The consequences of persistent inequality on social capital: A municipal-level analysis of blood donation data

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Abstract

This letter advances the hypothesis that persistent inequality affects cultural traits and undermines social capital. We use blood donation data at the local level in Southern Spain to document that, indeed, persistent inequality –as measured by land inequality– negatively affects blood donation, which indicates that it harms social capital. This evidence sheds new light into the debates on the consequences of inequality and the determinants of culture.

Keywords: Persistent inequality, land inequality, culture, social capital, blood donation.

JEL Classification: C21, O1, O18, R1

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1. Introduction

This article addresses an unexplored consequence of inequality: its implications for culture and social capital formation. A society suffering severe inequality may develop social and political apathy. If the situation persists for a long time, this apathy becomes a cultural trait hindering the creation of social capital. By putting forward and testing this hypothesis we contribute to the debates on the consequences of long-term inequality (e.g., Engerman and Sokoloff, 2002; Easterly, 2007; Galor *et al*., 2009) and the causes of culture, and more particularly, of social capital (e.g., Nunn 2012; Alesina and Giuliano 2015; Guiso *et al*., 2016).

We focus on the effects of historical persistent inequality –in short *persistent inequality*–, which refers to a type of inequality that persists over a long historical period. This persistence makes inequality a feature of society that can create cultural traits. As part of a society's culture, social capital can be undermined by persistent inequality. Arguably, an unequal society that, generations upon generations, excludes a large section of its population from having economic opportunities and acceptable living standards will hardly develop a strong sense of solidarity and commitment towards the common good. Once the cultural pattern has been created, it may persist even if society becomes more equal, thus constraining the potential for future economic growth.

We test this hypothesis using municipal-level data on blood donation in the Southern Spanish region of Andalusia (see Fig. 1). This is a case in point because Andalusia has suffered highly persistent inequality over its modern history, whose roots are largely exogenous (Oto-Peralías and Romero-Ávila, 2016a, b). In addition, blood donation is collected in a centralized way by the Andalusian Health Service, which has provided us with a unique dataset on the number of donors per municipality. We find that land inequality –as a proxy for persistent inequality– has a non-negligible negative effect on blood donation, thus supporting the hypothesis that persistent inequality undermines social capital. Interestingly, it is historical inequality rather than current inequality which affects social capital, suggesting that the effect works through the creation of cultural patterns.

2. Background and data

Following Guiso *et al*. (2011), social capital refers to "those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities" (p. 419). We measure social capital through blood donation, which is widely considered to be a good proxy (e.g., Guiso *et al*., 2011; Nannicini *et al*., 2013). The Andalusian Health Service has provided us with a unique dataset containing the postal code of every person that has donated blood in any year of the period 2012-2014. Using this information and data on the population in age to donate blood (i.e., between 18 and 65), we create the variable "percentage of blood donors" at the municipal level. It is worth noting that blood donors' data comes from an *ad hoc* extraction from administrative files conducted specifically for this study, and postal codes may contain errors. These errors are amplified in small municipalities, for which the denominator of the indicator is smaller. In addition, inhabitants of small municipalities have less access to blood collection units. Consequently, to reduce measurement errors we exclude municipalities with less than 1,000 inhabitants in 2014, which only account for 1% of the Andalusian population. Fig. 2 depicts the Kernel density estimation of the distribution of the percentage of blood donors, which approximately follows a normal distribution slightly skewed to the right. To mitigate the influence of high values, we limit them to the 99th percentile (20.2%).

Our indicator of persistent inequality comes from the 1982 agricultural census and measures the percentage of utilized agricultural area in holdings with 200 hectares or more, computed considering only private agricultural holdings. This is a good proxy for historical persistent inequality because it reflects the incidence of *latifundia* in the municipality. Land concentration has been endemic in large parts of the Spanish and Andalusian geography, and can be traced back to the way land was colonized in the Middle Ages. Factors affecting land distribution in the remote past were contingent and exogenous to the development path of each territory (Oto-Peralías and Romero-Ávila, 2016a, b). Fig. 3 provides some evidence on the persistence of land concentration throughout the 20th century in our sample of municipalities. Correlations are remarkably high, particularly bearing in mind that the indicators are not directly comparable. Tables A1 and A2 (Supplementary Material) provide the definitions and descriptive statistics of all variables used in the empirical analysis.

The persistent inequality suffered by municipalities characterized by high land concentration may have shaped the local culture and undermined social capital. The miserable living conditions of landless workers in Andalusia were pretty much those of a marginalized social group. Pablo de Olavide (1768/1996), Intendent of Seville in the second half of the 18th century, described them as "the unhappiest men that I know in Europe […] half-a-year laborers, and the other half beggars". This situation of inequality and dependence on the landowner persisted well into the 20th century (Oto-Peralías and Romero-Ávila, 2016a). Arguably, a society that over a long period of time has suffered such high levels of inequality will not develop a sense of commitment towards the public good and solidarity among its members. Social groups such as landless workers that have been oppressed, marginalized, or simply placed in a systematic inferior position, are very unlikely to view the state (or the society as a whole) as representing or sharing their own interests. This feeling of apathy, generations upon generations, leads to a culture of lack of trust, cooperation, or more broadly, social capital.

Finally, an interesting aspect of land inequality is that it was a very important determinant of overall economic inequality in the past, while its current relevance is much lower since agriculture only employs today a small fraction of the population (8.4% in Andalusia in 2014 according to the Labor Force Survey). Thus, in historical and cultural terms the effect of land inequality can be interpreted as a cumulative effect over time, which creates cultural patterns.

3. Empirical results

3.1. Baseline results

Column 1 of Table 1 reports the bivariate regression of the percentage of blood donors in 2014 on land concentration in 1982. The coefficient is negative and highly statistically significant, which provides initial support for our hypothesis. Column 2 adds two demographic factors that are relevant to explain blood donation, namely, total population and population’s average age (in linear and quadratic terms), while column 3 includes geographic indicators such as a coast dummy, distance to the capital city (linear and squared), and a capital city dummy. In both cases the coefficient on land concentration remains negative and statistically significant. Column 4 adds additional geographic controls that may influence both blood donation and land concentration (altitude, ruggedness, soil quality, rainfall, and average temperature). This is our baseline specification. The coefficient on land inequality is large and precisely estimated. Going from a municipality without large estates (0% in land concentration) to a municipality with a high concentration of land (90%) decreases blood donors by almost 2 percentage points (i.e., (90-0)*(-0.022)= -1.98).

The next two columns show that the result does not depend on a specific variable of land concentration. Column 6 employs the percentage of land in holdings equal to or greater than 200 hectares from the 1962 agricultural census, while column 7 uses the percentage of land in holdings greater than 250 hectares from cadastral data in 1930. The results obtained with these alternative measures are very similar to the baseline findings. This is as expected since land distribution has remained largely unchanged over time.

3.2. A two-stage least squared (2SLS) framework

Following our previous work (Oto-Peralías and Romero-Ávila, 2016a, b), we argue that land inequality can be largely considered as an exogenous factor due to the way the territory was colonized in the Middle Ages after the Christian conquest. This fact makes us confident that the uncovered negative effect of persistent inequality on social capital is not driven by reverse causality or omitted variables. To further pursue this issue, this section explicitly exploits the fact that Andalusia was divided during the Middle Ages by a frontier that ceased to exist in 1492 when the Catholic Monarchs conquered the Nasrid Kingdom of Granada (see Fig. 1). The Castilian part of Andalusia was colonized under the conditions of an insecure frontier region, which led to the concentration of land in the hands of the military elite, i.e., the nobility. In contrast, once conquered, the former Nasrid Kingdom of Granada was colonized under very different premises, that is, as a secure region, with land distribution evolving in a relatively more equal way (see details in Oto-Peralías and Romero-Ávila, 2016b). Since the territory close to the frontier is geographically very similar (as shown in Table 2 in Oto-Peralías and Romero-Ávila, 2016b), we can use this historical accident as a source of exogenous variation in persistent inequality within a 2SLS framework.

Columns 1 and 2 of Table 2 employ the whole sample, while columns 3 and 4 focus on municipalities within 25 km of the frontier. The instrument is a dummy variable capturing whether the municipality belonged to the Castilian part of Andalusia in the Middle Ages. This variable exerts a strong positive effect on land concentration, thereby indicating that it is a relevant instrument. The second stage, which uses only that part of land concentration that is due to the frontier dummy, reports a large, negative, and highly significant coefficient. The increase in the size of the effect suggests that the OLS estimates are downward biased. Moreover, it could suggest that the exclusion restriction does not hold. In this regard, one possible interpretation is that, as documented in Oto-Peralías and Romero-Ávila (2016b), the frontier of Granada also affected the concentration of political power by the nobility. Thus, if we consider the second-stage coefficient on land concentration to be capturing inequality in a broad sense (both in economic and political terms), this would also justify its larger effect. Notwithstanding, due to lack of data on other potential channels, it is impossible to test whether the frontier has only affected social capital through persistent inequality. Therefore, we cannot assure that persistent inequality is the only channel through which the presence of the frontier of Granada affected social capital, but it is likely to be the dominant one. All in all, this 2SLS exercise provides evidence consistent with the hypothesis that persistent inequality undermines social capital.

3.3. Additional robustness checks

Our reading of the results is that persistent inequality –proxied by land concentration– contributes to create a culture of low cooperation and low commitment towards the common good, which means low social capital. Therefore, this implies that persistent inequality has direct cultural implications. An alternative interpretation would be that persistent inequality harms economic development in the long-run, with poorer communities ending up with less social capital. This would imply an indirect effect working through economic development. We try to address this issue by adding proxies for income to our baseline model. Columns 1 to 4 of Table 3 control for the percentage of population with secondary and higher education, the average number of vehicles per household, average socio-economic condition, and average gross income. All these variables enter with a positive coefficient, which is statistically significant only in column 3. Reassuringly, the coefficient on land concentration remains unchanged.

One may also wonder whether it is current inequality, rather than historical inequality, what matters. Current inequality can be measured through income inequality in 2007. Data on this variable at the local level is seldom available. For the Spanish case, there are data available for municipalities larger than 5,000 inhabitants (Hortas-Rico and Onrubia, 2014). Column 5 estimates our baseline model with this smaller sample of municipalities. The coefficient on land concentration is larger, which is likely due to the fact that measurement errors in the dependent variable diminish as municipality size increases. Column 6 includes an income Gini index, which enters with a negative but statistically insignificant coefficient. Column 7 includes both inequality variables. Remarkably, the coefficient on persistent inequality (i.e., land concentration) remains negative and significant, while that on current inequality is again insignificant.

Finally, our findings are also robust to: i) correcting standard errors for spatial dependence; ii) trimming values of the percentage of blood donors at the 95th percentile (rather than at the 99th); iii) applying different cutoffs of municipalities' population; and iv) using electoral turnout as an alternative indicator of social capital (see Supplementary Material for details).

4. Conclusions

This letter advances and tests the hypothesis that persistent inequality undermines social capital. Using data on blood donors as a proxy for social capital, and land concentration as a measure of persistent inequality, our municipal-level analysis finds support for this hypothesis. Land inequality exerts a non-negligible negative effect on the percentage of blood donors, which is robust to the inclusion of a wide array of demographic and geographic controls. The effect is also robust to controlling for several proxies for income, which suggests that our findings are not driven by the fact that inequality negatively affects economic growth. In addition, we find that what matters is historical inequality rather than current (income) inequality. This is consistent with the fact that once the cultural trait is created, it may persist even if society becomes more equal. In all, the evidence provided sheds new light into the debates on the consequences of inequality and the determinants of culture.

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TABLES AND FIGURES

Table 1
The effect of land concentration on blood donation: Baseline results

	Dependent variable is the percentage of blood donors					
	(1)	(2)	(3)	(4)	(5)	(6)
Land concentration in 1982	-0.017***	-0.014**	-0.022***	-0.022***		
	(0.006)	(0.006)	(0.006)	(0.007)		
Land concentration in 1962					-0.015***	
					(0.005)	
Land concentration in 1930						-0.02***
						(0.005)
Population		-0.04***	-0.027***	-0.025***	-0.026***	-0.032***
		(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Population squared		56.945***	33.427***	31.325***	32.554***	57.143***
		(10.756)	(8.885)	(9.022)	(8.998)	(10.144)
Population's average age		3.256***	2.544***	2.112***	2.005***	1.601**
		(0.622)	(0.615)	(0.613)	(0.628)	(0.707)
Population's average age squared		-0.036***	-0.029***	-0.024***	-0.023***	-0.018**
		(0.008)	(0.007)	(0.007)	(0.008)	(0.009)
Coast dummy			-2.708***	-2.27***	-2.24***	-2.417***
			(0.278)	(0.366)	(0.381)	(0.414)
Distance to capital city			4.516**	5.487***	4.965**	5.793**
			(1.792)	(1.988)	(2.002)	(2.28)
Distance to capital city squared			-2.464	-3.554**	-3.22*	-4.123**
			(1.583)	(1.773)	(1.775)	(1.969)
Capital city dummy			2.834**	3.132**	3.005**	2.197*
			(1.356)	(1.413)	(1.463)	(1.272)
Altitude				0.002*	0.002*	0.002
				(0.001)	(0.001)	(0.001)
Ruggedness				-0.003*	-0.002	-0.001
				(0.002)	(0.002)	(0.002)
Soil quality				0.028	-0.091	0.028
				(0.25)	(0.266)	(0.283)
Rainfall				0.149*	0.13	0.061
				(0.085)	(0.083)	(0.115)
Average temperature				0.09	0.077	0.14
				(0.187)	(0.188)	(0.211)
R-squared	0.01	0.17	0.23	0.24	0.23	0.24
Obs.	570	570	570	570	569	509

Notes: Variables descriptions are provided in Table A1 (Supplementary Material). All regressions are estimated by OLS. The estimations include a constant term, which is omitted for space considerations. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively.

Table 2
The effect of land concentration on blood donation: A 2SLS exercise

	Dependent variable in the second stage is the percentage of blood donors			
	Whole sample		*Within 25 km of the Frontier*	
	First stage	*Second stage*	*First stage*	*Second stage*
	(1)	(2)	(3)	(4)
Land concentration in 1982		-0.109***		-0.164**
		(0.038)		(0.081)
Castilian part of Andalusia	11.744***		8.802***	
	(1.951)		(2.839)	
Demographic and geographic controls	Yes	Yes	Yes	Yes
F-stat of the instrument	36.220		9.613	
Partial *R*-squared	0.050		0.060	
R-squared	0.219		0.292	
Obs.	570	570	167	167

Notes: Variables descriptions are provided in Table A1 (Supplementary Material). All regressions are estimated by 2SLS. The estimations include a constant term, which is omitted for space considerations. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively.

Table 3
Robustness to alternative interpretations

	Dependent variable is the percentage of blood donors						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Land concentration in 1982	-0.022***	-0.022***	-0.020***	-0.022***	-0.028***		-0.029***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)		(0.007)
Education level (2001)	0.009						
	(0.016)						
Average number of vehicles per household (2001)		0.15					
		(1.155)					
Average socio-economic condition (2001)			3.028*				
			(1.751)				
Average gross income (2013)				0.79			
				(0.703)			
Income Gini index (2007)						-1.367	-3.034
						(2.771)	(2.578)
Demographic and geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.240	0.24	0.240	0.240	0.400	0.370	0.41
Obs.	569	569	569	570	234	236	234

Notes: Variables descriptions are provided in Table A1 (Supplementary Material). All regressions are estimated by OLS. The estimations include a constant term, which is omitted for space considerations. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively.

Fig. 1. Geographical context

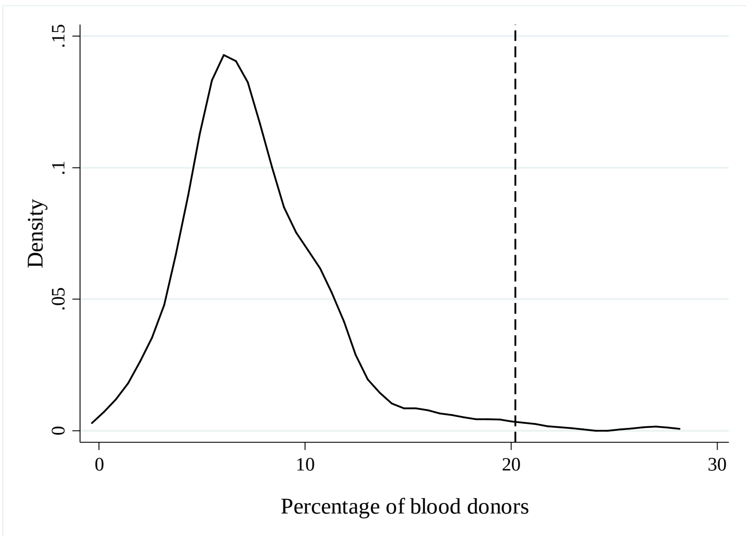
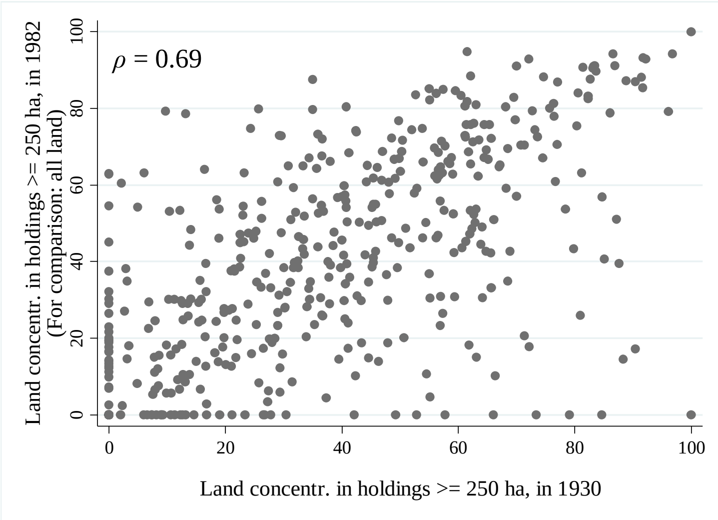
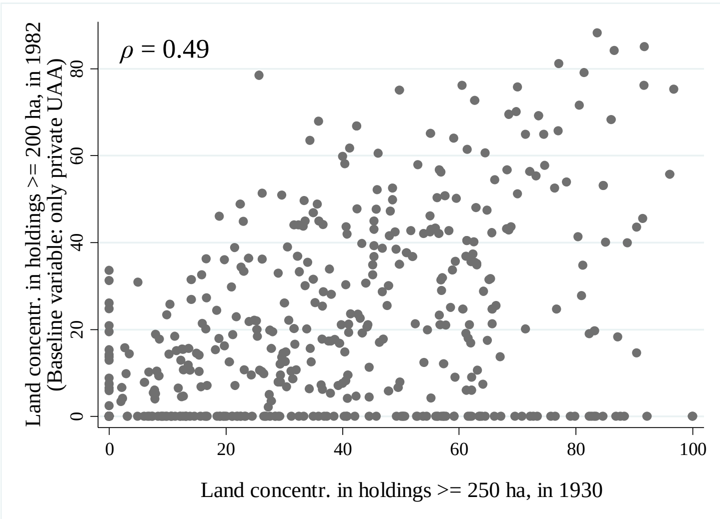


Fig. 2. Kernel density of the percentage of blood donors

Note: The vertical line reflects the value at which values are trimmed in the analysis (the 99th percentile).



Panel A. Land concentration in 1982 (for comparison*) and 1930 (cadastral data)



Panel B. Land concentration in 1982 (baseline indicator) and 1930 (cadastral data)

Fig. 3. Persistence in land concentration

Note: *Land concentration in 1982 in Panel A has been created for comparison purposes with the measure of 1930, which considers all types of land (see more details in Table A1).

Supplementary Material to

The consequences of persistent inequality on social capital: A municipal-level analysis of blood donation data

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This appendix includes:

Table A1
Description of variables

Variable	Description	Source
Altitude	Average altitude in meters, computed using GIS software.	Authors' elaboration using geo-referenced data from Hijmans et al. (2005).
Average gross income	Logarithm of 'gross personal income divided by the population aged between 18 and 65 years'. The informacion is collected from tax returns of the income tax of individuals (IRPF). The year of measurement is 2013.	Agencia Estatal de Administración Tributaria. Estadística de los declarantes del IRPF por municipios.
Average number of vehicles per household	Number of vehicles (cars and vans) for personal transport owned by households, divided by the number of households. The year of measurement is 2001.	Instituto Nacional de Estadística (INE). Censos de Población y Viviendas 2001.
Average socioeconomic condition	Average of class marks of socioeconomic conditions of individuals, combining information from occupation, activity and professional situation. To illustrate the construction of this variable, a (maximum) class mark of 3 is given to non-agricultural entrepreneurs with employees, and a (minimun) class mark of 0 to those unemployed who have not worked previously. Year 2001.	INE. Censos de Población y Viviendas 2001.
Average temperature	Annual average temperature (in degrees Celsius).	Authors' elaboration using geo-referenced data from Instituto de Estadística y Cartografía de Andalucía (IECA) (2014a).
Capital city dummy	Dummy variable capturing whether the municipality is the capital city of the province	Authors' elaboration.
Castilian part of Andalusia	Dummy variable indicating whether the municipality belonged to the Castilian part of Andalusia.	Oto-Peralías and Romero-Ávila (2016b).
Coast dummy	Dummy variable indicating whether the municipality has access to the coast.	Authors' elaboration.
Distance to capital city	Linear distance between the centroid of the municipality and its capital city (in hundreds km), computed using GIS software.	Authors' elaboration.
Education level	Percentage of population with secondary or higher education. Year 2001.	INE. Censos de Población y Viviendas 2001.
Income Gini index	Gini index corresponding to the distribution of the gross personal income in 2007.	Hortas-Rico y Onrubia (2014).

Table A1

Description of variables (*Continued*)

Variable	Description	Source
Land concentration in 1930	Percentage of land in holdings greater than 250 hectares in 1930, from cadastral data. Due to data availability, this indicator considers all types of land.	Carrión (1975).
Land concentration in 1962	Percentage of land in holdings greater than 200 hectares, measured in 1962. Due to data availability, this indicator considers all types of land (i.e., the whole census area).	1962 agricultural census (INE).
Land concentration in 1982	Percentage of UAA in holdings equal to or greater than 200 hectares of UAA, in 1982. We focus on private agricultural holdings (with legal status of natural person or company), which represent 95% of total UAA.	Authors' elaboration using the 1982 agricultural census (INE).
Land concentration in 1982 (Panel A of Figure 3)	For comparison purposes with "land concentration in 1930", this variable measures the percentage of land in holdings equal to or greater than 250 hectares in 1982. All types of land are considered.	Authors' elaboration using the 1982 agricultural census (INE).
Percentage of blood donors	Number of blood donors divided by the population aged between 18 and 65 years, which is the age at which an individual is eligible to donate blood. A person is considered a blood donor if he/she has donated blood in any year of 2012, 2013, and 2014.	Authors' elaboration using data from the Andalusian Health Service (*Centro Regional de Transfusión Sanguínea of Seville)* and INE (Padrón Municipal).
Population	Total population of the municipality (in thousands). Its squared term is expressed in millions. Year 2014.	INE. Padrón Municipal.
Population's average age	Average age of the population. Year 2014.	INE. Padrón Municipal.
Rainfall	Annual precipitation. It is expressed in hundreds of millimeters.	Authors' elaboration using geo-referenced data from IECA (2014a).
Ruggedness	Standard deviation of altitude in meters, computed using GIS software.	Authors' elaboration using geo-referenced data from Hijmans et al. (2005).
Soil quality	Indicator of soil quality calculated as: 4*(% surface area with excellent soil capacity) + 3*(% surface area with good soil capacity) + 2*(% surface area with moderate soil capacity) + 1*(% surface area with marginal soil capacity), with values ranging from 1 (low soil quality) to 4 (excellent soil quality). It is computed using GIS software.	Consejería de Medio Ambiente. Junta de Andalucía (1996).
Turnout in general elections	Average turnout in general elections during the period 1989-2011.	Authors' elaboration using data from IECA (2014b).

Table A1

Description of variables (*Continued*)

Notes and references:
Notes:
The basic layer with the administrative limits of the Andalusian municipalities, used in the variables computed with GIS software, comes from IECA (2014a).

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Instituto Nacional de Estadística (INE). Variables are available at www.ine.es

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Table A2

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Altitude	572	493.56	371.92	2.02	1878.49
Average gross income	572	2.23	0.22	1.62	3.01
Average number of vehicles per household	571	0.85	0.16	0.42	1.44
Average socioeconomic condition	571	0.78	0.09	0.55	1.06
Average temperature	572	15.40	1.75	8.59	19.00
Capital city dummy	572	0.01	0.12	0.00	1.00
Castilian part of Andalusia	572	0.62	0.49	0.00	1.00
Coast dummy	572	0.10	0.30	0.00	1.00
Distance to capital city	572	0.44	0.26	0.00	1.34
Education level	571	46.45	10.55	13.00	82.00
Income Gini index	236	0.45	0.04	0.20	0.61
Land concentration in 1930	509	34.79	26.93	0.00	100.00
Land concentration in 1962	569	40.11	26.61	0.00	99.58
Land concentration in 1982	570	17.36	20.93	0.00	88.28
Land concentration in 1982 (Panel A of Figure 3)	570	37.25	28.36	0.00	99.89
Percentage of blood donors	572	7.55	3.46	0.42	20.18
Population	572	14.51	45.73	1.00	696.68
Population's average age	572	41.49	3.52	32.84	52.99
Rainfall	572	6.70	1.95	2.00	18.47
Ruggedness	572	125.02	114.26	0.61	893.33
Soil quality	572	1.99	0.67	1.00	4.00
Turnout in general elections	570	77.94	5.48	57.52	90.07

Notes : Variables descriptions are provided in Table A1.

Table A3

Replication of Table 1 with standard errors corrected for spatial dependence

Dependent variable is Percentage of blood donors						
	(1)	(2)	(3)	(4)	(5)	(6)
Land concentration in 1982	-0.017*	-0.014*	-0.022**	-0.022**		
	[0.009]	[0.008]	[0.009]	[0.01]		
Land concentration in 1962					-0.015***	
					[0.006]	
Land concentration in 1930						-0.02***
						[0.006]
Population		-0.04***	-0.027***	-0.025***	-0.026***	-0.032***
		[0.007]	[0.008]	[0.008]	[0.009]	[0.01]
Population squared		56.945***	33.427***	31.325***	32.554**	57.143***
		[12.334]	[11.469]	[11.975]	[12.709]	[15.334]
Population's average age		3.256***	2.544**	2.112**	2.005**	1.601
		[1.133]	[0.996]	[0.863]	[0.846]	[1.061]
Population's average age squared		-0.036***	-0.029**	-0.024**	-0.023**	-0.018
		[0.014]	[0.012]	[0.011]	[0.01]	[0.013]
Coast dummy			-2.708***	-2.27***	-2.24***	-2.417***
			[0.417]	[0.537]	[0.563]	[0.566]
Distance to capital city			4.516	5.487*	4.965*	5.793*
			[3.041]	[2.86]	[2.823]	[3.175]
Distance to capital city squared			-2.464	-3.554	-3.22	-4.123
			[2.607]	[2.467]	[2.453]	[2.65]
Capital city dummy			2.834*	3.132**	3.005**	2.197
			[1.466]	[1.497]	[1.461]	[1.55]
Altitude				0.002*	0.002*	0.002
				[0.001]	[0.001]	[0.001]
Ruggedness				-0.003	-0.002	-0.001
				[0.002]	[0.003]	[0.002]
Soil quality				0.028	-0.091	0.028
				[0.266]	[0.266]	[0.267]
Rainfall				0.149	0.13	0.061
				[0.099]	[0.091]	[0.121]
Average temperature				0.09	0.077	0.14
				[0.229]	[0.235]	[0.25]
R-squared	0.01	0.17	0.23	0.24	0.23	0.24
Obs.	570	570	570	570	569	509

Notes: Variables descriptions are provided in Table A1 (Supplementary Material). All regressions are estimated by OLS. The estimations include a constant term, which is omitted for space considerations. Conley's standard errors (i.e., corrected for spatial dependence) are in brackets. We employ cutoffs of 1 decimal degree, beyond which spatial correlation is assumed to be zero. *, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively.

Table A4

Replication of Table 1 with values of the percentage of blood donors trimmed at the 95th percentile (rather than at the 99th)

	Dependent variable is Percentage of blood donors					
	(1)	(2)	(3)	(4)	(5)	(6)
Land concentration in 1982	-0.015**	-0.012**	-0.018***	-0.017***		
	(0.006)	(0.005)	(0.005)	(0.006)		
Land concentration in 1962					-0.013***	
					(0.005)	
Land concentration in 1930						-0.018***
						(0.005)
Population		-0.038***	-0.025***	-0.023***	-0.024***	-0.029***
		(0.006)	(0.005)	(0.006)	(0.005)	(0.006)
Population squared		54.121***	31.622***	29.419***	30.308***	52.957***
		(10.237)	(8.424)	(8.477)	(8.397)	(9.13)
Population's average age		2.917***	2.346***	2.005***	1.923***	1.424**
		(0.571)	(0.576)	(0.579)	(0.592)	(0.678)
Population's average age squared		-0.032***	-0.027***	-0.023***	-0.022***	-0.016*
		(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Coast dummy			-2.572***	-2.205***	-2.183***	-2.355***
			(0.258)	(0.335)	(0.347)	(0.379)
Distance to capital city			3.221**	4.247**	3.829**	4.398**
			(1.565)	(1.729)	(1.742)	(1.942)
Distance to capital city squared			-1.534	-2.626*	-2.352	-2.949*
			(1.367)	(1.531)	(1.535)	(1.686)
Capital city dummy			2.416*	2.635**	2.534*	1.719
			(1.272)	(1.29)	(1.337)	(1.156)
Altitude				0.001	0.001	0.001
				(0.001)	(0.001)	(0.001)
Ruggedness				-0.003*	-0.002	-0.001
				(0.002)	(0.002)	(0.002)
Soil quality				0.014	-0.092	0.02
				(0.231)	(0.246)	(0.262)
Rainfall				0.106	0.091	0.025
				(0.066)	(0.065)	(0.087)
Average temperature				-0.024	-0.034	0.012
				(0.16)	(0.162)	(0.182)
R-squared	0.01	0.2	0.26	0.27	0.26	0.27
Obs.	570	570	570	570	569	509

Notes: Variables descriptions are provided in Table A1 (Supplementary Material). All regressions are estimated by OLS. The estimations include a constant term, which is omitted for space considerations. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively.

Table A5

Baseline model for different cutoffs of municipalities' population

	Dependent variable is Percentage of blood donors						
	All municipalities	*> 500 inhabitants*	*> 1,000 inhabitants (Baseline)*	*> 2,000 inhabitants*	*> 5,000 inhabitants*	*> 10,000 inhabitants*	*> 20,000 inhabitants*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Land concentration in 1982	-0.013**	-0.015**	-0.022***	-0.024***	-0.028***	-0.03***	-0.029***
	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.006)	(0.009)
Population	-0.025***	-0.025***	-0.025***	-0.023***	-0.012**	-0.007*	-0.005
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.004)	(0.005)
Population squared	30.669***	31.394***	31.325***	30.148***	17.426**	10.693*	8.935
	(9.334)	(9.457)	(9.022)	(8.875)	(7.162)	(5.406)	(6.621)
Population's average age	2.493***	2.779***	2.112***	1.937***	4.118***	4.412***	4.493
	(0.572)	(0.614)	(0.613)	(0.666)	(1.113)	(1.362)	(2.729)
Population's average age squared	-0.03***	-0.033***	-0.024***	-0.022***	-0.052***	-0.058***	-0.059
	(0.007)	(0.007)	(0.007)	(0.008)	(0.014)	(0.018)	(0.036)
Coast dummy	-2.159***	-2.121***	-2.27***	-2.214***	-2.214***	-2.738***	-2.587***
	(0.359)	(0.372)	(0.366)	(0.352)	(0.367)	(0.418)	(0.596)
Distance to capital city	7.701***	7.595***	5.487***	6.379***	4.754**	5.863**	2.648
	(2.008)	(2.061)	(1.988)	(2.026)	(2.359)	(2.54)	(3.056)
Distance to capital city squared	-5.232***	-5.489***	-3.554**	-4.743***	-2.267	-5.189*	-2.001
	(1.771)	(1.877)	(1.773)	(1.816)	(2.225)	(2.764)	(3.17)
Capital city dummy	3.396**	3.322**	3.132**	3.013**	1.972	1.807	1.011
	(1.354)	(1.368)	(1.413)	(1.396)	(1.226)	(1.171)	(1.341)
Altitude	0.001	0.002	0.002*	0.002*	0.002	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ruggedness	-0.001	-0.002	-0.003*	-0.005**	-0.006***	-0.002	0
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Soil quality	0.803***	0.588**	0.028	-0.089	-0.249	-0.727**	-0.825
	(0.254)	(0.25)	(0.25)	(0.239)	(0.274)	(0.332)	(0.534)
Rainfall	-0.007	0.035	0.149*	0.08	-0.094	0.077	0.079
	(0.078)	(0.088)	(0.085)	(0.096)	(0.074)	(0.07)	(0.115)
Average temperature	-0.037	-0.021	0.09	-0.031	-0.132	-0.491**	-0.291
	(0.173)	(0.179)	(0.187)	(0.196)	(0.205)	(0.201)	(0.302)
R-squared	0.17	0.18	0.24	0.31	0.39	0.49	0.49
Obs.	769	667	570	452	257	153	79

Notes: Variables descriptions are provided in Table A1 (Supplementary Material). All regressions are estimated by OLS. The estimations include a constant term, which is omitted for space considerations. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively.

Table A6

An alternative indicator of social capital: Turnout in general elections

Dependent variable is Turnout in general elections (average period 1989-2011)

	(1)	(2)	(3)	(4)	(5)	(6)
Land concentration in 1982	-0.025**	-0.02**	-0.023**	-0.023**		
	(0.01)	(0.009)	(0.009)	(0.01)		
Land concentration in 1962					-0.031***	
					(0.008)	
Land concentration in 1930						-0.029***
						(0.008)
Population		-0.107***	-0.093***	-0.097***	-0.096***	-0.1***
		(0.017)	(0.011)	(0.013)	(0.013)	(0.012)
Population squared		151.446***	106.577***	109.532***	108.529***	147.307***
		(25.835)	(15.815)	(18.448)	(18.014)	(20.318)
Population's average age		4.453***	3.774***	4.42***	4.334***	4.474***
		(1.002)	(0.985)	(1.004)	(1.008)	(1.291)
Population's average age squared		-0.053***	-0.046***	-0.052***	-0.052***	-0.053***
		(0.012)	(0.012)	(0.012)	(0.012)	(0.015)
Coast dummy			-6.299***	-5.133***	-5.211***	-5.877***
			(0.738)	(0.891)	(0.894)	(0.948)
Distance to capital city			3.996	5.889**	5.592*	5.654*
			(2.883)	(2.952)	(2.985)	(3.256)
Distance to capital city squared			-4.799*	-6.318**	-6.027**	-6.773**
			(2.482)	(2.519)	(2.506)	(2.73)
Capital city dummy			10.109***	10.736***	10.644***	7.681***
			(2.045)	(2.182)	(2.288)	(1.74)
Altitude				0.003**	0.003*	0.003*
				(0.001)	(0.001)	(0.002)
Ruggedness				-0.004*	-0.002	-0.003
				(0.002)	(0.003)	(0.003)
Soil quality				1.332***	1.056**	1.442***
				(0.413)	(0.422)	(0.445)
Rainfall				-0.139	-0.144	-0.08
				(0.101)	(0.099)	(0.129)
Average temperature				0.405	0.404	0.284
				(0.265)	(0.257)	(0.284)
R-squared	0.01	0.19	0.32	0.35	0.36	0.37
Obs.	568	568	568	568	567	507

Notes: Variables descriptions are provided in Table A1 (Supplementary Material). All regressions are estimated by OLS. The estimations include a constant term, which is omitted for space considerations. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively.