APPENDIX

ADDITIONAL TABLES

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Table A1: Summary Statistics

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	Mean	Std Dev	Min	Max
Land Productivity and Geo-climatic Controls				
Mean of Crop-Specific Productivities	0.759	0.178	0.136	0.934
First Principal Component of Crop_Specific Productivities	0.000	1.850	-6.557	1.795
Mean Annual Precipitations	876.762	155.451	363.702	1219.727
Mean Annual Temperature	163.157	16.146	133.600	204.204
Elevation	131.977	195.087	-1.941	1104.171
Ruggedness	0.182	0.246	0.035	1.737
Ln Distance to Buenos Aires City	5.644	0.702	3.823	6.682
Historical Outcomes				
Ln Farm Capital Intensity 1914	1.644	1.000	-2.612	4.117
Railroads Density 1914	4.089	3.494	0.000	21.701
Land Concentration 1914	0.508	0.228	0.000	0.993
Ln Population Density 1914	1.697	0.983	-1.081	5.481
Urban Population Share 1914	0.340	0.202	0.000	0.903
Share of Europeans in Population 1914	0.229	0.111	0.001	0.469
Share of Italians Among Europeans 1914	0.436	0.159	0.095	0.864
Ln Population Density 1914	1.697	0.983	-1.081	5.481
Medium-run and Long-run Outcomes				
Ln Population Density 1947	2.141	1.025	0.090	6.534
Share of Population in Manufacturing 1947	0.028	0.024	0.004	0.182
Ln Manufacturing Valued Added per Worker	1.672	0.340	0.628	2.826
Skill-Intensity in Manufacturing 1947	0.094	0.034	0.011	0.176
Share of Population in Manufacturing 1970	0.047	0.028	0.003	0.127
Ln Income per capita 1994	18.309	1.153	14.931	21.692
Ln Non-Agricultural Income per capita 1994	17.288	1.569	12.528	21.691
Share of Population in Manufacturing 1947	0.169	0.050	0.048	0.288
Ln Population Density 1991	2.369	1.335	-0.163	7.649
Ln Population Density 2001	2.456	1.368	-0.051	7.734
Urban Population Share 2001	0.869	0.096	0.392	0.994
Average Years of Schooling 2001	8.732	0.733	6.553	11.214
Share of Population with Completed Primary Education 2001	0.825	0.061	0.623	0.917

Notes: This table reports summary statistics for the main variables used in the empirical analysis.
Source: See the appendix section on variable definitions and sources.

Table A2: Effects of Potential Yields on Land Shares (from FML model estimation)

Dependent variable:	Share Ranching (1)	Share Corn (2)	Share Wheat (3)	Share Flax (4)	Share Other (5)
Pasture Grasses potential yields	0.578*** (0.188)	-0.335 (0.235)	-0.419*** (0.095)	-0.054 (0.076)	0.012 (0.077)
Corn potential yields	-1.970*** (0.349)	1.571*** (0.519)	0.534*** (0.141)	0.654*** (0.231)	-0.090 (0.0178)
Wheat potential yields	2.111*** (0.330)	-1.539*** (0.552)	-0.744*** (0.159)	-0.396*** (0.113)	-0.100 (0.093)
Flax potential yields	-1.864*** (0.295)	1.616*** (0.544)	0.605*** (0.134)	0.301** (0.123)	0.056 (0.084)

Notes: This table reports marginal effects from the estimation of the Fractional Multinomial Logit Model for land shares, calculated at the median values of the covariates and expressed as semi-elasticities (they express the change in the share of a given crop in total farmland corresponding to changes in log of potential yields for a given crop). Standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Source: See the text and the appendix section on variable definitions and sources.

Table A3: Ranching and Railroads, controlling for Distance to the Paraná River

Dependent Variable:	Railroad Density			
	OLS Estimates		IV Estimates	
	(1)	(2)	(3)	(4)
Ranching	-5.073*** (1.336)	-6.393*** (1.417)	-7.339*** (2.321)	-9.388*** (2.684)
R^2	0.399	0.434	0.380	0.406
Distance to the Parana River	No	Yes	No	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
Land Productivity Measures	Yes	Yes	Yes	Yes
Geo-climatic Controls	Yes	Yes	Yes	Yes

Notes: Railroad density is defined as railroad km / 100 km^2. Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Source: See the text and the appendix section on variable definitions and sources.

Table A4: Additional Controls for Land Productivity

	Urban Population Share 2001			Ln Non-Agri. Inc. per capita 1994			Years of Schooling 2001		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. OLS Estimates									
Ranching	-0.161***	-0.167***	-0.142***	-2.623***	-2.725***	-2.601***	-1.364***	-1.410***	-1.502***
	(0.027)	(0.027)	(0.028)	(0.514)	(0.505)	(0.603)	(0.247)	(0.243)	(0.282)
Number of Counties	150	150	150	145	145	145	150	150	150
Mean of Dependent Variable	0.87	0.87	0.87	17.29	17.29	17.29	8.73	8.73	8.73
R^2	0.43	0.46	0.55	0.43	0.47	0.48	0.47	0.50	0.52
Panel B. IV Estimates									
Ranching	-0.255***	-0.231***	-0.175*	-2.701**	-2.085**	-1.241	-2.472***	-2.278***	-2.484***
	(0.074)	(0.067)	(0.094)	(1.142)	(1.060)	(1.806)	(0.557)	(0.517)	(0.772)
Number of Counties	150	150	150	145	145	145	150	150	150
Mean of Dependent Variable	0.87	0.87	0.87	17.29	17.29	17.29	8.73	8.73	8.73
R^2	0.39	0.44	0.55	0.43	0.46	0.46	0.37	0.43	0.46
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geo-climatic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Land Productivity Measures:									
Baseline Measures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Measures	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Cubic Polynomials	No	No	Yes	No	No	Yes	No	No	Yes

Notes: Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Source: See the text and the appendix section on variable definitions and sources.

Table A5: Excluding Provincial Capitals and Urban Counties

Dependent variable	Urban Pop Share 2001		Ln Non-Agricultural Income per cap 2001		Schooling 2001	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Excluding Provincial Capitals						
Ranching	-0.155***	-0.215***	-2.177***	-1.915**	-1.105***	-2.005***
	(0.027)	(0.066)	(0.448)	(0.962)	(0.170)	(0.404)
Number of Counties	146	146	141	141	146	146
Mean of Dependent Variable	0.87	0.87	17.19	17.19	8.68	8.68
R^2	0.46	0.44	0.46	0.46	0.55	0.48
Panel B. Excluding Urban Counties						
Ranching	-0.166***	-0.278***	-2.211***	-3.198***	-1.132***	-2.519***
	(0.033)	(0.083)	(0.514)	(1.125)	(0.193)	(0.510)
Number of Counties	124	124	120	120	124	124
Mean of Dependent Variable	0.85	0.85	17.01	17.01	8.58	8.58
R^2	0.45	0.40	0.48	0.46	0.60	0.42
State FE	Y	Y	Y	Y	Y	Y
Land productivity measures	Y	Y	Y	Y	Y	Y
Geo-climatic controls	Y	Y	Y	Y	Y	Y

Notes: Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Source: See the text and the appendix section on variable definitions and sources.

Table A6: Conley Standard Errors

Dependent variable	Urban Pop Share 2001		Ln Non-Agricultural Income per cap 2001		Schooling 2001	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Ranching	-0.161	-0.255	-2.623	-2.701	-1.364	-2.472
Huber-White robust standard errors	(0.027)***	(0.074)***	(0.514)***	(1.142)**	(0.247)***	(0.557)***
Conley standard errors with cutoff 50km	(0.027)***	(0.079)***	(0.478)***	(1.193)**	(0.261)***	(0.637)***
Conley standard errors with cutoff 100km	(0.028)***	(0.066)***	(0.441)***	(1.094)**	(0.266)***	(0.560)***
Conley standard errors with cutoff 150km	(0.027)***	(0.064)***	(0.496)***	(1.080)**	(0.279)***	(0.603)***
Conley standard errors with cutoff 200km	(0.027)***	(0.065)***	(0.601)***	(1.010)***	(0.293)***	(0.531)***
Conley standard errors with cutoff 250km	(0.018)***	(0.032)***	(0.551)***	(0.798)***	(0.249)***	(0.310)***
State FE	Y	Y	Y	Y	Y	Y
Land productivity measures	Y	Y	Y	Y	Y	Y
Geo-climatic controls	Y	Y	Y	Y	Y	Y

Notes: Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Source: See the text and the appendix section on variable definitions and sources.

Table A7: Effects of Agricultural Productivity on Industrialization

	Share of Population in Manufacturing 1947		Share of Population in Manufacturing 1970		Share of Labor Force in Manufacturing 2001	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean of Crop-Specific Productivities	-0.542	-0.393	0.464	0.502	-1.018	-1.139
	(1.013)	(1.080)	(0.846)	(0.892)	(1.784)	(1.763)
First Principal Component of Crop-Specific Productivities	0.049	0.035	-0.048	-0.052	0.094	0.106
	(0.096)	(0.102)	(0.080)	(0.085)	(0.169)	(0.167)
Average Growth in Mean of Crop-Specific Productivities		0.021		0.006		-0.018
		(0.025)		(0.022)		(0.054)
Ranching	-0.023**	-0.022*	-0.037***	-0.037***	-0.080***	-0.081***
	(0.012)	(0.012)	(0.010)	(0.011)	(0.019)	(0.019)
Number of Counties	147	147	150	150	150	150
Mean of Dependent Variable	0.03	0.03	0.05	0.05	0.17	0.17
R^2	0.16	0.16	0.49	0.49	0.46	0.46
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Geo-climatic Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: OLS estimates. Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.

Source: See text and appendix section on variable definitions and sources.

Table A8: Effects of Agricultural Prices on Industrialization

	Share of Population in Manufacturing 1947			Share of Population in Manufacturing 1970			Share of Labor Force in Manufacturing 2001		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ranching	-0.023**	-0.065*	-0.079**	-0.037***	-0.054*	-0.052***	-0.080***	-0.129***	-0.085
	(0.012)	(0.039)	(0.031)	(0.010)	(0.028)	(0.017)	(0.019)	(0.032)	(0.092)
Average Agricultural Prices 1914–1947		-0.050							
		(0.050)							
Coefficient of Variation of Agricultural Prices 1914–1947			-0.112						
			(0.069)						
Average Agricultural Prices 1914–1970					-0.009				
					(0.017)				
Coefficient of Variation of Agricultural Prices 1914–1970						-0.086			
						(0.104)			
Average Agricultural Prices 1914–2001								-0.030	
								(0.018)	
Coefficient of Variation of Agricultural Prices 1914–2001									0.019
									(0.292)
Number of Counties	147	147	147	150	150	150	150	150	150
Mean of Dependent Variable	0.03	0.03	0.03	0.05	0.05	0.05	0.17	0.17	0.17
R^2	0.16	0.17	0.18	0.49	0.50	0.50	0.46	0.47	0.46
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geo-climatic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Source: See the text and the appendix section on variable definitions and sources.

Table A9: Seasonality

Dependent variable	Urban Pop Share 2001		Ln Non-Agricultural Income per capita 2001		Schooling 2001	
	(1)	(2)	(3)	(4)	(5)	(6)
Ranching	-0.161***	-0.154***	-2.623***	-2.774***	-1.364***	-1.300***
	(0.027)	(0.031)	(0.514)	(0.742)	(0.247)	(0.352)
Wheat		0.026		-0.525		0.241
		(0.061)		(1.561)		(0.671)
Number of Counties	150	150	145	145	150	150
Mean of Dependent Variable	0.87	0.87	17.29	17.29	8.73	8.73
R^2	0.43	0.43	0.43	0.43	0.47	0.47
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Land Productivity Measures	Yes	Yes	Yes	Yes	Yes	Yes
Geo-climatic Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: OLS estimates. Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Source: See the text and the appendix section on variable definitions and sources.

Table A10: Schools

Dependent variable:	Schools per child 1914	Public Schools per child 1914	Religious Schools per child 1914	Private Schools per child 1914	School Enrollment 1914
	(1)	(2)	(3)	(4)	(5)
Panel A. OLS Estimates					
Ranching	0.003***	0.004***	-0.000	-0.001***	0.045
	(0.001)	(0.001)	(0.000)	(0.000)	(0.056)
Number of Counties	150	150	150	150	150
Mean of Dependent Variable	0.01	0.01	0.00	0.00	0.49
R^2	0.35	0.43	0.17	0.24	0.38
Panel B. IV Estimates					
Ranching	0.005***	0.007***	-0.000	-0.002***	0.139
	(0.002)	(0.002)	(0.000)	(0.000)	(0.109)
Number of Counties	150	150	150	150	150
Mean of Dependent Variable	0.01	0.01	0.00	0.00	0.49
R^2	0.32	0.37	0.17	0.15	0.37
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Land Productivity Measures	Yes	Yes	Yes	Yes	Yes
Geo-climatic Controls	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors reported in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level. Public schools are those with funding from either the national or provinical government. Religious schools also include those funded by charity. We normalize the number of schools in each category by the number of children in school age (i.e., between 6 and 14 years old).
Source: See the text and the appendix section on variable definitions and sources.

ADDITIONAL FIGURES

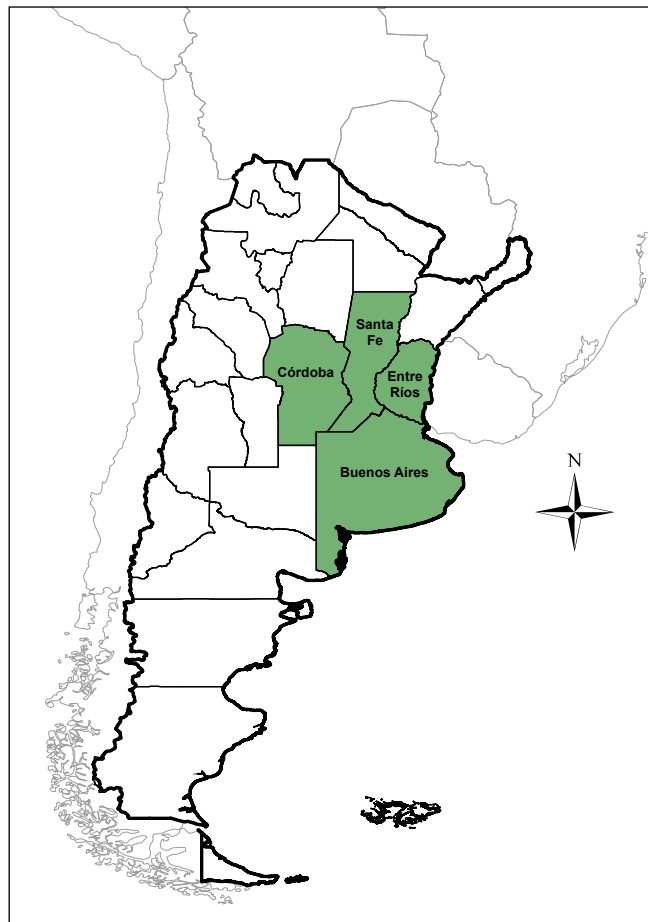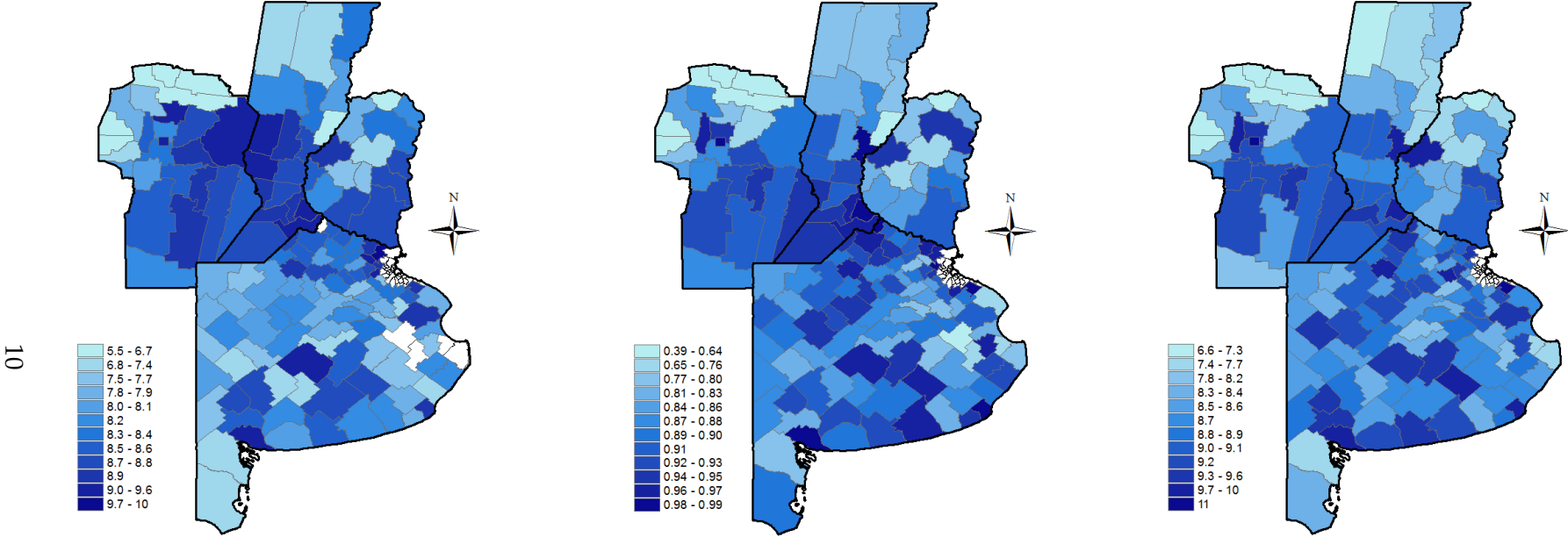**Figure A1:** Argentine Provinces in Our Sample: Buenos Aires, Córdoba, Entre Ríos, and Santa Fe

Figure A2: Long-Run Development Outcomes

A. NON-AGRICULTURAL INCOME
PER CAPITA (IN LOGS)

B. URBAN SHARE

C. AVERAGE YEARS OF SCHOOLING

Panel A legend:
- 5.5 - 6.7
- 6.8 - 7.4
- 7.5 - 7.7
- 7.8 - 7.9
- 8.0 - 8.1
- 8.2
- 8.3 - 8.4
- 8.5 - 8.6
- 8.7 - 8.8
- 8.9
- 9.0 - 9.6
- 9.7 - 10

Panel B legend:
- 0.39 - 0.64
- 0.65 - 0.76
- 0.77 - 0.80
- 0.81 - 0.83
- 0.84 - 0.86
- 0.87 - 0.88
- 0.89 - 0.90
- 0.91
- 0.92 - 0.93
- 0.94 - 0.95
- 0.96 - 0.97
- 0.98 - 0.99

Panel C legend:
- 6.6 - 7.3
- 7.4 - 7.7
- 7.8 - 8.2
- 8.3 - 8.4
- 8.5 - 8.6
- 8.7
- 8.8 - 8.9
- 9.0 - 9.1
- 9.2
- 9.3 - 9.6
- 9.7 - 10
- 11

Source: See the text and the appendix section on variable definitions and sources.

Variable Definitions and Sources

Outcome variables

Farm capital Intensity 1914. Value of tools, implements, and equipment per hectare. It excludes the value of land and animals. Source: 1914 Census

Railroad Density, 1914. Railroad km / 100 km2. We construct this measure using a digitized version of the 1914 railroad network map from Randle (1981).

Land concentration, 1914. Share of county-level farmland corresponding to farms of 1000 hectares or more.

Population Density, 1914, 1947, 1991, 2001. Population / area.

Urban Population Share, 1914, 2001. Population living in cities / total population. The census defines a city as a settlement with more than 2,000 individuals. Source: 1914 Census

European-Born Population Share, 1914. European-born population / total population. Data source: 1914 Census.

Italian Share of Europeans, 1914. Italian-born population / European-born population. Data source: 1914 Census.

Share of Population in Manufacturing 1947, 1970. Manufacturing workers / total population. For 1970, based on microdata drawn from the IPUMS-International 2% sample (Minnesota Population Center, 2020). Data sources: 1947 Census and IPUMS-International microdata from the 1970 Census.

Share of Population in Labor Force 2001. Manufacturing workers / labor force. Data source: 2001 Census.

Manufacturing Valued Added per Worker 1947. Valued added in manufacturing production / manufacturing workers. Data source: 1947 Census.

Non-agricultural Income per-capita, 1994. The Argentine Statistical Office (Instituto Nacional de Estadística y Censos, INDEC) does not compute GDP at the county level, but we can use measures available from the 1994 National Economic Census (NEC) ("Censo Nacional Económico"). In that year, the Census office surveyed all businesses in the main sectors of the economy (Oil and Natural Gas, Mining, Manufacturing Industries, Electricity, Gas and Water, Retail and Wholesale, Financial Intermediation, Communication, Enterprise Service Providers, and Personal Service Providers), gathering information on production, employment, revenue, costs, and investment. We use the county-level measures of output in all these sectors as a proxy for non-agricultural income, dividing by population in 1991 (the closest year with available data at the county leve) expanded by the rate of national population growth between 1991 and the Census year. For the province of Buenos Aires and Santa Fe, there is county-level GDP data

available from provincial statistical offices. The correlation betweeen our county-level proxies for non-agricultural income per capita and the official county level income per capita figures is about 95%.

Income per-capita, 1994. The National Economic Census (NEC) does not include agricultural output in its estimations. We combine the NEC data on output with proxies for crop production value and value of ranching products. Our proxy for crop production value relies on data from the Ministry of Agriculture. For each province, we consider the major agricultural products in 1994 and compute the value of agricultural output as the sum of each crop times its price (from FAOstat). Our proxy for the value of ranching products relies the 2002 Agricultural Census and market prices from the Liniers market, the country's main cattle market, located in the city of Buenos Aires (http://www.mercadodeliniers.com.ar/indexnuevo.htm). We consider cattle categories that are likely to end up in slaughterhouses within a year, inlcuding novillitos, novillos, terneras, terneros and vaquillonas, and use average monthly prices from 1995 (prior data is not available). We compute the estimated value of ranching output as the sum of each cattle category times its price, and the adjust by the ratio between the total number of slaughtered bovines in the years corresponding to the Agricultural Census and the NEC, from which the other data comes from. Finally, we add up our measure for non-agricultural income from the NEC and the proxies for crop production value and value of ranching products, and divide by population in 1991 (the closest year with available data at the county leve) expanded by the rate of national population growth between 1991 and the NEC year.

Skill intensity in Manufacturing, 1947. We rely on the distinction between *empleados* and (*obreros*) in the Census. These categories are akin to non-production workers and production workers, and we interpret them as proxies for skilled and unskilled workers. Our measure of skill intensity is the ratio between the number of *empleados* and total workers in manufacturing. Data source: 1947 Census.

Schools per child, 1914. Number of schools / number of school-age children (between 6 and 14 years old). Data source: 1914 Census

Public schools per child, 1914. Number of public schools / number of school-age children (between 6 and 14 years old). Public schools are schools funded by the National, Provincial, or Municipal government. Data source: 1914 Census

Religious schools per child, 1914. Number religious of public schools / number of school-age children (between 6 and 14 years old). We combine schools financed by charity together with those financed by religious entitites. Data source: 1914 Census

Private schools per child, 1914. Number private of public schools / number of school-age children (between 6 and 16 years old). Private schools are schools financed by private entities or individuals. Data source: 1914 Census

School Enrollment, 1914. Enrollment rate among school-age children (6-14 years old). Data source: 1914 Census.

Years of Schooling, 2001. Average years of schooling for population aged 25 and above. Data source: 2001 Census.

Primary School Completion, 2001. Share of adults between 25 and 60 years of age that have completed primary school. Data source: 2001 Census.

Ranching Specialization

Ranching, 1914. Share of total county-level agricultural land allocated to ranching activities. Data source: 1914 Census.

Ranching Potential Share. Predicted share of total county-level agricultural land allocated to ranching activities obtained from the FML model, using the same crop-specific attainable yields underlying our *land productivity measures*, described below.

Land productivity measures and other geo-climatic controls

Land productivity measures. Maximum and average of normalized attainable yields for pasture grasses, maize, wheat, and flax. These measures were constructed by the FAO's Global Agro-Ecological Zones project v3.0 (IIASA/FAO, 2012) using climatic data, including precipitation, temperature, wind speed, sunshine hours and relative humidity (based on which they determine thermal and moisture regimes), together with crop-specific measures of cycle length (i.e. days from sowing to harvest), thermal suitability, water requirements, and growth and development parameters (harvest index, maximum leaf area index, maximum rate of photosynthesis, etc). Combining these data, the GAEZ model determines the maximum attainable yield (measured in tons per hectare per year) for each crop in each grid cell of 0.083x0.083 degrees. We use FAO's measures of agro-climatic yields (based solely on climate, not on soil conditions). In all cases we consider yields under rain-fed conditions for intermediate levels of inputs/technology.

Index of land suitability for cultivation. As an additional land productivity measure, one of our robustness checks uses a suitability index constructed by Ramankutty et al. (2002), to be interpreted as the probability that a given area is cultivated.

Temperature. County-level mean annual temperature measured in Celsius degrees. Data source: IIASA/FAO (2012).

Rainfall. County-level average annual precipitation measured in mm. Data source: IIASA/FAO (2012).

Elevation. County-level average terrain elevation in km. Data source: IIASA/FAO (2012).

Terrain ruggedness. County-level average of terrain ruggedness by Nunn and Puga (2012), drawn from https://diegopuga.org/data/rugged/.

Distance to Buenos Aires. Straight line distance from the centroid of each county to Buenos Aires City, in km, calculated with GIS software.

Predicted price index for agricutural output, averages and coefficients of variation
We use data on export prices for beef, corn, and wheat between 1914 and 2001 from Ferreres et al. (2005). For each county, we consider the shares of ranching, corn, and wheat in local land use in 1914. We normalize all export prices to 1 in that year. For each year, we calculate a predicted price index for each county's agricultural output by multiplying product shares by the correspoding prices. Lacking data for other crops, we rescale the shares of the three products with available data by their added total, so that the rescaled shares add up to one for each county; this is equivalent to assuming that the price corresponding to the share for all other products evolves just like the combined share of the three products with price data. With the yearly predicted price index values, we calculate the average for 1914–1947, 1914–1970, and 1914–2001, and (to capture volatility) the coefficient of variation for the same three periods.