

The Wild West *is* Wild:  
The Homicide Resource Curse  
*Online Appendix*

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**Missing discovery dates in the MRDS**

The US part of the MRDS contains 267,072 distinct information points. Out of these observations, 152,477 points correspond to places where mining has been or is still operated. Other information points are worthless ground geology information from the econometrician's point of view.

Among the 152,477 that might contain useful information, the discovery year is available for 17,595 observations. To the best of our knowledge, observations for which the discovery year is not available correspond to subsequent detailed information on characteristics of the area that immediately surrounds places where mining has been operated (e.g. discovery of a new mineral vein next to the one already exploited) and/or to deposits that are not really valuable, i.e. not worth being exploited. We present below the different approaches we use to illustrate this claim.

First, we map undated discoveries and obtain Figure A2(a). Undated discoveries appear to be evenly distributed across space and located in 2,736 out of the 3,108 counties, a figure that is completely at odds with all available information

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about mineral resources exploitation in the US. The 849 counties considered as having mineral resources when we use dated discoveries portray a much more reasonable distribution of mining history and activity as shown by Figure A2(b) and Figure 1 in the main text.

The fact that undated discoveries do not exhibit a particular spatial distribution can also be illustrated thanks to a simple regression. For instance, we estimate a linear probability model where the dependent variable is equal to 1 if the discovery year is unavailable and the independent variables are each discovery's latitude and longitude. The R-squared from this model equals 0.003, i.e. it is very close to 0, meaning that the probability that the discovery date is missing does not vary substantially when moving on the East-West and North-South axis.

Second, it is also possible to take advantage of some information about commodities provided by the MRDS and investigate differences in observable characteristics between dated and undated discoveries. It appears that 41% (3%) of undated (dated) discoveries contain sand, gravel or stone as primary commodities. In contrast, 38% (22%) of dated (undated) discoveries contain gold or silver as primary commodity. These simple figures suggest that undated discoveries contain less valuable ores.

The MRDS also contains vague and frequently missing information about the size of each deposit. It turns out that this information is available for 61% (18%) of dated (undated) points. This suggests, under the hypothesis that size information is less likely to be reported for negligible deposits, that undated discoveries are likely not to correspond to anything important in terms of exploitation. Further comparing dated and undated discoveries within points for which some size information is available, we find that 87% of dated discoveries are categorized as “small”—as opposed to “large” or “medium”.<sup>1</sup> A similar share, i.e. 90%, of undated discoveries are identically categorized. This means that, conditional on size information being available—which we interpret as a signal of non-negligibility—dated discoveries are not systematically larger than undated ones.

Finally, we re-estimate equation (2) from the main text including undated discoveries as a supplementary explanatory variable. Estimated coefficients are

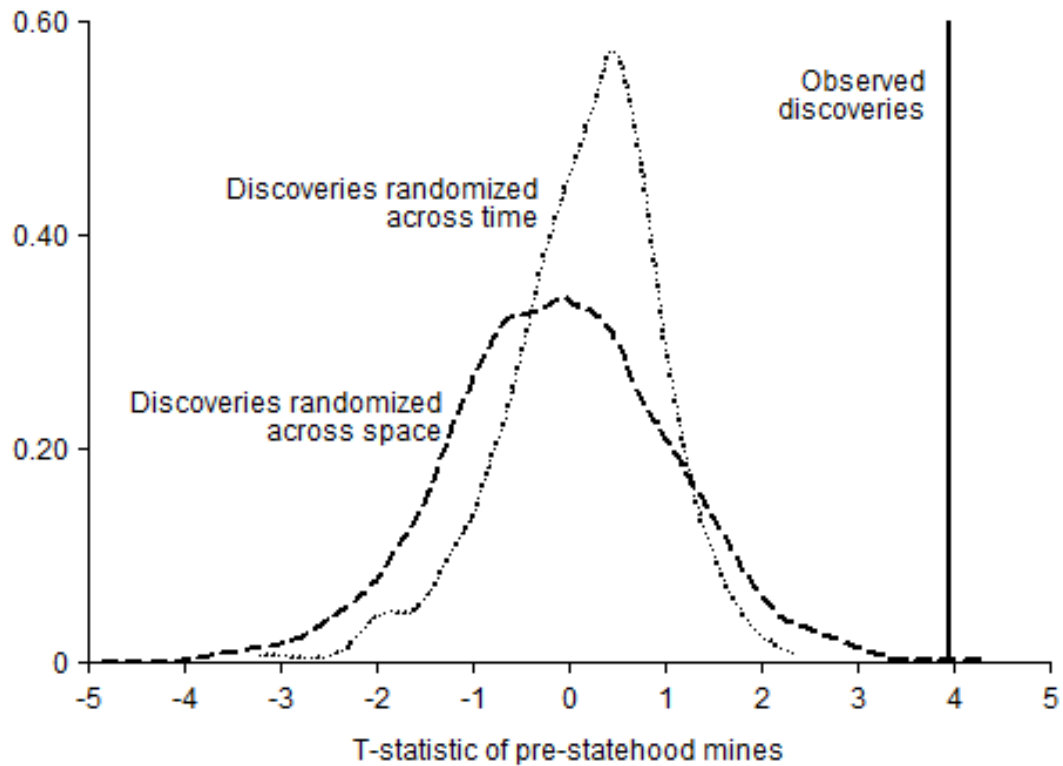
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<sup>1</sup>According to the data provider itself, “the precise meanings of [size information] have changed over time and are lost to history [...]”

presented in Table A7. Columns 1 and 2 reproduce columns 1 and 5 of Table 3. Columns 3 and 4 display the estimated coefficients when adding undated discoveries as a right-hand side variable. The magnitude and statistical significance of our coefficient of interest remains remarkably stable. In contrast, the estimated coefficient of undated discoveries is small and hardly statistically significant, which suggests that this variable has little explanatory power. Columns 5 and 6 further present estimated coefficients when our main variables of interest are interacted with the county-level undated discoveries, i.e. as if pre- and post-statehood discoveries were weighted by the extent of local missing information. Interaction terms turn out to be hardly statistically significant, while estimated coefficients of variables of interest remain fairly unchanged.

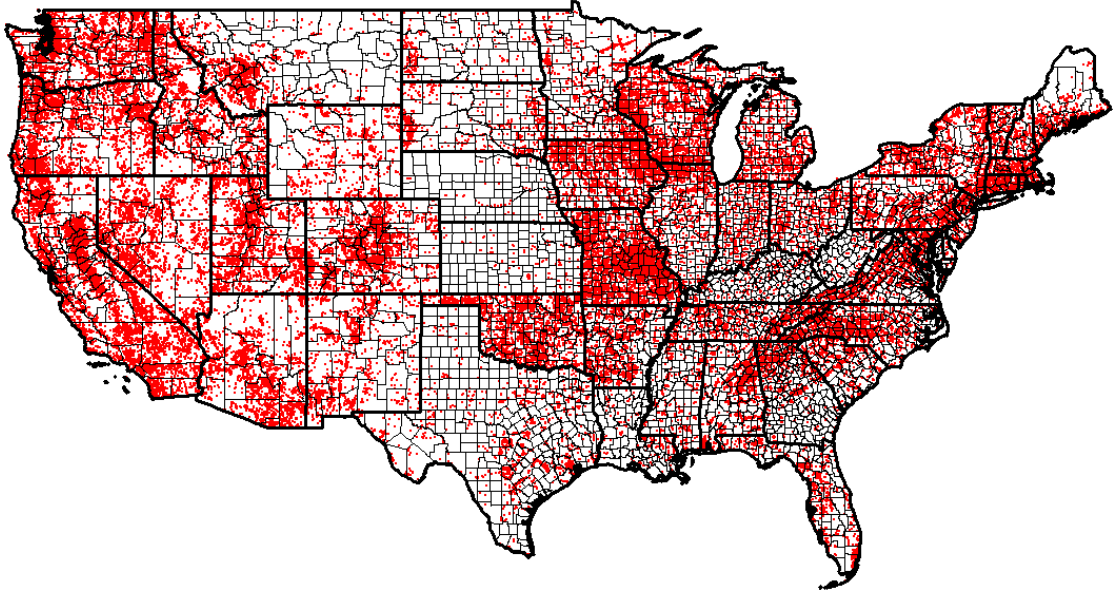
This last finding and the above mentioned points make us confident that no systematic or relevant bias arises from the fact that numerous discovery dates are missing from the MRDS.

Figure A1: T-statistics of pre-statehood mines when discoveries are randomized across space or time.

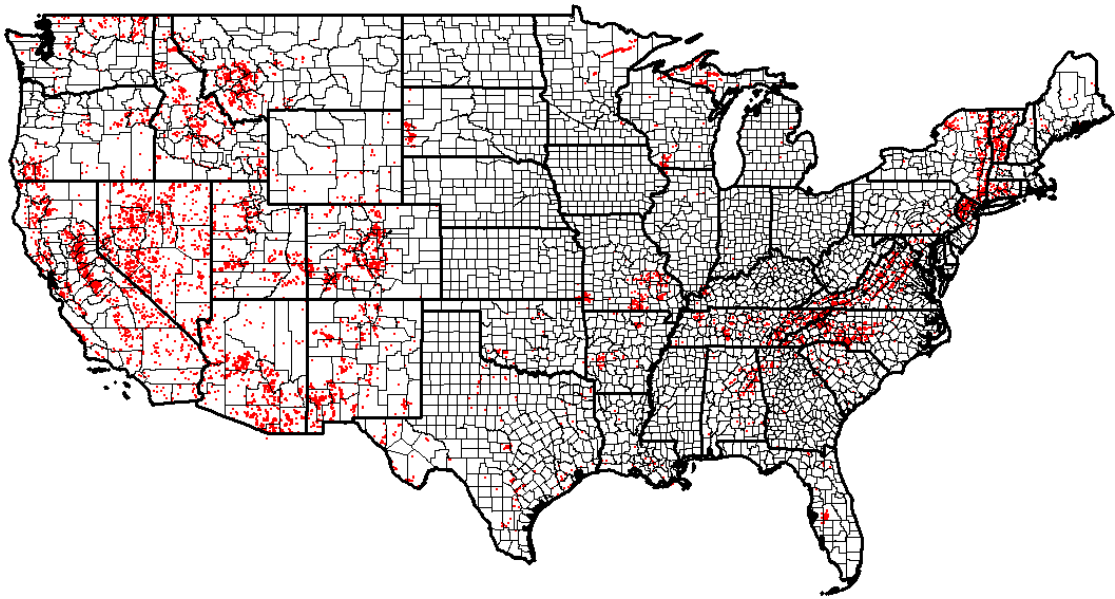


The figure plots the distributions of the t-statistics of pre-statehood mines obtained when randomizing discoveries across space or time. Randomization across time is achieved by randomizing the share of mines discovered in a county before or after that county's land was organized, taking the number of mines on the county's surface as given. Randomization across space is achieved by randomly allocating mines to counties, keeping constant the overall distribution of mines across counties. The estimated specification is the same as the one displayed in Table 3, column 5. Each randomization and its subsequent estimation has been performed 1,000 times. The vertical line corresponds to the t-statistic of the estimate of pre-statehood mines displayed in Table 3, column 5.

Figure A2: Dated and undated mineral resources information points.



(a) Undated mineral resources points.



(b) Dated mineral resources points.

Sources: Mineral Resources Data System. Each point corresponds to a distinct MRDS entry. Sub-figure (a) points are observations for which the discovery year is not available. Sub-figure (b) points are observations for which the discovery year is available.

Table A1: Historical data on homicide.

State	Period	# counties	State	Period	# counties
Arizona	1890 - 1900	1	Illinois	1830 - 1890	3
California	1850 - 1900	8	Nebraska	1880 - 1900	1
Colorado	1880 - 1900	1	Ohio	1800 - 1900	3
Florida	1830 - 1860	23	South Carolina	1790 - 1900	2
Georgia	1790 - 1900	7	Virginia	1790 - 1900	14

Data for counties in Arizona, Nebraska, Colorado, and California (except San Francisco) are from McKanna (2002), data for San Francisco are from Mullen (2005); Data for counties in Georgia, Ohio, and Virginia are from Roth (2009); data for counties in Florida are from Denham (1997); data for counties in Illinois are from Allaman (1989) and Erwin (1976); data for South Carolina are from Eckberg (2001).

Table A2: Historical evidence on mineral discoveries and homicide: Robustness checks.

Dependent variable: yearly rate of homicide per 1,000 inhabitants						
	(1)	(2)	(3)	(4)	(5)	(6)
				Log of dependent variable	Excluding 2-sigma outliers	Excluding 3-sigma outliers
Discovery	-0.14 (0.09)	-0.14 (0.09)	-0.13 (0.09)	-0.05 (0.03)	-0.05 (0.04)	-0.04 (0.02)
Discovery $\times$ pre-statehood mines	0.22** (0.11)	0.22* (0.12)	0.18* (0.09)	0.10** (0.05)	0.11** (0.05)	0.10** (0.04)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Spatial correlation adjustment	100 km	500 km				
County specific time trend			Yes			
Observations	3,588	3,588	3,588	3,588	3,473	3,539
R-squared	0.36	0.36	0.43	0.41	0.56	0.49

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . OLS regressions. Each column presents estimates from a separate regression. The unit of observation is a county-year. White heteroskedastic standard errors adjusted for clustering at the county level are presented in parentheses, except in columns 1 and 2 where standard errors are adjusted for spatial correlation adjustment with 100- and 500-kilometers radius following the method by Conley (1999, 2008), and Hsiang (2010). *Discovery* is a dummy equal to 1 if county  $i$  experiences a mineral discovery in a given year. *Pre-statehood* is a dummy variable equal to 1 for counties that ever experienced a pre-statehood discoveries. All regressions include a constant term. Table A1 presents sources used to construct the sample.

Table A3: Political and mining history and present-day violent crime: Summary statistics and covariates' estimates.

Dependent variable: rate of violent crime per 100,000 inhabitants in 2000						
	(1)	(2)	(3)	(4)	(5)	Mean (sd)
Rate of violent crime						499.620 (364.700)
Post-statehood discoveries	-79.63*** (28.37)	-56.37 (35.11)	-8.77 (25.87)	-43.33 (26.07)	-11.71 (28.71)	0.049 (0.214)
Pre-statehood discoveries	423.06*** (79.81)	512.80*** (91.74)	443.65*** (93.03)	294.67*** (108.79)	357.10*** (90.17)	0.004 (0.036)
Total land area		0.00 (0.01)			-0.00 (0.01)	829.105 (1,183.432)
Elevation mean		-0.02 (0.02)			0.06 (0.05)	320.767 (414.136)
Standard deviation of elevation		-0.61 (0.57)			-0.65** (0.30)	20.762 (33.853)
Total length of rivers		0.02 (0.03)			0.04 (0.04)	290.807 (342.299)
Agricultural suitability		132.59*** (38.19)			101.98*** (34.20)	0.541 (0.343)
Oil or gas resources		7.47 (12.70)			12.45 (16.36)	0.294 (0.456)
Distance to state's capital		0.03 (0.05)			0.01 (0.05)	199.758 (129.037)
Land organization date		-0.47 (0.47)			-0.20 (0.33)	1,806.305 (58.163)
Latitude		-15.52*** (5.25)			0.14 (6.09)	38.167 (4.491)
Longitude		-4.57 (2.81)			-6.30* (3.60)	-89.935 (10.740)
High school degree			-2.00 (1.90)		-1.98 (1.83)	77.404 (8.728)
Gini coefficient			-119.41 (175.48)		-219.91 (217.95)	0.433 (0.039)
Population density			-0.01*** (0.00)		-0.02*** (0.01)	233.327 (1,711.185)
Per capita income			0.00 (0.00)		-0.00 (0.00)	24,274.063 (5,764.821)
Share of blacks			368.46*** (121.22)		205.05* (119.99)	0.094 (0.149)
Ethnic fractionalization			466.17*** (96.48)		425.48*** (107.66)	0.205 (0.170)
Male literacy rate (1900)				-336.35* (171.02)	-79.40 (149.85)	0.851 (0.133)
Population density (1880)				-0.00 (0.00)	0.02*** (0.00)	81.117 (1,349.082)
Share of urban population (1880)				355.44*** (79.55)	295.44*** (73.26)	0.081 (0.172)
Share of women (1880)				-115.83 (135.83)	-8.91 (138.35)	0.468 (0.063)
Share of non-whites (1880)				200.94* (104.26)	13.15 (69.13)	0.157 (0.217)
Per capita farming output (1880)				0.44 (0.30)	0.19 (0.32)	49.387 (32.194)
Per capita manufacturing (1880)				0.14 (0.16)	0.15 (0.16)	37.813 (62.539)
State fixed effects	Yes	Yes	Yes	Yes	Yes	
Observations	3,108	3,108	3,054	2,484	2,460	2,460
R-squared	0.46	0.48	0.53	0.53	0.56	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . OLS regressions. Each column presents the estimates from a separate regression. The unit of observation is a county. White heteroskedastic standard errors adjusted for clustering at the state level in parentheses. Columns 1 – 5 mirror identically numbered columns of Table 3. *Violent crimes* include murders, aggravated assaults, and other assaults. *Pre-* and *Post-statehood discoveries* are the numbers of mineral discoveries per 0.1 square mile that have been discovered before and after political organization, respectively. All regressions include a constant term and UCR's county-level coverage indicator. See Table A8 for sources and definitions of covariates.

Table A4: Mining history and present-day violent crime: Metal, silver and gold mines.

Dependent variable: rate of violent crimes per 100,000 inhabitants in 2000						
Resources restriction:	(1)	(2)	(3)	(4)	(5)	(6)
	Metal		Gold or silver		Gold	
Post-statehood discoveries	-93.71** (41.91)	-20.31 (36.99)	-226.10* (124.98)	-134.06 (108.22)	-213.31 (142.62)	-101.44 (114.57)
Pre-statehood discoveries	439.79*** (79.02)	361.48*** (97.98)	567.41*** (111.74)	426.77*** (92.83)	616.66*** (137.95)	448.60*** (84.50)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls		Yes		Yes		Yes
Contemporary controls		Yes		Yes		Yes
Historical controls		Yes		Yes		Yes
Observations	3,108	2,460	3,108	2,460	3,108	2,460
R-squared	0.46	0.56	0.46	0.56	0.46	0.56

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions. Each column presents the estimates from a separate regression. The unit of observation is a county. White heteroskedastic standard errors adjusted for clustering at the state level in parentheses. *Violent crimes* include murders, aggravated assaults, and other assaults. *Pre-* and *Post-statehood discoveries* are the numbers of mineral discoveries per 0.1 square mile that have been discovered before and after political organization, respectively. Columns 1–2 only use discoveries that consist of metals, 3–4 only gold or silver, and 5–6 gold only. All regressions include a constant term and UCR’s county-level coverage indicator. *Geographic controls*: total land area, mean and the standard deviation of elevation, agricultural suitability, total length of rivers, a dummy indicating the presence of oil or gas resources, distance to state’s capital, the date at which the county’s land was first politically organized, latitude, and longitude. *Contemporary controls* are measured in 2000: share of population with high school degree, Gini coefficient, population density, per capita income, share of blacks, and ethnic fractionalization. *Historical controls*: male literacy rate in 1900, population density, share of urban population, share of women, share of non-whites, per capita farming output and per capita manufacturing output in 1880. See Table A8 for sources and definitions of covariates.



Table A5: Political and mining history and present-day crimes: Other types of crimes.

Dependent variables: rates of crime per 100,000 inhabitants in 2000						
	(1)	(2)	(3)	(4)	(5)	(6)
	Property crimes		Drug crimes		Other crimes	
Post-statehood discoveries	-90.52*** (28.45)	-29.12 (21.39)	-54.27* (27.20)	-30.86 (26.32)	-474.71*** (152.93)	-262.17** (103.97)
Pre-statehood discoveries	122.33** (60.76)	109.04 (87.00)	209.87 (160.32)	285.00 (251.01)	2,137.01 (1,535.10)	2,951.92 (2,013.51)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls		Yes		Yes		Yes
Contemporary controls		Yes		Yes		Yes
Historical controls		Yes		Yes		Yes
Observations	3,108	2,460	3,108	2,460	3,108	2,460
R-squared	0.32	0.46	0.21	0.28	0.29	0.37

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS regressions. Each column presents the estimates from a separate regression. The unit of observation is a county. White heteroskedastic standard errors adjusted for clustering at the state level in parentheses. *Property crimes* include robberies, burglaries, larcenies, and vehicle thefts. *Drug crimes* include all violations of drug laws. *Other crimes* include all other crimes. *Pre-* and *Post-statehood discoveries* are the numbers of mineral discoveries per 0.1 square mile that have been discovered before and after political organization, respectively. All regressions include a constant term and UCR's county-level coverage indicator. *Geographic controls*: total land area, mean and standard deviation of elevation, agricultural suitability, total length of rivers, a dummy indicating the presence of oil or gas resources, distance to the state's capital, the date at which the county's land was first politically organized, latitude, and longitude. *Contemporary controls* are measured in 2000: share of population with high school degree, Gini coefficient, population density, per capita income, share of blacks, and ethnic fractionalization. *Historical controls*: male literacy rate in 1900, population density, share of urban population, share of women, share of non-whites, per capita farming output and per capita manufacturing output in 1880. See Table A8 for sources and definitions of covariates.

Table A6: Political and mining history and present-day violent crime: Dealing with outliers.

Dependent variable: rate of violent crime per 100,000 inhabitants in 2000						
	(1)	(2)	(3)	(4)	(5)	(6)
	Log of dependent variable		Excluding 5th and 95th percentiles of crimes		Excluding 5th and 95th percentiles of mines	
Post-statehood discoveries	-0.15* (0.08)	-0.05 (0.09)	-33.68 (30.29)	2.44 (36.19)	-232.29** (97.54)	-8.09 (76.86)
Pre-statehood discoveries	0.97*** (0.24)	0.76** (0.29)	392.96*** (71.23)	367.87*** (86.11)	650.62** (265.63)	518.90 (372.20)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls		Yes		Yes		Yes
Contemporary controls		Yes		Yes		Yes
Historical controls		Yes		Yes		Yes
Observations	3,108	2,460	2,953	2,345	3,024	2,407
R-squared	0.73	0.79	0.47	0.54	0.47	0.56
	(7)	(8)	(9)	(10)	(11)	(12)
	Excluding 5th and 95th percentiles of mines or crimes		Excluding 2-sigma outliers		Excluding 3-sigma outliers	
Post-statehood discoveries	-102.03* (53.55)	-36.76 (62.95)	-53.91*** (19.20)	-6.34 (26.88)	-54.62** (26.85)	-2.84 (31.49)
Pre-statehood discoveries	546.12** (221.34)	717.44* (363.75)	387.35*** (59.22)	367.74*** (78.07)	388.58*** (80.04)	400.24*** (79.60)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls		Yes		Yes		Yes
Contemporary controls		Yes		Yes		Yes
Historical controls		Yes		Yes		Yes
Observations	2,871	2,292	2,945	2,325	3,059	2,418
R-squared	0.47	0.54	0.60	0.67	0.52	0.61

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . OLS regressions. Each column presents the estimates from a separate regression. The unit of observation is a county. White heteroskedastic standard errors adjusted for clustering at the state level in parentheses. *Violent crimes* include murders, aggravated assaults, and other assaults. *Pre- and Post-statehood discoveries* are the numbers of mineral discoveries per 0.1 square mile that have been discovered before and after political organization, respectively. All regressions include a constant term and UCR's county-level coverage indicator. *Geographic controls*: total land area, mean and standard deviation of elevation, agricultural suitability, total length of rivers, a dummy indicating the presence of oil or gas resources, distance to the state's capital, the date at which the county's land was first politically organized, latitude, and longitude. *Contemporary controls* are measured in 2000: share of population with high school degree, Gini coefficient, population density, per capita income, share of blacks, and ethnic fractionalization. *Historical controls*: male literacy rate in 1900, population density, share of urban population, share of women, share of non-whites, per capita farming output and per capita manufacturing output in 1880. See Table A8 for sources and definitions of covariates. In columns 3 and 4, observations with a rate of violent crime smaller than the 5th percentile or larger than the 95th percentile are excluded. In columns 5 and 6, observations with a number of mines per 0.1 square mile smaller than the 5th percentile or larger than the 95th percentile are excluded. In columns 7 and 8, observations meeting any of the two preceding criteria are excluded. In columns 9 and 10 (11 and 12), observations are excluded if their standardized residual from Table 3 (columns 1 and 5) is larger than 2 (3).

Table A7: Political and mining history and present-day violent crime: Accounting for undated discoveries.

Dependent variable: rate of violent crime per 100,000 inhabitants in 2000						
	(1)	(2)	(3)	(4)	(5)	(6)
Post-statehood discoveries	-79.63*** (28.37)	-11.71 (28.71)	-114.36*** (30.24)	-33.32 (22.10)	-154.65*** (39.60)	-74.31** (29.80)
Pre-statehood discoveries	423.06*** (79.81)	357.10*** (90.17)	313.93*** (114.15)	295.18*** (109.65)	521.72*** (100.05)	406.61*** (117.42)
Undated discoveries			16.06 (9.66)	10.16* (5.31)	14.68 (11.28)	4.63 (6.01)
Post-statehood discoveries × undated discoveries					8.69* (5.16)	10.00** (4.42)
Pre-statehood discoveries × undated discoveries					-38.93* (22.05)	-11.69 (14.91)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls		Yes		Yes		Yes
Contemporary controls		Yes		Yes		Yes
Historical controls		Yes		Yes		Yes
Observations	3,108	2,460	3,108	2,460	3,108	2,460
R-squared	0.46	0.56	0.47	0.56	0.47	0.56

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . OLS regressions. Each column presents the estimates from a separate regression. The unit of observation is a county. White heteroskedastic standard errors adjusted for clustering at the state level in parentheses. *Violent crimes* include murders, aggravated assaults, and other assaults. *Pre-* and *Post-statehood discoveries* are the numbers of mineral discoveries per 0.1 square mile that have been discovered before and after political organization, respectively. *Undated discoveries* is the number of undated mineral discoveries per 0.1 square mile. All regressions include a constant term and UCR's county-level coverage indicator. *Geographic controls*: total land area, mean and standard deviation of elevation, agricultural suitability, total length of rivers, a dummy indicating the presence of oil or gas resources, distance to the state's capital, the date at which the county's land was first politically organized, latitude, and longitude. *Contemporary controls* are measured in 2000: share of population with high school degree, Gini coefficient, population density, per capita income, share of blacks, and ethnic fractionalization. *Historical controls*: male literacy rate in 1900, population density, share of urban population, share of women, share of non-whites, per capita farming output and per capita manufacturing output in 1880. See Table A8 for sources and definitions of covariates.

Table A8: Definitions and sources of covariates used for present-day evidence.

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<i>Geographic controls</i>	
Total land area	County's area in square miles. Source: 2000 National Counties Gazetteer File (US Census).
Elevation mean	Average elevation in meters. Source: National Elevation Dataset (USGS).
Standard deviation of elevation	Standard deviation of elevation in meters. Source: National Elevation Dataset (USGS).
Agricultural suitability	Mean agricultural suitability. Index varies from 0 to 1. Source: Atlas of the Biosphere (Ramankutty et al. 2001).
Total length of rivers	Total rivers' length in kilometers. Source: National Weather Service.
Oil or gas resources	Dummy variable equal to 1 if there are oil or gas resources within the county's administrative boundaries. Source: The Petroleum Dataset (PRIO).
Distance to state's capital	Distance from county's centroid to state's capital in kilometers. Source: 2000 National Counties Gazetteer File (US Census).
Date at which the county's land was first politically organized	Date at which the county's land was first politically organized, taking re-districting into account. This variable has been constructed by looking for ancestors of today's county. Source: Atlas of Historical County Boundaries.
Latitude	Latitude of county's centroid. Source: 2000 National Counties Gazetteer File (US Census).
Longitude	Latitude of county's centroid. Source: 2000 National Counties Gazetteer File (US Census).

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<i>Contemporary controls</i>	
Share of population with high school degree	In 2000. From 0 to 100. Source: US Census.
Gini coefficient	In 2000. From 0 to 1. Source: US Census.
Population density	Population per square mile in 2000. Source: US Census.
2000 Per capita income	Per capita personal income in dollars. Source: Bureau of Economics Analysis.
Share of blacks.	In 2000. From 0 to 1. Source: US Census.
Ethnic fractionalization	In 2000. From 0 to 1. Ethnic fractionalization in county $j$ is computed as $1 - \sum_{i=1}^N s_{ij}^2$ where $s_{ij}$ is the share of ethnic group $i$ in county $j$ . Ethnic groups are: Whites, American Indians, Asians, Native Hawaiians, and Other races. Source: US Census.

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<i>Historical controls</i>	
Male literacy rate	Male literacy rate in 1900. From 0 to 1. Source: Historical US Census (Haines and Inter-University Consortium for Political & Social Research 2010).
Population density	Inhabitants per square mile in 1880. Source: Historical US Census (Haines and Inter-University Consortium for Political & Social Research 2010).
Share of urban population	In 1880. From 0 to 1. Source: Historical US Census (Haines and Inter-University Consortium for Political & Social Research 2010).
Share of women	In 1880. From 0 to 1. Source: Historical US Census (Haines and Inter-University Consortium for Political & Social Research 2010).
Share of non-whites	In 1880. From 0 to 1. Source: Historical US Census (Haines and Inter-University Consortium for Political & Social Research 2010).
Per capita farming output	In 1880 and in dollars. Source: Historical US Census (Haines and Inter-University Consortium for Political & Social Research 2010).
Per capita manufacturing	In 1880 and in dollars. Source: Historical US Census (Haines and Inter-University Consortium for Political & Social Research 2010).

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