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## **Can a Populist Political Party Bear the Risk of Granting Complete Property Rights?**

Electoral outcomes of Mexico's second land  
reform

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### **Abstract**

The Mexican land reform, one of the most sweeping in the world, proceeded in two steps: it granted peasants highly incomplete property rights on more than half of the Mexican territory starting in 1914, creating strong economic and political dependence for beneficiaries on the ruling political party; and complete property rights starting in 1992, allowing beneficiaries to relate directly to the market. We analyse the impact on political behaviour of switching from incomplete to complete property rights. We use for this the 13-year nationwide rollout of the certification programme and match land reform communities (*ejidos*) before and after titling with electoral outcomes in corresponding sections across seven electoral episodes. We find that, in accordance with the investor class theory, granting complete property rights induced a conservative ...

Keywords: land reform, property rights, voting, Mexico

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shift toward the challenger pro-market party. This shift was strongest where vested interests created larger benefits from market-oriented policies as opposed to public transfer policies. We also find that beneficiaries of the one-time irreversible transfer of a land title failed to reciprocate through votes for the benefactor party, the long time ruling party. The outcome shows that it is difficult for an authoritarian populist party to engage in a land reform that grants complete property rights, suggesting why so many land reforms are either not implemented due to political risk or remain at the ineffective level of incomplete property rights.

Figures and tables appear at the end of the paper.

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## **1 The politics of asset ownership**

This paper explores the generic question of the impact on voting behaviour of granting complete property rights over productive assets. By complete property rights, we mean rights that give the owner not only the freedom to access, extract, manage, and exclude others, but also to transfer or alienate (Ostrom 1990). Here, incomplete property rights are usufruct of land owned by the state or the community, and common property resources. Complete property rights are individual certification or titling (where the first has rights to sell requiring community approval while the second has the unrestricted right to sell), and tradable shares over common property resources. Expected impacts over voting behaviour of shifting from incomplete to complete property rights can come from two sources. One is the creation of vested interests through asset ownership that will induce beneficiaries to vote for political parties that support policies beneficial to their newly acquired economic interests. The other is that the benefactor party may expect reciprocity in being rewarded by votes for the stream of future benefits to be derived by beneficiaries from the assets received. The balance between these two effects will determine whether an incumbent political party can expect to gain or be doomed by the property rights reform.

Because complete property rights are the cornerstone of efficient markets, Coasian contracts to internalize externalities, and incomes earned, the issue of property rights reforms is of utmost importance, as recognized by the Chicago Property Rights School (Demsetz 1967; see also Platteau 2000). In development, De Soto (2000) emphasized the role of property rights over assets in helping the poor make more efficient use of the assets they control. A large literature on land reform has shown the importance of property rights that offer security of access to land in providing incentives to invest in agriculture (Deininger et al. 2004). However, many property rights reforms are not being implemented in spite of evident expected efficiency gains. This is a major puzzle in the field of land reform. Much of the literature on land reform has identified adverse political fallouts as a major reason why these reforms are not being implemented. Implementing land reforms has thus been typically associated with authoritarian governments that do not have to bear the electoral fallout of their actions (Albertus 2010), a regularity largely confirmed by the long history of land reform (Montgomery 1984). Yet, this regularity has not been submitted to rigorous hypothesis testing. Rarely do we have the possibility of rigorously identifying a causal relationship between property rights and electoral behaviour. This is an opportunity offered by using as a natural experiment the 1992 Mexican land reform that gave complete property rights to some 3.5 million rural households.

The property rights reform was rolled out over a period of 14 years between 1993 and 2006, following a pattern that does not bias the observed electoral responses to the newly acquired land certificates. This natural experiment gives us a strong identification strategy that we can use to measure the changes in electoral behaviour induced by the change in property rights. In this land reform, the vast majority of beneficiaries already had access to land under incomplete property rights before the reform, and titling was almost purely a change in property rights as opposed to a process of access to land under new property rights. To do the empirical analysis, we use the extensive administrative data from the titling programme (Procede, Programa de Certificación de Derechos Ejidales y Titulación de Solares Urbanos) and the National Land Registry,

matched with electoral outcomes over seven successive elections for federal deputies held every three years before, during, and after the titling process.

The specific questions we address (with generic value in understanding the way asset ownership affects political behaviour) are the following three:

- (1) Does land ownership create vested interests that inevitably draw beneficiaries to vote for pro-market right-wing political parties, in correspondence with the ‘investor class theory’?
- (2) Is the strength of the right-wing shift affected by the extent of expected benefits from pro-market policies, in accordance with the theory of vested interests?
- (3) Can the incumbent party that implements the reform expect voter gratitude through electoral support for the one-time transfer of a complete property right over land, in accordance with the theory of distributive politics?

Our results show that granting certificates of land ownership occurred at considerable political cost for the ruling populist party, with beneficiaries not reciprocating with votes for the assets received and swinging to the right in support of the pro-market political party. The carefully crafted political equilibrium that had kept the ruling party in power for sixty years (Diaz-Callejos et al. 2003), based in part on incomplete property rights for the large peasant population that was dependent on state support to link to the market and delivered votes in reciprocity, came to an end with implementation of a complete reform. An ‘incomplete’ land reform, the most prevalent form in Latin America, is thus a way to create dependency on the party in power and mobilize votes. A ‘complete’ land reform, where property rights allow direct access to the market, is only politically viable for a pro-market party, that will gather votes from beneficiaries proportionately to their newly acquired vested interests, i.e., from those with more to gain from pro-market policies to give value to the land. We draw from this the generic lesson that it is difficult for an incumbent party that is not to the right to benefit politically from a complete property rights reform, a conclusion consistent with the ‘investor class theory’ (Richardson 2010). This result has ominous implications for a very large number of political regimes that may be tempted to engage in property rights reforms in search of efficiency gains but fear the political fallout of the reform. It thus explains the well recognized gap between economic logic and lagging reality in implementing land reforms throughout the world.

## **2 History of land reform in Mexico**

Like most land reforms, the Mexican land reform initially granted access to land to beneficiaries under highly incomplete property rights. In a second phase, it transformed incomplete into complete property rights, allowing analysis on the political response to shifting from incomplete to complete property rights.

### **2.1 The first land reform (1914)**

Today’s Mexican agrarian society has been constructed over a turbulent and often violent series of events. Under the colonial regime, land had been appropriated from the original indigenous communities by an elite landlord class that concentrated the land in large haciendas making use of a labor force living on minuscule land plots insufficient

to guarantee the livelihood of households. While agriculture was booming at the turn of the twentieth century under the Porfiriato regime, extreme conditions of poverty and inequality fueled the revolution of 1910-20 that was, symptomatically, led by peasant leaders. The settlement between revolutionary peasants and the victorious conservative state was Mexico's land reform legislated in 1914 and initiated under President Lazaro Cardenas in 1934.

This first land reform was to be one of the largest in the world (Lamartine Yates 1981). Under this reform, the landed elite was expropriated, allowing the ruling party to consolidate its power that extended for nearly 60 years. Land was allocated to some 32,000 *ejido* (agrarian) communities including 3.5 million families and covering more than half (52 per cent) of the Mexican territory, no less than 103 million hectares. Land allocations were of three types: (i) household residential plots for housing and a garden; (ii) individual household land parcels for farming held in usufruct (right to use); (iii) and extensive lands for grazing and forestry held as common property resources (CPR) by the *ejido* community. Property rights were thus notably incomplete. The model was one of state-led capitalism in economic affairs and tight control over votes by the ruling party, the PRI (Institutional Revolutionary Party), in political affairs. The state regulated behaviour (prohibiting land transactions, the hiring of labour, leaving the land idle for two years or more to migrate, and making more than one descendant inherit the *ejido* membership (*ejidatario*) title), mediated access to the market for individual farmers through parastatals (or the purchase of inputs, access to credit, compulsory crop insurance coverage, and sale of a marketed surplus), delivered large public investments (especially in irrigation and road infrastructure), and ran collective affairs in the *ejido* (running assemblies, supervising the election of representatives). The economic model was thus one of strong state tutelage (Gordillo et al. 1998) and 'state-managed cooperation' (de Janvry et al., 2000).

The political model was closely patterned on the economic model. As the state controlled economic affairs, it could also control political life. *Ejidatarios* were members of corporatist organizations (the National Confederation of Peasants, CNC) controlled by the ruling party that mediated the relation between farmers and the state. The *ejido*'s political bosses (*caciques*) strongly embedded with the leadership were expected to deliver the community's vote as a block in support of the ruling party.

These early stages of the land reform were thus constructed on a consistent model of populist state-led capitalism and political control. Incomplete property rights and extensive market failures for *ejidatario* households—in part due to incomplete property rights preventing independent access to credit and state discretion in granting continued access to land—placed the state in a key position for the survival of peasants, securing state dependence, and consolidating political control over the agrarian vote in support of the ruling party. Because the state invested massively in irrigation (National Water Commission), managed effective development banks for credit (Banco Ejidal) and parastatals for marketing (Conasupo), and provided effective guidance to *ejido* assemblies (through the Unsecretariat of Land Reform), political control was initially matched by strong economic growth.

## **2.2 The intervening period**

As the years passed by, the 1914 land reform model became increasingly perverted and ineffective for growth. As import substitution industrialization became the main economic priority, the state failed to maintain strong investments in the ejido sector in support of growth. Economic stagnation and poverty thus became the norm. While the instrument of state-led capitalism was maintained, restrictions on behaviour were increasingly circumvented with illegal land transactions, informal settlement on the land of more than one heir, and presence of large numbers of non-ejidatarios cultivating land in the ejido community. However, these survival strategies, typical of an irrepressible peasant economy, were insufficient to compensate for an increasingly inefficient economic model organized to create political dependence (Magaloni et al. 2008).

The political model was also maintained, with continued control of political representation by the ruling party and vote delivery by the ejido leadership. Rising poverty in the ejido sector became an additional instrument of political control, with ejidatarios not only relying on the state to overcome market failures, but also to benefit from increasingly necessary transfers and social assistance. As Magaloni et al. (2008: 4) explain, 'the PRI-controlled state designed land reform policies that trapped peasants in a system where their livelihood and survival depended on their continual support of the regime'. Divisions in the ruling party (that split into the old PRI and a new PRD in 1989) created more political competition, but competition was for votes at the level of the ejido community, not over individual votes within the community.

This intervening period was thus creating an increasingly inconsistent model in the land reform sector: strong state control in economic affairs leading to stagnation due to purposeful neglect in trapping a core clientele, and continued political control of the ejido vote by the leadership, in a context of rising political competition. Clearly, as Mexico was negotiating its entry into the OECD and a free trade agreement with the USA and Canada (NAFTA) for a 1994 deadline, it had to increase its capacity to sustain growth in agriculture to offer more competitive nominal wages in industry and attract foreign direct investment. Continued expansion of the land reform sector, with the associated land invasions and threats of expropriation of private property, was creating an un-necessary disincentive to investment in the private sector (un-necessary in the sense that, by then, very few new ejidos were being created). And continued political support required reducing extensive poverty in the ejido. This is what led President Salinas de Gortari to use his overwhelming PRI majority in the Mexican congress to amend the constitution in 1992, bringing to an end expansion of the land reform sector and introducing a change in property rights in the ejido and a second phase of land reform. This bold move to achieve efficiency gains in agriculture through the granting of complete property rights by a populist state-led political party was a major political gamble: would granting individual asset ownership to the peasantry induce reciprocity by beneficiaries through vote delivery and consolidation of the PRI's political power, or would full asset ownership induce a flight away from state-led political parties toward market-led competing political parties?

## **2.3 The second land reform (1992)**

The new model for the land reform sector sought to achieve both economic and political gains through the assignment of complete property rights. Property rights were to be

initially granted to ejidatarios as ‘certificates’ of land ownership, that could subsequently be transformed into full individual titles. Certificates gave full security of access to land: a clear demarcation of boundaries of the individual plot and a corporate share over the CPR resources. Certificates can be sold to other community members and to outsiders with community approval. They do not allow unrestricted sale to interests outside the community and can consequently not easily be mortgaged with commercial banks in accessing credit. For this, subsequent full titling would be needed. However, certificates gave full freedom to beneficiaries to directly relate to market opportunities and to decide accordingly on optimum land use. The most important aspects of the 1992 land reform were thus to:

1. End the 60-year long land redistribution programme—providing increased security of tenure to privately owned land.
2. Establish a national programme to provide ejidatarios with land certificates, the Procede programme (Programme for the Certification of Rights to Ejido Lands).
3. Give ejidatarios with certificates the right to rent, sell, or mortgage their plots to willing parties.
4. Provide a mechanism through which ejidatarios could vote to turn all or part of the ejido certificates into full private property (dominio pleno or full land titles), thereby allowing unrestricted sales to non-ejidatarios and mortgaging of the land.
5. Create a national rural land registry that could track subsequent changes in ownership (de Janvry et al. 1997).

The land certification programme, Procede, was rolled out nationally over the 1992-2006 period during which it titled 92 per cent of the ejidos and communities. A small programme was left in place in 2006 to measure and title the 2,500 ejidos that for one reason or another had not been certified by the official end of the programme. Procede permitted the incorporation of new members in the ejido with a majority vote in the assembly, with land plots either based on subdivision (that was previously forbidden under the one-heir rule) of plots formerly held in usufruct or taken from the CPR lands. The new constitution gave economic freedom to ejido members in deciding on how to use the certified land (including leaving it fallow), directly relating to the market for products and services, hiring others to work on their land, migrating, and renting their land. Cooperation over the management of CPR and the provision of local public goods was left to the initiative of the community, thus transforming state-led into community-led cooperation (de Janvry et al. 2000).

### **3 The certification process**

The Procede programme was organized as a multiagency effort tasked with establishing boundaries for the ejido as a whole and for individual land parcels, regularizing land tenure, and issuing certificates of property rights (World Bank 2001). It opened an office in every Mexican state, and worked with human resources from INEGI (Mexican Statistical and Geographical Agency), RAN (National Agrarian Land Registry), PA (Agrarian Attorney’s Office), and the SRA (Land Reform Secretariat within the Ministry of Agriculture). Procede’s objectives and reports were in terms of number of parcels and area titled.

The titling procedure consisted of a first visit to the ejido to gauge the community's interest in acquiring certification. If there was interest, an ejido assembly was summoned (*Asamblea de Información y Anuencia*) in which a vote was taken to allow the programme to measure the ejido and create a contour map with subdivisions. This assembly thus marks the official beginning of the certification process. Ejidatarios then cooperated with INEGI to measure individual plots and determine whom they belong to. INEGI's measurement effort produced a map of the ejido with the names of the usufructors of all individually tilled parcels, common lands, and residential housing plots. Procede worked closely with ejido representatives in establishing individual rights. With a completed map, a final assembly was summoned to vote on the agreement to partition the land (*Asamblea de Delimitación, Destino y Asignación de Tierras*). This assembly thus marks the official end of the certification process. The authorized map was then sent to the national land registry (RAN) to issue the certificates of ownership to every stakeholder in the community. Titles were awarded simultaneously for the whole ejido.

The ejido recognizes three types of stakeholders: *ejidatarios* (household heads who have voting rights in the ejido assemblies), *posesionarios* (household heads who use land for agricultural purposes but do not have voting rights in the assemblies), and *avecindados* (landless household heads who live in the ejido and are recognized by the assembly of ejidatarios, but do not have voting rights and do not cultivate ejido land). Many of the latter two categories of residents are sons and daughters of generations of ejidatarios who could not be incorporated as ejido members due to the one-heir inheritance restriction.

Procede issued certificates for individual plots (*Certificados de derechos parcelarios*), and for a share of common property lands (*Certificados de derechos sobre tierras de uso común*), residential property titles (*títulos de propiedad de solares urbanos*), as well as titles over individual plots if land certificates were converted to full private property (*Certificados de dominio pleno*).

#### **4 Literature review: access to asset ownership and shifts in political behaviour**

This paper relates to three bodies of theory that correspond to the three questions we are asking:

- (1) Investor class theory: did access to complete property rights induce a conservative shift in political behaviour toward pro-market political parties?
- (2) Vested interest theory: is political support to pro-market political parties stronger among beneficiaries whose assets benefit more from pro-market policies?
- (3) Voter reciprocity theory: are beneficiaries of one-time irreversible property rights transfers expressing gratitude to the granting incumbent party through their electoral support?

##### **4.1 Investor class theory**

Transition to asset ownership has been recognized as affecting political beliefs and electoral behaviour. There are two levels of analysis: from property rights to votes; and from political manipulation of property rights, to the granting of rights, and to votes.



The first level was analysed by Di Tella et al. (2007) using a natural experiment in Argentina where some squatters received titles on invaded lands while others did not. They observe that those with property rights acquired beliefs supportive of free markets. These are, however, beliefs, not votes. The link between property rights and votes pertains to the ‘investor class theory’ (Nadler 2000).<sup>1</sup> It predicts that financial investments create vested interests that induce a conservative shift as asset owners will support pro-market politicians as opposed to politicians favouring state intervention. Members of the investor class want low taxes on capital, low taxes on individual or corporate income, light regulation of business, and limits on litigation (Duca and Saving 2008). Stock ownership should thus induce middle-income Americans to support pro-capital politicians. Earle et al. (1997) find that privatizations that distributed assets in the Czech Republic led to election of a conservative prime minister and of a centre-right pro-free market party.

The second level goes from politicians, to asset transfers, and to votes. Right-wing political parties stand to gain from programmes that enhance asset ownership by the electorate. For instance, the Republican Party in the USA under the Bush administration promoted stock market participation (the ownership of stocks and mutual funds) through reform of social security away from a pay-as-you-go system toward capitalization, in the expectation of gaining votes. Support for an ‘ownership society’ with widespread expansion of home ownership that also happened under the Bush administration was seen in the same perspective. The politics of asset ownership has also been extensively studied in the context of privatization of public assets. Biais and Perotti (2002) noted that, in Latin America, privatization occurred more when market-oriented parties were in power. In their study of ‘Machiavellian Privatization’ they observe how politicians from pro-market parties under-price assets to try to reach the median voter and induce support for their policies. Right-wing parties can thus support privatization and asset ownership for both political and economic gains, while left-wing parties can only do this for economic objectives such as revenues from the sale of public assets, at a political risk. Jones et al. (1999) test this proposition over a sample of 630 share issue privatizations (SIP) of state-owned enterprises in 59 countries over the 1977-97 period and find that market-oriented governments (as opposed to populist) under priced SIP offers for political objectives in attempting to reach the median voter. Yet, in reviewing this literature, Kaustia and Torstila (2008) note that well identified causal analyses of this relationship are still largely missing.

## **4.2 Vested interest in voting**

The rollout of the Procede programme offers a unique opportunity to test this asset-vote relationship in the context of access to land ownership. Predictions are that access to land ownership induces a rightwing shift in voting behaviour through the channel of vested interests. Vested interest is how politics is expected to affect the return derived from assets owned (Crano 1997). The size of the vested interest effect should thus be proportional not only to the size of the investment but also to its specific link to market forces. Shift to the right would thus be more pronounced where asset ownership creates greater expected gains, and where these gains are more closely linked to market-based policies. In Mexican agriculture, this would be the case with high value crops and un-

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<sup>1</sup> For a useful review of this literature, see Richardson (2010).

protected basic grains, as opposed to corn and beans that are heavily dependent on state subsidies, not on market-oriented policies. Conservative parties should thus gain rewards from property rights reforms particularly among those where asset use benefits most from market-based policies as opposed to public subsidies.

### **4.3 Reciprocity in distributive politics**

In distributive politics, political parties offer material incentives to individuals in exchange for their votes (Dixit and Londregan 1996). Transfers can be *ex ante* relative to votes, when politicians target districts with more swing voters whose political behaviour could be influenced by the material incentives. In this swing-voter model, votes are expected to follow transfers, and transfers to be targeted where they can have the greatest impact on swaying votes. Transfers can also be *ex post* relative to votes, when politicians allocate transfers to the district where they have received the strongest electoral support as rewards for loyalty, the core-supporter model (Cox and McCubbins 1986; Verdier and Snyder 2002). In both cases, transfers are expected to induce voter reciprocity through electoral support, immediately in the swing voter model and long term in the core supporter model.

Distributive goods can take different forms. When material incentives come under the form of public goods, this is referred to as pork barrel politics. When they come as private goods, this is referred to as political clientelism or patron (party)-client (voter) relationship (Stokes 2009). Private transfers can in turn come under different types of distributive goods. Most frequent are reversible discretionary handouts such as cash, food, public sector jobs, and various types of subsidies. Less frequent, which is the subject of interest here, is when handouts are one-time irreversible transfers such as a property title granted under a land reform programme. In his study of distributive politics in Venezuela, Albertus (2010) shows that land transfers are preferably targeted at swing voters as irreversibility serves as a commitment device, while rural investment projects are preferably targeted at core voters with whom long term relations of trust prevail.

Whether transfers elicit political reciprocity depends, however, on the type of good or service being transferred. Most likely to elicit voter gratitude are recurring short-term private benefits that may not be renewed, such as access to employment in workfare programmes, renewable food ration cards, and annual fertilizer subsidies. Least likely are one-time transfers such as land reform sanctioned by complete property rights that cannot be revoked. Even if the benefits received were large, gratitude votes cannot buy any additional favours, and favours received cannot be withdrawn. In a study of voters' responses to benefits from development programmes in West Bengal, Bardhan et al. (2008) find that there was strong response to short-term benefit programmes but not to infrastructure benefits nor to more substantial one-time benefits such as receiving a land title.

A last observation to be made on distributive politics is the great degree of stability in party loyalty when there are few political parties. This has been analysed by Green et al. (2004) for the USA States and the United Kingdom. Mexico is a case where three parties dominate, and electoral shifts have been important, but allegiance to the PRI is also deeply ingrained after 60 years in power.

#### 4.4 Toward a model of Mexico's second land reform

The first land reform granted access to land under incomplete property rights. In this case, reciprocity to the incumbent party was secured through the need for beneficiaries to rely on the state for the services they could not obtain through the market. Indeed, most land reforms in Latin America have been achieved by authoritarian, military, or populist regimes that expropriated the traditional landed elites, redistributed land to the peasants (often former workers of the haciendas), and secured sustained reciprocity through state dependency to give value to the assets received (Albertus and Menaldo 2010). For beneficiaries, there was little trade-off in casting their votes, as support to the incumbent authoritarian government was needed to obtain a continuous flow of services.

The second land reform gave complete property rights through certificates and the option of fully alienable titles. For beneficiaries, following the logic of Bardhan et al. (2008), there was little justification to reward the incumbent party for an irreversible transfer that freed them from the need for state tutelage. For them, the trade-off was between support to an emerging pro-market political party, and party loyalty to the long-standing incumbent populist party. This trade-off is weighted by vested interests. For those who received more land and land more dependent on market-oriented policies, the newly acquired vested interest made them switch more easily toward the pro-market political party. In that perspective, the PRI's property rights reform was a risky reform to make for its own survival in power. Which of the two countervailing forces—a conservative shift toward the PAN or a core supporter vote to the benefactor party (in reciprocity for the asset transfer or in intrinsic party loyalty)—would dominate was a huge gamble. It is an empirical question that we can resolve using the identification strategy provided by the rollout of the Procede programme under different political parties.

### 5 Data construction

We obtained the dates of assemblies held for all ejidos from Procuraduría Agraria. The file contains a comprehensive list of 29,398 ejidos. By December 2006, 95 per cent of all ejidos had had their first assembly, that is, had officially begun their titling process. We also obtained from Procuraduría Agraria a record of legal conflicts that occurred during the Procede process.

The core information on land registration was obtained from the Registro Agrario Nacional. The Phina (*Padrón Histórico de Núcleos Agrarios*) gives a full historical account of land acquisition and registration (donations, acquisitions, expropriations, divisions, changes in land use, and registration), the conclusion of the certification process on registered land by use (residential, individual parcels, common property), and a list of members by category (ejidatarios, posesionarios, and avecindados). As of March 2010, records were available on 29,221 ejidos. We successfully matched Phina records to the assembly dates file with a success rate of 97 per cent.

The office of the rural cadaster at Registro Agrario Nacional also provided us with geocoded contour maps of all ejidos titled until 2007. This allowed us to geographically match the ejidos to the 2000 locality level population census data. Census data provide the GIS reference of the centroid of each locality, and information on age structure,

education, housing conditions, employment structure, and access to public services. A census locality was matched to an ejido if its centroid was inside of the ejido contour. For ejidos without locality, we assigned the nearest locality not in another ejido. This is illustrated in Figure 1. Ejidos represented by coloured shape E1 and E2 have localities inside their territories, B and C, respectively. Ejido E3, on the other hand, does not have any locality within its area, and is assigned the closest locality. We should note that in this context geographical matching is not perfect. Whereas an ejido is defined by a land area and a defined population of beneficiaries/owners, the census information corresponds to a population settlement (or locality). While in most cases living quarters of ejido members are geographically inside the ejido, it is possible that all or some ejidatarios live in a locality situated outside the ejido perimeter, mixed with non-ejido population. It is also possible that non-ejidatario related population lives in localities within the ejido (especially in urban areas; see Gonzalez-Navarro 2009).

From these data sources, we therefore have a database on 24,663 ejidos used in the analysis of the rollout analysis.

For the analysis of voting behaviour, we use electoral results for the congressional elections held every three years from 1994 to 2009. Every six years, congressional elections are held jointly with presidential elections. This gives us six elections in 1994 (year of presidential election won by Zedillo from PRI), 1997, 2000 (year of presidential election won by Fox from PAN), 2003, 2006 (year of presidential election won by Calderon from PAN), and 2009. There are 300 districts subdivided into 65,000 electoral sections. IFE (*Instituto Federal Electoral*) provided geo-referenced electoral section maps for the whole country. The section is the most disaggregated electoral unit, and consists of a regular shape containing the homes of around 2,000 registered voters. We use geographically consistent electoral sections over time for the analysis.

There are three major political parties, with the other parties controlling an insignificant share of the vote (Figure 2): the PRI, the traditional party that remained in power for more than 60 years winning the presidency for the last time in 1994, and has been on the decline ever since; the PRD that split out of the PRI, positioning itself to the left, but never won the presidency; and the PAN, the pro-market conservative party, that gained control of the presidency for the first time in 2000, and again in 2006, controlling a rising share of the national vote. There were 78 million registered voters in 2009. Additionally, for the rollout analysis we use electoral results from the 1991 congressional election, which took place before initiation of *Procede*. Electoral section maps for 1991 are not available so we use the 1991 electoral results at the municipality level as covariates of programme rollout.

To match ejido and census information on electoral section, we first associate electoral sections with localities that have centroids inside their geographical contour. We then discard all the electoral sections and associated localities with a large difference between the number of adults of voting age (18 and above) in the localities and the number of registered voters. This is to avoid poor matches that will attribute large towns for example to the section of their centroid, or reciprocally use information for a very small fraction of the population, when the centroid of the main locality is outside the border of the section.

Each locality is in turn either associated with an ejido or is outside any ejido. The electoral section represented on Figure 1 has 4 localities, A to D, three of which are associated with an ejido, B with ejido E1, C with ejido E2, and D with ejido E3, and one locality, A, which is not part of an ejido. Ejido characteristics, notably whether it is titled or not at any particular date, is attributed to the locality.

This allows constructing population weighted average characteristics at the section level. Locality weights are their population of voting age. The key variable for the analysis of the impact of titling on voting is the share of the population that has been titled by Procede in any particular year. Structural characteristics that do not change over time are for example the average distance of the ejido population to a major town of more than 25,000 inhabitants. Each of these localities pertains to a municipality and, for some characteristics, we only have data at that level.

## **6 Analysis of the rollout: technocracy and clientelism**

We analyse in this section the rollout of Procede: its pace, correlates of when and which ejidos were treated, and proceed to a test of exogeneity of the rollout relative to our endogenous variables of interest, the changes in vote shares associated with titling.

### **6.1 The pace of progression of Procede through Mexico**

Mexico has 31,857 ejidos and communities. Numbers vary significantly across states, with 3,711 ejidos in Veracruz, 2,944 in Chiapas, between 1,500 and 2,000 in many states, but less than 200 in some states such as Morelos, Aguascalientes, Tlaxacala, and Colima (Figure 3). Ejidos vary in size and membership, in pressure exerted by non-members to obtain land, in conflicts over land among members and with neighbors, in opportunities for land development due to proximity to cities, etc., all factors that we expect may affect the demand for certification and the difficulty with which Procede could operate, and hence the pace at which it reached its objective of certifying ejido lands.

The Agrarian Attorney's Office (Procuraduría Agraria) started conducting the first Information Assemblies in 195 ejidos in 1992 and quickly moved on to reach more than 9,000 or 29 per cent of all ejidos and communities in 1993, and more than 19,000 or 61 per cent in 1996. The pace subsequently slowed down, adding 2-4 per cent of ejidos/communities each year. By 31 December 2006, when Procede was officially declared terminated, 30,152 or 95 per cent of all ejidos/communities had held their first information assembly. The pace varied quite a bit across states. Figure 3 suggests that it is partly correlated with the sheer number of ejidos/communities a state has. States with the lowest numbers of ejidos/communities reached at least 40 per cent right the first year. By 1996, only Chiapas and Oaxaca with relatively large numbers of ejidos had not reached 50 per cent.

The achievements of certification by mid-course of the programme in 1996 and at the end of the programme in 2006 are shown in Figure 4 on a map of Mexico where the area certified is shaded. The achievement is truly spectacular in terms of speed of progress and area covered.

Descriptive statistics in Table 1 are only for ejidos, not indigenous communities. Property rights in indigenous communities are granted to the community as a whole, not to individual members, leaving to the community the role of individual land assignments and the flexibility of re-assignments as community membership changes. Political responses to Procede are consequently not comparable to those induced by ejido titling.

We regroup variables into four categories: (1) ejido characteristics that may affect the difficulty of the procedure (such as area, land use, and number of members and non-members), (2) economic environment that affects opportunities for ejidatarios offered by titling (distance to a city, employment structure, and education in localities), (3) indicators of poverty (marginality index, number of persons per room), and (4) indicators on conflicts which, if they were anticipated by RAN, may have influenced when to initiate the process. We also include (5) political variables indicating the shares of municipal votes received by the political parties (PRI, PAN, and PRD) in Federal deputy elections, the share of ejidos in municipalities where the PRI received the highest share of votes, and the incidence of alignment between municipal mayor and state governor, all in 1991 just prior to the Procede rollout.

## **6.2 Correlates of rollout**

While the rollout of the Procede process over the 1993-2006 period progressed in all states, it responded within each state to different administrative (supply side), demand-driven, and political forces. In this section, we seek to establish what were the main variables associated with the date at which RAN held the first information assembly, initiating the Procede process. All regressions are run with state fixed effects since it was a definite policy that Procede should progress in parallel in all states. So, comparisons of starting dates according to ejido characteristics hold within each state.

## **6.3 Ejido characteristics and economic opportunities**

Regression results reported in Table 2 show that the rollout clearly started with the smaller ejidos. Very large ejidos were treated later. An additional 100 members is associated with a three month delay for the initial assembly. Presence of more posesionarios, who are people cultivating land and related to the ejido but without having the title of member, is associated with delay. Posesionarios are often family members who did not get the title of member, in a system where only one of the children could inherit the membership of a parent. Procede gave an opportunity to incorporate new members, and thus the presence of posesionarios with demands for incorporation may complicate the certification process. Only 10 per cent of the ejidos have either posesionarios or avecindados. But when those are present their numbers can be very large, often as many or many more than there are ejidatarios. Having a population of posesionarios as large as that of ejidatarios is associated with a 2 months delay.

Large ejidos in terms of land were also attended later, but the coefficient is small: 1 month delay is associated with 10,000 ha in total, or 250 ha per capita, which are both large numbers. At given land area, the more of it is in parcels used for private agricultural production, the earlier Procede was started, most likely responding to

pressure from the members to obtain titles. Finally Procede seems to have attended to ejidos created earlier rather than later, and to those of smaller size at the origin. All these parameters are partial correlates. They are however relatively robust across specifications, suggesting that we can interpret them causally. Exception is the ratio of *avecindados* which, within state, is correlated with the age of the ejido. As expected, older ejidos have a larger population of *avecindados*, and are associated with earlier attention from Procede. We also observe a positive correlation between conflicts, as they would unfold over time, and the date at which Procede conducted the first information assembly in the ejido. Assuming that these were anticipated or reveal some structural conflictive relationships in the ejido, it suggests that RAN did indeed rollout first the certification in areas less prone to conflicts. A 20 disputes difference is associated with  $\frac{3}{4}$  of a month delay.

Looking at indicators of economic opportunities in the local economy, Table 2 reports that ejidos closer to a city of at least 25,000 inhabitants, and with local population more educated and more engaged in non-agricultural activities started the Procede process earlier. A difference of 40 percentage points in the share of the population in non-agriculture is associated with a one month earlier starting date.

Poverty indicators at the locality level also indicate that poorer ejidos were reached later than richer. As these poverty indicators are correlated with economic activity and education levels, their introduction in the regression overshadows the partial correlation of activity and education with the timing of Procede. Note however that partial correlation of ejido characteristics with Procede timing are robust to the inclusion of economic opportunity variables. In column (7), we add controls for political affiliation (discussed in the next table in detail) to show that partial correlation of ejido characteristics and economic opportunity variables with Procede timing are robust to the inclusion of political variables.

In conclusion, it seems that the progressive deployment of Procede has reached ejidos in response to:

- Certification difficulty, treating first ejidos of smaller size, with less members, and less presence of landed non-member households (*posesionarios*).
- Higher demand, as seen by earlier consideration of ejidos with more of their land in privately cultivated parcels rather than common property, and in areas closer to a city, and where the population has more non-agricultural activities and is more educated.
- All this resulted in a clear bias against the poorest ejidos being considered later, as revealed by the higher locality marginality index.

Procede proceeded remarkably rapidly with these first information assemblies which for most of the ejidos were held in the first 18 months after the start of the programme. Hence potential 3 or 4 months delays relative to 18 months represent a big difference.

#### **6.4 Core supporters politics**

Whether political affiliation of the ejidos had any influence on the rollout is open to debate. Mexico has made remarkable efforts to de-politicize its social programmes; at

the same time Procede represents a huge wealth transfer that is unlikely to remain above politics in a country where clientelism and corruption (the famous *mordida*) is prevalent at all levels. In the early 1990s, Mexico was still largely dominated by PRI. As seen in Table 3, PRI received 69 per cent of the votes in the 1991 Federal deputies election in the municipalities associated with 96.7 per cent of the ejidos. There is however some variation in the share of the votes received by PRI, with an inter-quartile range of 20 percentage points, and similarly of 13 and 10 percentage points for PAN and PRD, respectively. At that time 28 of the 31 governors were from PRI. So party alignment between the municipality and the governor occurred for 87.4 per cent of the ejidos. Partial correlations between political affiliation and the rollout of Procede are reported in Table 3. A 20 percentage point higher PRI vote share is associated with a 0.70 month earlier start, while the inter-quartile 13 percentage point for PAN is associated with a more than two months move forward for the first assembly. Results reported in the last column show that these partial correlations are robust to addition of the ejido, conflict, economic opportunity, and poverty variables analysed in the previous section. Alignment with the governor's party is particularly stable to addition of controls, suggesting causality between political alignment and earlier initiation of the titling process, whatever the political party. Party politics was thus not absent from priority given to ejidos in initiating the certification process.

## 6.5 Test of exogeneity of the rollout

Clientelism affected the rollout, but did pre-Procede changes in electoral results affect the dates of the process? To use the rollout to identify the role of certification on electoral outcomes, we need to verify the existence of pre-programme 'parallel trends', i.e., that the order or date of the rollout of Procede is not correlated with the trends in voting patterns. We only have two elections prior to Procede, in 1991 and 1994, and we do not have the matching of electoral sections for these two elections. So the lowest level at which we can compare the results is the municipality. Results are reported in Table 4. The rollout is best characterized by the information assembly date, but since the impact we are interested in is certification, we run regressions on both dates. We regress these dates on the change in vote share received by PRI and PAN. Neither coefficient is statistically significant. A one standard error increase in PAN share is associated with Procede reaching the ejidos on average 5 months earlier, compared to an average 48 months.

In Table 5, we report specifications that are closer to those we will be using to estimate the impact of certification. These are regressions of changes in vote shares for a given political party (PAN or PRI) in a given electoral section ( $s$ ), as a function of the date of the first assembly that took place in the ejidos of the section (either first information or certification), and of state and election year fixed effects:

$$PANShare_{st} - PANShare_{s,t-1} = \delta ProcedeDate_s + \mu_{state} + v_t + \varepsilon_{st} \quad (1)$$

for  $t < ProcedeDate_s$ .

Election dates are in July 1994, 1997, 2000, 2003, 2006, and 2009. The table reports on three windows of pre-programme voting results, 1994-97, 1994-2000, and 1994-2003, and correlates the pre-programme changes in vote shares on the date of Procede for the subset of ejidos that were reached by the programme after the later election date. The



rollout date is never significant. In terms of order of magnitude, here dates are in months. A ten month delay in Procede certification would be associated with gains or losses of voting share of 0.02 to 0.10 percent of votes. So numbers are extremely small.

We now turn to the analysis of the impact of certification on political behaviour, using the conditional exogeneity of the rollout of the programme as our identification strategy. We test three hypotheses:

- Investor class theory: access to asset ownership induces a shift to the right.
- Vested interest theory: the conservative shift is more pronounced when vested interests are more closely related to market-led policies
- Reciprocity theory: titling is rewarded by votes of gratitude to the benefactor party.

## 7 Impact of titling on voting behaviour

### 7.1 Evidence of a shift to the right

We now analyse the prediction of the ‘investor class theory’ according to which asset ownership induces a conservative shift to the right in voting behaviour. The unit of analysis is the electoral section, and the dependent variable is the share of the votes obtained by PAN, the rightwing party.

We start with a standard panel analysis, where the PAN share in votes is regressed on the share of the section’s population that has been titled by Procede, and the average number of years of being titled:

$$PANShare_{st} = \delta ShareTitled_{st} + \mu_s + v_t + \varepsilon_{st} \quad (2)$$

$$PANShare_{st} = (\delta_0 + \delta_1 YearsTitled_{st}) ShareTitled_{st} + \mu_s + v_t + \varepsilon_{st} \quad (3)$$

for section  $s$  and election in year  $t$ .  $ShareTitled$  is the fraction of the section’s population that is in a titled ejido,  $YearsTitled$  is the average number of years this population has been titled,  $\mu_s$  and  $v_t$  are section and time fixed effects, and  $\varepsilon_{st}$  error terms clustered at the section level. Under the condition that the participation rate is the same in the ejido and non-ejido population (so that the share of the ejido is the same among voters as it is in the population), and that the titling of an ejido does not affect the voting behaviour of the other localities in the same section, the parameters  $\delta$  identify the effect of titling on the vote of the ejido population.

Results reported in Table 6, columns (1) and (2) show that titling induced a shift in favour of PAN, the right party, by 1.46 percentage points, or 6.8 per cent of the average PAN share, 21.4 per cent, over the whole period. This impact of titling increases over time, starting at 0.35 percentage points immediately after titling and growing by 0.27 percentage points per year thereafter, reaching a total of 4.4 percentage points 15 years after the titling. A non-parametric estimation of the increasing effect of titling over time confirms the linear trend, at least over the 15 years range of our observations.

A more precise measure of this shift is obtained by focusing on the sections which have their first ejido certified around each election. Using a window of 3 years on each side of the election date, we estimate a simple regression:

$$PANShare_s = \delta ShareTitled_s + \alpha ShareEjido_s + \varepsilon_s, \quad (4)$$

where  $ShareEjido_s$  is the share of the population that belongs to an ejido in section  $s$ . Too few ejidos were certified between the election dates in 2006 and 2009 to analyse the discontinuity at the election of 2006. We observe a consistent shift to the right by 1.2 to 2.9 percentage points over an average of 12 to 19 percentage points in the first three elections. Impact on the last group of ejidos that gain titling between 2000 and 2003 seems however small.

Finally, we verify in column (7) that this shift to the right is in fact obtained as soon as the process of certification is engaged, by contrasting ejidos that have had their assembly within 6 months of the election in 1994, either before or after the election date. In column (7), we examine the impact of starting the titling process. This can only be seen around the 1994 election since the very large majority of ejidos had started the certification process by the next election. In a window of 6 months, the impact of having held the first assembly that presented the titling programme was already a 2 percentage points increase in the share of PAN.

## 7.2 Heterogeneity of political response to titling

In this section we investigate the heterogeneity in voting responses to titling by estimating the following model:

$$PANShare_{st} = (\delta_0 + \delta_1 X_s) ShareTitled_{st} + \mu_s + \nu_t + \varepsilon_{st} \quad (5)$$

where  $X_s$  is a structural characteristic of the ejido population in section  $s$ .

The investor class theory suggests that the shift to the right in voting behaviour depends on the potential profit gain to be expected from acquiring asset ownership. We characterize this potential benefit by two variables: average land quality and distance to a city. Land quality in Mexico is frequently measured by corn yield, as corn is the main staple, grown all over the country. The only systematic measure of yield we have is at the municipality level, a higher level of administrative unit than either the locality or the section. We use the average corn yield over the period 2002-08 as an indicator of land quality. It varies from 0.4 ton/ha (in the lowest decile) to 2.8 tons/ha (in the highest decile), and 8 tons/ha in the best areas. Distance to a city of at least 25,000 inhabitants is calculated from each locality and averaged over the section population. To facilitate the interpretation, the variable is then normalized to a mean 0 and a unit standard deviation.

Results reported in Table 7, columns (2) and (3), show that stronger shifts to the right are associated with proximity to city and land quality. Ejidos situated one standard deviation away from a city show a response half that of ejidos close to a city. A two-fold increase in yield is associated with an almost 50 per cent increase in the shift to the right in voting.

A more accurate specification of vested interest in voting for Mexican farmers is the contrast between the pro-state PRI and the pro-market PAN. One can expect that the shift to the right would be less important in areas that mostly grow crops such as corn and beans that have always been supported by the state, as they may expect losses in support that will come with the pro-market policies of the right, while areas growing crops that are left to market forces have more to gain from complete property rights if they are accompanied by pro-market policies. To analyse this, we use the cropping pattern at the municipal level, and compute the average share of the cropping area dedicated to corn and bean in 2002-08. That Mexican agriculture is dominated by corn and bean is revealed by these numbers. The mean value of the share of land planted to corn and bean is 68 per cent, reaching more than 93 per cent in the 25 per cent most dedicated municipalities. This variable is again normalized to facilitate its interpretation. Results reported in column (4) show that a one standard deviation (equal to 29 per cent land share) increase in land share cultivated in corn and beans is associated with a decline in the shift to the right by almost 25 per cent. Putting these interactions together in column (5) shows the coefficient of the distance to city and land share in corn and bean to be robust, but not that of corn yield. These associations are thus suggestive but one cannot eliminate the possibility that they reflect omitted correlated effects.

### **7.3 Reciprocity: was titling rewarded by votes?**

The second land reform was a massive asset transfer programme, creating significant wealth and land security benefits for 3.5 million title recipients. For the ruling party that initiated the reform, electoral gains could be expected in return, although as discussed above (Bardhan et al. 2008), reciprocity is less expected from a one time irreversible transfer such as land titling than from an entitlement to recurrent transfers.

Having established the occurrence of an overall switch to the right associated with titling, a reciprocity-voting behaviour could be defined as a modification of the shift to the right. For ejidos granted certification by PAN, reward to the granting party would be additive to the switch to the right, while it would be mitigating for the ejidos granted certification by PRI. This is analysed with the estimation of equation (5) in which  $X$  is the share of the titled population that received its title from PRI. Results reported in column (6) of Table 7 show no evidence of reciprocity behaviour from voters toward the party that granted them certification.

A caveat in this analysis is that the party granting the certification cannot be distinguished from time, since PRI was in power until 2000, and PAN afterward. Hence one could not separate a variable shift to the right from a differential effect associated with the granting party. The absence of evidence on reciprocal voting behaviour toward the granting party is conditional on assuming that the shift to the right is constant over time.

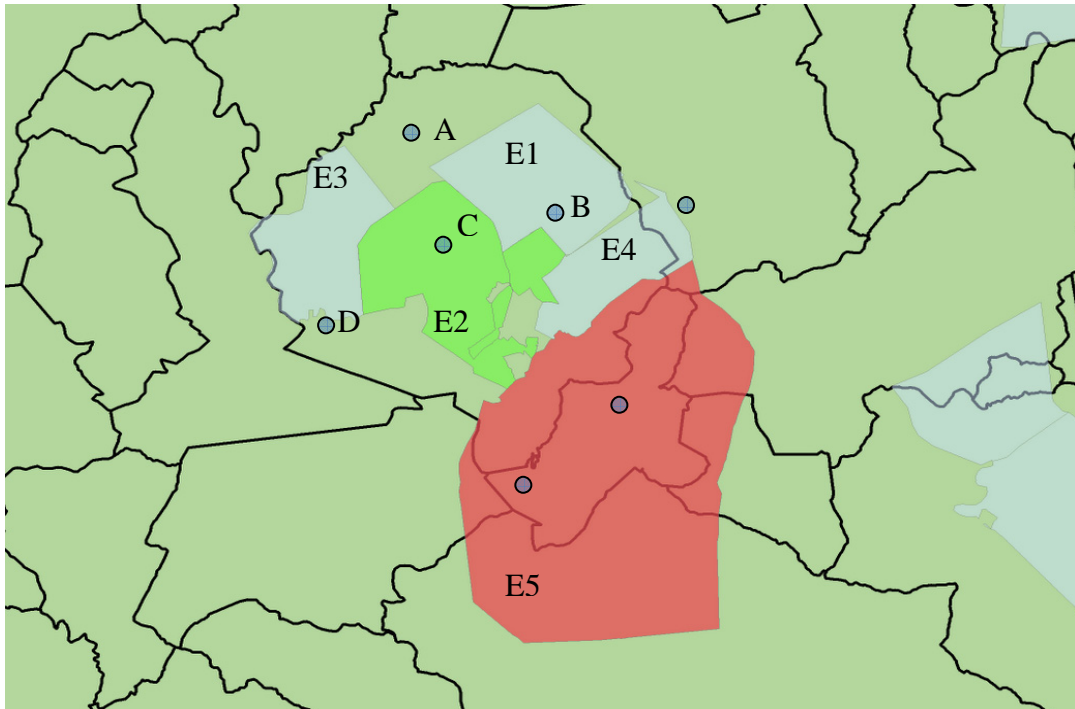
## **8 Conclusions: the political risks of complete land reform**

Following the peasant-led revolution of 1910, Mexico engaged in an ambitious land reform that gave access to 3.5 million households on more than half of its territory. Property rights were however highly incomplete, making household behaviour strongly dependent on state tutelage. The model of state-led capitalism and tight political control

by the ruling political party initially performed effectively, delivering both growth and political stability. State-led capitalism in the ejido sector however fell victim of the times, coming to an end following the debt crisis and introduction of neo-liberal adjustment policies under the Washington Consensus. Stagnation and poverty became the norm for the ejido sector. The second land reform initiated by the ruling party in 1992 had the objective of seeking efficiency gains in agriculture by offering peasants complete property rights, thus freeing them from state tutelage as an intermediary to the market. This was a huge political gamble as vote mobilization now had to come from willful reciprocity by beneficiaries expressing gratefulness to the benefactor incumbent party through electoral support, as opposed to coercive state tutelage.

Using the 13 years rollout of *Procede*, the land certification programme, that we showed to be unbiased in terms of prior trends in electoral support and largely driven by technocratic and clientelistic considerations, we identified the impact that complete property rights—and the associated freedom from state dependency—had on political expression. We found three major results. First, consistent with the investor class theory, asset ownership induced a conservative shift in electoral choices, favouring the political party with pro-market (PAN) as opposed to state-led (PRI) economic programmes, thus playing against the interests of the long standing incumbent party. Second, consistent with the theory of vested interests in electoral behaviour, this shift was more pronounced where vested interests in electing a pro-market party were the largest, not only in terms of value of the assets but more specifically of market-dependence of the activities pursued with these assets. Third, consistent with the theory of distributive politics, one-time irreversible asset transfers failed to induce electorate reciprocity, to the demise of the ruling party. For these reasons, the political calculus of the second land reform failed to deliver its promise to the ruling populist party. These results help explain the well known puzzle of missing complete land reforms, like what a widely recognized policy in terms of potential efficiency gains fails to pass the test of political feasibility for incumbent state-led parties, thus remaining non-existent or incomplete. It is the privilege of neo-liberal political parties to gain from complete property rights reforms, even if land reform is a favourite policy platform for state-led political parties.

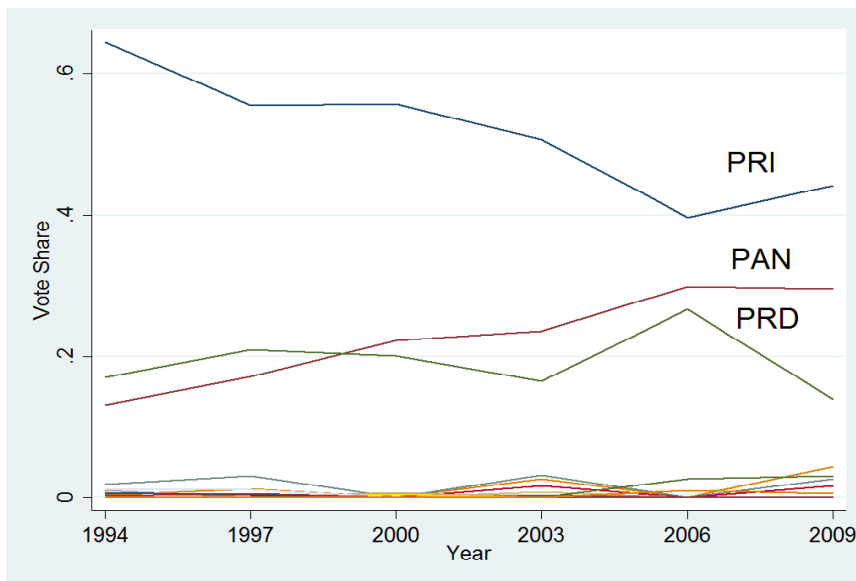
Figure 1: Matching ejidos and census data on electoral sections



Note: Electoral sections are shown by the black contours. Ejidos are marked as coloured shapes and designated by E1 to E5. Locality centroids are marked by small circles, and noted A to D. The section represented on this figure has 4 localities, A-D, three of which are associated with an ejido: B with ejido E1, C with ejido E2, and D with ejido E3.

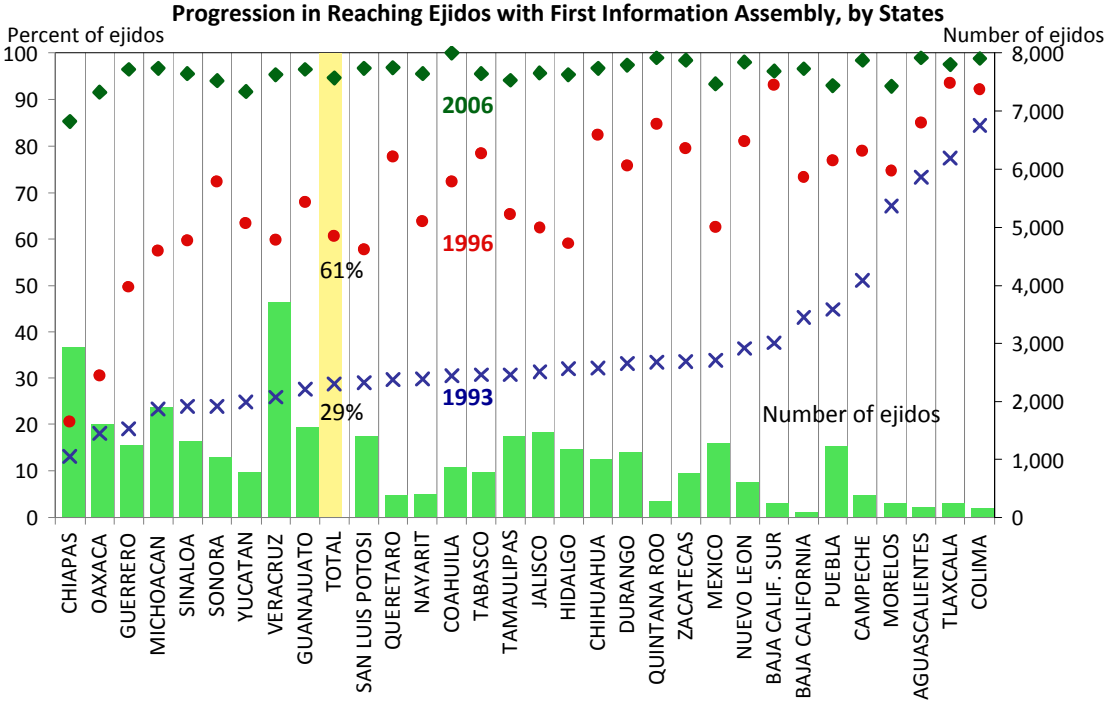
Source: Authors' illustration.

Figure 2: Share of votes by political party in elections of federal legislators



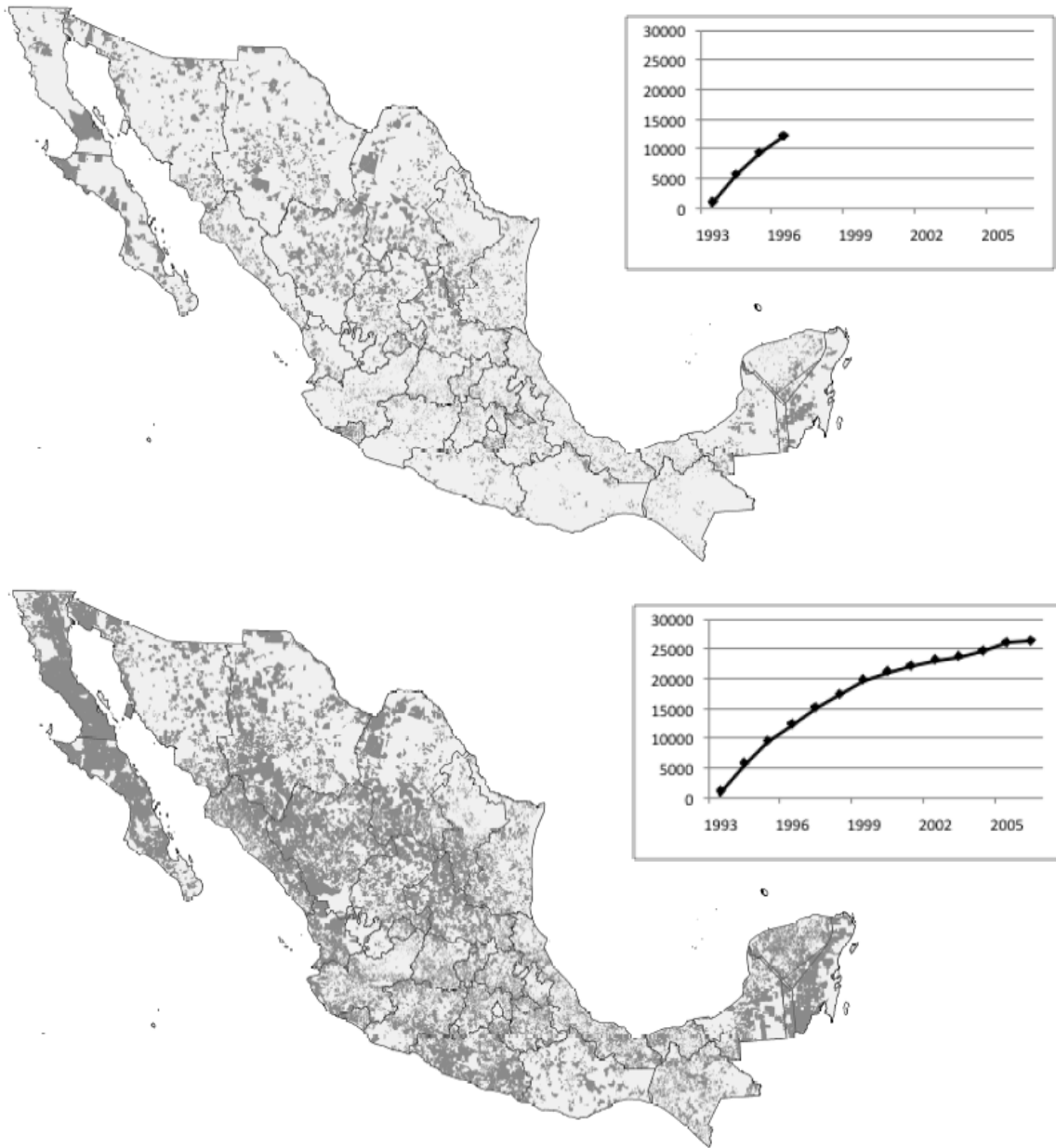
Source: Authors' illustration.

Figure 3: Progress in initiating certification by state, 1993, 1996, and 2006



Source: Authors' illustration.

Figure 4: Area certified by Procede in 1996 and 2006 and number of ejidos treated over time, 1993-2006



Note: Histogram for the 26,010 ejidos that had completed the process in less than 100 months by the end of 2006. 940 ejidos had completed the process in more than 100 months and 2,448 had not completed it by the end of 2006.

Source: Authors' illustration.

Table 1: Descriptive statistics for ejidos

	Mean	Median	25th percentile	75th percentile
<b>Ejidos</b>				
Starting date	May-96	October-94	October-93	November-97
Duration of Procede process (months)	24.4	13.4	6.9	30
Total area (ha)	2,855	966	387	2,491
Parcel area (ha)	950	399	109	945
Common area (ha)	1,784	105	0	1,018
Ejidatarios	92.6	56	31	106
Posesionarios	20.7	0	0	6
Avecindados	17.2	0	0	0
Area per member (ha)	37.8	13.6	6.7	30
Creation date	1950	1940	1935	1967
Number of members at creation	81	49	30	88
<b>Opportunities in localities associated with ejido</b>				
Active population as share of labor force	0.42	0.42	0.35	0.48
Share of occupied population in agriculture	0.35	0.30	0.14	0.54
Share of population with superior education	0.02	0.00	0	0.02
Share of population with high school	0.04	0.02	0.003	0.06
Marginality index	-0.23	-0.28	-0.89	0.40
Average persons per room	2.4	2.0	2	3
<b>Conflicts</b>				
Disputes received	29.4	14.0	5.0	33.0
<b>Politics - 1991 Federal deputies elections results at municipality level</b>				
PRI share	0.690	0.698	0.595	0.782
PAN share	0.096	0.049	0.018	0.148
PRD share	0.081	0.036	0.008	0.107
PRI wins	0.967	1.0	1.0	1.0
Aligned with governor	0.874	1.0	1.0	1.0

Source: Authors; see text.



Table 2: Rollout of the Procede programme: correlates of start date

	Date of the Information Assembly (in months since Jan 1, 199)								Mean value [st.dev.]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<b>Ejido size and endowment</b>									
Members	0.0152 (4.05)***	0.0185 (5.05)**	0.029 (6.49)***	0.0213 (4.03)***	0.0207 (3.87)***	0.0213 (3.95)***	0.021 (3.89)***	0.0187 (2.57)**	98.4 [135.0]
Total area (ha)	0.0001 (1.80)*								2925 [11282]
Total area/member (ha)		0.005 (1.21)	0.005 (1.18)	0.005 (1.18)	0.002 (0.69)	0.003 (0.89)	0.003 (0.88)	0.001 (0.34)	38.6 [140]
Share in common		0.065 (0.80)	0.082 (0.91)	0.078 (0.91)	0.069 (0.84)	0.075 (1.00)	0.076 (1.03)	0.056 (1.03)	0.38 [0.38]
Share in parcels		-0.14 (2.02)*	-0.16 (2.00)*	-0.15 (1.98)*	-0.13 (1.80)*	-0.26 (1.79)*	-0.26 (1.76)*	-0.22 (1.73)*	0.62 [0.38]
Ratio posesionarios/members		1.31 (1.70)*	2.17 (2.63)**	1.87 (2.47)**	1.94 (2.51)**	1.89 (2.41)**	1.93 (2.40)**	1.58 (1.86)*	0.23 [0.86]
Ratio avecindados/members		-0.56 (1.04)	-0.14 (0.37)	-0.22 (0.58)	-0.14 (0.37)	-0.13 (0.38)	-0.12 (0.35)	0.08 (0.28)	0.21 [1.42]
Year of first land endowment			0.26 (8.23)***	0.26 (8.33)***	0.24 (7.93)***	0.21 (6.65)***	0.21 (6.67)***	0.22 (6.27)***	1950 [21]
Number of members at creation			0.011 (2.71)**	0.006 (1.51)	0.007 (1.76)*	0.008 (1.88)*	0.008 (1.91)*	0.010 (2.16)**	80 [105]
<b>Conflicts</b>									
Disputes registered				0.057 (4.12)***	0.063 (4.73)***	0.062 (4.74)***	0.062 (4.66)***	0.054 (3.70)***	29 [46]
<b>Opportunities, characterized by the localities associated to ejidos</b>									
Distance to nearest city (pop > 25,000) in kms					0.0022 (2.10)**	0.0018 (1.77)*	0.0018 (1.73)*	-0.0006 (0.46)	215 [446]
Share active in labor force					-2.15 (0.51)	-3.33 (0.72)	-2.15 (0.47)	-6.47 (1.10)	0.42 [0.12]
Share non ag. in occupied population					-2.97 (1.38)	-1.64 (0.65)	-1.20 (0.48)	-6.11 (1.74)*	0.35 [0.26]
Share of population with more than high school					10.6 (0.87)	14.3 (0.95)	12.3 (0.82)	18.6 (1.32)	0.02 [0.03]
Share of pop. with high school					-24.6 (2.21)**	-12.5 (1.04)	-13.0 (1.11)	-9.6 (0.89)	0.04 [0.05]
<b>Poverty</b>									
Locality marginality index						2.18 (2.35)**	2.11 (2.29)**	3.05 (2.57)**	-0.23 [0.88]
Average number of inhabitants per room						0.72 (1.10)	0.75 (1.16)	1.25 (0.83)	2.37 [0.89]
Mean value of dependent variable (months)									47.3 [36.8]
Observations	24,663	24,350	23,423	22,698	22,641	21,296	21,225	21,225	
State FE	31	31	31	31	31	31	31	No	
Other controls							Conflicts and politics	Conflicts and politics	

Robust t statistics in parentheses, from standard errors clustered at the state level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Source: Authors; see text.

Table 3: Role of clientelism in the Procede rollout

	Mean value [st. dev.]	Date of the Information Assembly (in months since Jan 1, 1992)		
		(1)	(2)	(3)
<b>Politics - 1991 Federal deputies election results at the municipal level</b>				
PRI share	0.69 [0.13]	-3.70 (0.61)	0.35 (0.07)	-2.39 (0.39)
PAN share	0.10 [0.11]	-18.14 (2.63)**	-15.04 (2.45)**	-9.32 (1.84)*
Alignment with governor's party	0.87 [0.33]		-8.02 (8.63)***	-9.44 (6.12)***
Observations		24,346	24,346	21,225
State FE		31	31	31
Other controls				Ejido, conflict, opportunity, and poverty

Robust t statistics in parentheses, from standard errors clustered at the state level.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Source: Authors; see text.

Table 4: Test of exogeneity of the Procede rollout 1991-94

	Mean value (se)	Date of first assembly (1)	Date of certification (2)
Municipal level results for federal deputy elections			
Change in PRI share 1991-94	-0.120 (0.106)	-0.92 (0.14)	2.99 (0.31)
Change in PAN share 1991-94	0.066 (0.073)	-8.17 (1.02)	-9.20 (0.76)
Constant		47.74 (51.63)**	75.42 (64.35)**
Number of observations		24,346	24,359
State FE		31	31

Robust t statistics in parentheses, from standard errors clustered at the state level.

\* significant at 5%; \*\* significant at 1%

Date of assemblies are measured in months since January 1992

Source: Authors; see text.

Table 5: Test of exogeneity of the Procede rollout prior to certification

	Date of first assembly (1)	Date of certification (2)	Elections	Fixed effects	Number of sections in columns (1) / (2)
Ejidos with first assembly / certification date after July 6, 1997					
Election to election change in PRI share (%) mean value of dependent variable: -7.4	-0.0026 (0.0126)	0.0014 (0.0068)	1994, 1997	State	1,999 / 5,120
Election to election change in PAN share (%) mean value of dependent variable: +3.5	0.0004 (0.0091)	0.0018 (0.0052)	1994, 1997	State	
Ejidos with first assembly / certification date after July 2, 2000					
Election to election change in PRI share (%) mean value of dependent variable: -3.3	-0.0501** (0.0189)	-0.0102 (0.0074)	1994, 1997, 2000	State, year	712 / 2,383
Election to election change in PAN share (%) mean value of dependent variable: +3.5	-0.0154 (0.0111)	0.0028 (0.0052)	1994, 1997, 2000	State, year	
Ejidos with first assembly / certification date after July 6, 2003					
Election to election change in PRI share (%) mean value of dependent variable: -4.9	-0.0116 (0.0609)	-0.0020 (0.0224)	1994, 1997, 2000, 2003	State, year	428 / 1,224
Election to election change in PAN share (%) mean value of dependent variable: +3.5	-0.0183 (0.0443)	-0.0108 (0.0176)	1994, 1997, 2000, 2003	State, year	

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Each number comes from a separate regression of the change in shares for a given party between two consecutive elections on the month of the first assembly (col. 1) or the first certification (col. 2), to take place in the section, with state and time fixed effects, and errors clustered at the electoral section level. Observations are at the electoral section level

Source: Authors; see text.

Table 6: Certification induces a shift to the right

Dependent variable: Sample	PAN share						
	All sections		Sections with first ejido titled ± 3 years from election				Sections with first assembly ± 6 months from election
	Elections: 1994 & 2009 (1)	2009 (2)	1994 election (4)	1997 election (5)	2000 election (6)	2003 election (7)	1994 election (3)
Share of population titled	0.0146*** (0.0017)	0.00354* (0.0019)	0.0124*** (0.0046)	0.0231*** (0.0046)	0.0291*** (0.0070)	-0.00242 (0.0095)	
Share of population with first assembly completed							0.0180*** (0.0055)
Share of population titled* average years titled		0.00268*** (0.0002)					
Share of population in ejidos			-0.0542*** (0.0041)	-0.0648*** (0.0059)	-0.106*** (0.0088)	-0.0400*** (0.0114)	-0.0555*** (0.0073)
Fixed effects	Section & year		None	None	None	None	None
Observations	113,825	113,825	6,222	7,316	3,902	2,246	2,376
Electoral sections	19,088	19,088	6,222	7,316	3,902	2,246	2,376
Mean PAN Share	0.214	0.214	0.119	0.158	0.194	0.198	0.112

Robust standard errors in parentheses, clustered at the electoral section level in col. 1 and 2.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors; see text.

Table 7: Heterogeneity of impact on shift to the right and reciprocity to PRI

	Pan share					
	(1)	(2)	(3)	(4)	(5)	(6)
Share of population titled	0.0146*** (0.0017)	0.0152*** (0.0017)	0.0156*** (0.0018)	0.0155*** (0.0018)	0.0160*** (0.0018)	0.0145*** (0.0028)
Interaction with:						
Distance to city (pop <sup>3</sup> 25,000) <sup>a</sup>		-0.00648*** (0.0016)			-0.00468*** (0.0016)	
Average corn yield (log)			0.00350* (0.0018)		0.002 (0.0019)	
Share of corn-bean in crop area <sup>a</sup>				-0.00376** (0.0015)	-0.00533*** (0.0016)	
Share with title granted by PRI						0.00017 (0.0033)
Fixed effects	Section & year	Section & year	Section & year	Section & year	Section & year	Section & year
Observations	113,825	113,825	111,133	111,877	111,133	113,825
Number of sections	19,088	19,088	18,959	18,982	18,959	19,088

Robust t statistics in parentheses, from standard errors clustered at the electoral section level.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

<sup>a</sup> Normalized variable with mean 0 and standard deviation equal to 1.

Source: Authors; see text.

## References

- Albertus, Michael (2010). 'Democracy and the Threat of Redistribution in Latin America'. Department of Political Science, Stanford University.
- Albertus, Michael, and Victor Menaldo (2010). 'If You're Against Them You're With Us: The Effect of Expropriation on Autocratic Survival'. Department of Political Science, Stanford University.
- Bardhan, Pranab, Sandip Mitra, Dilip Mookherjee, and Abhirup Sarkar (2008). 'Political Participation, Clientelism, and Targeting of Local Government Programmes: Analysis of Survey Results from Rural West Bengal, India'. Boston University, Department of Economics, Institute for Economic Development Working Paper No. DP-171.
- Biais, Bruno, and Enrico Perotti (2002). 'Machiavellian Privatization'. *American Economic Review*, 92(1): 240-58.
- Cox, Gary, and Mathew McCubbins (1986). 'Electoral Politics as a Redistributive Game'. *Journal of Politics*, 48(May): 370-389.
- Crano, William (1997). 'Vested Interest, Symbolic Politics, and Attitude-Behaviour Consistency'. *Journal of Personality and Social Psychology*, 72(3): 485-91.
- Deininger, Klaus, Gershon Feder, Isabel Lavadenz, Mike Nowak, Laura Tlaiye, and Rogier van den Brink (2004). *Land Policy Research Report: Principal Lessons and Next Steps*. Washington DC: The World Bank.
- de Janvry, Alain, Céline Dutilly, Carlos Muñoz-Piña, and Elisabeth Sadoulet (2000). 'Liberal Reforms and Community Responses in Mexico'. In Masahiko Aoki, Douglas North, and Yujiro Hayami (eds) *Community and Market in Economic Development*. New York: Oxford University Press.

- de Janvry, Alain, Gustavo Gordillo, and Elisabeth Sadoulet (1997). *Mexico's Second Agrarian Reform*. Center for US-Mexican Studies, University of California at San Diego.
- De Soto, Hernando (2000). *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*. New York: Basic Books.
- Demsetz, Harold (1967). 'Toward a Theory of Property Rights'. *American Economic Review*, 57(2): 347-59.
- Di Tella, Galiani, and Ernesto Schargrotsky (2007). 'The Formation of Beliefs: Evidence from the Allocation of Land Titles to Squatters'. *Quarterly Journal of Economics*, 122(1): 209-41.
- Diaz-Cayeros, Alberto, Beatriz Magaloni, and Barry Weingast (2003). 'Tragic Brilliance: Equilibrium Party Hegemony in Mexico'. Available at SSRN: <http://ssrn.com/abstract=1153510>
- Dixit, Avinash, and John Londregan (1996). 'The Determinants of Success of Special Interests in Redistributive Politics'. *Journal of Politics*, 58 (4): 1132-55.
- Duca, John, and Jason Saving (2008). 'Stock Ownership and Congressional Elections: The Political Economy of the Mutual Fund Revolution'. *Economic Inquiry*, 46(3): 454-79.
- Earle, John, Scott Gehlbach, Zuzana Sakova and Jiri Vecernik (1997). 'Mass Privatization, Distributive Politics, and Popular Support for Reform in the Czech Republic'. SITE Working Paper No. 121. Available at SSRN: <http://ssrn.com/abstract=32787>.
- Gonzalez-Navarro, Marco (2009). 'Urbanization quality and property rights'. Economics Department, University of California at Berkeley.
- Gordillo, Gustavo, Alain de Janvry, and Elisabeth Sadoulet (1998). 'Between political control and efficiency: Evolution of agrarian property rights in Mexico'. *CEPAL Review*, 66(December): 149-66.
- Green, Donald, Bradley Palmquist, and Eric Schickler (2004). *Partisan Hearts and Minds: Political Parties and the Social Identities of Voters*. New Haven: Yale University Press.
- Jones, Steven, William Megginson, Robert Nash, and Jeffrey Netter (1999). 'Share Issue Privatizations as Financial Means to Political and Economic Ends'. *Journal of Financial Economics*, 53(2): 217-53.
- Kaustia, Markku, and Sami Torstila (2008). 'Political Preferences and Stock Market Participation'. Mimeo. Helsinki School of Economics.
- Lamartine Yates, Paul (1981). *Mexico's Agricultural Dilemma*. Tucson: University of Arizona Press.
- Magaloni, Beatriz, Barry Weingast, and Alberto Diaz-Cayeros (2008). 'Why Developing Countries Sabotage Economic Growth: Land Reform in Mexico'. Mimeo. Department of Political Science, Stanford University.
- Montgomery, John (1984). *International Dimensions of Land Reform*. Boulder: Westview.

- Nadler, Richard (2000). 'Portfolio Politics: Nudging the Investor Class Forward'. *National Review*, 52(23): 38-40.
- Ostrom, Elinor (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.
- Platteau, Jean-Phillipe (2000). *Institutions, Social Norms, and Economic Development*. London: Routledge.
- Richardson, Munro (2010). Financial Stocks and Political Bonds: Stock Market Participation and Political Behaviour in the United States and Britain. PhD dissertation. Department of Political Science, University of Illinois at Urbana-Champaign.
- Stokes, Susan (2009). 'Political Clientelism'. *The Oxford Handbook of Comparative Politics*. Oxford Handbooks Online.
- Verdier, Thierry, and James Snyder (2002). 'The Political Economy of Clientelism'. CEPR Discussion Paper No. 3205.
- World Bank (2001). *Mexico's Land Policy: A Decade After the Ejido Reform*. Report 22187-ME. Washington DC: The World Bank.