) Bishops

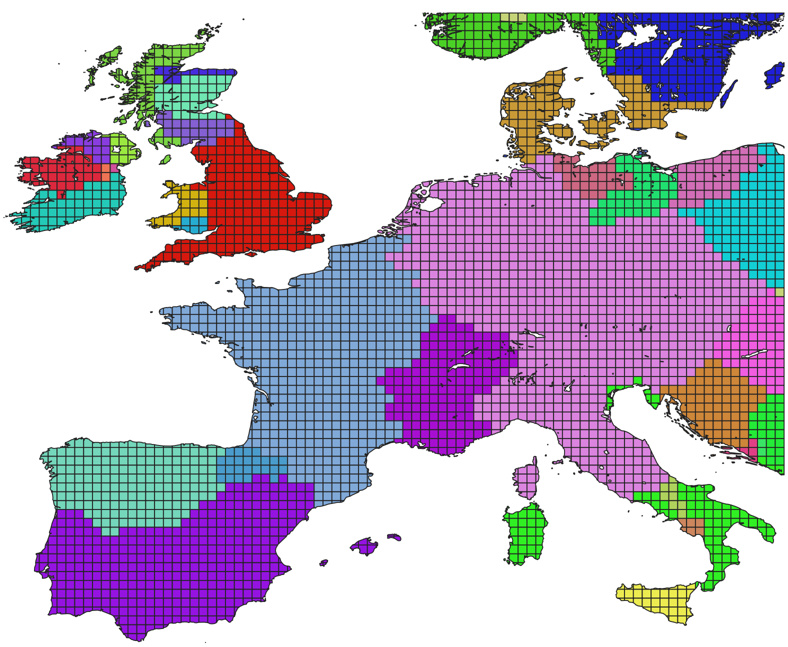
(d) Carolingian monasteries

(e) Urbanization

Figure A4: Political, economic and ecclesiastical controls

Figure A5: Grid and political unit fixed effects





Robustness checks

This section presents an array of robustness checks. Using alternative explanatory variables in Tables A1 and A2, we confirm the positive relationship between proximity to the Cluniac movement and crusading. Table A3 shows that the results remain when using the logged number of crusaders (plus 1) as our outcome. In addition, Figure A6 provides evidence that our findings are insensitive to the exact control setup. Figure A7 confirms that the Cluniac reform movement primarily played a role in recruitment for the First Crusade. In Table A4 we investigate whether changing the size of grids used as the basis for our dataset has any impact on our findings. We find a similar correlation with both smaller and larger grids. In Table A5 we show that changing the size of the grid fixed effects up or down does not alter our findings. Finally, in Figure A8 we consider if the mendicant movements of the thirteenth century are related to pre-mendicant crusade participation. We find a non-robust and substantially small correlation between proximity to the Dominican and Franciscan orders and crusading. If the areas that sent many crusaders were in general supportive of new Church movements, we would expect a similar higher number of crusaders from mendicant areas. The contrary empirical pattern suggests that it was the Cluniacs in particular that fostered crusading as we have argued.

Table A1: Alternative explanatory variables: distance in 100km

	(1) Crusaders	(2) Crusaders	(3) Crusaders	(4) Crusaders	(5) Crusaders
Dist. Cluniac monastery (in 100km)	-7.858	-9.955	-7.570	-10.000	-8.360
	(1.538)***	(3.297)**	(1.817)***	(8.080)	(4.000)*
	[0.872]***	[2.197]***	[1.403]***	[5.5630]	[3.590]*
Controls	No	No	No	Yes	Yes
Lat, lon, lat squared, and lon squared	No	No	No	Yes	Yes
200km grid FE	No	Yes	No	Yes	No
Realm in 1000 FE	No	No	Yes	No	Yes
Observations	3729.000	3729.000	3728.000	3729.000	3728.000

Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Alternative explanatory variables: monastery within 100km

	(1) Crusaders	(2) Crusaders	(3) Crusaders	(4) Crusaders	(5) Crusaders
Cluniac monastery within 100km	0.633	0.248	0.342	0.170	0.273
	(0.127)***	(0.147)	(0.099)***	(0.133)	(0.091)**
	[0.080]***	[0.102]*	[0.083]***	[0.095]	[0.082]***
Lat, lon, lat squared, and lon squared	No	No	No	Yes	Yes
200km grid FE	No	Yes	No	Yes	No
Realm in 1000 FE	No	No	Yes	No	Yes
Observations	3729.000	3729.000	3728.000	3729.000	3728.000

Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: Alternative dependent variable: logged number of crusaders

	(1) Ln(1+crusaders)	(2) Ln(1+crusaders)	(3) Ln(1+crusaders)	(4) Ln(1+crusaders)	(5) Ln(1+crusaders)
Ln(distance Cluniac monastery)	-0.124	-0.088	-0.088	-0.053	-0.064
	(0.020)***	(0.028)**	(0.017)***	(0.027)*	(0.017)***
	[0.012]***	[0.023]***	[0.017]***	[0.024]*	[0.021]**
Lat, lon, lat squared, and lon squared	No	No	No	Yes	Yes
200km grid FE	No	Yes	No	Yes	No
Realm in 1000 FE	No	No	Yes	No	Yes
Observations	3729.000	3729	3729	3729	3729

Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: Alternative grid sizes

	(1)	(2)	(3)
Grid size	15km	25km	35km
Dependent variable	Crusaders	Crusaders	Crusaders
Ln(distance Cluniac monastery)	-0.066	-0.187	-0.464
	(0.0237)**	(0.0566)**	(0.137)**
	[0.0191]**	[0.0532]***	[0.104]***
Standardized beta coefficient	-0.210	-0.302	-0.440
200km grid FE	Yes	Yes	Yes
Observations	9982	3729	2015

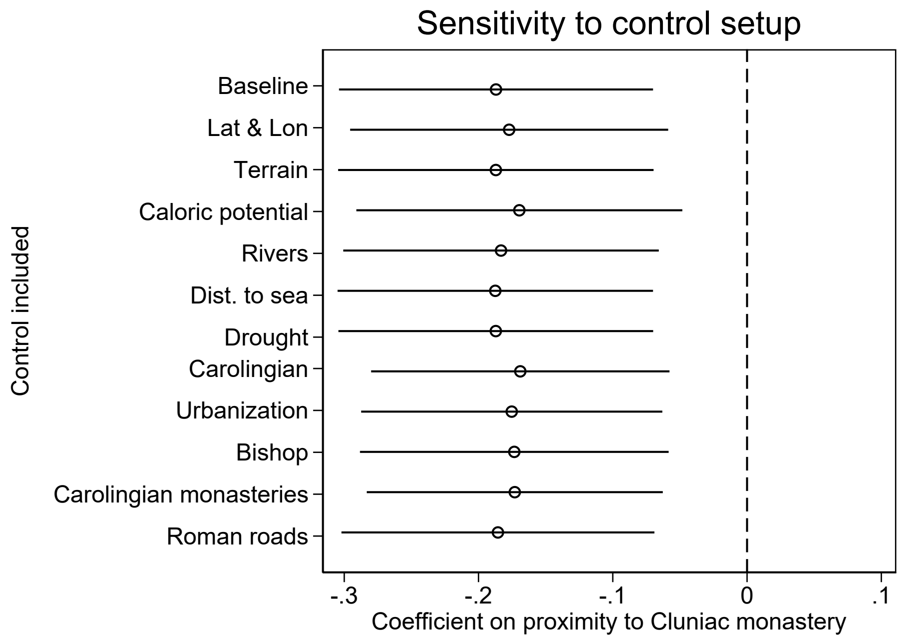
Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: Alternative grid FE sizes

	(1)	(2)	(3)
Grid FE size	150km	200km	250km
Dependent variable	Crusaders	Crusaders	Crusaders
Ln(distance Cluniac monastery)	-0.165	-0.187	-0.181
	(0.0584)**	(0.0582)**	(0.0421)***
	[0.0519]**	[0.0533]***	[0.0447]***
Standardized beta coefficient	-0.267	-0.302	-0.292
Grid FE	Yes	Yes	Yes
Observations	3729	3729	3729

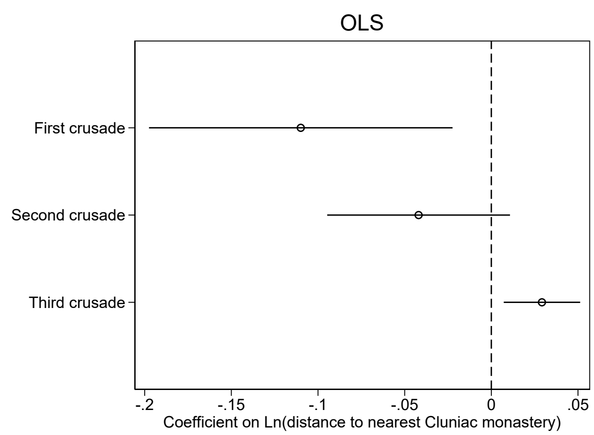
Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A6: Sensitivity to control setup



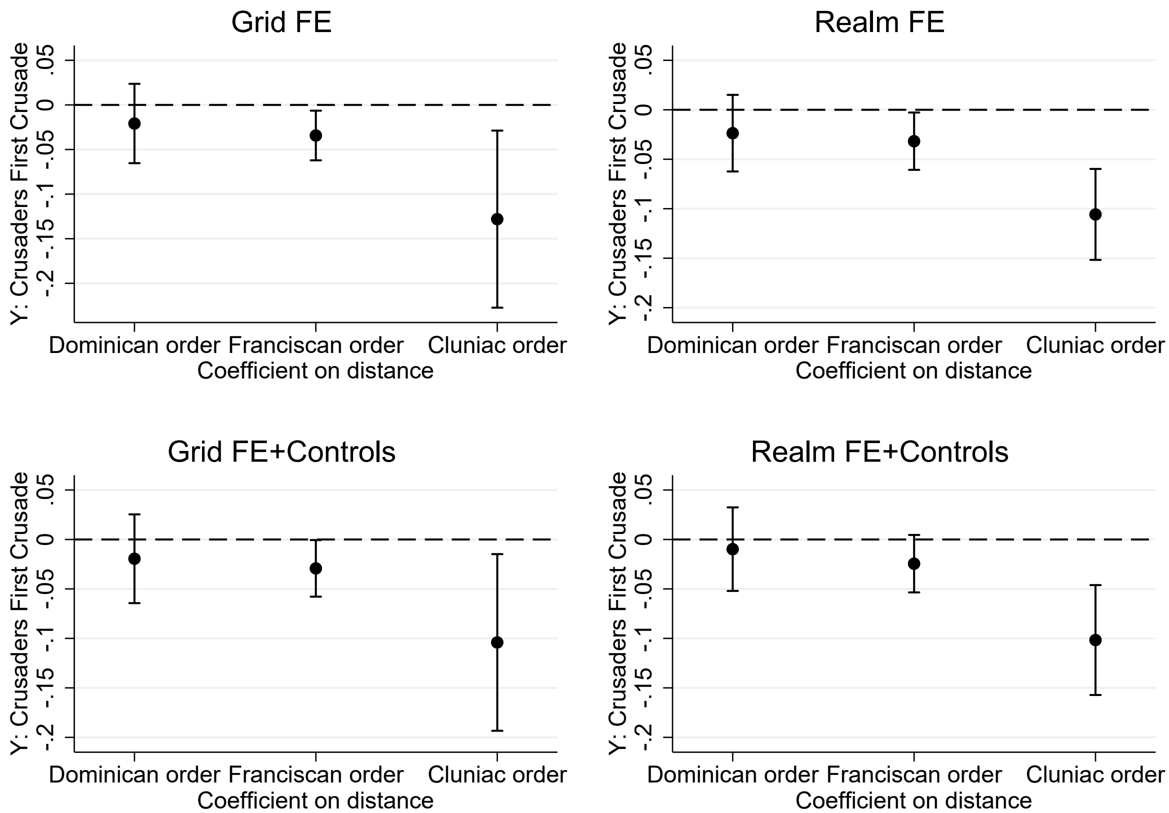
Note: Baseline is Model 2 from Table 1. 95% confidence intervals based on clustering by 200km grids. Dependent variable: crusaders.

Figure A7: Impact over time with controls



Note: Based on Figure 4 with added controls. 95% confidence intervals based on clustering by 200km grids. Dependent variable: crusaders in each major crusade.

Figure A8: Placebo religious order



Note: Dependent variable is number of crusaders participating in the First Crusade. Estimated using OLS. 95% confidence intervals based on clustering by 200km grids.

IV robustness checks

As illustrated in Doucette and Møller (2021, 210), the Cluniac reform movement spread in concentric circles from the initial monastery in Cluny. The movement spread via personal ties to neighbouring Cluniac monks - sometimes quite literally, as abbots were brought in from nearby Cluniac monasteries to lead new monasteries (Bouchard 1987,90, 94; Bouchard 1990, 380). This makes it likely that our instrument - distance to Cluny - is strongly correlated with our explanatory variable (distance to the nearest Cluniac monastery). When the first monastery was established, Cluny was an insignificant hamlet in the Black Valley. It was a remote location that had little contact with important lay or ecclesiastical hubs or power centers in West Francia (Bouchard 1987, 91; Melville 2016, 55; Wickham 2016, 111). In support of this, Doucette and Møller (2021) show that distance to Cluny is uncorrelated with tenth-century urban change (i.e. population growth, sieges, and episcopal foundations). We also show in Table 4 in the article that distance to Cluny, conditional on our preferred set of controls, is unrelated to the presence of prior ecclesiastical institutions. This indicates that the exclusion assumption is plausible. We present and discuss additional tests concerning the validity of our IV approach below.

This section presents a series of robustness checks of our IV models. First, Figure A9 illustrates the first stage correlation, and confirms the positive association between the instrument, distance to Cluny, and proximity to a Cluniac monastery both with and without regional fixed effects and controls. Tables A6 reports IV results for our test of the timing of Cluniac influence. The results are consistent with the pattern reported in the article. In Table A7 we consider if spatial dependence may be driving our findings. First, we follow Betz et al. (2020) and use a binary contiguity matrix (W). Next, we estimate a SAR model (Column 1), which confirms the negative association between distance to a Cluniac monastery and crusading. Finally, we estimate a spatial 2SLS, which returns a negative impact of distance to a Cluniac monastery. Is the severity of the Carolingian collapse driving the results? Stasavage (2011) argues that the severity of the state collapse varied across the three partitions on the Empire in 843. Table A8 shows that our findings remain even if we control for this possibility.

Table A6: Assessing implication using IV

	(1)	(2)	(3)	(4)	(5)	(6)
Crusade	First	Second	Third	First	Second	Third
Dependent variable	Crusaders	Crusaders	Crusaders	Crusaders	Crusaders	Crusaders
Ln(distance Cluniac monastery)	-0.263	-0.004	0.084	-0.188	-0.046	0.026
	(0.171)	(0.026)	(0.068)	(0.056)***	(0.011)***	(0.020)
	[0.010]*	[0.027]	[0.029]**	[0.053]***	[0.019]*	[0.015]
F statistic for first stage	61	61	61	88	88	88
200km grid FE	Yes	Yes	Yes	No	No	No
Realm FE	No	No	No	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3729	3729	3729	3729	3729	3729

Estimated using 2SLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7: Spatial models

	(1)	(2)
Model	SAR spatial	S-2SLS spatial
Dependent variable	Crusaders	Crusaders
Ln(distance Cluniac monastery)	-0.215***	-0.254***
	(0.014)	(0.018)
Spatial ρ_y	0.412**	0.535**
Controls	Yes	Yes
Observations	3729	3729

W matrix for spatial models based on contiguous neighbors. OIM standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A9: First stage

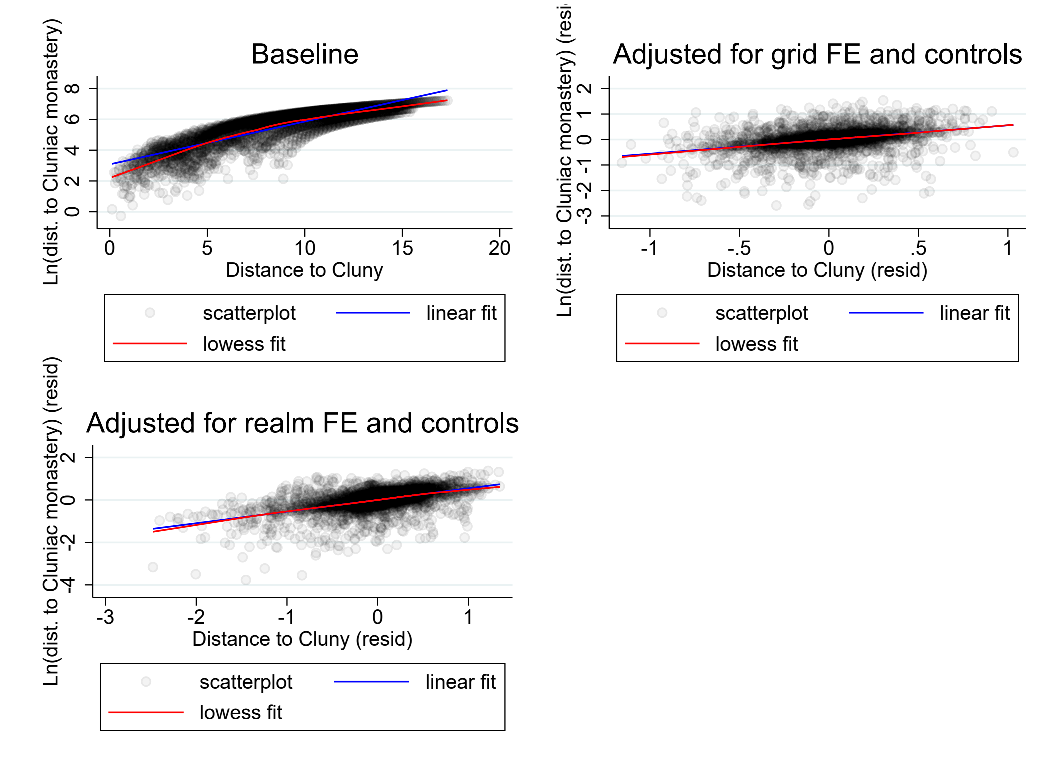


Table A8: Is IV driven by degree of Carolingian collapse?

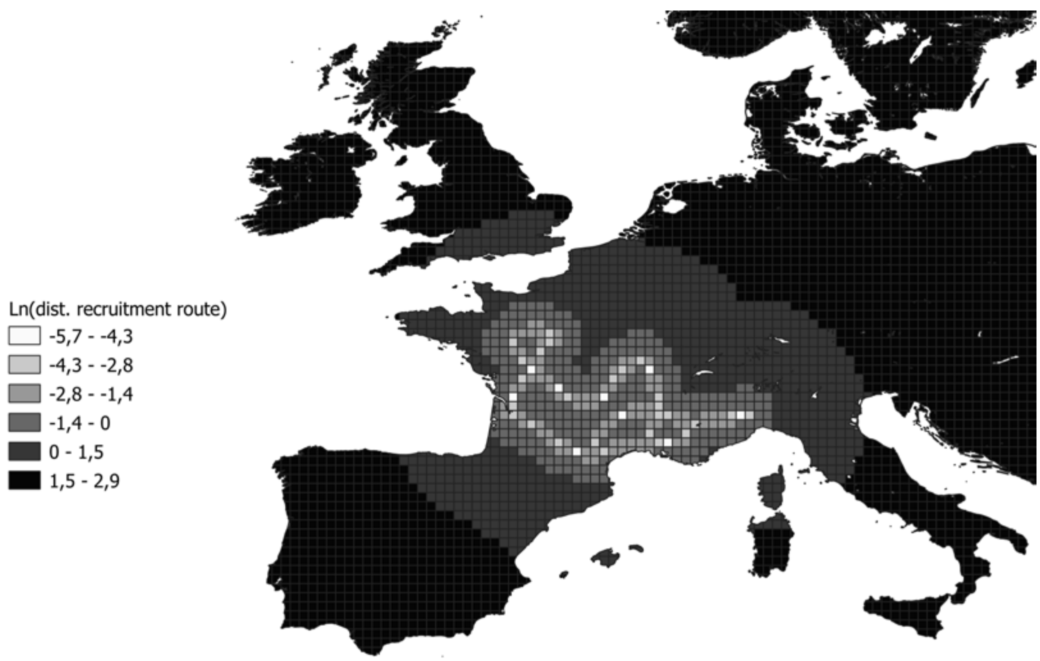
	(1)
Dependent variable	Crusaders
Ln(distance Cluniac monastery)	-0.192
	(0.059)**
	[0.035]***
Control for Carolingian partition	Yes
F statistic for first stage	146
Observations	3729

Note: Estimated using 2SLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Alternative Explanations

In this section, we investigate whether the recruitment tour undertaken by Pope Urban II or economic gains from crusading could explain away our findings. Figure A10 presents the distance between each area in our dataset and the pope's route. Table A9 shows that controlling for this distance does not invalidate our main findings. Table A10 documents that accounting for the economic gains between 1100 and 1300 does not alter the relationship. Finally, Table A11 shows that our findings hold when controlling for distance to Paris.

Figure A10: Distance from Pope Urban II's recruitment route



Note: Based on Riley-Smith (1991, 29).

Table A9: Alternative explanation: Pope Urban II's recruitment route

	(1) Crusaders	(2) Crusaders	(3) Crusaders	(4) Crusaders	(5) Crusaders
Ln(dist. Cluniac monastery)	-0.144	-0.122	-0.145	-0.085	-0.107
	(0.077)	(0.058)*	(0.052)**	(0.054)	(0.044)*
	[0.052]**	[0.048]*	[0.047]**	[0.051]	[0.047]*
Control for dist. Urban II's route	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes
Lat, lon, lat squared, and lon squared	No	No	No	Yes	Yes
200km grid FE	No	Yes	No	Yes	No
Realm in 1000 FE	No	No	Yes	No	Yes
Observations	3729.000	3729.000	3728.000	3729.000	3728.000

Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A10: Alternative explanation: Economic gains from crusading

	(1) Crusaders	(2) Crusaders	(3) Crusaders	(4) Crusaders	(5) Crusaders
Ln(dist. Cluniac monastery)	-0.229	-0.176	-0.171	-0.127	-0.142
	(0.042)***	(0.056)**	(0.037)***	(0.055)*	(0.039)***
	[0.026]***	[0.052]***	[0.037]***	[0.057]*	[0.045]**
Control for urban growth, 1100 to 1300	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes
Lat, lon, lat squared, and lon squared	No	No	No	Yes	Yes
200km grid FE	No	Yes	No	Yes	No
Realm in 1000 FE	No	No	Yes	No	Yes
Observations	3729.000	3729.000	3728.000	3729.000	3728.000

Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A11: Alternative explanation: Distance to Paris

	(1) Crusaders	(2) Crusaders	(3) Crusaders	(4) Crusaders	(5) Crusaders
Ln(dist. Cluniac monastery)	-0.095	-0.156	-0.108	-0.106	-0.080
	(0.037)*	(0.053)**	(0.043)*	(0.050)*	(0.040)
	[0.029]***	[0.059]**	[0.042]*	[0.050]*	[0.040]*
Control for distance to Paris	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes
Lat, lon, lat squared, and lon squared	No	No	No	Yes	Yes
200km grid FE	No	Yes	No	Yes	No
Realm in 1000 FE	No	No	Yes	No	Yes
Observations	3729.000	3729.000	3728.000	3729.000	3728.000

Note: Estimated using OLS. Standard errors clustered by 200km grid in parentheses, spatially corrected standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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