Land reform, ethnicity and political participation: Evidence from Peru

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Abstract

This paper examines the effects of Peru's 1969 Land Reform on the political representation of marginalized ethnic groups in local elections. Using electoral data from 1963 to 1983, I employ surname analysis and a skin color detection algorithm to identify ethnic groups. I show that greater exposure to land reform increases the candidacy of marginalized ethnic groups, but has no effect on their electoral success. I explore potential channels and find the creation of political parties of peasant or worker origin could be plausible mechanisms for the presence of more candidates from marginalized ethnic groups.

JEL: Q15, N56, J15, D72
Keywords: land reform, ethnicity, voting, Peru.

I.   Introduction

By the mid-twentieth century, Peru was characterized by high land inequality, with a 1% of landowners controlling 80% of the land, allowing a small elite to maintain significant economic and political power (Ankersen and Ruppert, 2019; Albertus, 2015). This elite resisted land reform efforts and enacted policies that favored large landowners, perpetuating the concentration of land and power (Masterson, 1991). Despite 48% of the population speaking an indigenous language in 1960, indigenous communities remained marginalized in local politics, struggling against landowners since colonial times (Kay, 1982; Cant, 2018). By the early 1960s, their discontent had grown, leading to large-scale protests, some of which turned violent, as peasant communities organized to demand better working conditions. This peasant activism created a new political environment where indigenous communities began to demand a more active role in decision-making.

The underrepresentation of certain ethnic groups in politics poses a significant concern, particularly within the Peruvian context, which is characterized by a high diversity of ethnic communities. The attributes and origins of political leaders can shape the trajectory of their mandates once in office. Leaders who empathize with their constituents and possess a nuanced understanding of local contexts can more effectively provide public goods that address their group's specific needs (Chattopadhyay and Duflo, 2004). Marginalized groups often exhibit low voter turnout when they perceive a lack of affinity with candidates. Consequently, political power remains concentrated among groups with consistent electoral participation. Research indicates that minority voter turnout increases when a co-ethnic candidate runs (Washington, 2006; Barreto, 2007) or when the ethnic group comprises a substantial portion of the electorate in a district (Fraga, 2016).

Land inequality, servitude relationships, and the political underrepresentation of indigenous communities set the stage for profound socio-political upheaval, leading in the transformative Land Reform initiated in 1969 under the military government of General Velasco Alvarado. This reform aimed to redistribute land and dismantle servitude structures, thereby empowering peasants both economically and politically. Reform's key components included the creation of agrarian zones for centralized land redistribution, the formation of cooperatives to directly involve peasants, and the use of political propaganda to promote the reform as a movement for social justice and national unity. Although previous studies have explored the effects of land reforms on capital accumulation, productivity, poverty, health, human capital, and conflict (Martinelli and Vega, 2019; Albertus and Popescu, 2020; Albertus et al., 2020; Murphy and Rossi, 2016), the impact on the political

landscape of marginalized ethnic groups remains little discussed in the literature.

This paper examines the impact of Land Reform on the representation of marginalized ethnic groups in local elections in Peru. I compiled data on local election participants from 1963 to 1983 for this analysis. To identify ethnic groups, I used two methodologies. Historically, I employed surnames as proxies for "ethnic clans" to determine the indigenous heritage of each political actor. Observationally, I analyzed candidates' photos to assess skin color using a machine learning algorithm, which allows for the identification of Afro and mestizo individuals as potentially marginalized ethnic groups in political spheres. As far as I know, this study is the first in Peru to use skin-detection machine learning techniques to measure ethnicity within a political context. For land reform variables, I utilized data and digitized maps of Land Reform zones from Albertus et al. (2020). To measure Land Reform exposure, I use the distance from each district to the corresponding Agrarian Zone's central office which was the operational hub for implementing the land reform. In this context, distance is crucial: the farther a district is from the central office of the Agrarian Zone, the less exposure it has to the land reform and less attention was received from the government (Echevarria, 1979).

This paper study how the land reform exposure affects political-ethnic outcomes. The measure of land reform exposure is not random: distance to the Agrarian Zones' central offices has potential endogeneity concerns. These offices were typically located in larger and more developed cities, raising concerns about potential omitted variable bias. For instance, cities closer to these offices may also have greater access to educational programs, which could influence political participation decisions. Thus, using the distance to the office as a proxy for land reform exposure requires careful consideration. By integrating various data sources at the district level, I estimate the effect of land reform exposure using a two-stage least squares (2SLS) approach, with the distance from each district to the Agrarian Zone centroid serving as an exogenous source of variation in land reform exposure. This instrument is relevant because most Agrarian Offices are near the center of the Agrarian Zone. I argue that this instrument meets the exclusion restriction within the specific context of Peruvian Land Reform implementation. The borders of the agricultural zones, which determine the centroid of the region, were arbitrarily drawn, allowing me to assume that the distance to the centroid is quasi-random. Additionally, I control for demographics, geography, state capacity, land characteristics, and the historical background of each district. I show that greater exposure to land reform increases the candidacy of marginalized ethnic groups, but has no effect on their

electoral success. My results are consistent with a series of robustness checks.

My research is related with the literature of land reforms and their potential ability to alter political landscapes. For example, in Chile, the municipalities more affected by land reform showed a decreasing political support to left wing party (González, 2013). Despite not preventing the rise of Chilean left government, the land reform shows how it can strategically be used in politics. In Mexico, the way of land reform was applied, through property rights, influenced in the preferable pro-market voting behavior (De Janvry et al., 2014) and the decreasing vote share in the incumbent party (Larreguy et al., 2015). Similarly, Di Tella et al. (2007) found that squatters granted property rights in the outskirts of Buenos Aires were more likely to support politicians advocating free-market policies. In addition, redistribution policies may foster clientelism. For example, Caprettini et al. (2021) demonstrated that towns affected by Italian land reform increased their support for the incumbent party and saw a rise in public sector employment, a common form of patronage. This paper builds on these findings by exploring the impact of Peru's land reform on the political representation of marginalized ethnic groups, offering new insights into the socio-political consequences of land redistribution policies.

II. Historical context

A. Before the Land Reform

In the mid-twentieth century, Peru exhibited pronounced inequality in land ownership. According to the 1961 Census, the top 1 percent of landowners controlled 80 percent of the land, whereas 83 percent of farmers held plots of five hectares or less, collectively constituting just the 6 percent of the land (Albertus, 2015, p. 194).

The agrarian structure was characterized by a servitude system, typically rooted in colonial times. Land inheritance over several generations perpetuated the economic and political dominance of certain groups or families. This arrangement resulted in a labor system where peasants were subjected to exploitation and harsh working conditions. The servitude relations ignited strong peasant mobilizations in the early 1960s. These large-scale mobilizations were distinguished by the organization, leadership, and methods of the movement, contrasting sharply with revolts of colonial times (Caballero, 1981, p. 360).

Land-owners had not only economic power, but a strong influence in politics at both local and national levels. Prior to Velasco's government, land reform proposals faced resistance from top

policymakers. For instance, in 1956, a commission to discuss the creation of an agrarian reform law[1] was led by a prominent landowner. Predictably, no real reform materialized. In the 1960s, government efforts for land reform were thwarted by congressional opposition, resulting in ineffective legislation that redistributed only a minimal amount of land. The main objective of previous land reform efforts in Peru was to calm the peasant protests, prevent them from becoming more violent and capture political peasant leaders (Kay, 1982; Valderrama, 1976).

In the 1960s, the political spectrum was dominated by traditional parties, military movements, and popular leaders. For example, in the 1963 presidential elections, 98% of the votes went for only three traditional parties. However, alternative political movements emerged at the local level, potentially offering better representation for the voters in those areas. A comparison of the 1966 and 1993 elections reveals an increase in the number of candidates and elected officials from independent parties (see Figure 1).

Figure 1 : Distribution of candidates by type of political party and electoral year
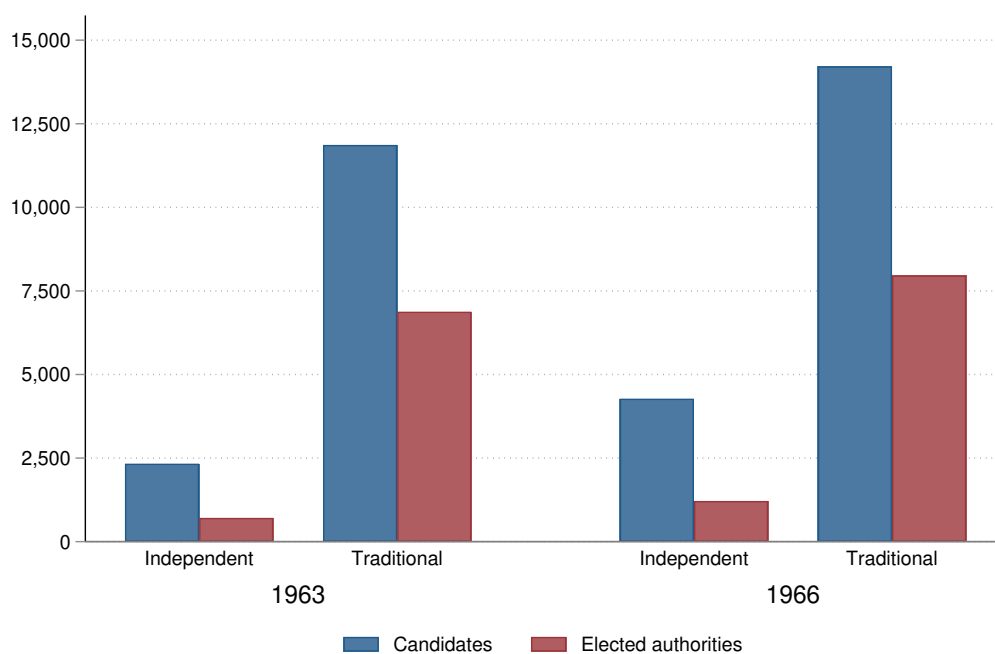
The names of these new movements are not arbitrary. In fact, the majority of these new parties

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[1]In 1956, Peru's President Manuel Prado exemplified oligarchic governance. His family's wealth, primarily from the agro-export sector and ownership of a major Peruvian bank, positioned him as a staunch supporter of agribusiness and large landowners (Masterson, 1991).

Table 1—: Indigenous structure of political parties

	Independent	Traditional	Diff.	p-value	Obs.
Indigenous candidates (1963)	49.796	50.035	-0.239	0.837	13,613
Indigenous candidates (1966)	52.202	49.919	2.283**	0.011	17,540
Indigenous candidates (1963-1966)	51.347	49.972	1.375*	0.053	31,153

Notes: Indigenous candidates were identified based on their surnames, using dictionaries of indigenous languages as referenced by Artiles (2023).

had a peasant origin. An analysis of the names of independent political parties shows that most of them included the word "peasant" (see Figure A1). This phenomenon is unprecedented, as peasant-origin parties had not previously participated in elections. Additionally, it is not only related to the party's names; the ethnic composition of the parties also differs. As shown in Table 1, independent parties feature a higher percentage of candidates with indigenous roots compared to traditional ones.

A discrepancy in ethnic representation may exist between voters and political leaders. Notably, districts with higher percentages of individuals who speak an indigenous mother tongue, such as Quechua or Aymara, tend to elect fewer officials with Indigenous roots as mayors or councilors. Figure 2 classifies districts by low, medium, and high proportions of indigenous language speakers, highlighting this disparity. In districts with a higher prevalence of indigenous language speakers (between 90-100% of total population), only 42.8% and 46.5% of officials had an indigenous root in the 1963 and 1966 elections, respectively. As discussed previously, this misalignment between the ethnic composition of voters and elected officials could significantly impact the provision of public goods, voter turnout, and conflict dynamics.

B.   The components of the Land Reform

Since 1960, prior to Velasco's major land reform, the Peruvian Agrarian Research and Promotion Service (SIPA) promoted agricultural development through technological innovations. To this end, SIPA established thirteenth agrarian zones[2] across the country, each characterized by similar ecological, social, infrastructure, and market access attributes, which served as sites for agricultural research and experimentation (INIA, 2018, p. 61). These agricultural areas, initially intended for

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[2]Originally, only twelve agrarian zones were created. In 1974, a thirteenth agrarian zone was established. This is crucial for my identification strategy, as I will utilize only the invariant agrarian zones for the analysis.

Figure 2 : Indigenous representation by proportions of indigenous language speakers
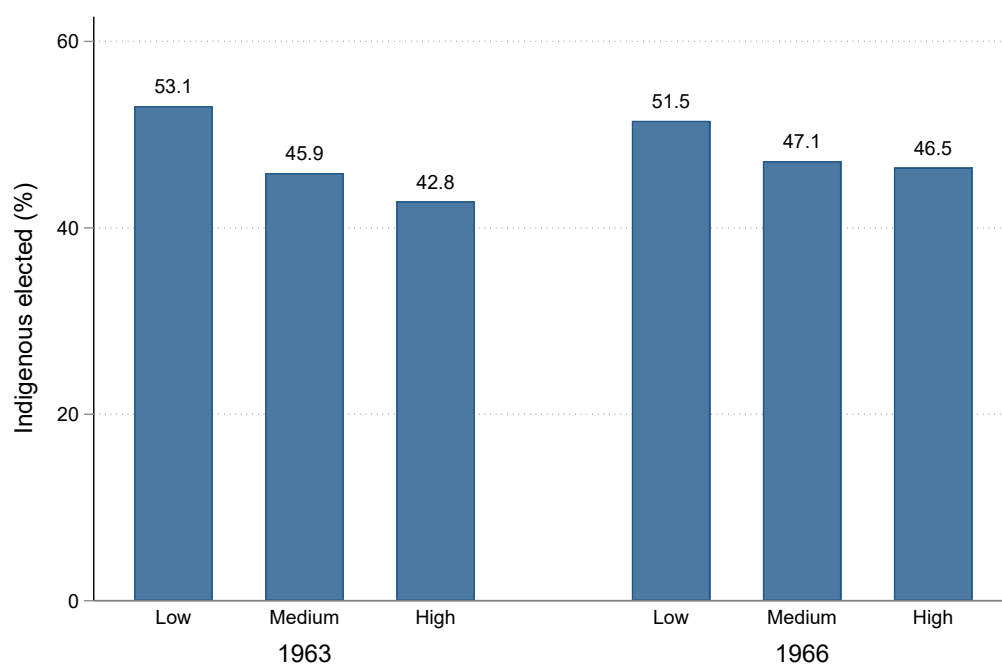

research and technology, were the basis for nationwide land reform.

The agrarian zones functioned as administrative and operational hubs for implementing land reform. Unlike other land reforms in Latin America, the Peruvian government effectively minimized the potential for violent resistance by establishing administrative hubs beforehand and prioritizing the expropriation of large landowners. Furthermore, the establishment of a limited number of agrarian zones facilitated more centralized management (Albertus, 2020). In summary, these agrarian zones became fundamental components for the expropriation and redistribution of the land reform.

In the 1960s, there was very little precision about Peru's rural areas and topography (Albertus and Popescu, 2020). The agrarian zones were delineated prior to the First Agrarian Census of 1961, resulting in their implementation without comprehensive knowledge of the regions. Consequently, for practical reasons rather than as a precise aspect of the agrarian reform, the central offices of these agrarian zones were located in the most well-known, explored, and developed cities within each zone. Figure 3 illustrates the administrative division of the thirteen agrarian zones created, along with the locations of their respective offices. The boundaries of these agrarian zones do not

align with departmental borders; in some instances, a single agrarian zone encompasses multiple departments.

Figure 3 : Departments and Agrarian Zones
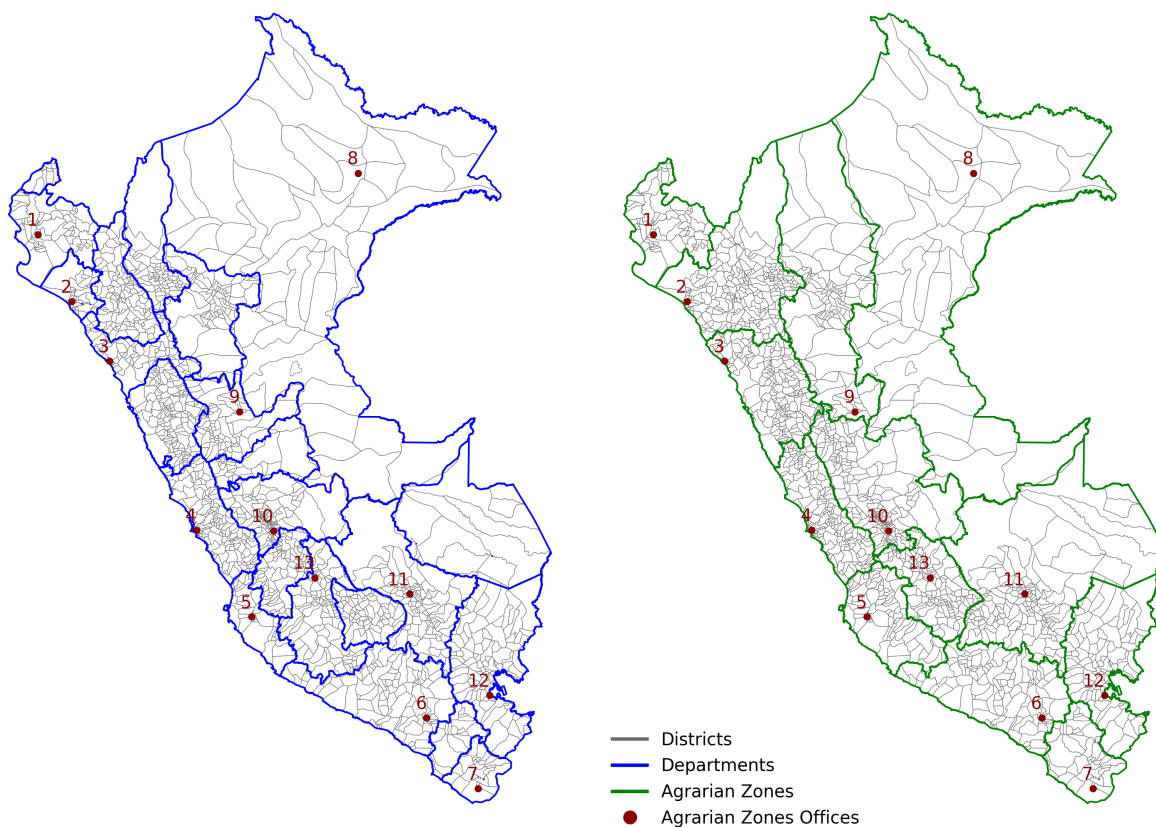
In some cases, the agrarian central offices were established in the departmental capitals, that is, in the most important cities of the largest administrative unit. This centralization in the agrarian zones led to a geographically unequal implementation of the land reform. In those years, physical distance was relevant for government presence and dissemination of policies. The districts farther away from the central office were less exposed to land redistribution. In consequence, as shown in Figure 4, there is a negative correlation between the distance to the central office and the percentage

of land expropriated for both total and private areas. This pattern suggests that proximity to the Agrarian Office was a significant factor, highlighting the challenges faced by more remote regions in accessing the benefits of land reform.

Figure 4 : Land redistribution and distance to central agrarian offices
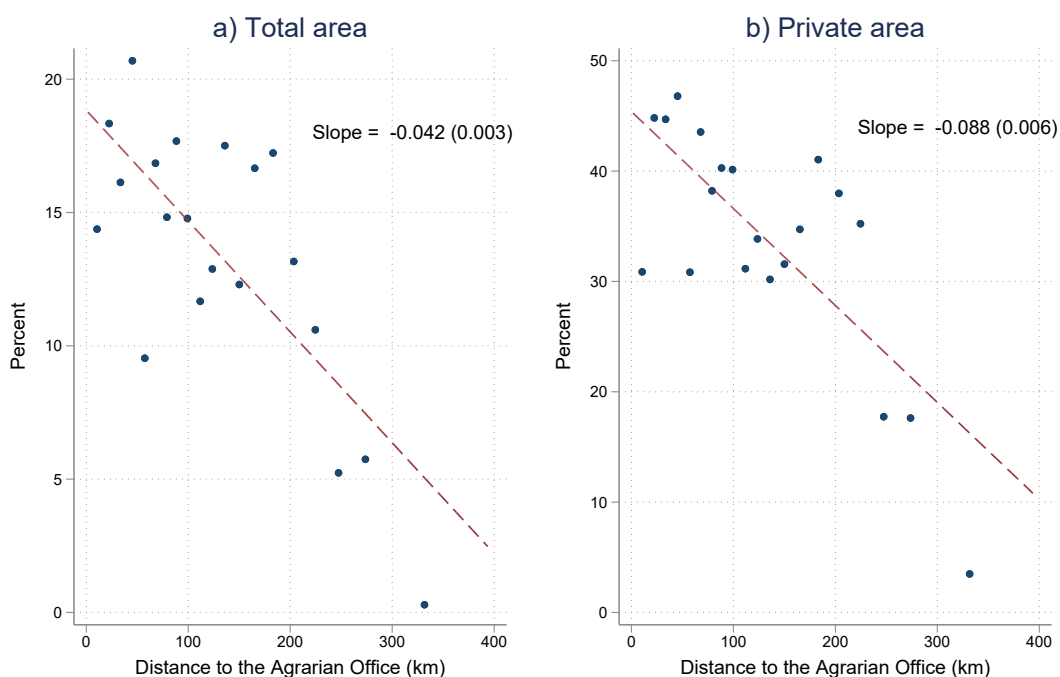
The government uses an associative model for land adjudication, whereby groups of peasants form cooperatives. Nearly two-thirds of the expropriated land was awarded to cooperatives, which served as a means to engage the farming population more directly (Alvarez and Caballero, 1980). Members of these cooperatives participated in officer elections, open assemblies, vigilance, and administrative tasks (Cant, 2018). This structure often provided marginalized populations their first opportunity for political participation, thus playing a crucial role in involving peasants in political life, democracy, and economic decisions.

The agrarian reform was not merely an economic policy; it was also imbued with ideological and nationalist undertones. The government framed the reform as a means of promoting social justice, national unity, and sovereignty. Additionally, the land reform was accompanied by a movement of retribution towards the indigenous population, which was materialized in political propaganda

disseminated at the national level (see Figure A2). Political propaganda was not an isolated event but also a well-planned element. Through political speeches and strong rhetoric, the government sought to gain greater support from certain social groups, mainly in the rural sector (Puente, 2019; Hurtado, 2017).

The land distribution initially empowered peasants economically and politically by granting them assets and decision-making opportunities within the reform's framework. The central government's pro-indigenist rhetoric further encouraged peasant participation in local decisions. The reform definitely reshaped the country's political dynamics, with newly empowered peasant and indigenous communities asserting their rights and demanding greater representation.

III. Data

I am interested in measure the effect of the Peruvian land reform on participation of ethnic marginalized groups in local politics. For this, I will use many sources of information between 1960-1986, so I expect to see a short run effect. The unit of analysis is the district, the more disaggregated administrative unit.

A. Land reform variables

For the analysis of land reform, I utilized data compiled by Albertus (2020), who examined all supreme decrees, supreme resolutions, and ministerial resolutions that led to the expropriation of individual properties between 1969 and 1980. This comprehensive review accounted for approximately 21,000 expropriations. These documents contain information on district locations and the amount of expropriated land. In addition to the redistribution of private land, the government also redistributed land that was abandoned, long fallowed, or public. Additionally, utilizing maps created by the Ministry of Agriculture and digitized by Albertus (2020), I am able to calculate distances from each district to other points. For my empirical strategy, which I will explain later, I calculated two relevant distances: (i) from each district to the corresponding Agrarian office and (ii) from each district to the Agrarian Zone centroid.

B. Electoral variables

I gathered data from four municipal elections in Peru: two pre-reform (1963, 1966) and two post-land reform (1980, 1983). This information, sourced from INFOGOB, a Peruvian Governance

Observatory, was web-scraped to create a comprehensive dataset containing district locations, candidate names, political parties, vote counts, and election outcomes. A challenge was standardizing district names due to changes in territorial distribution. For example, in 1966 a district belonged to a department, but in 1980 the same district belongs to another administrative division. It is possible to find cases of creation of new districts during the period of analysis. To solve this problem, I standardized all districts to the district denomination of the 2017 National Census and obtained unique district codes, enabling linkage to other databases for further analysis.

C. Ethnicity variables

As I collected information on local elections at the candidate level, I sought to retrieve some measures of ethnicity. Ethnicity, lacking a single definition, is characterized by the multiple traits with which it is associated. An ethnic group can be determined by geography, history, language, skin color, and customs (Figueroa and Barrón, 2005; Paredes, 2007). Given the data constraints, I will employ two definitions of ethnicity.

My initial approach entails a historical analysis of ethnicity. Surnames are viewed as cultural inheritances transmitted across generations. In Peru, as a result of colonial evangelization, surnames are regarded as ethnic names, indicative of communal ties and a shared racial, linguistic, and religious heritage (Carpio and Guerrero, 2021). Leveraging dictionaries of indigenous languages such as Quechua and Aymara, Artiles (2023) developed an algorithm to ascertain the historical lineage of surnames. This classification method allows me to determine whether a candidate's surname has indigenous origins. Specifically, I classify a surname as indigenous if it traces its roots to Quechua, Aymara, Amazonic, or Tallanes origins.

The second approach to defining ethnicity focuses on an observable characteristic: skin color. Various methods exist in the literature, with one commonly used approach involving interviewers rating individuals on a scale from black to white. This method's efficacy in ethnic classification is influenced by the interviewer's ability to discern ethnic backgrounds and may even be impacted by the interviewer's own ethnicity (Hill, 2002). To achieve a more objective measurement of skin color, I employ a image-based algorithm that utilizes face detection and skin segmentation techniques developed by Rejón Piña and Ma (2023). This novel algorithm has been previously applied in a similar context, showing ethnic inequalities in the Mexican legislature (Rejón Piña, 2024). As far as I am concerned, this could be the first work that uses machine learning techniques to measure

ethnic diversity in a political context in Peru.

Figure 5 : Distribution of candidates by skin color (1980-1983)
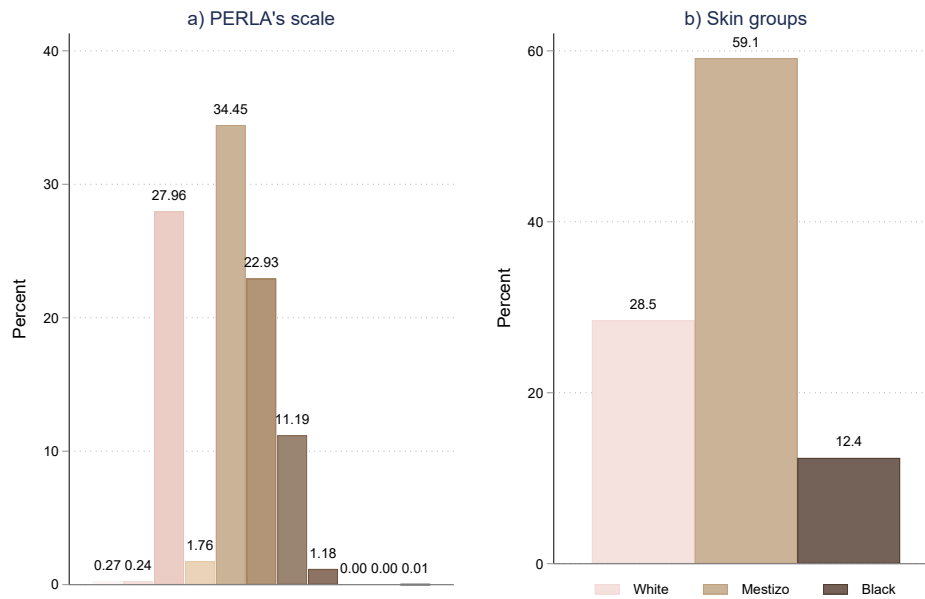
Notes: Based on Campos-Vazquez and Medina-Cortina (2019), three groups were created: White (PERLA 1-3), Mestizo (PERLA 4-6) and Black (PERLA 7-11).

The machine learning algorithm I employ analyzes photographs (see Figure A3) and categorizes each into one of the eleven skin color tonalities defined by the Project on Ethnicity and Race in Latin America (PERLA)[3]. In total, I analyzed 9,139 photos for elections of 1980 and 1983, covering 24% of candidates. The average accuracy of the skin-detection algorithm was 89.2, with a minimum and maximum value of 71 and 98, respectively.

As depicted in Panel A of Figure 5, the algorithm's precision in identifying distinct skin tones needs to be improved, likely due to the constrained quality of the photographs. For analytical clarity, I follow the previous work of Campos-Vazquez and Medina-Cortina (2019), who also uses PERLA's skin colors, and I re-categorized individuals into three ethnic groups: white, black, and mestizo. Panel B of Figure 5 illustrates the distribution of these ethnic groups, revealing a predominant proportion of mestizo candidates, followed by white candidates, with a notably lower percentage of black candidates.

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[3]PERLA is based on Princeton University since 2008 has reshaped the understanding of ethnic issues and inequalities in Latin America with its innovative approach to ethnicity and race classification (Telles et al., 2013). More information here.

<center>*D.   Control variables*</center>

I also included a rich set of control variables. For demographics-related variables, I included the population size of the district and the illiteracy rate at the district level. Due to the particular geography of Peru and its possible relation in national political implementation, I included the elevation of the district and the average slope of the terrain, which data is provided by the Food and Agriculture Organization's Global Agro-Ecological Zones database. I also includes land characteristics, such as land area from the Peruvian National Institute of Statistics, the percentage of land that is cultivable calculated from the Global Agro-Ecological Zones database, and the number of hectares of land under private ownership from the 1972 Agricultural Census. The capacity of the state is important for successful political implementation, so I included the number of state employees per district calculated from the 1961 census. In addition, I included the road density, which measures the number of meters of roads per square kilometer. This road density data was calculated by the National Touring and Automobile Club and the Banco de Crédito del Peru using a 1973 Peruvian map of road networks. Finally, such as political marginalization could be impulsed by historical background and previous movements, I included a dummy variable to indicate if the district is located in a *mita* zone, the forced mining labor regimen during colonial-era collected by (Dell, 2010), and a variable to measure rural social movements from the 1920s to the 1960s collected by Kammann et al. (1982). The Table 2 shows an overview of the variables used in the analysis.

<center>**IV.   Empirical strategy**</center>

My analysis sits on the fact that distance to the agrarian offices is relevant. I would like to see if the land reform exposure, measured in terms of the distance from each district to the agrarian offices, affects political-ethnic outcomes. Districts that have seen less exposure to land reform tend to have lower participation and representation of people with indigenous roots in local elections (see Figure A5). However, we need to consider this relation is endogenous. As mentioned earlier, the location of agrarian offices was an institutional and strategic decision. Therefore, the distance to the agrarian office could be correlated with omitted variables that are also linked to the political and ethnic outcomes. For example, areas surrounding agrarian offices might have a higher accumulation of human capital, which could lead to increased participation of people in local politics. On the other hand, peripheral districts may be associated with lower income levels, potentially resulting in less political participation due to limited resources and time availability.

Table 2—: Summary statistics

	Mean	SD	Min	Max	N
Demographics and geography					
Population (ths.)	5.67	12.93	0	231	1424
Illiteracy (%, 1972)	0.36	0.19	0	5	1424
Elevation (thds. of meters)	2.71	1.43	0	5	1424
Slope (degrees)	5.77	3.70	0	20	1424
State capacity					
Road density (1973)	33.47	67.64	0	993	1424
State personnel	2.44	1.24	0	7	1424
Land characteristics					
Land area (hds. sq. km.)	7.37	26.07	0	517	1424
Cultivable land (% area)	6.99	9.10	0	82	1424
Private land area (ths. ha.)	11.72	74.21	0	2680	1424
Historical and social background					
Inside mita zone	0.34	0.47	0	1	1424
Previous social movements	0.13	0.67	0	8	1424
Electoral variables					
Number of candidates (1963)	10.65	5.71	1	80	1226
Number of indigenous candidates (1963)	7.65	4.13	0	50	1226
Number of candidates (1966)	11.86	8.05	5	131	1396
Number of indigenous candidates (1966)	8.58	5.66	0	89	1396
Number of candidates (1980)	10.32	7.83	1	80	1341
Number of indigenous candidates (1980)	7.59	5.72	0	54	1341
Number of candidates (1983)	16.29	8.44	4	100	1312
Number of indigenous candidates (1983)	12.03	6.39	0	59	1312

To address endogeneity, I will leverage an exogenous source of variation in the distance from each district to its respective agrarian office: the agrarian zone's geographical centroid. The centroid is a mechanical construct that depends solely on the agrarian zone's geographical shape. This provides an ideal setting to test my hypothesis, as it allows me to leverage the exogenous variation in the location of agrarian zone's centroids for identification, following the approach used by previous studies with similar concerns on endogeneity (Campante and Do, 2014; Rossitti, 2019; Loumeau, 2021).

As previously documented, the delineation of agrarian zones was undertaken without precise knowledge of topography or the spatial distribution of the population. Furthermore, these Agrarian Zones were not part of any department; they functioned as independent administrative units, often without contiguous borders. Notably, the boundaries of these zones were established prior to the First

Agrarian Census of 1961, highlighting the limited understanding of the land at that time. According to the report by INIA (2018), which features the original (and scanned) maps of the agrarian reform, these zones are depicted with somewhat oval borders that vary slightly between versions. Although intended to group districts with similar ecological characteristics, the territorial boundaries and shapes of these zones were arbitrarily drawn, with minimal consideration for logical divisions or territorial knowledge, ultimately determining the district centroid. In summary, considering the way in which the agricultural zones were delimited, it is plausible to assume that the centroid of the Agrarian Zone is exogenous.

To convert this exogenous variation into an instrumental variable, I computed the distance from each district to the Agrarian Zone's centroid. As illustrated in Figure 6, there is a positive correlation between these distances, which satisfies the relevance assumption for an instrumental variable approach. This process of creating an instrumental variable from exogenous variation is a key methodological step in the analysis, as it allows us to address the potential endogeneity.

An important concern regarding the plausibility of the instrument is that boundaries change the spatial distribution of the population and, therefore, affect other social and political variables. This was an important critique of Loumeau (2021) to the studies of Campante and Do (2014) and Rossitti (2019). In the context of the USA, where the state's borders have not changed in 100 years, borders play an important role, both demographically and institutional aspects. Although I cannot directly test the exclusion restriction, the specific historical context of the agrarian reform implementation in Peru suggests that the instrument is plausibly exogenous. The agrarian zone's delimitation has something special: it was created uniquely with agrarian research and then for the implementation of land reform. This means that agrarian zones had validity only for the land reform period of time (1969-1980). Currently, agrarian zones are absent in the national debate, and they are used less for the implementation of any kind of policy. Given the particular Peruvian Land Reform context, the distance from each district to the Agrarian Zone's centroid satisfies the exclusion restriction assumption: it is not correlated with the error term and the political-ethnic outcomes.

To enhance empirical identification, I constrain the sample to districts meeting two specific criteria: (i) the boundaries of the Agrarian Zones remain unchanged, and (ii) the Agrarian Zones does not align precisely with departmental boundaries. The first criterion excludes the original Agrarian Zone 10, which was divided into Zones 10 and 13, while the second criterion omits Zone 12, as it corresponds entirely with the department of Puno.

Therefore, the model specification is as follows:

$$(1) \qquad PolEthnic_{dry} = \alpha_r + \tau_y + Land\widehat{Reform}Iso_{dr}\delta + X'_{dry}\beta + \varepsilon_{dry}$$

where $PolEthnic_{dry}$ represents the political-ethnic outcomes in district d of Agrarian Zone r during election year y. The model includes fixed effects for the Agrarian Zone (α_r) and election year (τ_y). The vector X comprises district-level control variables, encompassing demographics (e.g., population, illiteracy rate), geography (e.g., elevation, slope), state capacity metrics (e.g., state personnel, road density), and historical/social factors (e.g., number of social movements, district's inclusion in a mita zone). $Land\widehat{Reform}Iso_{dr}$ serves as the instrumented variable measuring the distance from each district d to the central office of Agrarian Zone r, indicative of the district's degree of isolation from core land reform areas. δ is the coefficient of interest. If δ is negative, it indicates that being less exposed to land reform—i.e., being farther away from the Agrarian Zones' central offices—reduces the presence or electoral success of marginalized ethnic groups.

Figure 6 : Distance to agrarian office and distance to agrarian zone's centroid: relevance assumption
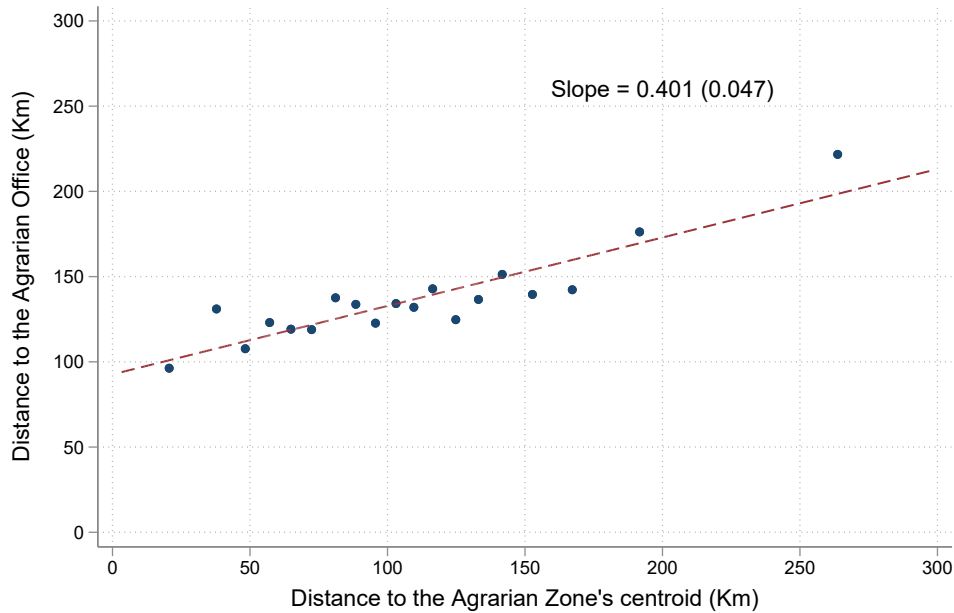
V.   Results

First, I establish the significance of proximity to agrarian offices in the redistribution of land. It is crucial to recognize that Peru's agrarian reform extended beyond land redistribution; it also encompassed indigenist propaganda, community support, and the promotion of nationalist sentiment. In this context, land redistribution represents a final outcome of exposure to what we define as the reform. Utilizing a 2SLS approach, I find that exposure to the reform significantly increased the percentage of land redistributed, affirming the validity of this measure of exposure (see Table A1). I now turn to examine the effects of reform exposure on ethno-political outcomes.

Table 3 shows the main findings. Panel A examines the relationship between the distance to the agrarian office and the identification of indigenous ethnic groups through surname analysis. The results indicate a significant negative relationship between the distance from the agrarian office and the proportion of candidates with indigenous surnames. Specifically, more isolated districts—those farther from the agrarian office—see fewer indigenous candidates running for political office. Although this negative relationship extends to the share of indigenous elected candidates and the likelihood of having an indigenous mayor, these latter associations are not statistically significant. Panel B explores an alternative measure of ethnicity using skin detection to classify mestizo individuals. While the negative relationship persists across all outcomes, none of these relationships reach statistical significance. These results provide some evidence that the agrarian reform in Peru may have increased the number of political actors with an indigenous background. Specifically, in areas most exposed to the reform—those closer to agrarian offices—there was an increase of 9 percentage points in the share of candidates with indigenous surnames. A similar pattern emerges with skin identification, where the coefficients are substantial in magnitude but not statistically significant.

HETEROGENEITY

The main results encompass nearly the entire national territory, excluding only agrarian zones omitted based on the two specified criteria. To explore potential heterogeneous effects, I examine district conditions based on language data from the 1961 Population Census, which distinguishes between individuals whose mother tongue is Spanish and those whose mother tongue is an indigenous language, such as Quechua, Aymara, or their variants. Of particular interest is the impact of the agrarian reform in districts with a higher proportion of native indigenous language speakers.

The first column of Table 4 displays a negative and significant coefficient, indicating that districts

Table 3—: IV Results (1980-1983)

Panel A: Indigenous by surname identification			
	Candidantes	Elected	Prob(elected as mayor)
Distance to Agrarian Office (log)	-0.089**	-0.086	-0.023
	(0.043)	(0.063)	(0.115)
Election FE	Yes	Yes	Yes
Agrarian Zone FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Mean of dependent variable	0.51	0.48	0.69
Observations	1,909	1,909	1,909
Method	2SLS	2SLS	2SLS
Panel B: Mestizo by skin detection			
	Candidantes	Elected	Prob(elected as mayor)
Distance to Agrarian Office (log)	-0.051	-0.086	-0.074
	(0.069)	(0.083)	(0.110)
Election FE	Yes	Yes	Yes
Agrarian Zone FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Mean of dependent variable	0.71	0.71	0.27
Observations	1,790	1,587	1,790
Method	2SLS	2SLS	2SLS

Notes: Robust standard errors are shown in parentheses. The unit of observation is the district. Distance to Agrarian Office is instrumented using the distance to Agrarian Zone's centroid, both in logs. Controls includes state personnel, population, road density, elevation, slope, district's surface, private and cultivable land (% of area), a dummy to indicate if district is inside a mita zone, and number of previous social movements.
* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

less exposed to the land reform experienced a 12 percentage point reduction in the proportion of indigenous candidates. This effect is larger, in absolute terms, compared to the analysis of all districts, suggesting that the agrarian reform had a greater impact in districts with a larger population of indigenous language speakers.

As mentioned earlier, I focus on areas where the main reform legislation was applied—specifically, locations where large landowner haciendas were effectively expropriated, embodying the core spirit of the agrarian reform with its indigenist propaganda. Therefore, I present the results excluding the eastern region (the Amazon jungle), where the agrarian reform primarily targeted the colonization of public lands (Albertus and Popescu, 2020), and the Lima region, due to its concentration of national political power. Excluding Lima helps to avoid confounding effects that could be attributed to factors other than the reform itself. The second column of Table 4 shows the significant effect of land reform on the share of indigenous candidates in these specific zones. Once again, the effect is larger in absolute terms compared to the analysis of the entire national territory.

Table 4—: IV Results: Heterogeneity (1980-1983)

	High Indigenous Language Prevalence	Excluding Amazon and Lima Regions
Distance to Agrarian Office (log)	-0.181**	-0.125**
	(0.084)	(0.060)
Election FE	Yes	Yes
Agrarian Zone FE	Yes	Yes
Controls	Yes	Yes
Mean of dependent variable	0.51	0.51
Observations	1,195	1,352
Method	2SLS	2SLS

Notes: Robust standard errors are shown in parentheses. The unit of observation is the district. Distance to Agrarian Office is instrumented using the distance to Agrarian Zone's centroid, both in logs. Controls includes state personnel, population, road density, elevation, slope, district's surface, private and cultivable land (% of area), a dummy to indicate if district is inside a mita zone, and number of previous social movements.
* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Mechanisms

I demonstrate that increased exposure to land reform correlates with a higher proportion of indigenous candidates, although this effect is significant only when using surname identification. Despite a negative coefficient for the percentage of indigenous candidates elected or the likelihood of their election as mayors, this relationship lacks statistical significance. Thus, we conclude that the most substantial impact of agrarian reform in post-reform elections lies in candidate nomination rather than the election of indigenous candidates: there is greater representation on the ballot, but not necessarily in positions of power.

Several mechanisms could explain these outcomes. Historically, land redistribution was implemented through a cooperative model. Agrarian cooperatives grouped peasants from the same geographic area and involved administrative activities, elections, and assemblies to decide land use, likely serving as their first experience with democratic processes (Cant, 2018). This political experience within the cooperatives could have encouraged peasants to engage in local politics and assume roles beyond land management. In other words, peasants might have started to believe in their potential political influence, leading to increased electoral participation. However, significant changes in election outcomes were not observed. Historical evidence suggests that cooperatives were often led by economically better-off peasants—a "peasant middle class" (Albertus, 2015). While ethnic affinity might play a role, voters also consider other candidate characteristics.

Testing these mechanisms is challenging. Ideally, information on candidates' political beliefs and

cooperative activities would be available. Given current data limitations, I analyze political beliefs through political party names, assuming that party names are indicative of the group's interests. I categorize political parties into two groups: those with peasant origins and those with worker origins, aiming to determine if the presence of such parties in a district can explain the relationship between agrarian reform and the increased number of indigenous candidates.

Table 5 shows that a 1% increase in distance from the Agrarian Office corresponds to a 4.8 percentage point decrease in the likelihood of a peasant political party participating in elections. This trend holds for worker-origin parties and when both party types are combined. The relationship between land reform and votes received by each party type is also noteworthy. As expected, less exposure to reform negatively impacts the votes for each party type, though this effect is not statistically significant. This aligns with our main findings, which show no significant results for elected indigenous candidates. If land reform influences the percentage of indigenous candidates on the ballot, a potential mechanism is the increased presence of peasant or worker parties.

VI. Robustness

A. Placebo test

To ensure that the observed effects on the share of indigenous candidates are only attributable to the land reform rather than other confounding factors, I conducted a placebo test using the same specification for periods when the land reform was not in effect, specifically the 1963 and 1966 district-level elections in Peru. As shown in Table 6, the coefficient for the share of indigenous candidates is not statistically significant in these periods, unlike the main results and the heterogeneity effects observed previously. This lack of significance during non-intervention periods reinforces our confidence that the observed effects are indeed attributable to the land reform.

B. An spatial regression discontinuity design

The political-ethnic effects of land reform can be further examined using an alternative methodology. Given the geographic nature of land reform implementation and the importance of proximity to operational areas, a spatial regression discontinuity design (RDD) could be employed. This approach has been utilized in a similar context by Caprettini et al. (2021); however, the Peruvian case warrants special consideration due to the imperfectly defined treatment boundaries. Albertus (2020), in applying this methodology to Peru, defines treated districts based on their location within an

Table 5—: Potential mechanisms

Panel A: Peasant-Based Parties		
	Presence	Votes
Distance to Agrarian Office (log)	-0.048*	-465.094
	(0.029)	(432.524)
Election FE	Yes	Yes
Agrarian Zone FE	Yes	Yes
Controls	Yes	Yes
Observations	1,909	1,909
Method	2SLS	2SLS
Panel B: Worker-Based Parties		
	Presence	Votes
Distance to Agrarian Office (log)	-0.087**	-87.658
	(0.034)	(57.009)
Election FE	Yes	Yes
Agrarian Zone FE	Yes	Yes
Controls	Yes	Yes
Observations	1,909	1,909
Method	2SLS	2SLS
Panel C: Peasant or worker party		
	Presence	Votes
Distance to Agrarian Office (log)	-0.102**	-535.939
	(0.040)	(438.231)
Election FE	Yes	Yes
Agrarian Zone FE	Yes	Yes
Controls	Yes	Yes
Observations	1,909	1,909
Method	2SLS	2SLS

Notes: Robust standard errors are shown in parentheses. The unit of observation is the district. Distance to Agrarian Office is instrumented using the distance to Agrarian Zone's centroid, both in logs. Controls includes state personnel, population, road density, elevation, slope, district's surface, private and cultivable land (% of area), a dummy to indicate if district is inside a mita zone, and number of previous social movements.
* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

agrarian zone and the department to which they belong. Notably, the borders of agrarian zones do not align with departmental borders, and multiple departments can exist within a single agrarian zone. For instance, Agrarian Zone 3 encompasses the departments of La Libertad and Ancash, with the agrarian office situated in a city of La Libertad. This scenario allows for the identification of districts within the department that houses the central office of the agrarian zone, referred to as treated districts. This distinction is crucial for accurately assessing the impact of the policy across different regions, considering the varying levels of exposure to the policy intervention.

This treatment definition was employed in prior studies of land reform in Peru (Albertus, 2020;

Table 6—: Placebo test (1963-1966)

	Candidantes	Elected	Prob(elected as mayor)
Distance to Agrarian Office (log)	-0.068	-0.035	-0.083
	(0.046)	(0.054)	(0.118)
Election FE	Yes	Yes	Yes
Agrarian Zone FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	1,853	1,853	1,853
Method	2SLS	2SLS	2SLS

Notes: Robust standard errors are shown in parentheses. The unit of observation is the district. Distance to Agrarian Office is instrumented using the distance to Agrarian Zone's centroid, both in logs. Controls includes state personnel, population, road density, elevation, slope, district's surface, private and cultivable land (% of area), a dummy to indicate if district is inside a mita zone, and number of previous social movements.
* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Albertus and Popescu, 2020). The central assumption of this analysis is that the treatment definition is relevant to the outcomes of the land reform. However, upon examination, it becomes evident that this assumption does not hold at the national level. On average, the percentage of land distributed is similar between treated and control districts, suggesting that this treatment definition does not uniformly apply across the entire country. Nevertheless, the treatment definition appears to be more pertinent in specific agrarian zones, such as zones 2, 3, and 11 (for details, see Table A2). Consequently, the spatial RDD analysis will focus on these zones, where the treatment classification is more relevant for evaluating the reform's impact. This targeted approach will provide a more precise assessment of the reform's effects in regions where the treatment distinction is meaningful.

Figure 7 shows the treated districts for each agrarian zone. In the spatial RDD framework, the running variable will be the distance of a district from the border separating treated and control districts within the agrarian zone. Districts classified as control will have negative scores, while treated districts will have positive scores, with the cutoff set at zero. This RDD specification will enable us to estimate the local impact of land reform on indigenous political participation.

Formally, the model is specified as follows:

$$(2) \qquad PolEthnic_{drt} = \alpha + \tau D_{drt} + f(X_{drt}) + \beta Z_{drt} + \epsilon_{drt}$$

where $PolEthnic_{drt}$ is the selected political-ethnic outcome in the district d of the Agrarian Zone r during the period t; D_{drt} is the treatment indicator based on Albertus' definition, which equals 1 if

Figure 7 : Treated areas using the definition of Albertus (2020)

a) Agrozone 2

b) Agrozone 3

▬ Treatment zones
● Agrarian Zones Offices

c) Agrozone 11
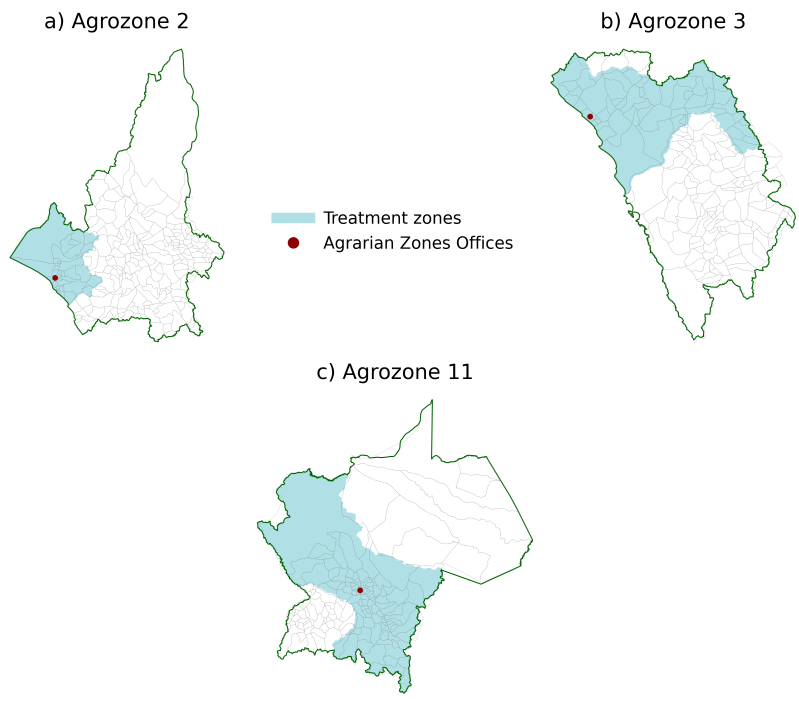
the running variable (X_{drt}) is above the cutoff and 0 otherwise; $f(X_{drt})$ is a function of the running variable, which can be linear or polynomial; and Z_{drt} is the vector of covariates used in all previous estimations. The key identification assumption is the presence of parallel trends at the border. I show evidence that districts near the border are balanced in almost observable characteristics (see Table A3).

If the results align with the IV framework, an increase in the share of indigenous candidates in the treated districts would be expected. Table 7 presents findings that are consistent with this expectation. Treated districts increase in 3.8pp the share of indigenous candidates and 6.6pp in the share of mestizos, however, this result is not statistically significant. While both specifications indicate trends in the same direction, the spatial RDD specification suggest no significant effects.

Table 7—: Spatial RDD (1980-1983)

	Indigenous	Mestizo
Treatment	0.038	0.066
	(0.042)	(0.078)
Controls	Yes	Yes
Mean of dependent variable	0.47	0.70
Observations	473	465
Method	Spatial RDD	Spatial RDD

Notes: Controls includes state personnel, population, road density, elevation, slope, district's surface, private and cultivable land (% of area), a dummy to indicate if district is inside a mita zone, and number of previous social movements.
* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

VII.   Conclusions

This paper examines the impact of the Land Reform in Peru on the political representation of marginalized ethnic groups in local elections. Using a unique dataset of local election participants from 1963 to 1983 and employing innovative methodologies to identify ethnic backgrounds, this paper provides new insights into the effects of land redistribution on political-ethnic outcomes.

The results reveal that proximity to Agrarian Offices, used as a measure of exposure to land reform, significantly increased the representation of candidates with indigenous surnames. Districts closer to these offices saw an 9 percentage point increase in the share of candidates with indigenous surnames, with a larger effect in districts with a higher proportion of indigenous language speakers. However, I found no evidence that land reform has a role over the electoral success of indigenous candidates: marginalized ethnic groups are present in the ballot, but not in the exercise of power.

The mechanisms that explain these results merit further investigation in the future. Historical evidence suggests that cooperatives played an important role in the beginning of democratic and political life for many peasants. While we do not have information on the activities of cooperatives, we do a similar exercise where we assume that political parties are also a space for political life and that party names reflect the political beliefs of their members. I find that districts more exposed to agrarian reform increase the probability that a party with peasant or worker origins will run in elections.

In conclusion, the 1969 Land Reform in Peru played a significant role in enhancing the political representation of marginalized ethnic groups, particularly in areas with higher exposure to the reform. These findings contribute to the broader literature on the political economy of land reforms and their implications for democratic governance.

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Supplementary Appendix

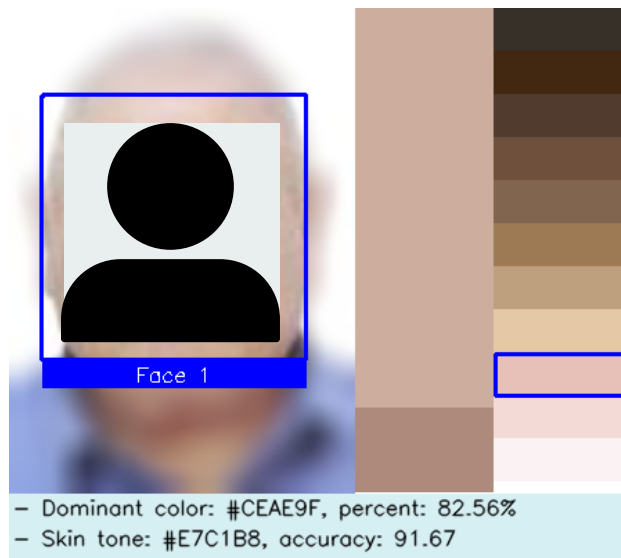Figure A1 : Names of independent political parties (1963-1966)

Notes: The most prominent words in the names of independent political parties include 'peasant,' 'workers,' 'popular,' and 'people.'

Figure A2 : Political propaganda of land reform

Figure A3 : Classification Algorithm for Skin Color (CASCo): an example

Notes: This algorithm identifies the dominant skin color and using clusters groups them into one of the 11 categories of the PERLA's color palette. For more technical details about the code, please visit the Github repository .

Figure A4 : PERLA's color palette and skin groups based on Campos-Vazquez and Medina-Cortina (2019)
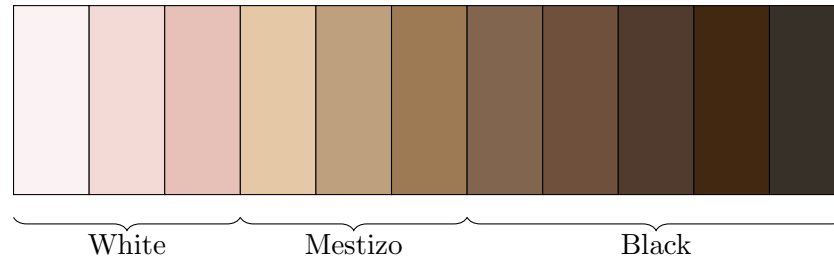

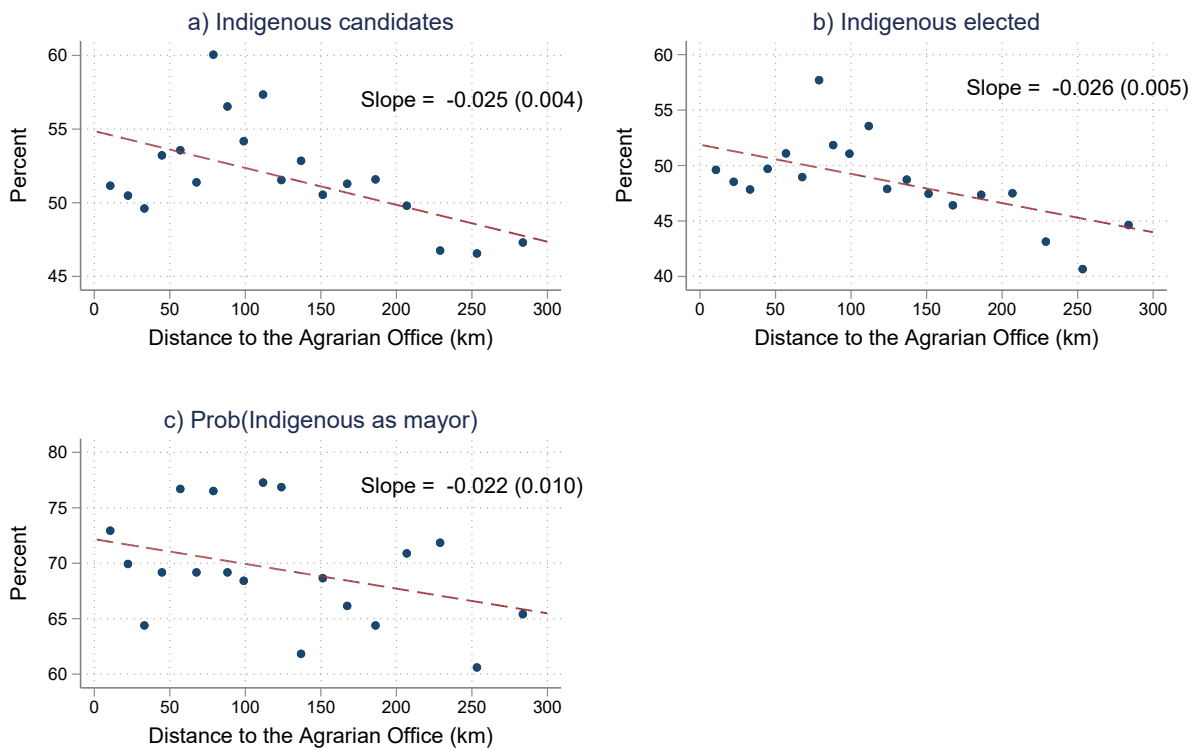Figure A5 : Relation between distance to agrarian office and political-ethnic outcomes

Table A1—: Effect of reform exposure on private land redistributed (1980-1983)

	OLS	2SLS
Distance to Agrarian Office (log)	-0.064***	-0.121*
	(0.009)	(0.064)
First Stage		
Distance to Agro Zone centroid (log)		0.189***
Robust S.E.		0.027
F statistic in first stage		50.997
Observations	2,653	2,653
Mean of dependent variable	0.339	0.339

Notes: Robust standard errors are shown in parentheses. The unit of observation is the district. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table A2—: Percentage of land redistributed according to group, by Agrarian Zone

	Control	Treated	Diff.	p-value	Obs.
National level	0.130	0.134	-0.004	0.555	5,275
Zone 1	0.269	0.253	0.016	0.788	218
Zone 2	0.134	0.233	-0.099***	0.001	723
Zone 3	0.228	0.348	-0.121***	0.000	608
Zone 4	0.036	0.059	-0.024	0.124	640
Zone 5	0.069	0.064	0.005	0.819	275
Zone 6	0.010	0.032	-0.023	0.120	405
Zone 7	0.022	0.032	-0.011	0.392	127
Zone 8	0.000	0.006	-0.006	0.586	95
Zone 9	0.000	0.003	-0.002	0.131	311
Zone 10	0.102	0.064	0.038***	0.005	732
Zone 11	0.072	0.287	-0.215***	0.000	454
Zone 12	0.000	0.345	-0.345*	0.074	300
Zone 13	0.167	0.100	0.066***	0.004	387

Notes: If Albertus's definition were appropriate at the national level, a higher percentage of land redistributed would be expected in the zones targeted by the agrarian reform, this means, the treated zones. However, this expectation holds true only for specific agrarian zones, such as zones 2, 3, 11 and 12. It should be noted that agricultural zone 12 coincides exactly with the department of Puno, so there are no control districts for this zone, which is why we did not include it in the analysis.
* Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table A3—: Balance across treatment boundaries, pre-reform

	RD Effect	Robust p-val	Control obs.	Treated obs.
State personnel	-.145	.806	100	87
Population (ths.)	1.28	.449	65	58
Road density (1973)	-24.709	.094*	54	52
altitude	654.196	.128	57	53
Slope (degrees)	-1.54	.146	110	95
Cultivable land (% area)	-3.16	.316	54	51
Surface	-27.919	.424	52	48
Private land area (ths. ha.)	1.541	.548	69	65
Illiteracy (%, 1961)	.196	.014**	63	58
Mother tongue is Spanish (1961)	.198	.205	90	72
Number of candidates	-2.042	.497	68	62
Share of indigenous candidates	.072	.152	112	95

Notes: * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.