



university of
 groningen

faculty of economics
 and business

2022012-EEF

Persistent Specialization and Growth: The Italian Land Reform

October 2022

Riccardo Bianchi-Vimercati
Giampaolo Lecce
Matteo Magnaricotte



SOM is the research institute of the Faculty of Economics & Business at the University of Groningen. SOM has seven programmes:

- Accounting
- Economics, Econometrics and Finance
- Global Economics & Management
- Innovation & Organization
- Marketing
- Operations Management & Operations Research
- Organizational Behaviour

Research Institute SOM
Faculty of Economics & Business
University of Groningen

Visiting address:
Nettelbosje 2
9747 AE Groningen
The Netherlands

Postal address:
P.O. Box 800
9700 AV Groningen
The Netherlands

T +31 50 363 9090/7068/3815

www.rug.nl/feb/research



Persistent Specialization and Growth: The Italian Land Reform

Riccardo Bianchi-Vimercati
Department of Economics, Northwestern University

Giampaolo Lecce
University of Groningen, Faculty of Economics and Business, Department of Economics,
Econometrics and Finance, and CEPR
g.lecce@rug.nl

Matteo Magnaricotte
Department of Economics, Northwestern University

Persistent Specialization and Growth: The Italian Land Reform*

Riccardo Bianchi-Vimercati[†]
Northwestern U.

Giampaolo Lecce[‡]
Groningen U. & CEPR

Matteo Magnaricotte[§]
Northwestern U.

October 3, 2022

Abstract

Land distribution has ambiguous effects on structural transformation: large landowners can slow industrialization by limiting the provision of education, but larger scale and local market power might accelerate the mechanization of production. We examine the effects of redistribution following the Italian 1950 land reform and find that redistribution led to less industrialization. We explain this finding with a reduction in the scale of operations and a more intensive use of family labor. Agricultural specialization persisted for at least 50 years, consistent with models of occupational inheritance. Finally, we show that expropriated areas had lower growth during 1970-2000.

*We are very grateful to Nicola Bianchi, Bruno Caprettini, Leander Heldring, Mariko Klasing, Marti Mestieri, Petros Milionis, Joel Mokyr, Matthew Notowidigdo, Tommaso Orlando, Christopher Udry, Miriam Venturini, to seminar participants at EHS annual conference at Cambridge University, Northwestern University, Peking University, University of Groningen, Arne Ryde Workshop at Lund University and Zurich Political Economy Seminar for their helpful comments. This research has been supported by the Center for Economic History at Northwestern. All errors remain our own.

[†]Department of Economics, Northwestern University, riccardobianchivimercati2021@u.northwestern.edu

[‡]Faculty of Economics and Business, University of Groningen and CEPR, g.lecce@rug.nl

[§]Department of Economics, Northwestern University, matteomagnaricotte2021@u.northwestern.edu

1 Introduction

The structure of property affects economic outcomes through bargaining (Hart and Holmström, 1987), consumption patterns (Matsuyama, 1992), and other economic decisions (Besley and Ghatak, 2010). In the agricultural sector, redistribution policies are often created by governments as a tool to improve economic productivity and gain popular consensus.

However, evidence about the effects of land distribution on industrialization and overall development is mixed. Concentrated land ownership has found to be associated with a lower provision of education (Galor et al., 2009), slowing down structural change. However, recent research shows that larger landowners typically employ a lower amount of labor, either because of higher mechanization (Foster and Rosenzweig, 2022) or because of local monopsony power (Martinelli, 2014). Research on the long-run effects of changes in land ownership structure often focuses on outcomes within the agricultural sector (Besley et al., 2016; Smith, 2021), thus knowledge about effects on overall sectoral composition and development is still limited.

This paper examines the short-run and long-run impact of a large-scale land redistribution reform on local sectoral specialization and economic growth. In the 1950s, the Italian Government implemented a reform based on land redistribution and improvement with three main objectives: (i) redistributing wealth, (ii) increasing agricultural efficiency, and (iii) gaining political consensus.

We use a unique dataset based on newly digitized information about expropriations at the municipal level, as well as on pre-reform and post-reform socioeconomic variables, to show the effects on the sectoral composition of employment. To identify the causal impact of the reform on the structural transformation, we estimate a difference-in-differences model, tracking the share of individuals employed in agriculture and manufacturing at the municipal level through several census waves. This model controls for time-invariant characteristics of each municipality and shared time trends. Identification follows from a “parallel trends” assumption; the absence of pre-treatment differential trends validates our design.

Areas with a higher incidence of redistribution experienced a sizable and significant increase in the share of workers employed in agriculture; the converse happened for manufacturing. The effects of the reform are sizable and highly persistent: 50 years after the reform,

the share of agricultural workers in treated areas is 16% on average, 45% higher than the corresponding share in control areas. These results are not sensitive to several robustness exercises, including conditioning on the main predictors of the reform with a doubly robust approach.

What mechanisms explain these occupational patterns? While Galor et al. (2009) and Albertus et al. (2020) find opposing effects of redistribution on educational attainments, we do not find important effects on literacy and college attainment. We show, instead, that reformed areas become less densely populated and housing becomes more sparse, suggesting that lack of agglomeration might slow industrialization (Breinlich et al., 2014; Martin and Ottaviano, 2001). We also discuss other mechanisms that are potentially at play. Additionally, we argue that the persistent effects on the sectoral composition are partly due to an increased intergenerational transmission of occupation, and provide evidence of the relation between land property and occupational inheritance from Italian survey data.

Finally, we explore whether the reform led to more or less local economic prosperity, as agricultural specialization has ambiguous implications for average income in a municipality. We digitize historical estimates to measure income growth at the municipality level during 1970-2000 and match treated and control municipalities based on their pre-treatment land inequality, geography, and soil fertility. We show that municipalities affected by land redistribution experienced lower long-run growth. We find 20p.p. lower growth between 1970 and 2000 in treated areas, compared to a 183% baseline in the relevant sample. Linear specifications and propensity score methods confirm this finding.

Our first contribution relates to the empirical literature on structural change and economic growth and development (Bustos et al., 2016, 2020; Porzio et al., 2021). We leverage a specific historical event that represented a labor-increasing shock to productivity and find that it increased participation in agriculture. We also find remarkable persistence, and provide suggestive evidence of the driving mechanisms.

Historically, land reforms have included policies focused on different aspects, such as redistribution (Albertus et al., 2020), land titling formalization (De Janvry et al., 2015), land granting (Mattheis and Raz, 2021), or changes in the organization of production (Montero, 2020). Importantly, reforms vary in the thoroughness of implementation. For example, the case of India (Besley et al., 2016) and Colombia (Galán, 2018). The Italian land reform was

focused on land redistribution and, according to historical accounts, carefully implemented. Our paper is among the first to estimate the long-run effects of a reform with such characteristics.

Finally, we add to the growing literature on agricultural policies in Italian history – land reform (Marciani, 1966; King, 1973; Caprettini et al., 2021) and Mussolini’s Battle of Grain (Carillo, 2021). Novel expropriation-level data allows for the estimation of the reform’s causal impact on the sectoral composition and economic development of reformed areas.

2 Historical Framework

2.1 The Reform

After the end of World War II (WWII), poor agricultural workers were living in dire straits, especially in the rural areas of Southern Italy, where a feudal regime was essentially still in place. At the end of the 1940s, rural workers began striking and occupying plots of uncultivated land. Grievances were linked to the inaction and exploitation of absentee landowners.¹ The protest occupations led to repression by the police, which in several instances ended in blood.²

To avoid an even bloodier escalation of social unrest, the Christian Democrats (i.e., the ruling party since the 1948 elections) decided on a redistributive plan and, in the first semester of 1950, presented a land reform to the Parliament (N. 977). The proposed land reform was motivated by the differences in land distribution between Italy and most other European countries and the need to improve land productivity. Reformed areas were identified with the help of agrarian technicians. While the initial version of the land reform was not approved, a modified proposal was enacted in October: law n.841, called *Legge Stralcio*³ (Bagnulo, 1976). Similar to the first version, the main declared goal of the land reform was to reduce land inequality with an eye toward productivity improvement.⁴ An additional im-

¹Martinelli (2014) suggests that large landowners enjoyed sizable market power over labor workers.

²The most notable case is probably the one of Melissa in 1949, which culminated with the killing of three occupants (Ginsborg, 2003).

³*Legge Stralcio* translated to “excerpt of law”, alluded to the fact that more would be done to address the social and distributional issues of the affected areas.

⁴These goals were enacted in the expropriation rule (see Figure A1 in the Appendix) that combined measures of inequality with measures of productivity to determine the amount of land that would be expropriated from

plicit objective of the reform was to contrast the rhetoric of the Italian Communist Party, which led and fomented many of the revolts and land occupations (Ginsborg, 2003).

The enacted reform had comprehensive coverage; 8.5 million hectares were potentially interested: approximately one-third of the total national territory.⁵ The reformed territories in the North of Italy resembled those of the first proposed reform.⁶

Eventually, approximately 700.000 hectares were expropriated. Two measures prevented landowners from eluding expropriation or taking advantage of them. First, decisions were based on the land distribution as of 1949, which prevented splitting of ownership within families or fake transfers of land; second, the value of the compensation was calculated using the tax returns of 1947 (Bandini, 1952). Expropriated landowners were compensated with 25-year fixed-rate government bonds at an average rate of 77.000 lire per hectare, approximately one-third of the market value, according to Marciani (1966). To avoid a rapid restoration of the pre-reform status quo, expropriated landlords were banned from purchasing new lands for 6 years after the expropriation.

Beneficiaries of the reform needed to be already working in agriculture, and preference was given to residents of the municipality where the land was located. Farmers who were assigned a plot could purchase it through advantageous long-term loans consisting of 30 annuities (later relaxed to allow for early repayment). Redistributed plots had different sizes: the smaller ones were called *quota* and meant to supplement existing household income; larger plots were called *podere* and meant to constitute independent farms.⁷ To alleviate the potential concern that the reduction in the scale of operations following the expropriations would impair the investment ability and productivity of the new business units, assignees were required to affiliate with cooperatives (Bandini, 1952). Such cooperatives would make the high-cost investments in equipment and infrastructure to enable the processing and com-

each landowner.

⁵Figure A2 in the Appendix shows the areas that were affected by the reform.

⁶This is not true for the South of Italy, where the reformed areas were significantly different in some provinces. The suggestive evidence of strategic manipulation for political reasons supports our decision to exclude southern municipalities from the analysis. See Section 4 for more details.

⁷The *Enti di riforma* (reform bodies) were the institutions entitled to implement the reform at the local level. There was one local reform authority for each reform area, and these institutions were in charge of managing the applications and the reform process in general. The assignment procedure was not consistent across all areas. Several scholars, like Ginsborg (2003) and King (1973), remarked that political ideology played a role and that applicants with known communist sympathies were penalized. Caprettini et al. (2021) argues that this was less prevalent in the Center and North of Italy.

mercialization of agricultural products. Approximately 120,000 families received a part of the 700.000 expropriated hectares.

2.2 A Short-Term Assessment

The Italian land reform of the 1950s attracted considerable attention in the aftermath of its implementation. [Prinzi \(1956\)](#) and [Rossi-Doria \(1958\)](#) analyzed the implementation of the reform and its short-term effects. [King \(1973\)](#) and [Angeli and INSOR \(1979\)](#) provide an overall assessment of the success of the reform in attaining its main goals 20 years after the law was signed. According to [Angeli and INSOR \(1979\)](#), 83% of the original 120,000 firms were still operating in 1974. About 80,000 plots were still cultivated by the original assignees or their descendants. Rural workers grew their possessions: an additional 170,000 hectares of land not affected by the reform were cultivated in 1974.

As opposed to the mechanic effects on land distribution, the effects on productivity are ambiguous due to the countervailing effects of land improvement, agency realignment, and the reduction of scale. However, the available evidence suggests that the reform brought significant improvements to the affected areas. [King \(1973\)](#) shows that productivity growth in the reformed areas was higher than the national average between 1953 and 1963 (see Appendix Table [A1](#)). This was likely due to the change in ownership structure and land investments.

3 Data

To assess the impact of the Italian land reform on economic development and its effects on the structure of the local economies, we build a novel dataset that combines information on all recorded episodes of expropriation with a comprehensive set of historical information on Italian municipalities. In particular, the dataset combines publicly available information, mainly from decennial censuses, with newly digitized data on land reform and land distribution.⁸

Expropriation Data.

Our novel dataset includes each single land expropriation realized following the 1950 *Legge*

⁸The descriptive statistics are reported in Appendix Table [A2](#)

Stralcio extracting the first and last name of the expropriated landowner, municipality, and size of the expropriation from the original expropriation documents.⁹ These documents were originally published in the *Gazzetta Ufficiale*, the official law gazette of Italy, between 1950 and 1953. [Prinzi \(1956\)](#) was the first to list the municipalities within the reform areas that underwent land expropriations.

Our primary measure of expropriation for the municipality is built by aggregating the expropriation data at the municipality level (i.e., the sum of total expropriated lands in each municipality) and dividing it by the municipality's total area in 1951. This measure, called *percent expropriation*, is expressed in percentage points and constitutes our main treatment variable. We are the first to systematically collect and use precise information about the intensity of expropriation. We also create a dummy variable to analyze the extensive margin of expropriation.¹⁰

Land Distribution Data.

We also collected novel data about the land distribution in Italy in 1948 by digitizing Table 1 in [Medici \(1948\)](#)'s study. Giuseppe Medici, on behalf of INEA, the Italian Institute for Agricultural Economics, undertook the impressive task of measuring land distribution in each Italian municipality. While the size of a land plot was not a direct factor in determining the amount of land that would be expropriated, the reform areas were chosen based on their significantly unequal distribution.

Socioeconomic and Political Variables.

We rely on a broad set of socioeconomic indicators from decennial censuses in our analysis, such as sectorial employment, resident population, and share of college graduates. Specifically, we use the municipality-level data from the 1936-2001 Italian national censuses collected by the Italian Institute of National Statistics (ISTAT). We also digitize data on municipal-level income per capita in 1970 from the Historical Archive of Banco di Roma. We combine this measure with the same variable elaborated in 2000 by the Ministry of Economics and Finance to produce a measure of economic growth between 1970 and 2000.¹¹

We calculate the average land suitability for each municipality based on the land suit-

⁹For an example of the original source, see Appendix Table [C1](#).

¹⁰Appendix Table [A3](#) reports descriptive statistics of the expropriation data for each treated region.

¹¹More details on the construction and the sources of these variables are reported in Appendix [C](#)

ability for wheat measured by the Food and Agriculture Organization (FAO) with the Global Agro-Ecological Zoning (GAEZ) project. We also digitize and use data from the decennial Italian agrarian censuses of 1970, 1990, and 2000 collected by ISTAT to measure inequality in land distribution. We complete our dataset with electoral data collected by the Ministry of Interior on the national elections from 1946 to 1987.

4 Empirical Strategy

4.1 Model

The panel structure of the data allows us to follow treated and untreated municipalities over time and estimate a difference-in-differences model under the assumption of parallel trends. The chosen model is:

$$y_{it} = \delta_i + \gamma_t + \sum_{\tau \in \{1936, \mathcal{T}^{post}\}} \alpha_\tau \times d_\tau \times E_i + \varepsilon_{it} \quad (1)$$

where y_{it} is the economic outcome (e.g., agricultural employment) in municipality i in the year t ; E_i represents either a treatment dummy or the percentage of expropriated lands; d_t are time dummies; δ_i and γ_t denote a full set of municipality and time fixed effects, respectively; \mathcal{T}^{post} is the set of years after treatment. This model controls for common changes over time in the sectoral composition of employment through γ_t and for time-invariant, municipality-level characteristics through δ_i . We can now test for the presence of differential pre-trends (α_{1936}) and for dynamic effects over time (α_τ for $\tau \in \mathcal{T}^{post}$). All coefficients are relative to 1951, whose coefficient is normalized to 0.¹² To account for potential serial correlation at the municipal level and within census waves, our favorite specification uses two-way clustered standard errors at the municipality level and year level.

Our sample includes only municipalities in the Center and North of Italy, excluding southern regions. This choice is driven by the contemporaneous implementation of the

¹²Treatment is implemented as a consequence of the so called *stralcio* law, which was approved on 28 July 1950. This law pre-dates the 1951 census, set to represent a snapshot of the country as of 4 November 1951. The implementation of the 1950 law, however, required some time: only 13 out of 1,143 of the digitized expropriation decrees related to the areas of interest were issued prior to the census (the first of them was issued on 30 August 1951). Even for the land expropriated by these decrees, reallocation likely happened after the census date.

“Cassa del Mezzogiorno” policy, which determined massive public transfers to southern municipalities to boost industrialization in underdeveloped areas, (see Colussi et al., 2021 for more details) and that might bias our estimates. Additionally, we replicate our main specifications and show that parallel trends are unlikely to hold for the southern regions based on a pre-trend analysis (see Appendix Table A4).¹³

The top panels in Figure 1 show how land inequality and plot size changed in the treated and control areas after the land reform. We can observe partial convergence of the two areas, consistently with a successful reform implementation. Table A5 in the Appendix reports the corresponding difference-in-differences estimates. The bottom panels display the evolution of employment in agriculture and manufacturing for the two groups of municipalities in the raw data. Our approach compares the evolution of the variables in the two groups, and formally tests whether their trends diverged following the land reform.

4.2 Identification

Identification of our model follows from the “parallel trends” assumption underlying the chosen difference-in-differences approach (Angrist and Pischke, 2008). This requires that, absent the reform, the variables of interest would have evolved similarly in all municipalities. The bottom panels in Figure 1 allow a visual inspection of trends: both the level and the evolution of treatment and control areas were very similar prior to the reform. This is likely due to the similarity of the two groups: the control group only includes untreated municipalities belonging to provinces with at least one expropriation. A map of the expropriated municipalities in treated provinces is in Figure 2.

As discussed in Section 2, reform areas were chosen based on the recommendation of expert agronomists and the prevalence of large and inefficient land ownership. In Appendix Table A6, we show that land distribution is a strong predictor of treatment assignment, but also other socioeconomic and geographical variables have significant coefficients and explanatory power. Political support for the Italian Communist Party in the previous two elections, a potential driver of the reform, is also related to the reform.

While in our main specification, we rely on exogeneity conditional on municipal and year

¹³Our choice of using a restricted sample is consistent with Caprettini et al. (2021), who also exclude southern regions for identification reasons.

fixed effects, in robustness checks, we also condition on the main predictors of the reform using the doubly robust approach proposed by Sant’Anna and Zhao (2020) and implemented in Callaway and Sant’Anna (2021)’s study. Results are largely unaffected and discussed in more detail in Section 5.2. Additionally, in Table 1, we test for the presence of differential pre-trends under the first assumption, and cannot reject parallel trends before the reform. This further validates the chosen research design.

Finally, we show that, in our setting, alternative approaches based on border discontinuities for the study of the impact of land redistribution would suffer from low statistical power. While the land reform was implemented in well-defined areas, municipalities near the borders had small percentages of land expropriated. Thus, we could not identify a significant discontinuity in expropriations at the border (see Appendix Figure D1 and Appendix Table D1).

5 Results

In this section, we perform an analysis of the effects of the land reform on sectoral specialization. We first discuss our main results, and then prove that they are consistent across several robustness checks.

5.1 Main Results

Table 1 reports the results of estimating Equation (1) using the share of individuals employed in agriculture in the municipality as the dependent variable in columns (1) to (3) and those employed in manufacturing in columns (4) to (6).

We detect large, positive effects on agricultural employment: column (1) shows that areas treated with expropriation had as much as 5p.p. higher employment in agriculture in 1991 (average agricultural employment in control areas was 11% in 1991). While we find significant effects from the first years following the reform, we want to highlight that effects become larger over time: this means that, while the agricultural sector shrinks over time, treated areas retain more workers in agriculture. In column (2), we use the fraction of municipal area expropriated as a treatment variable, and identify very similar patterns as those estimated in the previous model using a treatment dummy. Finally, column (3) reports

the results of the model estimated using the fraction of municipal area expropriated on the sample, including only treated municipalities (i.e., expropriated lands >0). All the estimated models show that agricultural specialization in the municipalities increased proportionally to our measure of expropriation intensity.

Columns (4) - (6) of Table 1 use employment in manufacturing as an outcome variable. The effect appears to be negative and of similar magnitude to that on agriculture, but with somewhat lower persistence. Estimated effects are the largest in 1981 and decrease in the years following. The empirical evidence suggests that the land reform, precisely our measure of expropriation, is associated with a significant decline in employment in the manufacturing sector.

Overall, our findings show that treated areas reported a significant relative increase in agricultural employment in the short term and maintained higher levels in the following decades.¹⁴ The increase is proportional to the intensity of expropriation, which is the central aspect of the land reform affecting the sectoral composition.¹⁵ We find that this specialization in agriculture was compensated by a corresponding reduction in manufacturing employment. As previously discussed, small and statistically insignificant estimates for α_{1936} across all specifications support the research design.

5.2 Robustness

In this section, we perform a series of robustness checks to address potential threats to our identification strategy. In particular, we test for robustness using alternative model specifications, samples, and inference assumptions.

First, we show that using province fixed effects and including controls at the municipality level does not meaningfully affect magnitudes and significance patterns. Results are reported in Appendix Table A7.

We then show that our evidence is not driven by the inclusion in our sample of the administrative center of each province (see Appendix Table A8). Administrative centers are

¹⁴We obtain consistent results when splitting the sample around the median of the share of labor workers in agriculture in 1951. Results are available upon request.

¹⁵When implementing a Sobel-Goodman mediation analysis on the specification of column (1) by including also the percentage of expropriated lands, the estimated average coefficient drops from 3.92 to 1.04. This suggests that approximately 73% of the effect of land reform on employment in the agricultural sector is mediated by land expropriation.

often the most populated town in the province and might have different economic dynamics. Estimated coefficients are virtually unchanged with respect to the baseline models.

The geographical nature of our treatment suggests that the intensity of expropriation might be spatially correlated. Appendix Table A9 reports the baseline estimates with standard errors that account for spatial correlation using the procedure developed in Conley (1999)'s study. Specifically, columns (1) - (8) replicate columns (2) and (5) of Table 1, with different distance cutoffs. While standard errors are generally larger, overall significance patterns are unaffected.

To relax the assumption of unconditional parallel trends, we use the doubly robust estimator proposed by Sant'Anna and Zhao (2020) and condition on the main predictors of expropriation: land inequality and geographical coordinates (see Table A6). If the correct underlying model is a propensity score or an outcome regression model, this estimator is shown to be consistent. Results for average treatment effect on the treated are largely unaffected and very close to the main specification (see Appendix Table A10). Controlling for additional weaker predictors does not affect their robustness.

6 Mechanisms, Persistence Channels, and Long-Run Growth

In this section, we discuss and provide evidence on the mechanisms generating our results, the drivers behind the persistence of sectoral employment, and the consequences for the local economies in the medium to long run.

6.1 Mechanisms: Education

Many studies have documented a positive relationship between land distribution and human capital development. Galor et al. (2009) develop a model in which economies with more equal land distribution implement public education earlier than economies characterized by a more unequal distribution. Cinnirella and Hornung (2016) provide more evidence of a negative relationship between landownership concentration and education in 19th-century Prussia. Albertus et al. (2020) show that a land reform implemented in Peru had a negative effect on human capital accumulation as a result of "intergenerational rural stasis."

Using data on educational outcomes at the municipal level, we provide evidence that

there is no detectable effect of the Italian land reform on educational patterns. Columns (1) - (6) of Table 2 present the results of our baseline models using educational outcomes as dependent variables. In columns (1) - (3), we use the percentage of illiterate people at the municipal level as reported in the decennial censuses. The estimated coefficients are always negative and statistically significant, suggesting that the reform is associated with a decrease in the illiteracy rate. However, their magnitude is quite small, indicating that reformed areas had a decrease of 0.28 percentage points in illiteracy rates from a baseline of 12% in 1951. Additionally, columns (4) - (6) report the estimates for the reform's effects on the percentage of people with completed higher education at the municipal level. We find no detectable systematic impact of the expropriation on higher education attainment. Columns (3) and (6) show a very weak relationship between education outcomes and the intensity of expropriation.

6.2 Mechanisms: Scale

Another channel suggested by researchers relates to scale. [Adamopoulos and Restuccia \(2020\)](#) examine the effects of land reform in the Philippines, where, different from our context, a ceiling was imposed on landholdings. This reduced agricultural productivity. In the Italian case, the average land size was reduced by the reform (see [Figure 1](#)), but no ceiling on ownership was ever imposed. Moreover, existing evidence suggests that productivity rose rapidly in reformed areas (see discussion of [King, 1973](#) in [Section 2](#)).

[Foster and Rosenzweig \(2022\)](#) propose and test a theory that features a U-shaped relationship between productivity and plot size, which can reconcile our findings and those of [Adamopoulos and Restuccia \(2020\)](#). This theory also suggests that smaller agricultural companies would employ relatively larger amounts of labor due to frictions in the labor market and economies of scale in agricultural machines. An additional reason why smaller companies might employ more labor is argued in [Martinelli \(2014\)](#) for pre-land reform in Italy: large landowners enjoy local monopsony power and might optimally hire fewer workers than if they were operating in a perfectly competitive environment.

6.3 Mechanisms: Agglomeration

Breinlich et al. (2014) point out that industrialization necessitates local agglomeration. In Table 2, columns (7) - (12) report the estimates of Model 1 using population density and rurality as an outcome.¹⁶ Both measures show that the reform reduced density and agglomeration, which might explain our main results on industrialization. Indeed, the share of the population in urban areas might have significantly affected the local economic development and reinforced labor specialization between treated municipalities and untreated ones in the long run.

Interestingly, we can see from column (9) that the intensity of expropriation was *positively* related to population density until 1961, while the sign flipped for each decade thereafter. This suggests that the redistribution might have increased fertility or in-migration in its first years before reducing them. Data limitations make it impossible to distinguish fertility from migration changes.

6.4 Mechanisms: Land Productivity

One last explanation for the observed divergence relates to the land improvement initiative carried out by the Italian Government alongside the land redistribution. Ginsborg (2003) highlights how the largest component of expenditures for land improvement (which represented 55% of the total, see Figure A3) was devoted to housing construction, while efforts to implement irrigation plans in some regions were largely unsuccessful. We also find that, while time-invariant soil suitability was lower in reformed areas, employment was similar to control areas prior to the land reform. Coefficients from regressions that control for soil characteristics are very similar to those without the control (see Table A10).

6.5 Persistence

Not all the above-discussed mechanisms have the potential to explain the observed persistence in agricultural specialization. For example, economies of scale are unlikely to deliver

¹⁶Population density is the ratio between the decennial population reported in the relative census and the area of the municipality reported in 1951, winsorized at 1%. Rurality is computed as the percentage of the total municipal population living in *case sparse* (i.e. houses spread over the territory of the municipality but without forming a residential nucleus).

persistence alone, given that an optimal scale could be achieved through land markets. However, they are likely to interact with a new channel: occupational inheritance.¹⁷

The Italian land reform might have affected the extent of intergenerational transmission of sectoral occupations through the creation of many self-employed, land-owning, agricultural workers. As discussed in Section 2, beneficiaries of the reform were required to already be employed in agriculture: in order for the reform to change sectoral specialization over the decades, we need *ownership* of the land to affect intergenerational transmission. In Table 3, columns (1) and (2), we show that ownership of land is positively related to higher occupational transmission in the Italian Survey on Household Income and Wealth. This survey allows us to identify whether young adults are employed in agriculture.

The outcome is a binary indicator of whether an individual’s father ever worked in agriculture as a business-owner; we build and include the same variable for other sectors. Finally, we control for the sector in which the father was last employed, the year of the survey, and the respondent’s age. We include males aged 20 or older and estimate the linear probability model as follows:

$$agr_{it} = \beta_1 agr_owner_i + \beta_2 other_owner_i + \sum_s \theta_s \{father_sector_i = s\} + \theta_t + \rho age_i + e_i \quad (2)$$

Male children of agricultural workers have about a 50% higher probability of staying in agriculture when their parents own the land they are working on. On the contrary, we find that parental business ownership in other sectors is linked to a lower probability of employment in agriculture.¹⁸

Agglomeration is another mechanism that has been shown to induce strong persistence (for a very long-run example, see Bleakley and Lin, 2012). The Italian land reform might have induced a reduction in agglomeration, which led to slower industrialization, further reducing agglomeration forces.

¹⁷Dunn and Holtz-Eakin (2000), among others, shows the transmission of self-employment. Corak and Piraino (2011) show that intergenerational transmission of employers is positively related to the presence of self-employment income. Lo Bello and Morchio (2021) highlights parental professional networks’ role in occupational choices. Fernando (2022) shows that Indian firstborns that inherit agricultural land display reduced migration and entry into non-agricultural sectors.

¹⁸Results are very similar when extending the analysis to include female respondents.

6.6 Long-Run Local Economic Effects

Both scale reduction and occupational inheritance mechanisms have been found to be related to inefficient outcomes. Foster and Rosenzweig (2022) argue that if all Indian farms were at the minimum scale required to maximize the return on land, farmworkers' income would rise by 68%. Caselli and Gennaioli (2013) argue that dynastic management, i.e., the practice of passing ownership and control of a firm from one generation to the other within a family, is a substantial driver of cross-country TFP differences. Thus, we examine the economic growth consequences for the local economies in the medium to long run.

To estimate the impact of the reform on growth, we examine income per capita at the municipality level. Due to the unavailability of income data at the municipal level before the reform, we resort to a matching approach to study the effects of the reform on 1970 income and income growth between 1970 and 2000. We use Coarsened Exact Matching (Blackwell et al., 2009) and identify strata in the data where units are comparable based on their belonging to the same region, their soil suitability for wheat, and their Gini Index of land ownership in 1948 calculated using Medici (1948). Belonging to the same region allows for comparability of regional policies and increases precision. The second and third variables capture the factors determining expropriation intensity for municipalities included in the reformed area: this is meant to fulfill the "backdoor criterion" and provide identification. While Exact Matching only compares treated and control units that have the *same* covariates, Coarsened Exact Matching compares municipalities in the same region that have *similar* soil suitability and ownership distribution, which facilitates the inclusion of continuous variables.

The estimates of the effects of the land reform on income in 1970 and income growth during 1970-2000 are reported in Table 3, columns (3)-(6). Columns (3) and (4) show small and statistically insignificant estimates of 1970 income. Effects on growth in columns (5) and (6) appear to be negative and statistically significant, around 20p.p. lower growth over 30 years, compared to an average of 183% growth in the studied sample.¹⁹ These results indicate that any positive effects on economic development early on were likely more than offset by the negative ones on income growth in the long run.

¹⁹Linear specifications and propensity score methods also yield negative and statistically significant effects on growth. Results available upon request.

7 Conclusions

This study analyzes the outcomes of a land reform implemented in Italy in the post-WWII period. It was a large-scale redistribution effort with different (i.e., social, economic, and political) goals. We use administrative sources and construct a novel dataset to measure redistribution intensity at the municipal level.

First, we exploit this measure to evaluate the impact of the reform on the sectoral composition. Estimating a difference-in-differences model, we find robust evidence that the land reform increases the number of workers employed in the agricultural sector and a drop in the number of workers employed in manufacturing. The Italian land reform did not have significant effects on human capital accumulation, but had a negative effect on agglomeration: treated municipalities are characterized by persistently lower levels of population density compared to untreated ones. A reduction in average farm scale might have further increased employment in the agricultural sector. The persistent effects on structural change motivate an investigation of transmission mechanisms. Our findings indicate that the new ownership structure and intergenerational transmission of occupation played a relevant role.

Lastly, we investigate the impact of this structural change on economic development. We use a matching estimator and provide evidence of a negative relation between the land reform and income growth during 1970-2000. These results support the hypothesis that the reform might have had some positive effects in the short run, both in terms of economic development and wealth redistribution, but had negative effects over the following decades.

In a broader perspective, our results contribute to the existing debate on the effects of large-scale redistribution programs. We highlight how long-term effects may conflict with the initial goals of development. The short-term reduction in inequality and poverty caused by this land reform was followed by lower levels of industrialization and economic growth in the long run. Despite the usual limits to the generalizability of analyses of specific historical events, our findings support the idea that land redistribution can exacerbate pre-existing distortions and frictions in labor markets that are detrimental to long-term economic growth.

References

- Adamopoulos, T. and Restuccia, D. (2020). Land reform and productivity: A quantitative analysis with micro data. *American Economic Journal: Macroeconomics*, 12(3):1–39.
- Albertus, M., Espinoza, M., and Fort, R. (2020). Land reform and human capital development: Evidence from peru. *Journal of Development Economics*, 147:102540.
- Angeli, F. and INSOR (1979). *La riforma fondiaria: trent'anni dopo*.
- Angrist, J. D. and Pischke, J.-S. (2008). *Mostly harmless econometrics*. Princeton university press.
- Bagnulo, A. (1976). *Legislazione sulla bonifica*. Istituto poligrafico dello Stato.
- Bandini, M. (1952). La riforma fondiaria in italia. *Moneta e credito*, 5(17).
- Besley, T. and Ghatak, M. (2010). Property rights and economic development. In *Handbook of development economics*, volume 5, pages 4525–4595. Elsevier.
- Besley, T., Leight, J., Pande, R., and Rao, V. (2016). Long-run impacts of land regulation: Evidence from tenancy reform in india. *Journal of Development Economics*, 118:72–87.
- Blackwell, M., Iacus, S., King, G., and Porro, G. (2009). Cem: Coarsened exact matching in stata. *The Stata Journal*, 9(4):524–546.
- Bleakley, H. and Lin, J. (2012). Portage and path dependence. *The quarterly journal of economics*, 127(2):587–644.
- Bocca, G. A. and Scott, W. G. (1974). *Gli Indici di Reddito a Livello Comunale*. MB Editrice.
- Breinlich, H., Ottaviano, G. I., and Temple, J. R. (2014). Regional growth and regional decline. In *Handbook of economic growth*, volume 2, pages 683–779. Elsevier.
- Bustos, P., Caprettini, B., and Ponticelli, J. (2016). Agricultural productivity and structural transformation: Evidence from Brazil. *American Economic Review*, 106(6):1320–1365.
- Bustos, P., Garber, G., and Ponticelli, J. (2020). Capital Accumulation and Structural Transformation. *The Quarterly Journal of Economics*, 135(2):1037–1094.

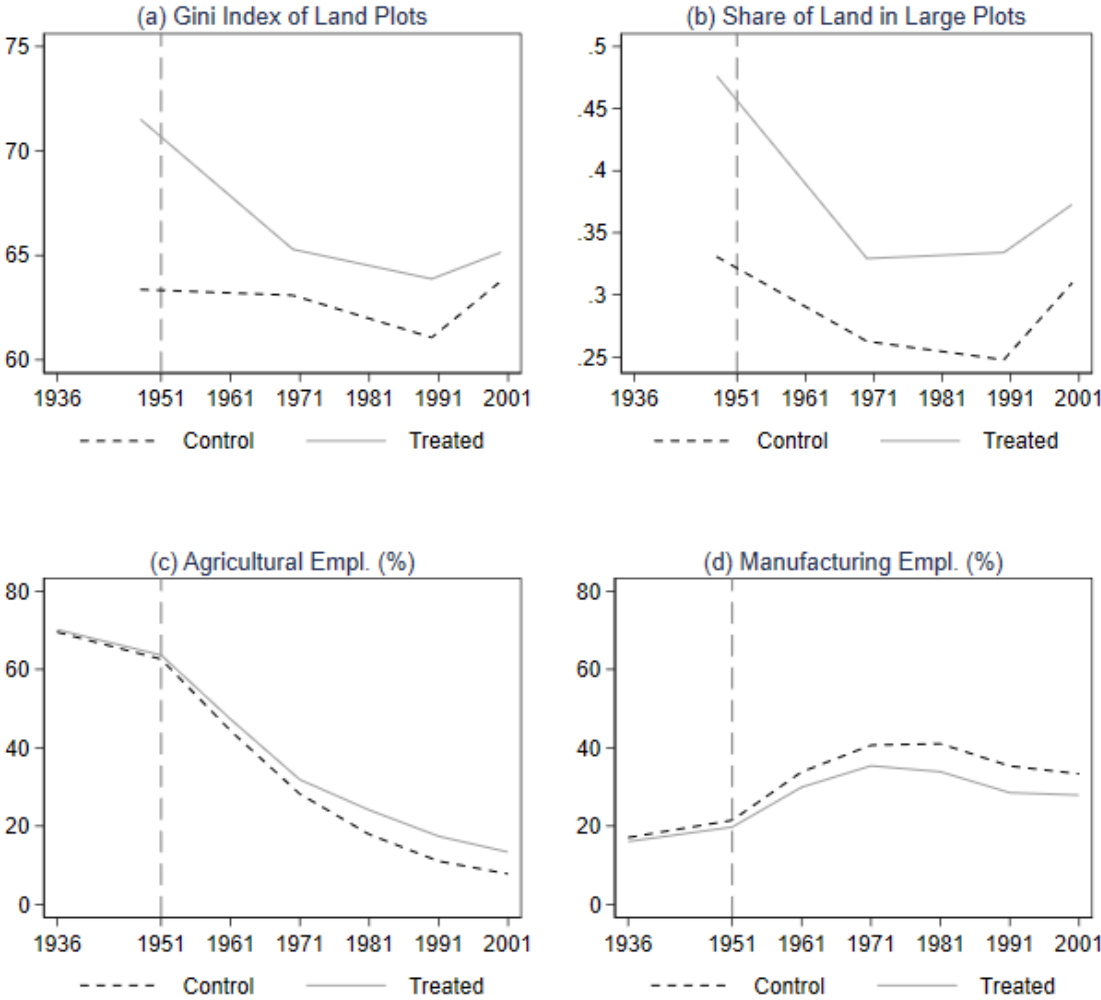
- Callaway, B. and Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230.
- Calonico, S., Cattaneo, M. D., Farrell, M. H., and Titiunik, R. (2017). rdrobust: Software for regression-discontinuity designs. *The Stata Journal*, 17(2):372–404.
- Calonico, S., Cattaneo, M. D., and Titiunik, R. (2014). Robust nonparametric confidence intervals for regression-discontinuity designs. *Econometrica*, 82(6):2295–2326.
- Caprettini, B., Casaburi, L., and Venturini, M. (2021). The electoral impact of wealth redistribution: Evidence from the Italian land reform. Discussion Paper DP15679, CEPR.
- Carillo, M. F. (2021). Agricultural Policy and Long-Run Development: Evidence from Mussolini's Battle for Grain. *The Economic Journal*, 131(634):566–597.
- Caselli, F. and Gennaioli, N. (2013). Dynastic management. *Economic Inquiry*, 51(1):971–996.
- Cattaneo, M. D., Idrobo, N., and Titiunik, R. (2019). *A practical introduction to regression discontinuity designs: Foundations*. Cambridge University Press.
- Cinnirella, F. and Hornung, E. (2016). Landownership concentration and the expansion of education. *Journal of Development Economics*, 121:135–152.
- Colussi, T., Lecce, G., Manacorda, M., and Onorato, M. (2021). The Economics and Politics of Government Aid. *Working Paper*.
- Conley, T. G. (1999). Gmm estimation with cross sectional dependence. *Journal of econometrics*, 92(1):1–45.
- Corak, M. and Piraino, P. (2011). The intergenerational transmission of employers. *Journal of Labor Economics*, 29(1):37–68.
- De Janvry, A., Emerick, K., Gonzalez-Navarro, M., and Sadoulet, E. (2015). Delinking land rights from land use: Certification and migration in Mexico. *American Economic Review*, 105(10):3125–3149.

- Dunn, T. and Holtz-Eakin, D. (2000). Financial capital, human capital, and the transition to self-employment: Evidence from intergenerational links. *Journal of labor economics*, 18(2):282–305.
- Fernando, A. N. (2022). Shackled to the soil? inherited land, birth order, and labor mobility. *Journal of Human Resources*, 57(2):491–524.
- Foster, A. D. and Rosenzweig, M. R. (2022). Are there too many farms in the world? labor market transaction costs, machine capacities, and optimal farm size. *Journal of Political Economy*, 130(3):636–680.
- Galán, J. S. (2018). Tied to the land? intergenerational mobility and agrarian reform in colombia. *Under Review*.
- Galor, O., Moav, O., and Vollrath, D. (2009). Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence. *The Review of Economic Studies*, 76(1):143–179.
- Ginsborg, P. (2003). *A history of contemporary Italy : society and politics, 1943-1988*. Palgrave Macmillan.
- Hart, O. and Holmström, B. (1987). The theory of contracts. In *Advances in economic theory: Fifth world congress*, volume 1. Cambridge University Press Cambridge.
- King, R. (1973). *Land reform: the Italian experience*.
- Lo Bello, S. and Morchio, I. (2021). Like father, like son: Occupational choice, intergenerational persistence and misallocation. *Quantitative Economics*.
- Marciani, G. E. (1966). *L'esperienza di riforma agraria in Italia*. Giuffrè.
- Martin, P. and Ottaviano, G. I. (2001). Growth and agglomeration. *International economic review*, 42(4):947–968.
- Martinelli, P. (2014). Latifundia revisited: Market power, land inequality and agricultural efficiency. evidence from interwar italian agriculture. *Explorations in Economic History*, 54:79–106.

- Matsuyama, K. (1992). Agricultural productivity, comparative advantage, and economic growth. *Journal of Economic Theory*, 58(2):317–334.
- Mattheis, R. and Raz, I. T. (2021). There's no such thing as free land: The homestead act and economic development.
- Medici, G. (1948). *La distribuzione della proprietà fondiaria in Italia*.
- Montero, E. (2020). Cooperative Property Rights and Development: Evidence from Land Reform in El Salvador.
- Porzio, T., Rossi, F., and Santangelo, G. V. (2021). The human side of structural transformation. Working Paper 29390, National Bureau of Economic Research.
- Prinzi, D. (1956). *La riforma agraria in Puglia, Lucania e Molise nei primi cinque anni*.
- Rossi-Doria, M. (1958). La riforma agraria sei anni dopo. In *Dieci anni di politica agraria nel Mezzogiorno*.
- Sant'Anna, P. H. and Zhao, J. (2020). Doubly robust difference-in-differences estimators. *Journal of Econometrics*, 219(1):101–122.
- Smith, C. (2021). Land concentration and long-run development in the frontier united states.

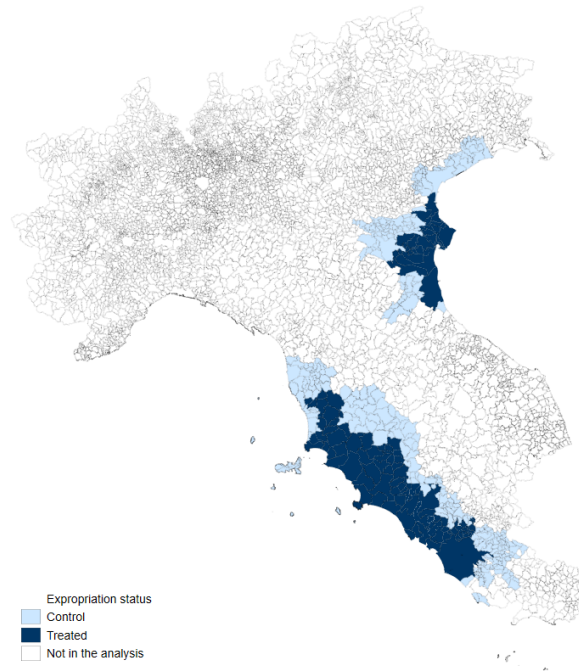
Paper Figures and Tables

Figure 1: Time series averages for treated and control areas



Panels (a) and (b) display the average Gini Index and share of land belonging to plots larger than 10 hectares, respectively, calculated using data from Medici (1948) and the Agricultural Censuses of 1970, 1990, and 2000. Panels (c) and (d) display the average employment share of agriculture and manufacturing, respectively, as measured by the Population Census for the period 1936-2001.

Figure 2: Expropriated municipalities in treated provinces



Note: In dark blue, municipalities that were included in the land reform; in light blue, municipalities in provinces where at least one municipality was expropriated. Light blue municipalities will comprise the main control group in our difference-in-differences analysis. *Source:* Legge Stralcio.

Table 1: Difference-in-Differences, Agriculture, and Manufacturing Employment

	Agriculture			Manufacturing		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat. margin:	Extensive	Both	Intensive	Extensive	Both	Intensive
1936	-0.299 (0.627)	-4.597 (2.755)	-9.110 (5.531)	0.692 (0.534)	4.957 (2.626)	5.797 (4.706)
1961	1.917*** (0.365)	15.11*** (1.423)	19.67*** (2.613)	-2.177*** (0.354)	-13.14*** (0.741)	-11.49*** (2.539)
1971	2.627** (0.928)	17.51** (4.932)	18.34* (7.571)	-3.543*** (0.737)	-16.93*** (3.402)	-6.700 (5.193)
1981	5.190*** (1.292)	31.01*** (5.881)	26.58** (9.452)	-5.433*** (1.131)	-20.04** (6.065)	5.726 (9.663)
1991	5.328** (1.523)	28.04*** (7.335)	17.02 (11.96)	-5.079*** (1.299)	-14.73* (7.080)	16.16 (12.02)
2001	4.544** (1.531)	22.85** (7.639)	11.64 (12.55)	-3.695** (1.302)	-8.655 (7.423)	17.32 (12.49)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mun. FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	35.34	35.34	38.27	30.79	30.79	27.35
SD Dep. Var.	26.94	26.94	25.66	14.91	14.91	12.68
Avg. Effect	3.92*** (1.04)	22.90*** (5.14)	18.65** (8.04)	-3.99*** (0.83)	-14.70** (4.63)	4.20 (7.29)
Observations	2867	2867	672	2867	2867	672

Notes. Column (1) estimates Model (1) exploiting the treatment dummy; Column (2) estimates Model (1) exploiting the percentage of expropriated lands; Column (3) estimates Model (1) exploiting the percentage of expropriated lands in the sample including only municipalities where lands have been expropriated. Year and municipality fixed effects are always included. The mean and the standard deviation of the dependent variable are reported. The average of the estimated coefficients in years 1961, 1971, 1981, 1991 and 2001 and the standard errors (in parentheses) are reported. Clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Mechanisms

	Education						Agglomeration					
	Illiteracy %			Higher Educ. %			Pop. Density			Rurality		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat. margin:	Ext.	Both	Intensive	Ext.	Both	Intensive	Ext.	Both	Intensive	Ext.	Both	Intensive
1936							-0.325 (4.643)	2.288 (22.26)	9.909 (39.44)			
1961	-0.00281*** (0.000481)	-0.0131*** (0.00159)	-0.00451 (0.00541)	0.0762 (0.148)	0.344 (0.747)	0.0888 (1.392)	-6.362*** (0.147)	-18.09*** (0.811)	21.24*** (3.890)	1.691*** (0.411)	10.96*** (1.548)	10.98*** (2.074)
1971	-0.00383*** (0.000732)	-0.0194*** (0.00329)	-0.0101* (0.00478)	0.290*** (0.0527)	0.627 (0.330)	-1.505 (0.921)	-19.69*** (5.309)	-84.03** (26.71)	-9.989 (42.34)	4.907*** (0.396)	22.95*** (1.985)	7.927 (3.952)
1981	-0.00471 (0.00238)	-0.0278* (0.0120)	-0.0232 (0.0195)	-0.187 (0.237)	-1.956 (1.214)	-3.216 (1.721)	-27.83** (8.107)	-119.8** (39.50)	-16.87 (60.51)	8.029*** (1.318)	32.97*** (5.936)	0.592 (9.250)
1991	-0.00518 (0.00325)	-0.0374* (0.0174)	-0.0439 (0.0289)	0.0980 (0.548)	-2.425 (2.925)	-7.625 (4.792)	-29.64** (9.521)	-129.5** (47.54)	-23.11 (72.59)	8.954*** (1.620)	34.33*** (7.144)	-5.930 (10.25)
2001	-0.00679 (0.00359)	-0.0465* (0.0193)	-0.0509 (0.0318)	-0.702 (0.619)	-6.788* (3.271)	-10.60* (5.220)	-34.38** (10.20)	-152.7** (50.60)	-33.39 (76.38)	10.57*** (1.697)	39.20*** (7.447)	-10.57 (11.18)
Mun. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	0.0537	0.0537	0.0574	11.05	11.05	11.00	168.1	168.1	99.62	25.24	25.24	23.98
SD Dep. Var.	0.0467	0.0467	0.0471	10.36	10.36	10.52	185.9	185.9	134.9	19.47	19.47	16.77
Observations	2466	2466	576	2460	2460	576	2874	2874	672	2460	2460	576

Notes. Columns (1), (4), (7), and (10) estimate Model 1 with a binary treatment; Columns (2), (5), (8), and (11) estimate Model 1 with the percentage of expropriated lands as treatment; Columns (3), (6), (9), and (12) estimate Model 1 with the percentage of expropriated lands as treatment in the sample including only municipalities where lands have been expropriated. Year and municipality fixed effects are always included. The dependent variables are reported in the column headings. Clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Probability of Agricultural Employment and Long-Run Income and Growth Effects

Dep. Var.	Persistence		Long-Run Outcomes			
	Agr. Employment		1970 Income		1970-2000 Growth	
	(1)	(2)	(3)	(4)	(5)	(6)
Owner (Agriculture)	0.0783*** (0.0143)	0.0719*** (0.0140)				
Owner (Other Sector)	-0.0183* (0.0098)	-0.0168* (0.0094)				
Reform Dummy			6.802 (159.7)	12.25 (154.7)	-0.203** (0.0841)	-0.211** (0.0815)
Region FE	No	Yes				
Other Controls	Yes	Yes				
Coarsened Var.			No	Yes	No	Yes
Mean Dep. Var. (Father in Agr.)	0.185	0.185				
Mean Dep. Var. (Father in Oth. Sect.)	0.0630	0.0630				
Mean Dep. Var.			4821	4821	1.832	1.832
SD Dep. Var.			1113.9	1113.9	0.603	0.603
Observations	4433	4433	341	341	331	331

Notes for columns (1)-(2). Data from the Bank of Italy's Survey on Household Income and Wealth (SHIW). Our sample consists of males older than 19 surveyed 1977-2016. Standard errors clustered at the household level in parentheses. Other controls: age, survey year, father's last sector of employment (6 categories). *Notes for columns (3)-(6).* Coarsened Exact Matching estimates for the effect of the land reform on income levels in 1970 and on growth in the period 1970-2000. Observations matched based on the administrative region (exact matching), Gini of landownership, and soil suitability to wheat. Columns (4) and (6) control for the coarsened variables used in matching. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Online Appendix for *Persistent Specialization and Growth: The Italian Land Reform*

by Riccardo Bianchi-Vimercati, Giampaolo Lecce, and Matteo Magnaricotte

A Additional Figures

Figure A1: Expropriation Rule for the *Legge Stralcio*

SCAGLIONI DI REDDITO IMPONIBILE TOTALE		Imponibile medio per Ha.												
		Lire.												
		1000 e oltre	900	800	700	600	500	400	300	200	100 e meno			
Fino a	30.000	—	—	—	—	—	—	—	—	—	—	—	—	—
Da oltre	30.000 a	60.000	—	—	—	—	0	15	30	55	70	85	90	95
»	60.000 a	100.000	—	—	—	0	10	30	60	70	85	90	95	95
»	100.000 a	200.000	35	40	47	55	60	65	70	75	84	90	95	95
»	200.000 a	300.000	45	50	55	60	65	70	75	80	87	95	95	95
»	300.000 a	400.000	52	57	60	65	70	75	80	85	90	95	95	95
»	400.000 a	500.000	60	64	66	71	76	80	85	90	95	95	95	95
»	500.000 a	600.000	64	70	76	78	80	85	90	95	95	95	95	95
»	600.000 a	700.000	68	74	79	82	85	90	95	95	95	95	95	95
»	700.000 a	800.000	72	78	82	85	90	95	95	95	95	95	95	95
»	800.000 a	900.000	76	82	86	90	93	95	95	95	95	95	95	95
»	900.000 a	1.000.000	82	86	90	93	95	95	95	95	95	95	95	95
»	1.000.000 a	1.200.000	90	92	95	95	95	95	95	95	95	95	95	95
	Oltre	1.200.000	95	95	95	95	95	95	95	95	95	95	95	95

Notes. Percentage of land to be expropriated depending on total taxable income (vertical dimension) and average income per hectare (horizontal dimension). Landowners with higher income and lower productivity per hectare were expropriated higher shares of their land.

Figure A2: Areas interested by the land reform



Source: King (1973)

Figure A3: Breakdown of the expenses of the *Enti di riforma* in the 1950s

Tab. 41 - Risultanze finanziarie per l'insieme degli Enti di riforma (a)
a fine del decennio 1950-51 / 1959-60.

Categorie di entrata	Importi		Categorie di uscita	Importi	
	milioni di lire	%		milioni di lire	%
Assegnazioni per compiti istituzionali	512.760	84,2	Trasformazione fondiaria	340.006	55,8
Redditi patrimoniali e entrate diverse	51.571	8,5	Assistenza e cooperazione	41.903	6,9
Debiti verso banche	33.856	5,5	Acquisizione di macchine e scorte	38.661	6,3
Totale entrate	598.187	98,2	Anticipazioni per opere di bonifica eseguite in concessione	2.281	0,4
Disavanzo	10.867	1,8	Crediti verso assegnatari e cooperative	26.395	4,3
			Spese generali, di amministrazione e per oneri patrimoniali	138.101	22,7
			Interessi passivi	21.707	3,6
Totale a pareggio	609.054	100,0	Totale uscite	609.054	100,0

(a) Eclusa la Sezione speciale per la riforma fondiaria dell'Ente autonomo del Flumendosa.

FONTE: Nostra elaborazione dei dati tratti dalle Relazioni della Corte dei conti al Parlamento (ATTI PARLAMENTARI, *cit.*).

Notes. Left column reports revenues; right column reports expenses. Among expenses, 55.8% is attributed to land transformation: historical reports (Ginsborg, 2003) report that most of the resources for land transformation were used to build new housing on the redistributed plots. General administrative costs of the reform accounted for 22.7% of the total. Source: Parliamentary Acts.

B Additional Tables

Table A1: Gross Saleable Production per Hectare

Year	Po Delta	Maremma	Fucino	Campania	A-L-M	Calabria	Sardinia	Total	Average (Italy)
1953	189	83	345	156	66	57	10	71	134
1954	182	81	275	133	55	60	15	73	129
1955	245	92	288	216	61	65	18	86	136
1956	226	97	292	242	63	80	20	90	133
1957	195	87	287	284	78	86	33	94	136
1958	247	110	379	280	89	98	48	114	151
1959	266	114	362	308	113	95	53	124	156
1960	246	107	375	330	92	98	56	116	151
1961	264	115	381	315	124	118	55	132	164
1962	265	135	414	411	138	129	59	148	165
1963	293	123	370	554	146	135	56	153	161
% yearly growth	4	4.9	3.2	13.4	11.5	9.5	19.9	8.5	2.6

Notes. Gross saleable production per ha. on assigned reformed lands (figures in '000 lire, constant prices). *Source:* King (1973).

Table A2: Descriptive Statistics

	Mean	Min	Max	Std. Dev.	Observations
Expropriation					
Expropriation Dummy	0.23	0.00	1.00	0.42	411
Land Expropriated (%)	0.04	0.00	0.4	0.08	411
Census					
Empl. Agriculture (% - 1951)	62.87	2.96	91.65	19.56	410
Empl. Manufacturing (% - 1951)	21.07	1.32	79.48	13.60	410
Illiteracy Rate (1951)	0.12	0.03	0.25	0.04	411
Higher Education Rate (1951)	1.99	0.39	12.47	1.24	410
Population (Thousands - 1951)	12.83	0.24	1651.75	83.50	411
Population Density (1951))	159.16	17.99	1140.80	139.65	411
<i>Rurality Measure</i> (% - 1951)	36.29	0	87.15	24.87	410
Geography					
Gini Index - Land Dist. (1948)	76.95	47.80	93.42	9.29	411
Land Suitability (Wheat)	3193.89	249.93	7752.41	2054.71	411
Municipality Area (1951)	68.21	3.50	1285.30	96.31	411

Notes. Percentage of land to be expropriated depending on total taxable income (vertical dimension) and average income per hectare (horizontal dimension). Landowners with higher income and lower productivity per hectare were expropriated higher shares of their land.

Table A3: Expropriation Data Statistic

Region	Number of municipalities	Number of expropriations	Expropriated area (hectares)	
			Total	Average
<i>Main sample regions</i>				
EMILIA-ROMAGNA	13 (44)	200	36,339.38	2,795.34
LAZIO	40 (180)	341	68,647.16	1,716.18
TOSCANA	38 (123)	540	127,102.97	3,344.81
VENETO	9 (93)	71	9,490.20	1,054.47
<i>Other regions</i>				
ABRUZZO	8 (108)	18	19,331.85	2,416.48
BASILICATA	45 (131)	353	64,000.12	1,422.22
CALABRIA*	81 (262)	279	43,795.82	-
CAMPANIA	18 (262)	132	9,046.44	502.58
MOLISE	12 (84)	55	5,416.46	451.37
PUGLIA	60 (258)	1,107	129,158.08	2,152.63
SARDEGNA	113 (377)	240	45,554.93	403.14
Total	437	3,336	557,883.41	-

Notes: Values in parenthesis report the overall number of municipalities in the treated provinces (i.e. provinces with at least one expropriation in their territory).

Table A4: Replication of Table 1 with Municipalities in the South of Italy

	Agriculture			Manufacturing		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat. margin:	Ext.	Both	Intensive	Ext.	Both	Intensive
1936	-1.282*** (0.341)	-13.19*** (2.652)	-12.26** (3.763)	1.137*** (0.261)	10.69*** (2.006)	9.321** (2.962)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mun. FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9794	9738	2193	9794	9738	2193

Notes. The analyzed sample includes only treated provinces in the south of Italy and replicates the models in Table 1. Column (1) estimates Model (1) exploiting the treatment dummy; Column (2) estimates Model (1) exploiting the percentage of expropriated lands; Column (3) estimates Model (1) exploiting the percentage of expropriated lands in the sample including only municipalities where lands have been expropriated. Year and municipality fixed effects are always included. Clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A5: Effect of Land Redistribution on Land Inequality

	Gini Index			Share of Large Plots		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat. margin:	Ext.	Both	Intensive	Ext.	Both	Intensive
1970	-5.950*** (0.881)	-37.18*** (3.706)	-36.46*** (6.241)	-0.0790*** (0.0123)	-0.484*** (0.0600)	-0.463** (0.0884)
1990	-5.347** (1.021)	-35.39*** (3.587)	-37.17*** (5.690)	-0.0593** (0.0145)	-0.392** (0.0742)	-0.411** (0.113)
2000	-6.781*** (1.126)	-40.45*** (3.854)	-37.27*** (4.187)	-0.0826** (0.0151)	-0.466** (0.0810)	-0.395** (0.116)
Mun. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1580	1580	360	1580	1580	360

Notes. Column (1) estimates Model 1 exploiting the treatment dummy; Column (2) estimates Model 1 exploiting the percentage of expropriated lands; Column (3) estimates Model 1 exploiting the percentage of expropriated lands in the sample including only municipalities where lands have been expropriated. Baseline period is 1948. Data for 1948 obtained from [Medici \(1948\)](#); data for later years from the General Italian Census of Agriculture. Year and municipality fixed effects are always included. Clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6: Predicting Land Reform Intensity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.	Expr.
Political Variables																
$\Delta PCI\%$	0.096**															0.033
	(0.042)															(0.042)
$\Delta DC\%$		0.017														0.007
		(0.045)														(0.040)
$\Delta Turnout$			0.288*													0.196
			(0.154)													(0.162)
Socioeconomic Variables																
$\Delta Agr.\%$				0.001												0.000
				(0.000)												(0.001)
$\Delta Man.\%$					-0.001*											0.000
					(0.000)											(0.002)
Employment %						14.709*										10.460
						(8.495)										(11.089)
$\Delta Pop.Dens.$							-0.000									-0.000
							(0.000)									(0.000)
Illiterate %								0.203**								0.198
								(0.099)								(0.140)
Education									-0.003							-0.008**
									(0.003)							(0.004)
Land Gini										0.214***						0.203***
										(0.038)						(0.057)
Geographical Variables																
Wheat											-0.019					-0.097
											(0.019)					(0.093)
Maize												-0.027				0.097
												(0.029)				(0.153)
Elevation													-0.016			-0.066**
													(0.015)			(0.032)
Latitude														-0.005*		-0.015**
														(0.003)		(0.006)
Longitude															-0.016***	-0.008
															(0.004)	(0.006)
N	411	411	407	407	407	410	408	411	411	410	411	411	411	411	411	403
Within R2	0.012	0.000	0.004	0.003	0.004	0.009	0.000	0.012	0.058	0.002	0.002	0.002	0.002	0.005	0.021	0.125

Notes. The outcome is the percentage of total land expropriated in the municipality. Whenever information is available for more than one pre-treatment observation, we use the change as a predictor, as indicated by the use of Δ . Predictors in columns (1)-(3) are from the Ministry of Interior for the national elections of 1946 and 1948; those in columns (4), (5), and (7) come from the national censuses of 1936 and 1951; those in columns (6), (8), and (9) come from the national census of 1951. The land Gini Index in column (10) comes from [Medici \(1948\)](#). Predictors in columns (11) and (12) come from FAO GAEZ. In column (16), we include all available predictors. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A7: Replication of Table 1 with a Different Set of Controls

	Agriculture			Manufacturing		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat. margin:	Ext.	Both	Intensive	Ext.	Both	Intensive
1961	0.876 (1.100)	13.89** (5.219)	19.25* (7.857)	-1.319 (1.034)	-14.46** (4.305)	-14.74** (5.476)
1971	1.373 (1.200)	15.67** (5.508)	18.06* (8.668)	-2.252 (1.122)	-17.29** (4.614)	-11.93 (6.222)
1981	3.233** (1.141)	27.33*** (4.875)	28.81** (7.448)	-4.199** (1.061)	-21.97*** (4.430)	-3.206 (5.846)
1991	3.493** (1.015)	25.58*** (4.493)	20.24** (7.809)	-3.574** (0.916)	-17.79*** (4.170)	1.287 (5.574)
2001	2.180* (0.957)	18.34*** (4.312)	14.15 (7.543)	-2.734** (0.866)	-15.26** (4.060)	-0.635 (5.242)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Prov. FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2460	2460	576	2460	2460	576

Notes. Column (1) estimates Model (1) exploiting the treatment dummy; Column (2) estimates Model (1) exploiting the percentage of expropriated lands; Column (3) estimates Model (1) exploiting the percentage of expropriated lands in the sample including only municipalities where lands have been expropriated. Year and province fixed effects are always included. Municipality latitude, longitude, wheat soil suitability, illiteracy rate, share of educated people and the percentage of the population living in *case spare* (scattered houses) are always included. Clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A8: Robustness: Excluding Administrative Centers of Each Province

	Agriculture			Manufacturing		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat. margin:	Ext.	Both	Intensive	Ext.	Both	Intensive
1936	-0.345 (0.620)	-5.061 (2.761)	-9.873 (5.462)	0.567 (0.511)	4.840 (2.566)	6.911 (4.621)
1961	1.860*** (0.404)	15.26*** (1.508)	20.91*** (2.761)	-2.153*** (0.373)	-13.28*** (0.785)	-12.38*** (2.654)
1971	2.551** (0.926)	17.87** (4.986)	20.43** (7.596)	-3.462*** (0.717)	-17.13*** (3.369)	-8.551 (5.181)
1981	5.135*** (1.267)	31.54*** (5.834)	29.19** (9.396)	-5.328*** (1.114)	-20.19** (6.014)	3.450 (9.671)
1991	5.225** (1.485)	28.49*** (7.251)	20.01 (11.88)	-5.018*** (1.305)	-14.94* (7.077)	14.22 (12.10)
2001	4.381** (1.477)	23.22** (7.535)	14.96 (12.45)	-3.631** (1.311)	-8.847 (7.439)	15.58 (12.57)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mun. FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2797	2797	644	2797	2797	644

Notes. The sample does not include the administrative centers of each province. Year and municipality fixed effects are always included. For more details, see footnote of Table 1. Clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A9: Robustness: Using Conley Standard Errors

	Agriculture				Manufacturing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1936	-4.597 (3.782)	-4.597 (4.353)	-4.597 (4.806)	-4.597 (4.365)	4.957* (2.735)	4.957 (3.278)	4.957 (3.692)	4.957 (3.743)
1961	15.11*** (5.275)	15.11** (6.356)	15.11** (7.632)	15.11* (9.025)	-13.14*** (3.989)	-13.14*** (4.861)	-13.14** (5.829)	-13.14* (6.732)
1971	17.51** (8.135)	17.51* (9.467)	17.51 (11.07)	17.51 (12.68)	-16.93*** (5.912)	-16.93** (6.918)	-16.93** (7.677)	-16.93** (8.541)
1981	31.01*** (8.857)	31.01*** (10.64)	31.01** (12.63)	31.01** (13.60)	-20.04*** (7.771)	-20.04** (9.342)	-20.04* (10.36)	-20.04* (11.19)
1991	28.04*** (9.702)	28.04** (11.80)	28.04** (13.82)	28.04* (15.26)	-14.73* (8.896)	-14.73 (11.01)	-14.73 (12.05)	-14.73 (12.78)
2001	22.85** (10.51)	22.85* (12.55)	22.85 (14.43)	22.85 (15.68)	-8.655 (9.549)	-8.655 (11.71)	-8.655 (13.11)	-8.655 (14.35)
Bandwidth	5	10	15	20	5	10	15	20

Notes. Estimation of Model 1 using a treatment dummy using Conley standard errors with different bandwidths.

Comparable estimates with clustered standard errors are available in columns (2) and (5) of Table 1 * $p < 0.10$,

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

Table A10: Replication of Columns (1) and (4) of Table 1 Controlling for Expropriation Predictors

	(1)	(2)	(3)	(4)	(5)	(6)
ATT Agr. %	3.921*** (1.480)	3.454** (1.635)	3.017** (1.488)	3.259* (1.800)	3.583*** (1.359)	2.709* (1.457)
ATT Man. %	-3.985*** (1.175)	-4.650*** (1.334)	-2.719** (1.179)	-3.543** (1.438)	-3.904*** (0.964)	-3.241*** (0.924)
Observations	407	407	401	401	402	402
Gini	No	Yes	No	Yes	Yes	Yes
Geolocation	No	No	Yes	Yes	Yes	Yes
Others	No	No	No	No	Yes	Yes
Soil Quality	No	No	No	No	No	Yes

Notes. Estimates of Model 1 using binary treatment using the doubly-robust difference-in-differences estimator proposed by Sant’Anna and Zhao (2020) and implemented in the `did` package by Callaway and Sant’Anna (2021). Reported coefficients are the average of treatment effects estimated post-reform. Columns control for different combinations of reform predictors, as shown in Table A6. *Geolocation* controls include latitude and longitude; *Others* include 1951 employment, 1951 literacy rate, share of college-graduated residents in 1951, PCI vote share change, electoral turnout change, and municipal elevation. Soil quality controls include suitability for wheat and maize, according to FAO GAEZ. Clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C Data: Description and Sources

Expropriation Data

Treatment variables have been digitized from original expropriation documents (i.e., *Gazzetta Ufficiale*). In each expropriation, we collected information on the first name and the last name of the beneficiary, municipality and size of the expropriation. Figure C1 reports an example.

Figure C1: Example of reported expropriation in *Gazzetta Ufficiale*

Supplemento ordinario n. 5 alla GAZZETTA UFFICIALE n. 13 del 17 gennaio 1953 49	
<p>DECRETO DEL PRESIDENTE DELLA REPUBBLICA 18 dicembre 1952, n. 3300.</p> <p>Trasferimento in proprietà all'Ente per lo sviluppo dell'irrigazione e la trasformazione fondiaria in Puglia e Lucania - Sezione speciale per la riforma fondiaria - di terreni di proprietà di Torre Maria fu Gioacchino, nel comune di Grottole (Matera).</p> <p>IL PRESIDENTE DELLA REPUBBLICA</p> <p>Visti gli articoli 77, comma primo ed 87, comma quinto, della Costituzione della Repubblica; Viste le leggi 12 maggio 1950, n. 230; 21 ottobre 1950; n. 841; 18 maggio 1951, n. 333; 2 aprile 1952, n. 339 e 16 agosto 1952, n. 1206; In virtù della delegazione concessa dagli articoli 5 della legge 12 maggio 1950, n. 230 ed 1 e 2 della legge 21 ottobre 1950, n. 841; Visto il proprio decreto 7 febbraio 1951, n. 67; Visto il piano particolareggiato di espropriazione compilato dall'Ente per lo sviluppo dell'irrigazione e la trasformazione fondiaria in Puglia e Lucania - Sezione speciale per la riforma fondiaria -, nei confronti di Torre Maria fu Gioacchino, per i terreni ricadenti nel comune di Grottole (provincia di Matera); Udito il parere, in data 26 novembre 1952, espresso dalla Commissione parlamentare nominata a norma degli articoli 5 della legge 12 maggio 1950, n. 230 ed 1 e 2 della legge 21 ottobre 1950, n. 841; Sentito il Consiglio dei Ministri; Sulla proposta del Ministro Segretario di Stato per l'Agricoltura e per le foreste;</p> <p>Decreta:</p> <p>Art. 1.</p> <p>E' approvato il piano particolareggiato di espropriazione compilato dall'Ente per lo sviluppo dell'irrigazione e la trasformazione fondiaria in Puglia e Lu-</p>	<p>cania - Sezione speciale per la riforma fondiaria -, nei confronti di Torre Maria fu Gioacchino, relativo ai terreni ricadenti nel comune di Grottole (provincia di Matera), per una superficie di ettari 51.26.31, specificamente descritti nell'elenco n. 1 allegato al presente decreto.</p> <p>Art. 2.</p> <p>I terreni indicati nel precedente articolo sono trasferiti in proprietà all'Ente per lo sviluppo dell'irrigazione e la trasformazione fondiaria in Puglia e Lucania - Sezione speciale per la riforma fondiaria.</p> <p>Art. 3.</p> <p>E' ordinata l'immediata occupazione, da parte dell'Ente predetto, dei terreni indicati nel precedente articolo 1.</p> <p>Art. 4.</p> <p>L'elenco dei terreni, con l'indicazione dell'indennità di espropriazione offerta, munito del visto del Ministro proponente, forma parte integrante del presente decreto, che entra in vigore il giorno stesso della sua pubblicazione nella <i>Gazzetta Ufficiale</i> della Repubblica Italiana.</p> <p>Il presente decreto, munito del sigillo dello Stato, sarà inserito nella Raccolta ufficiale delle leggi e dei decreti della Repubblica Italiana. E' fatto obbligo a chiunque spetti di osservarlo e di farlo osservare.</p> <p>Dato a Roma, addì 18 dicembre 1952</p> <p>EINAUDI</p> <p>DE GASPERI — FANFANI</p> <p>Visto, il Guardasigilli: ZOLI Registrato alla Corte dei conti, addì 15 gennaio 1953 Atti del Governo, registro n. 69, foglio n. 108. — FALLA</p>

Income Data

Income 1970 is an estimation of the average net income at the municipal level in 1970. Incomes are expressed in 2000 euros. The data are from [Bocca and Scott \(1974\)](#).

Income 2000 is an estimation of the average net income at the municipal level in 2000. It has been computed as the ratio between the overall taxable income over the number of taxpayers in each municipality. Incomes are expressed in 2000 euros. The data were downloaded from the Ministry of Economy and Finance.

Other Control Variables

Rurality is the percentage of the population living in *nucleo abitato* (i.e., a tiny nucleus of houses in the territory of the municipality) or in *case sparse* (i.e., houses spread over the territory of the municipality but without forming a residential nucleus) over the total population at municipal level. The data are from "[ottomilacensus.istat.it](#)".

Share of People with Completed Higher Education is the share of people in the population (aged 6 and above) that completed at least high school. The data are from "[ottomilacensus.istat.it](#)".

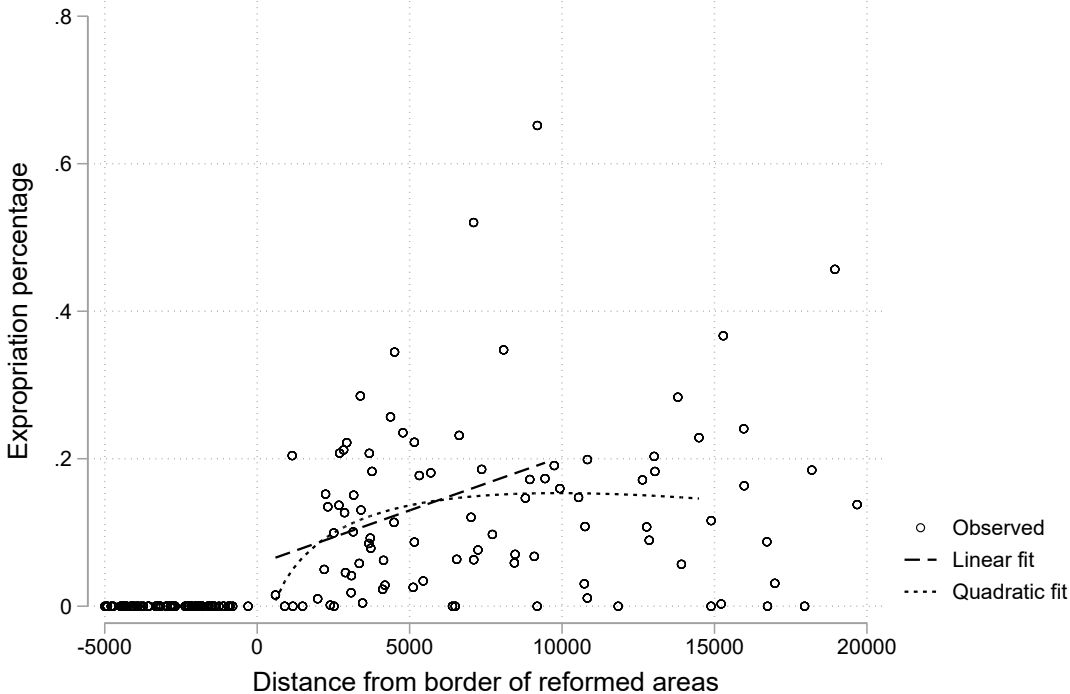
Illiteracy Rate is the share of people in the population (aged 6 and above) that is illiterate. The data are from "[ottomilacensus.istat.it](#)".

D Additional Results: Regression Discontinuity

In this section, we provide evidence that justifies excluding a regression discontinuity design for our empirical strategy. Our main treatment variable is the percentage of expropriated land of each municipality. Looking at the spatial distribution of expropriated land can inform us on the magnitude of the discontinuity at the border of municipalities that were part of reformed areas. Figure [D1](#) shows the scatter plot of the expropriation data, ranked

by distance from the closest border of the reformed areas. The figure also displays a linear and quadratic fit within the bandwidths chosen by the procedure described in [Calonico et al. \(2017\)](#), which are shown in [Table D1](#). A visual inspection of the plot reveals the absence of a sharp discontinuity at the border for our main treatment variable. Therefore, employing a regression discontinuity design based on the distance from reformed areas would not capture well the underlying variation that we want to capture.

Figure D1: Expropriation percentage and distance from the border of reform areas



Notes. The y-axis represents the percentage of land in the municipality that was expropriated by the reform; the x-axis reports distance from the reform border, where negative values mean that municipalities were not treated. The positive slope of the linear and quadratic fits of the data and the small discontinuity around 0 suggest that a Regression Discontinuity Design would be statistically underpowered to identify the effects of land redistribution.

In [Table D1](#), we formally test the discontinuity in the percentage of expropriated land using distance from the border of reformed areas as our running variable. We do so for a linear and a quadratic specification, which correspond to the two fitted lines displayed in [Figure D1](#). In line with state-of-the-art techniques on regression discontinuity designs

(Cattaneo et al. (2019)), the Table reports the conventional estimate of the local treatment effect at the discontinuity, with the corresponding optimal choice for the bandwidth. The Table also shows conventional and robust standard errors, where the latter accounts for bias. The expropriation percentage does not display a significant discontinuity at the threshold (except for the case of a linear fit with conventional standard errors, which is significant at the 10% level).

Table D1: Regression Discontinuity

	Expropriation %	
	Linear	Quadratic
Treatment	0.049	0.016
Conventional s.e.	(0.029)	(0.042)
Robust s.e.	(0.037)	(0.049)
Bandwidth (m)	9539	14549
Observations	1449	1449

Notes. Treatment is a binary variable taking value of 1 for municipalities within the reform borders. Outcome is the percentage of land expropriated by the reform. The two columns control for linear or quadratic effects of distance from the reform border. Estimates of the change in outcome at the discontinuity are not significant at standard thresholds when using the bias-robust standard errors implemented by the `rdrobust` package by Calonico et al. (2014). This suggests that a Regression Discontinuity Design would be statistically underpowered to identify the effects of land redistribution.



List of research reports

17001-EEF: Trinks, A., B. Scholtens, M. Mulder, and L. Dam, Divesting Fossil Fuels: The Implications for Investment Portfolios

17002-EEF: Angelini, V., and J.O. Mierau, Late-life Health Effects of Teenage Motherhood

17003-EEF: Jong-A-Pin, R., M. Laméris, and H. Garretsen, Political Preferences of (Un)happy Voters: Evidence Based on New Ideological Measures

17004-EEF: Jiang, X., N. Hermes, and A. Meesters, Financial Liberalization, the Institutional Environment and Bank Efficiency

17005-EEF: Kwaak, C. van der, Financial Fragility and Unconventional Central Bank Lending Operations

17006-EEF: Postelnicu, L. and N. Hermes, The Economic Value of Social Capital

17007-EEF: Ommeren, B.J.F. van, M.A. Allers, and M.H. Vellekoop, Choosing the Optimal Moment to Arrange a Loan

17008-EEF: Bekker, P.A., and K.E. Bouwman, A Unified Approach to Dynamic Mean-Variance Analysis in Discrete and Continuous Time

17009-EEF: Bekker, P.A., Interpretable Parsimonious Arbitrage-free Modeling of the Yield Curve

17010-GEM: Schasfoort, J., A. Godin, D. Bezemer, A. Caiani, and S. Kinsella, Monetary Policy Transmission in a Macroeconomic Agent-Based Model

17011-I&O: Bogt, H. ter, Accountability, Transparency and Control of Outsourced Public Sector Activities

17012-GEM: Bezemer, D., A. Samarina, and L. Zhang, The Shift in Bank Credit Allocation: New Data and New Findings

17013-EEF: Boer, W.I.J. de, R.H. Koning, and J.O. Mierau, Ex-ante and Ex-post Willingness-to-pay for Hosting a Major Cycling Event

17014-OPERA: Laan, N. van der, W. Romeijnders, and M.H. van der Vlerk, Higher-order Total Variation Bounds for Expectations of Periodic Functions and Simple Integer Recourse Approximations

17015-GEM: Oosterhaven, J., Key Sector Analysis: A Note on the Other Side of the Coin

17016-EEF: Romensen, G.J., A.R. Soetevent: Tailored Feedback and Worker Green Behavior: Field Evidence from Bus Drivers

17017-EEF: Trinks, A., G. Ibikunle, M. Mulder, and B. Scholtens, Greenhouse Gas Emissions Intensity and the Cost of Capital

17018-GEM: Qian, X. and A. Steiner, The Reinforcement Effect of International Reserves for Financial Stability



- 17019-GEM/EEF: Klasing, M.J. and P. Milionis, The International Epidemiological Transition and the Education Gender Gap
- 2018001-EEF: Keller, J.T., G.H. Kuper, and M. Mulder, Mergers of Gas Markets Areas and Competition amongst Transmission System Operators: Evidence on Booking Behaviour in the German Markets
- 2018002-EEF: Soetevent, A.R. and S. Adikyan, The Impact of Short-Term Goals on Long-Term Objectives: Evidence from Running Data
- 2018003-MARK: Gijsenberg, M.J. and P.C. Verhoef, Moving Forward: The Role of Marketing in Fostering Public Transport Usage
- 2018004-MARK: Gijsenberg, M.J. and V.R. Nijs, Advertising Timing: In-Phase or Out-of-Phase with Competitors?
- 2018005-EEF: Hulshof, D., C. Jepma, and M. Mulder, Performance of Markets for European Renewable Energy Certificates
- 2018006-EEF: Fosgaard, T.R., and A.R. Soetevent, Promises Undone: How Committed Pledges Impact Donations to Charity
- 2018007-EEF: Durán, N. and J.P. Elhorst, A Spatio-temporal-similarity and Common Factor Approach of Individual Housing Prices: The Impact of Many Small Earthquakes in the North of Netherlands
- 2018008-EEF: Hermes, N., and M. Hudon, Determinants of the Performance of Microfinance Institutions: A Systematic Review
- 2018009-EEF: Katz, M., and C. van der Kwaak, The Macroeconomic Effectiveness of Bank Bail-ins
- 2018010-OPERA: Prak, D., R.H. Teunter, M.Z. Babai, A.A. Syntetos, and J.E. Boylan, Forecasting and Inventory Control with Compound Poisson Demand Using Periodic Demand Data
- 2018011-EEF: Brock, B. de, Converting a Non-trivial Use Case into an SSD: An Exercise
- 2018012-EEF: Harvey, L.A., J.O. Mierau, and J. Rockey, Inequality in an Equal Society
- 2018013-OPERA: Romeijnders, W., and N. van der Laan, Inexact cutting planes for two-stage mixed-integer stochastic programs
- 2018014-EEF: Green, C.P., and S. Homroy, Bringing Connections Onboard: The Value of Political Influence
- 2018015-OPERA: Laan, N. van der, and W. Romeijnders, Generalized alpha-approximations for two-stage mixed-integer recourse models
- 2018016-GEM: Rozite, K., Financial and Real Integration between Mexico and the United States



2019001-EEF: Lugalla, I.M., J. Jacobs, and W. Westerman, Drivers of Women Entrepreneurs in Tourism in Tanzania: Capital, Goal Setting and Business Growth

2019002-EEF: Brock, E.O. de, On Incremental and Agile Development of (Information) Systems

2019003-OPERA: Laan, N. van der, R.H. Teunter, W. Romeijnders, and O.A. Kilic, The Data-driven Newsvendor Problem: Achieving On-target Service Levels.

2019004-EEF: Dijk, H., and J. Mierau, Mental Health over the Life Course: Evidence for a U-Shape?

2019005-EEF: Freriks, R.D., and J.O. Mierau, Heterogeneous Effects of School Resources on Child Mental Health Development: Evidence from the Netherlands.

2019006-OPERA: Broek, M.A.J. uit het, R.H. Teunter, B. de Jonge, J. Veldman, Joint Condition-based Maintenance and Condition-based Production Optimization.

2019007-OPERA: Broek, M.A.J. uit het, R.H. Teunter, B. de Jonge, J. Veldman, Joint Condition-based Maintenance and Load-sharing Optimization for Multi-unit Systems with Economic Dependency

2019008-EEF: Keller, J.T. G.H. Kuper, and M. Mulder, Competition under Regulation: Do Regulated Gas Transmission System Operators in Merged Markets Compete on Network Tariffs?

2019009-EEF: Hulshof, D. and M. Mulder, Renewable Energy Use as Environmental CSR Behavior and the Impact on Firm Profit

2019010-EEF: Boot, T., Confidence Regions for Averaging Estimators

2020001-OPERA: Foreest, N.D. van, and J. Wijngaard. On Proportionally Fair Solutions for the Divorced-Parents Problem

2020002-EEF: Niccodemi, G., R. Alessie, V. Angelini, J. Mierau, and T. Wansbeek. Refining Clustered Standard Errors with Few Clusters

2020003-I&O: Bogt, H. ter, Performance and other Accounting Information in the Public Sector: A Prominent Role in the Politicians' Control Tasks?

2020004-I&O: Fisch, C., M. Wyrwich, T.L. Nguyen, and J.H. Block, Historical Institutional Differences and Entrepreneurship: The Case of Socialist Legacy in Vietnam

2020005-I&O: Fritsch, M. and M. Wyrwich. Is Innovation (Increasingly) Concentrated in Large Cities? An Internatinal Comparison

2020006-GEM: Oosterhaven, J., Decomposing Economic Growth Decompositions.

2020007-I&O: Fritsch, M., M. Obschonka, F. Wahl, and M. Wyrwich. The Deep Imprint of Roman Sandals: Evidence of Long-lasting Effects of Roman Rule on Personality, Economic Performance, and Well-Being in Germany

2020008-EEF: Heijnen, P., On the Computation of Equilibrium in Discontinuous Economic Games



2020009-EEF: Romensen, G.J. and A.R. Soetevent, Improving Worker Productivity Through Tailored Performance Feedback: Field Experimental Evidence from Bus Drivers

2020010-EEF: Rao, Z., M. Groneck, and R. Alessie, Should I Stay or Should I Go? Intergenerational Transfers and Residential Choice. Evidence from China

2020011-EEF: Kwaak, C. van der, Unintended Consequences of Central Bank Lending in Financial Crises

2020012-EEF: Soetevent, A.R., Determinants choice set variation in demand estimation – with an application to the electric vehicle public charging market

2020013-EEF: Kwaak, C. van der, Old-Keynesianism in the New Keynesian model

2020014-EEF: Laat, m. van der, Loan Sales and the Tyranny of Distance in U.S. Residential Mortgage Lending

2020015-I&O: Fritsch, M., and M. Wyrwich, Initial Conditions and Regional Performance in the Aftermath of Disruptive Shocks: The Case of East Germany after Socialism

2020016-OPERA: Laan, N. van der, and W. Romeijnders, A Converging Benders' Decomposition Algorithm for Two-stage Mixed-integer Recourse Models

2021001-OPERA: Baardman, L., K.J. Roodbergen, H.J. Carlo, and A.H. Schrottenboer, A Special Case of the Multiple Traveling Salesmen Problem in End-of-aisle Picking Systems

2021002-EEF: Wiese, R., and S. Eriksen, Willingness to Pay for Improved Public Education and Public Health Systems: The Role of Income Mobility Prospects.

2021003-EEF: Keller, J.T., G.H. Kuper, and M. Mulder, Challenging Natural Monopolies: Assessing Market Power of Gas Transmission System Operators for Cross-Border Capacity

2021004-EEF: Li, X., and M. Mulder, Value of Power-to-Gas as a Flexibility Option in Integrated Electricity and Hydrogen Markets

2021005-GEM: Rozite, K., J.P.A.M. Jacobs, and D.J. Bezemer, Investor Sentiment and Business Investment

2021006-EEF: Spierdijk, L., and T. Wansbeek, Differencing as a Consistency Test for the Within Estimator

2021007-EEF: Katz, M., and C. van der Kwaak, To Bail-in or to Bailout: that's the (Macro) Question

2021008-EEF: Haan, M.A., N.E. Stoffers, and G.T.J. Zwart, Choosing Your Battles: Endogenous Multihoming and Platform Competition

2021009-I&O: Greve, M., M. Fritsch, and M. Wyrwich, Long-Term Decline of Regions and the Rise of Populism: The Case of Germany

2021010-MARK: Hirche, C.F., T.H.A. Bijmolt, and M.J. Gijsenberg, When Offline Stores Reduce Online Returns



2021011-MARK: Hirche, C.F., M.J. Gijsenberg, and T.H.A. Bijmolt, Promoting Product Returns: Effects of Price Reductions on Customer Return Behavior

2021012-MARK: Hirche, C.F., M.J. Gijsenberg, and T.H.A. Bijmolt, Asking Less, Getting More? The Influence of Fixed-Fee and Threshold-Based Free Shipping on Online Orders and Returns

2021013-I&O: Sorgner, A., and M. Wyrwich, Calling Baumol: What Telephones Can Tell Us about the Allocation of Entrepreneurial Talent in the Face of Radical Institutional Changes

2021014-I&O: Slavtchev, V., and M. Wyrwich, TV and Entrepreneurship

2021015-EEF: Kate, F. ten, M.J. Klasing, and P. Milionis, Diversity, Identity and Tax Morale

2021016-EEF: Bergemann, A., and R.T. Riphahn, Maternal Employment Effects of Paid Parental Leave

2021017-GEM: Abolhassani, M., Productivity Spillovers of Multinational Enterprises through Worker Mobility: New Evidence for the Netherlands

2021018-GEM: Abolhassani, M., Productivity Spillovers of Superior Firms through Worker Mobility

2022001-GEM: Oosterhaven, J., A Price Reinterpretation of the Leontief Quantity Model

2022002-EEF: Ghaemi, S, X. Li, and M. Mulder, Economic Value of Flexibility Provided by Power to gas Conversion Systems in Low-voltage Distribution Grids

2022003-OB: Meer, P.H. van der, Are All Self-employed Happy?

2022004-EEF: Perey, P., and M. Mulder, International Competitiveness of Low-carbon Hydrogen Supply to the North-west European Market

2022005-OPERA: Kasper, A., M. Land, and R. Teunter, University of Groningen, Faculty of Economics and Business, Department of Operations.

2022006-I&O: Fritsch, M., and M. Wyrwich, Entrepreneurship in the Long-run: Empirical Evidence and Historical Mechanisms.

2022007-EEF: Treurniet, M., and R. Lensink, Belief-based Poverty Traps and the Effects of Material and Psychological Development Interventions.

2022008-EEF: Kwaak, Christiaan van der, Monetary Financing Does Not Produce Miraculous Fiscal Multipliers

2022009-EEF: Beesten, E.R. van, and D. Hulshof, Transmission Capacity Reduction in International Power Systems: Economic Incentives and Welfare Effects

2022010-OPERA: Romeijnders, W., N.D. van Foreest and J. Wijngaard, On Proportionally Fair Solutions for the Divorced-Parents Problem



2022011-I&O: Hipp, A., M. Fritsch, M. Greve, J. Günther, M. Lange, C. Liutik, B. Pfeifer, M. Shkolnykova, and M. Wyrwich, Comprehensive Patent Data of the German Democratic Republic 1949-1990—Technical Report and Dataset Overview

2022012-EEF: Bianchi-Vimercati, R., G. Lecce, and M. Magnaricotte, Persistent Specialization and Growth: The Italian Land Reform



www.rug.nl/feb