The University Of Sheffield.

Empirical Essays on Clientelism, Favouritism and Cartel Violence at the End of the PRI Regime in Mexico.

By

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Declaration

I, the author, attest that the Thesis is my original work. I am aware of the University's Policy on Unfair Means. This work has never been nominated for an award at this or any other university. This dissertation has 6 figures and 58,000 words, including appendices, references, footnotes, tables, and equations.

Arising from this thesis, the chapter 4 of this work, was submitted as a working paper in collaboration with my initial supervisor, Dr Vassilis Sarantides for The Sheffield Economic Research Paper Series (SERPS). I retain full rights of the contents of the aforementioned working paper (See Sanchez Andalco and Sarantides, 2022).

Luis Alfredo Sanchez Andalco

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Abstract

This thesis presents three empirical cases, each originated by separate main political economy events that took place in recent times in Mexico, namely the 1992 agricultural reform implemented in the country, the probable association between the PRI regime and cartels in the nation and the increase of cartel related violence in Mexico during the end of the PRI regime and the start of the democratization period in the nation. The initial empirical chapter studies the key political structure changes in 1992 that the country experienced. Particularly, the ejido dismantling and an increase in policy instruments manipulation by the PRI. Concretely, this paper examines the impact of public and municipality investment, and a granting property titles program, PROCEDE, on the political outcomes of the PRI by employing a unique nationwide dataset at the municipality level for the 1997-1991 period. To find evidence of those effects, we exploit the observed heterogeneity on the percentage change in ejido certification, public and municipality investment across municipalities as identifying sources of variation and employ a first differences design that holds unobserved local characteristics fixed. The subsequent chapter explores how cartels and political favouritism drive the allocation and generation of local resources across constituencies. Particularly, we study the extent to which the favouritism between Mexican cartels activities and the PRI regime in Mexico affects the creation and allocation of local resources for the 1991-2006 period. The final empirical chapter investigates the origins of the dramatic escalation of the Mexican drug war escalation since 2007. In accordance with the theory, its origin is in the 1990s turf wars involving the main drug trafficking organisations operating in the country. To this end, this study examines empirically the main cause of turf wars at the municipal level between 1995-2006. Overall, our results indicate that the PRI regime and its fall in the late 90's was a crucial event for the socioeconomic dynamics in Mexico.

Keywords: land reform; PROCEDE; PRI; democratisation; organised crime deaths, local fiscal components, narco-political favouritism

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Chapter 1 Introduction

1.1. Motivation and Aims

The Institutional Revolutionary Party (Spanish: Partido Revolucionario Institucional, PRI) ruled Mexico for over 70 years (Hammett, 2006; Kirkwood, 2006). The party was created by the victorious groups of the Mexican revolution after its end in 1920. These elites established the party in 1929 as way to access political power and control the country. The PRI quickly became the hegemonic party in the country by winning almost all elections during the majority of the 20th century (Diaz-Cayeros and Magaloni, 2001; Klesner et al., 2001; Magaloni, 2007). Nevertheless, since 1988 there have been three main parties in the country. Alongside the PRI, The Party of the Democratic Revolution (PRD, Spanish: Partido de la Revolución Democratica), and The National Action Party (Spanish: Partido Accion Nacional, PAN) have constituted the multi-party system in Mexico. Despite this apparent growing political competition, particularly after that year, the PRI achieved to maintain its hegemony until the year 2000. Originally, this hegemony was based in getting its supporters to the polls and win elections by large margins. To achieve that, the PRI relied primarily on its old clientelistic networks and state corporatist institutions to maintain power. That scheme was initially created parallel to the party. Thus, electoral participation remained high despite the absence of serious electoral competition because of these state-corporatist associations, clientelistic ties, and other traditional instruments of social control (Klesner et al., 2001). Additionally, the PRI party also enjoyed indiscriminate access to the government's revenue to run its campaigns (Magaloni, 2007). Therefore, during the majority of the 20th century until the end of the 1990's, the party established a system of authoritarian rule that was characterized by corruption, cronyism, and a lack of accountability.

Additionally, in order to study the PRI regime and its initial electoral success and its subsequent fall, we need to consider Mexico's administrative structure. Specifically, in the country, there are three administrative and elected levels of government: approximately 2,500 municipalities, 31 states (excluding the Federal District of Mexico City), and the federal government. The president leads the federal government, which finances the majority of social programmes. As a result of decentralisation reforms implemented in the 1990s, mayors are now responsible for managing municipal services such as sanitation, electricity, piped water, sewage, roads and building public infrastructure. Hence, given those attributions, municipalities are the most relevant subdivision for this thesis (Larreguy et al., 2015). Specifically, the municipality president, who implements city council decisions, is its

most important figure. The number of municipalities has fluctuated up to almost 2,500, giving us a large number of observations to analyse the political impact of the agricultural reform. Despite this, the Federation or central power retains certain degree of control on those municipalities in 32 states with high legal autonomy.

Thus, to understand the PRI's political survival, we must examine its clientelistic networks, especially the ejido, which was essential to its survival strategy (De Janvry et al., 2014; Albertus et al., 2015). The ejido was established after the Mexican Revolution. The revolution demanded land for the landless, thus the ejido was created to fulfil that popular demand (Walsh, 1984; Albertus et al. 2012). The ejido aided the party control land, credits, and public infrastructure (Sabloff, 1981; Johnson, 2001; Dell, 2012; Morett-Sanchez and Cosío-Ruiz, 2017; Ramírez-Álvarez, 2019). This property's legal rights implied that the land was tied to the ejidatarios' use (Fergusson 2013, De Janvry et al., 2015). Hence, political elites used this requirement as an electoral punishment to survive by forcing ejidatarios to vote for the PRI to keep their land (Sinkler 2014; Magaloni 2006; Manzanilla Schaffer 2004; Cornelius et al. 1998). Specifically, the PRI sought insecure property rights to gain political power. Insecure asset rights allow those in power to use land to exert political control by linking access to land to political behaviour. Thus, the PRI was able to manipulate ejidatarios' electoral support by threatening expropriation (Castañeda Dower and Pfutze, 2015). As a difference with the first reform, the 1992 second reform was driven by pressure to democratise the country and end agricultural stagnation, despite its importance to the PRI's political survival (Albertus, 2012). The second reform, which delinked land property rights from use, freed ejidatarios and ended the PRI's hegemony by changing their political preferences (De Janvry et al. 1997; De Janvry et al. 2015; De Janvry 2014; Castañeda Dower and Pfutze, 2015). Therefore, the second reform allowed ejidatarios to request property certificates with rights to rent and sell to other ejidatarios, use the ejido as collateral for loans, vote to privatise it, and created the National Agrarian Registry (Registro Agrario Nacional, RAN) to track ownership changes. The reform tasks of certified the ejidos were given to the Programa de Certificación de Derechos Ejidales y Titulación de Solares or PROCEDE, a nationwide programme with the goal to certify as many ejidos as possible in the shortest amount of time. Specifically, the program covered the period of 1993 to 2007, eventually certificating 92% of all ejidos at the end of its life (De Janvry et al., 1997).

Consequently, the first aim of this thesis is to examine the relationship between the investment class theory regarding the PROCEDE program for ejido plots and the PRI's political survival in Mexico. While much of the existing literature on this topic has focused

on the effects of the 1992 agricultural reform and its use as a failed survival strategy, this research aims to go beyond this by examining the role of the ejido as a tool in the PRI's political survival. Additionally, this study aims to explore the combined impact of the 1992 agricultural reform, the PRI's use of public and municipality investment, and the party's decision to give property titles to ejidatarios on its electoral demise. This elemental combination enhances our estimation precision of the dual policy instruments' effects, an improvement over studies limited to the ejido reform impact. Other common topics that have been explored in the literature on this topic include the effects of these reforms on migration, access to credit, allocation of public goods, political budget cycles, and democratization. However, there is still a gap in the literature on the combined analysis of these factors and their impact on the PRI's electoral demise. Hence, this thesis chapter aims to address this gap by providing a comprehensive examination of the relationship between the investment class theory, the PRI's political survival, and the agricultural reform in Mexico in the 1990's.

Another important area of study regarding the Mexican case during this democratization period, and the fall of the PRI is the analysis of is impact on the illegal drug trafficking. Specifically, the illegal drug trafficking structure in Mexico has recently become a major industry, initially fuelled by an increase in the demand for marijuana (Toro 1995; Astorga 2005; Swanson 2020) and, more recently, by the demand for cocaine (Arends, 2021; Grillo 2011). As a result, this activity's behaviour has evolved over time, increasing its influence on other fields and sectors and facilitating its categorization into distinct phases (Trejo and Ley, 2020). Part of these drug trafficking behaviour over time, seems to be relate to the PRI regime's tight control of the country's political structure; this control allowed drug cartels or OCGs to establish impunity agreements or informal protection networks, especially at the gubernatorial level (O'Neil, 2009; Dube et al., 2013).

Thus, Chapter 3 aims to study the impact of narco-political favouritism on local finances in Mexico. Narco-political favouritism, or the association between the PRI and cartels in Mexico, has not been extensively studied in the literature as a combined effect. This favouritism could be facilitated by practices such as bribery, in which high-level officials and police officers collaborate with criminal enterprises in exchange for personal gain. This collaboration could had led to the infiltration of state institutions by the cartels, resulting in corruption or favouritism at the highest levels of Mexican policy (Brenneman, 2012; Merino et al., 2013; Trejo and Ley, 2020). In addition to bribery, there is also evidence of favouritism from the cartels towards the PRI, with some cartels helping PRI candidates win elections in

exchange for access to resources and influence within the government (Trejo and Ley, 2020). This type of partisanship could allow certain cartels to channel more resources from the central government to the municipalities where they operate, giving them an advantage over their rivals. Thus, finding evidence of the existence of narco-political favouritism and its mechanism is, therefore, a crucial element in proposing potential public policy solutions to this alarming situation.

Finally, chapter 4 aims to empirically examine the role of the regional democratization given the fall of the PRI and the onset of turf wars at the municipal level in Mexico between 1995 and 2006 (Osorio, 2014; Rios, 2015, Trejo and Ley, 2018). In particular, the focus is on the role of the large-scale land titling reform known as PROCEDE, which aimed to secure property rights for the electorate and break the clientelistic linkages between the electorate and the PRI. Specifically, the study will consider the relationship between the rollout of PROCEDE, subnational democratization, and the onset of the Mexican drug war during the 1990s. In particular, the research aims to determine whether the turnover of mayorship and gubernational positions from the PRI to other parties after the implementation of PROCEDE led to an increase in organized crime deaths (OCDs) between 1995 and 2006. This increase in violence, in accordance with the theory seems to be related to the PRI's electoral decline in the 1990s; this decline made illegal pact formation and implementation more difficult, which contributed to subnational violence. Specifically, newly democratised municipalities experienced a greater increase in drug-related violence than municipalities still under PRI rule; this increase in violence was in part due to turf wars between cartels that originated after these pacts of protection ended (Dube et al., 2013; Trejo and Ley, 2018). Hence, by examining these factors, this study seeks to shed light on the complex interplay between political and criminal dynamics at the municipal level in Mexico.

Therefore, due to the fact that the PRI regime has had a significant impact on the Mexican society, particularly in the area of drug cartels and the associated levels of violence (Trejo and Ley, 2018), understanding its relevance in this context is crucial for those interested in the complex social and political issues facing Mexico. Particularly given that the regime's monopoly on power and lack of transparency and accountability facilitated the growth of drug cartels and contributed to the high levels of violence in the country.

1.1.1. Overview of chapter 2

In this chapter, we study the impact of public and municipality investment, and a granting property titles program, PROCEDE, on the political outcomes of the PRI. This chapter distinguishes itself from other research on the topic by using municipality data and two policy instruments (agricultural reform and the manipulation of public and municipality investment) as independent variables to provide a more detailed analysis at the local level and strengthen the predictive results of the empirical approach used. This proposal also utilizes the investor class theory to argue that vote targeting occurred alongside the granting of property titles in an effort by the central government to reduce defection of ejidatarios and other loyalist voters to the opposition. As a result, the purpose of this paper is to determine whether the granting of complete property titles resulted in a change in political preferences among ejidatarios that influenced the PRI's political outcomes; additionally, we will examine the party's use of public and municipal investment as policy instruments in conjunction with full property title concessions to those communal farmers; these concessions as a mean of maintaining political influence in the wake of the 1992 agricultural reform that diminished electoral chances of the PRI.

To achieve these goals, the research employs a municipality-level dataset for the 2,450 municipalities in existence during the study period for the elections in 1991 and 1997. A panel data model with a difference-in-differences strategy and state fixed effects is used, controlling for various economic characteristics of each municipality, to estimate the results.

The empirical findings support the existence of an investor class theory effect, mainly a negative impact on PRI vote share combined with an increase in PRI public and municipal investment. This evidence particularly evident in municipalities with more ejidos, as a policy instrument for targeting loyal supporters, impoverished peasants, in response to the 1992 agricultural reform. These results suggest that the disappearance of the ejido negatively affected the PRI's political influence, but the party was able to manipulate public resources with some success in an effort to maintain political influence. More concretely, the use of policy instruments in addition to the investor class theory allows for a more nuanced understanding of the PRI's strategies for retaining voters and maintaining political influence. This approach distinguishes itself from previous research by examining the impact of the termination of the ejido system rather than its creation, and by using municipality-level data and a combined use of two policy instruments manipulation, public and municipality investment, to provide a more detailed analysis at the local level. Overall, the results suggest that the PRI used targeted investments and concessions to ejidatarios as a

means of retaining voter loyalty and maintaining political influence in the face of economic and political changes. At the same time, this research provides evidence that the manipulation of municipality and public investment and the ejido certification was damaging for the PAN party's electoral results, cancelling in a certain degree the negative impact of certification found in other works.

Particularly, our results are closely related to the paper of De Janvry et al. (2014) where the authors analyse the situation before and after ejidatarios acquiring property titles, and the effect of those complete rights on the farmers support for the PAN party, a right-wing party, at the electoral section level, a non-official national subdivision. One difference with our work is that they never combined the effect of that certification with the use of other policy instruments to see how that original impact on ejidatarios political preferences could have changed while not just considering the new assets as the only source of variation.

1.1.2. Overview of chapter 3

In chapter 3 of the thesis, we study the impact of cartel local operations on municipal fiscal policies and revenue generation in Mexico over the period of 1990-2006. Using municipality level data for around 2,250 municipalities, we find that during the period of 1991-2000, when the PRI (Institutional Revolutionary Party) regime was in power, there was a positive relationship between cartel presence and public investment in certain municipalities with evidence of drug trade operations. This suggests that the PRI regime may have used public subsidies to benefit cartels, potentially providing state protection and involving government officials in the drug trade. However, particularly after 2001, when the PRI regime ended, we found that tax revenues increased significantly, potentially due to an increase in cartel operations and profits linked to higher demand for illegal drugs. We also found that the presence of cartels can have both positive and negative impacts at the municipal level, depending on the type of revenue generation. For example, while legal businesses may see increased profits and tax revenue, illegal activities such as extortion can lead to decreased public investment. Overall, we could argue that the presence of cartels in Mexico has significant implications for municipal fiscal policies and revenue generation.

This study contributes to the relationship between cartels and the PRI, the ruling political party in Mexico, and its impact on socio-economic outcomes including homicides and economic development. The research suggests that the PRI has previously played a stabilizing role in terms of cartel violence (Trejo and Ley, 2018). However, following the defeat of the PRI, the emergence of subnational governance systems controlled by cartels has had significant effects on resource allocation and taxation at the local level (Chabat, 2005). These systems are often maintained through the use of armed clientelism and other techniques that allow cartels to suppress local unrest and gain support from local authorities (Eaton, 2006; Arends, 2021). The study also contributes on the analysis of narco-political favouritism and its impact on the subnational allocation of public resources, specifically the granting of preferential treatment to drug cartels in exchange for illicit or illegal favours. Previous research has shown that such favouritism can significantly impact resource allocation at the subnational level and is often driven by factors including political competition and partisan alignment (Díaz Cayeros and Silva Castañeda, 2004; Trillo and Rabling, 2007; Langston, 2010). However, narco-favouritism represents a unique form of corruption driven by collusion between actors such as the PRI and drug cartels, leading to the misallocation of resources or preferential treatment for these groups (Morris, 1991; Beith, 2013; Flores Pérez, 2014).

Specifically, those results are also consistent with Arends's (2021) assertion that criminal organisations seek control of municipal finances in order to use those resources for their own purposes. Thus, it is evident that cartels in our case may attempt to influence state and federal policymakers in order to redirect funds to municipalities where they operate, particularly during the 1990s. This can have a positive impact on local resources, as the influx of funding can be used to improve infrastructure, provide social services, and stimulate economic development. However, it is important to note that the primary motivation for such actions is often self-serving, as cartels seek to gain an advantage over their rivals or to protect their own operations. Thus, the influence of cartels on local fiscal levels and policy decision-making, particularly during the PRI regime era, cannot be denied.

1.1.3. Overview of Chapter 4

In chapter 4, we examine the relationship between the rollout of the land certification program (PROCEDE) in Mexico and the onset of the country's drug war in the 1990s. Specifically, the chapter investigates whether changes in mayoral and gubernatorial leadership from the Institutional Revolutionary Party (PRI) after the implementation of PROCEDE led to an increase in organized crime deaths (OCDs) between 1995-2006. Using the Criminal Violence in Mexico dataset, which records drug trade-related deaths at the municipal level, the results suggest that political change at the municipality level after the rollout of PROCEDE is a significant predictor of OCDs. This is because the termination of clientelistic links, which were a key feature of PRI's local power, due to the titling program disrupts the equilibrium between corrupt local officials and drug cartels, making the latter more vulnerable to expansion by rivals and resulting in more OCDs. Additionally, the study finds that a change at the gubernatorial levels is also detrimental for the level of violence, as higher-ranking state officials with wider geographical reach can further disrupt government protection for cartels, leading to even greater instability and more OCDs.

These results are robust to various robustness checks, including the use of an instrumental variable approach to address endogeneity concerns, controlling for confounders such as increased cultivation of illicit crops due to PROCEDE, and dividing the sample by time period and geographical region. The study also employs a novel dataset tracking the presence of 10 criminal organizations at the municipal level to provide evidence that local cartel expansion operations are the main driver of the increase in OCDs.

Overall, this chapter contributes to the literature on the impact of subnational democratic pluralism on OCDs prior to the escalation of violence in 2007. Previous research has shown that increased access to guns from the US, political competition in municipal elections, and rising subnational electoral competition are all related to drug trade-related violence in Mexico. This study adds to this body of work by providing causal evidence of the effect of the democratization wave on turf wars between cartels that lead to an increase in OCDs. In addition, chapter 4 contributes to the broader literature on the determinants of the Mexican drug war, which has identified factors such as changes in maize prices, the presence of different parties at different levels of government and rising levels of subnational electoral competition as contributing to drug trade-related violence in the country.

1.2. Organisation of this Thesis

The following three chapters utilize advanced econometric methods to examine the impact of interest. The data utilized in each chapter complements each other, with chapter 2 employing electoral, economic and ejido certification data, chapter 3 using fiscal and cartel presence data also at the municipality level, and chapter 4 extending the data by using cartel related violence and electoral data at the municipality level. The remainder of this thesis is organized as follows.

Chapter 2 begins by introducing the research in terms of previous literature and highlighting various pieces of literature that have explored determinants of the possible implication of ejido certification implementation with regards to the PRI regime's political survival; next, we present historical evidence of the PRI regime and how they use ejido property rights to remain in power. Then we highlight the municipality and public investment nature in Mexico and its possible use as survival tool by the PRI. The proceeding section then discusses the relevant data. Then, I outline the construction the empirical specification used. Following this I present the results regarding the possible PRI survival strategies. Then I conduct a number of robustness checks, which are standard in the literature. The final section in this chapter concludes.

In chapter 3 I start by describing the data and variables. I then present the empirical design regarding our aim of investigating the possible municipality cartel presence on local fiscal variables. The next section sets out the main results. I first focus on sole effect of cartel presence on our local fiscal components. Secondly, I add the possible effect of the PRI regime in an attempt to capture the effect of narco-political favouritism by adding an interaction term composed of the cartel presence indicator with a dummy variable tracking the years of the PRI regime. Thirdly, I present the robustness to exclude the possibility that cartel presence is correlated with political alignment and that our previous results could be attributed to this correlation instead of favouritism between the PRI party and the cartels. We achieved this by adding an additional term with two variations that identifies if a mayor is aligned or not with the federal government and with the governor of its corresponding state. Next, we present regional estimations to test whether the direction and magnitude of the effect of organised crime presence on our fiscal variables differs for municipalities located in different regions of Mexico during the PRI regime (1991-2000). The final section of this chapter discusses the main results, concludes and briefly discussed possible contributions and future additions to complement the research.

I start chapter 4 by giving information on the Ejidos and the downfall of PRI with its relationship with the Mexican drug war that unravelled during the final years of this party's regime. The next subsection describes the data used in the study. Following this part I characterize the empirical specification. The following section presents the results. First, to illustrate the quality of the data, I show that the data is an accurate predictor cartel related violence with respect to a political change at the municipality level. I then estimate the same equation enriched with an interaction term consisting in the interaction of our political variable and four different variables of illicit drug production. To alleviate further endogeneity concerns of the rollout of PROCEDE, our next exercise is to implement a two-stage-least-square (2SLS) strategy employing the first informational meeting by authorities as an instrument for certification. Then present estimation for two sub-periods. In particular, for the sub-periods 1995-1999 and 2000-2006. Next, we report results for the division of our sample into the three major areas of Mexico: north, centre, and south. Later, we present as our last step in our empirical analysis a series of estimations that replace the dependent variable OCD with the variables Any cartel, Multiple cartels, and First cartel presence. The next section discusses the results. Finally, the last section in chapter 4 concludes.

This thesis concludes in chapter 5. Here, I summarise the implications of this thesis for, economists, policy makers and the overall society in Mexico. I begin by presenting each chapter's main findings and provide an economic interpretation of the main effect of interest. Then I discuss the policy implications, limitations and possible future research. For the second chapter, I highlight the potential mechanism underneath the PRI electoral demise related to the ejido certification program started in 1992 and how the party could have tried to politically survive by modifying public investment to try to substitute clientelistic networks related to the ejido. With respect to the third chapter, I discussed the evidence of an impact of cartel presence locally on the local fiscal variables suggesting a possible narco-political favouritism. And in the fourth chapter this thesis describes the implications on the political rotation at the local level related to the PRI electoral demise to the cartel violence level.

Chapter 2 The investment class theory: A test in Mexico at the end of the ejido era

Mexico experienced key political structure changes in 1992, the ejido dismantling and an increase in policy instruments manipulation by the PRI. This paper examines the impact of public and municipality investment, and a granting property titles program, PROCEDE, on the political outcomes of the PRI by employing a unique nationwide dataset at the municipality level for the 1997-1991 period. To find evidence of those effects, we exploit the observed heterogeneity on the percentage change in ejido certification, public and municipality investment across municipalities as identifying sources of variation and employ a difference-in-differences design that holds unobserved local characteristics fixed. Our results provide strong evidence in favour of a differential effect of the "Investment Class Theory" (voters changing their political preferences due to stock ownership) combined with distributive politics in municipalities of Mexico. Building on the literature of the ejido's socio-economic impact on the Mexican economy, we argue that the PRI tried to avoid a change in political preferences of ejidatarios by the property titles granting process with a considerable increase in public and municipality investment; nevertheless, its level of efficacy could not have been enough to avoid the party's falling.

2.1. Introduction

Political preferences are generally linked to personal characteristics or circumstances that define a person's position in society that one-time drastic change occurrences can alter. One of those circumstances is an asset acquisition, financial or non-financial, like land property titles in countries like Mexico. Once the new investor has acquired his asset, he develops more refined and important financial interests towards protecting the value of his new acquisition. To protect his financial interests, the individual will gradually support political options, parties with market-friendly policy proposals that can provide him with better assurances that his assets will remain valuable if those policies are implemented (Nadler, 1999). This shift in political preferences is commonly referred to as the investment class theory.

In the case of the United States, this theory arose primarily from a group of conservative think tanks that depicted a situation in which self-interest was an important factor in motivating a behaviour change. This change in behaviour is expressed as marginal

shifts towards conservative parties, in this case, the Republican party (Nadler, 1999; Richardson, 2010). This shift is comprised of two distinct processes: first, the search for new specialised financial information sources, and second, as the value or number of assets owned increases, the investor will gradually seek out parties with pro-market and financial-friendly proposals to increase the value of his assets (Nadler, 1999, Richardson,2010). These processes imply that participation in the stock market, or any other non-financial stock market, has a specific degree effect on partisanship and more conservative political attitudes; these attitudes are then translated into a higher likelihood of a voter leaning conservative (Glassman, 2001).

On the other hand, there is evidence that this effect has been present for the Mexican case, especially since the 1992 agricultural reform. This reform ended the ejido as a communal land without direct property rights, and for the first time in history, ejidatarios, or Mexican farmers, were granted full property titles for their land plots. These new plot owners were liberated from the previous system in which they were forced to vote for the PRI party, which ruled Mexico from 1929 to 2000. Due to this new circumstance, these new owners started to vote for the right-wing PAN party (De Janvry et al., 2014; Castaneda Dower and Pfutze, 2015). Consequently, the PAN party, which advocated for more market-friendly policies, was the primary beneficiary of the country's second agricultural reform (De Janvry et al. 1997; De Janvry et al. 2015; De Janvry 2014; Castaneda Dower and Pfutze, 2015).

Moreover, the PRI's survival strategy extended beyond the realm of agricultural reform and land property rights. It also involved a strategic allocation of public and municipal investments (Bardhan et al., 2008; De Janvry et al. 2014). Public investment, often directed towards larger infrastructure projects, was concentrated in wealthier regions and big cities. This approach, however, may not have been ideally suited to attract voters in rural communities and smaller towns, where the impact of these investments could be less noticeable. On the other hand, municipal investment, which was more localized and evenly distributed, could have had a more significant impact on the value of ejido lands, thereby influencing the political preferences of ejidatarios (similarly as in Vicente and Wantchekon, 2009).

The ejidatarios' significant political change was generated by the second agricultural reform enacted in 1992, which was originated as a survival strategy by the party.The implementation of this reform was initiated by a pressure to democratize the country and at the same time to solve the stagnation of the agricultural sector at the end of the 80’s. In

the same time period, the PRI started to increase the public and municipality investment as concessions to traditional and possible new voters to retain their support in the absence of the ejido as punishment system for voter's lack of support. The combination of those strategies was used to deter a higher political competition and for PRI's elites to gain favourable policy concession under the new democratic system (Albertus, 2012).

In Mexico during the 20th century prior to the 92 reform, the survival strategy mainly depended on the establishment of a land rights system that usually tied land to its continuous use (Fergusson 2013, De Janvry et al. 2015); the elites in power often used this requirement as an electoral punishment system to politically survive forcing ejidatarios to vote for the PRI to preserve the property over their lands (Sinkler 2014; Magaloni 2006; Manzanilla Schaffer 2004; Cornelius et al. 1998).

Interestingly, the PRI's strategy of increasing public and municipal investment may have fostered an environment conducive to political exploration. The certification process, coupled with the PRI's strategy of manipulating public and municipal investment, could have influenced the political preferences of ejidatarios, helping the party to partially retain power but at the same time leading to an increase in the PAN's vote share. However, the differential impacts of public and municipal investment on electoral outcomes suggest that public investment could potentially disadvantage the PAN party while benefiting the PRI.[1]

The establishment of the ejido, or communal agricultural land, as a result of the first agricultural reform resulting from a civil war, "The Mexican Revolution," aided the party in establishing a strong control over access to land, credit, and public infrastructure (Walsh, 1984; Albertus et al. 2012); those strategies allowed the Institutional Revolutionary Party (Spanish: Partido Revolucionario Institucional, PRI), to remain in power for over 70 years (Hammet, 2006; Sanderson 1986; Eckstein,1968).

The second reform, as previously mentioned, delinked land property rights from use, giving ejidatarios more freedom and contributing to a shift in their political preferences and the end of the PRI's hegemony (De Janvry et al. 1997; De Janvry et al. 2015; De Janvry 2014; Dower et al. 2015). This result appears counterintuitive because it would be expected that granting full property land rights to landless individuals while increasing public

[1] For a nuance study of public investment and its electoral effects but for the Spanish case see De La Calle & Orriols (2010).

investment would increase rather than decrease loyalty (Sabloff, 1981; Albertus et al. 2015).

This party's loss of hegemony occurred in no more than seven years from 1991 to 1997, and on average, the PRI lost about 30 per cent of votes in many municipalities. This fact begs the question of whether the policy instruments chosen, the increased use of public investment, and the ejido certification programme, which were designed to mitigate the loss of an essential part of the PRI's clientelistic network, the ejido, were successful in keeping the party's main voters loyal despite their shift in political preferences.

The majority of the literature on investment class theory and its relationship to the PRI's political survival has focused solely on the 92 agricultural reform effects and their use as a failed survival strategy.[2] Another part of the PRI political survival related literature, the party decision to create and use the ejido as a tool, has centred part of their efforts on the relationship of the first agricultural reform in Mexico to establish a punishment system to control electoral outcomes. Other common topics on the two agricultural reforms have been the study of the effects of those reforms on migration, access to credit, allocation of public goods, political budget cycles or democratisation (Fergusson et al. 2018; Ramírez-Álvarez 2019; Dell 2012; Sinkler, 2014; Albertus et al., 2015; Deininger, 2001; Albertus et al., 2012a; De Janvry et al., 1997; Johnson, 2001).

Despite the study of those topics, there is a pending theme to be addressed: the combined analysis of the PRI's electoral demise as a result of a failed survival strategy of giving property titles to ejidatarios, the 1992 agricultural reform, and the party's simultaneous use of public and municipal investment to mitigate any potential negative impact of that agricultural reform.

In contrast to other papers, this approach, which uses municipal data and two policy instruments as independent variables, agricultural reform and manipulation of public and municipal investment, implies more information at the local level and more data to strengthen the predictive results for the empirical approach used in this work.

[2] Among those works, the most closely related to our research is the paper of De Janvry et al. (2014) where the authors analyse the situation before and after ejidatarios acquiring property titles, and the effect of those complete rights on the farmers support for the PAN party, a right-wing party, at the electoral section level, a non-official national subdivision. One difference with our work is that they never combined the effect of that certification with the use of other policy instruments to see how that original impact on ejidatarios political preferences could have changed while not just considering the new assets as the only source of variation.

In addition to the foregoing, this proposal employs the investment class theory to argue that vote targeting occurred concurrently with the granting of property titles in an effort by the central government to reduce the deflection of ejidatarios and other loyalist voters to the opposition.

As a result, the purpose of this paper is to determine whether the granting of complete property titles resulted in a shift in political preferences among ejidatarios, which influenced the PRI's political outcomes. Secondary to this goal, the research seeks to shed light on the party's use of public and municipal investment as policy instruments, in conjunction with full property tile concessions to ejidatarios, in order to try to politically survive and, in part, avoid the effects of the investment class theory. Thus, this scheme could have been used to compensate for the loss of ancient clientelistic networks as a result of the 1992 reform. This paper contributes to the existing body of knowledge by adding more layers of information to original works such as the one presented by De Janvry et al (2014). It explores the addition of public and municipality investments as alternative political survival strategies of this party during the study period, thereby providing a more nuanced understanding of the PRI's survival strategy.

In order to pursue the goal of identifying the causal relationships mentioned previously, we employ a municipality-level dataset for the 2,450 municipalities existent in the study period for the elections that took place in 1991 and 1997. We use this information to estimate a panel data model in a difference-in-differences strategy with state fixed effects and robust standard errors controlling for several economic characteristics of each municipality.

Our empirical findings provide evidence in favour of a possible existence of the investment class theory effect, a negative impact on the PRI vote share, combined with the rise of public and municipality investment by the PRI, especially on municipalities with more ejidos as a policy instrument to target loyal supporters, impoverished peasants, in response to the 1992 agricultural reform.

The possible existence of the Investment class theory effect in the study period is supported by the evidence of a negative and statistically significant coefficient for the percentage change of the titling program. In addition, the positive and statistically significant coefficient for the interaction term between the policy instruments considered in the study, indicates a certain level of success of the party’s strategy on keeping voters loyal, diminishing the incentives of ejidatarios to deflect to the opposition. Two outcomes

arise from these results, first, that the ejido disappearance negatively affected the PRI political influence, and second, that the party was able to manipulate with relative success public resources to retain a certain level of political influence.

This result found with our empirical specification is similar to De Janvry et al. (2014) because they found some evidence of the effect of the investment class theory, more voters deflecting to the political opposition due to a change in political preferences; nevertheless, they did not use other policy instruments to have a higher level of information for their model. At the same time, our result is also similar to Albertus et al. (2015), in which the PRI support eroded more rapidly in regions with higher economic development, although they measured the effect of the creation of the ejido and not its termination where some of those dynamics seemed to last beyond ejido's end.

Therefore, the simultaneous existence of ejidatarios targeting with more public and municipal investment would be based on voters more sensitive to receiving concessions, especially in a fragile environment such as the ejido, and the PRI elites' preference for using public and municipal investment as an instrument to attract voters rather than for improving economic development. At the same time, the change in political preferences of some ejidatarios could be based on the newly acquired value of this new asset and their intention to preserve or increase that market value with the support of more market-friendly parties.

This result means that our proposed hypotheses of the existence of a negative impact of the investment class theory effect on the PRI vote share and a direct influence of the policy instrument manipulation on keeping voters' loyalty were a combination of survival strategies applied by the PRI despite the result of the loss of its hegemony at the end of the period of study. This strategy implementation was done despite the change in political preferences.

Finally, in order to further validate our findings, we conducted a robustness check by replicating the same estimations, but this time focusing on the PAN party's percentage vote share change. The results from this analysis corroborate and reinforce our main conclusions. The combination of the use of public and municipal investment, along with the certification process, was indeed a somewhat successful strategy for political survival. Specifically, the use of public investment appeared to be more successful than municipal investment in preserving some level of support for the PRI, and to a certain degree, it seemed to negatively impact the PAN party's electoral prospects. However, despite these

strategic efforts, they were not sufficient to prevent the eventual fall of the PRI. This robustness check further strengthens our analysis and provides additional support for our conclusions, highlighting the complex dynamics of political survival strategies and their limitations.

The remainder of the chapter is organised as follows. Section 2.2 discusses the theoretical considerations upon which we base our analysis. Sections 2.3 and 2.4 introduces the political and historical background of the country. Section 2.5 presents the empirical specification and the data. Section 2.6 discusses the empirical results. Finally, Section 2.7 summarises the main propositions of this dissertation.

2.2. Theoretical Considerations

2.2.1. Investment Class Theory

A change in political preferences from certain members of society is not an uncommon occurrence; this change could be motivated by an alteration in how an individual sees the world due to a long process of acquiring goods or special rights. Those difficulties make the individuals appreciate more the newly acquired goods, and those individuals will try to support any government policies that help them keep or increase the value of the newly acquired goods.

The investment class theory was originated in the United States through right-wing think tanks. This theory is based on the self-interest that motivates an individual, especially if they acquire a certain amount of financial assets; Those assets make the individuals who possess them more aware of their market value and more careful with the political parties they support because parties' political platform could influence that value. These parties usually belong to the right-wing spectrum, like the Republican Party in America (Richardson, 2010).

According to Richardson (2010), there are two mechanisms behind that shift in individual preferences. The first mechanism is a change in the source of information from mass media to more specialized sources, aimed at increasing the value of her assets. These sources are usually journals that blend this information with a market ideology, which the individual absorbs and incorporates into her mentality. The second mechanism involves a shift in the economic interests of the new stockholders. Over time, these interests become more aligned with pro-market policies aimed at protecting the stockholders' interests.

Finally, the investment class theory correlates with partisanship, political attitudes, and participation. Consequently, new investors tend to be more politically conservative and are more likely to vote for a right-wing party, which generally supports market-friendly initiatives.

Several studies have investigated the effects of that shift in preferences in the USA, but recently, a number of papers have identified a similar pattern in developing countries.

On papers treating the American case, Duca and Saving's research (2008) indicates a higher preference for the Republican party correlating with increased stock ownership within the American population. Their findings suggest that when an individual's asset ownership rises, their political allegiance may shift to favor parties that protect their wealth. This theory might apply in Mexico, where ejidatarios, armed with property titles

for their lands, reportedly began supporting the PAN party after the 1992 agricultural reform.

The paper employed three tests to establish a link between higher stock ownership rates and increased Republican vote shares in the House of Representatives, implying that property interests impact voting behavior. However, their research could be potentially limited by the use of time series over panel data methodology. As Hill et al. (2020) explain, panel data offer richer information and variability, increasing efficiency over time-series data.

The researchers' use of time series could miss certain significant effects as it doesn't account for unobserved heterogeneity, potentially leading to biased estimates (Hsiao, 2007). Fixed effects models utilized in panel data analysis can control for this unobserved heterogeneity, offering an advantage in overcoming omitted variable bias (Hill et al., 2020; Matthias and Eberl, 2020). Despite potential limitations, Duca and Saving's study (2008) provides a well-structured examination of factors influencing voting behavior beyond stock ownership. Their results remain a significant contribution to understanding the relationship between asset ownership and political behavior, despite the possible robustness of their methodology with a panel data approach. Their study serves as a crucial starting point to affirm that asset ownership, specifically land property rights, can alter political allegiances.

On the other hand, Di Tella et al. (2007) study the case of squatters in Buenos Aires, Argentina, where the government granted land titles to some of these squatters due to a political decision. According to the research, this changed the beneficiaries' beliefs, aligning them more closely with the workings of a free market. The researchers used a two-stage least squares technique to find evidence of a shift towards a free-market mentality among the squatter owners. The implementation of this study proxied the preferences of these owners with the beliefs of success, money importance, effort, trust, and market attitudes as a dependent variable.

Overall, the study by Di Tella et al. (2007) provides reasonably consistent evidence of an association between possession (or lack thereof) of a property title and the likelihood of an individual holding beliefs that are individualistic and materialistic.

This study is relevant to our case because it links property rights to an increase in market beliefs in a developing country like Mexico. It presents a scenario similar to the one

under investigation here, where the government granted property titles to low-income, less-educated individuals who were already occupying the land. This case could be an accurate example of what happens when a deprived population gains access to an asset, in this case, property rights over land, and how this asset influences the people's political beliefs.

One critique of this work could be that the natural experiment did not extend broadly enough beyond the specific area of the city where it took place. It would be interesting to identify a similar natural experiment, apply the same methodology, and see if the conclusions are replicated. Nevertheless, the conclusions of this paper are extremely valuable as they illustrate that assets other than financial stocks can alter individuals' mentalities.

In a study specific to Mexico, De Janvry et al. (2014) identified the impact of the PROCEDE program, which conferred property rights to citizens. This program, which primarily benefitted the right-wing PAN party through increased voter support, especially from ejidatarios with property titles, had a negative effect on the PRI party to some extent. The researchers focused on the influence of ejido certification on the PAN's share of votes, contrasting with our study where we considered the PRI's vote share and indirectly estimated the adverse impact on the PRI's political longevity. The shift in voter preference is interpreted as a consequence of the potential profitability from acquiring asset ownership, a fundamental premise of the Investor Class Theory.

Further, De Janvry et al. (2014) also considered the possibility that internal migration might have influenced the change in vote share, prompting an adjustment for the changes in the number of voters in each election. An estimation of pre-trends in voting behaviour was conducted using data preceding the 1992 reform. Additionally, the study provides evidence that the release of ejidatarios from their obligation to support the PRI validates the plausibility of the Investor Class Theory in a country like Mexico. This conclusion is underscored by the observation that farmers primarily shifted their votes to a more market-friendly party in an effort to protect the market value of their ejidos. Thus, the phenomena seem to not be exclusive to developed countries or strictly linked to financial assets.

The analysis by De Janvry et al. (2014) however, does not account for the possibility that the PRI could have counterbalanced the loss of peasants' support by manipulating policy instruments, such as public investment, to soothe the disruption of PRI's core

electoral machinery, the ejido. In contrast, our research explores this interplay between increased property titles and public investment. Furthermore, the research also intersects with the topic of distributive politics. It suggests that distributive goods, specifically ejido titles, were deliberately issued to their primary voters when the economic liberalization outweighed the need to preserve the ejido's clientelistic network and retain peasant support. The party likely believed that property certificates would suffice to sustain their backing.

In addition, the study utilizes locality-level data, the most granular territorial division, alongside election results for the House of Representatives (Camara de Diputados), combined with information on ejidos. This allowed the researchers to identify a correlation between the geographic and economic characteristics of ejidos and support for the PRI. The timing of certification and prior party alignment of municipal presidents and state governors were also found to affect the party's support levels. In addition, the certification time also affected the percentage of support for the party combined with the previous party alignment of the municipality president and Governor of every state. Additionally, to test exogeneity, the work uses pre-Procede changes in electoral results from 1991 and 1994 to see if the order or date of the program's rollout is not correlated with the change in ejidatarios' vote.

Lastly, three key findings were noted by the authors: asset ownership triggered a shift in support for the PAN party, primarily due to ejidatarios voting against the PRI's lack of commitment to enhancing the value of their new assets; this shift was more significant where economic interests related to ejido profitability were higher; one-time irreversible asset transfers couldn't maintain or boost support for the PRI party. Thus, the research by De Janvry et al. (2014) is valuable as it demonstrates that once ejidatarios were released from the obligation to support the PRI, the Investor Class Theory could be relevant even in a country like Mexico. The farmers' shift in allegiance to a more market-friendly party to safeguard their ejidos' market value suggests this phenomenon isn't exclusive to developed nations or strictly financial assets.

Finally, The Investor Class Theory's impact on the decline of the PRI party and the surge in votes for the PAN party is supported by evidence suggesting that not only did granting property rights aid the right-wing party, but it also benefited the country's third party, the left-wing PRD, which seemed to gain from the Procede program rollout. Additionally, it's noteworthy that the influence of property titles on the rise in votes for the

PAN party disappears if the PRI had already lost at least one local election (Castañeda Dower and Pfutze, 2015).

This evidence adds insight into the operation of the Investor Class Theory in a country like Mexico, with unique characteristics like electoral machinery tied to land use until 1992, high corruption levels, and a highly centralised government. These factors may explain why land titling appears to affect all opposition parties. If the PRI had previously lost elections, the change to an investment mentality did not significantly increase votes for primarily the PAN party, suggesting that other core voter groups sustained a certain level of PRI support despite ejidatarios' dwindling allegiance.The fact that land titles benefited not only the PAN but also the PRD party does not detract from the dominant effect of vote increase for the PAN. It merely suggests a potential spillover effect of PRI losses on other opposition parties. However, upon initial analysis, this spillover effect seems minor as the right-wing party remains the primary beneficiary, aligning with other studies.

The core voter hypothesis seems to be an effective framework for understanding how a group can undergo a mental shift that also manifests politically in their society. This political shift can be particularly significant in a country like Mexico, where a long-lasting ruling party employed tactics to forcibly secure a large number of votes. Such change rooted in land reforms or other market-friendly reforms can be instigated by the very party or group that established an autocratic regime to maintain influence following potential regime collapse.

Interestingly, evidence suggests that it's more likely for an autocracy, like the PRI, rather than a democracy, to implement substantial changes requiring significant political backing. When such a regime perceives itself as posing substantial risks to its members' interests, democratisation and a more open economy are typically the chosen path for the elites. These seemingly counterintuitive moves by regimes to self-destruct are often based on the calculation that the autocrats can leverage their previous power to secure advantageous positions, even within a democracy (Albertus, 2012b). This seems applicable to Mexico, where the PRI party dismantled the ejido system, a crucial part of its electoral machinery. By granting property titles, the party attempted to maintain political survival while securing advantageous positions within a democratic system.

2.3. Agricultural Reforms in Mexico

2.3.1. The First agricultural reform in Mexico

The fight for public land access in Mexico has its roots in the local elite's denial of peasant access to land at the end of the 20th century. Access to land was historically guaranteed by two ancient property systems that the Spanish conquerors respected. These systems were the pre-Spanish conquest communal land regime on one side, and the Spanish organization of public land, which was brought directly from the mother country, on the other (Johnson, 2001).

Those types of land rights systems allowed peasants to access small parcels of land, but all of that ended when Mexico became an independent nation. In particular, the restriction of access to communal land was more severe during the Porfiriato period (1876-1911). The dominant figure of the era, General Porfirio Diaz, allowed certain oligarchs to accumulate land, which resulted in peasants becoming a poor and landless class. This land-grabbing occurred mainly through the seizure of land, using both legal and illegal methods, to establish an agricultural export system (Coatsworth, 1974). Therefore, at the end of that period, those actions made the fight for land free access a growing demand that became necessary to gain stability and generate growth.

This fight for land became one of the main pillars of the Mexican Revolution, a movement from which the PRI party originated. The Revolution, which lasted from 1911 to 1920, initially aimed to overthrow Porfirio Diaz. The importance of the land access request became evident when some of its main leaders had it as their main priority, like Emiliano Zapata. At the end of that conflict, that fight materialized in one of the most important articles of Mexico's 1917 constitution, article 27.

This article enabled the distribution of land to more than 32,000 rural communities, equating to 103 million hectares—almost half of Mexico's surface area (De Janvry et al. 2014). Article 27 established that the communal property, known as ejido, could not be sold, rented, or used as collateral, but it was possible to inherit certain parcels. This land ownership system divided ejidos into three categories: lands with usage rights, lands to be used as residential plots, and lands for grazing and forestry.

Those lands were heavily regulated by the PRI government, to the extent that hiring labour was forbidden under threat of the government reclaiming any plot left idle for two years. All this regulation fell under the purview of the National Agrarian Commission, a highly bureaucratic body key to the party's dominance of the rural sector

(Albertus et al., 2015). Ejidos were represented through the establishment of the "Comisariado ejidal" office. The officials of this office were elected by the majority of ejido members, who liaised with the National Agrarian Commission to request government financial aid.

The process of land allocation was politically controlled by the National Confederation of Peasants, an arm of the PRI party. The commission was formed for each of the Comisariado ejidal offices of each ejido and had close ties with the National Agrarian Commission. This commission required each ejidatario, or communal peasant, to cast their votes for the PRI party in exchange for financial support (Larreguy, 2013).

A key aspect of the first agricultural reform in Mexico is the study of the long-term effects on the country's regional development. Particularly noteworthy is the study of government strategies aimed at maintaining public support and preventing another uprising. In order to study this historical event, Dell (2012) exploits within-state variation in drought severity to identify how the intensity of insurgency during the Mexican Revolution had a lasting economic effect on those regions.

This instrumental variable allowed the calculation of the intensity of the land distributed, especially in the most affected areas by the Mexican revolution. According to work, the intensity of this land distribution is strongly related to the level of industrialization, income, and political competition in the long run. The paper concludes that these long-term effects are significant for understanding the major economic and political differences among the nation's various regions.

A novel aspect of Dell's paper is the use of drought severity as a measure of conflict intensity. Uncertainty remains as to whether this mechanism could be used to analyse other conflicts involving popular uprisings. This circumstance arose because Mexico had a unique culture and geographical characteristics that could not be applied elsewhere. In addition, the goal of the Mexican Revolution was to secure land and freedom for impoverished peasants. Since other civil wars were fought for entirely different reasons, this instrument may not be applicable in other instances.

The concept of poverty traps is central to the discussion of the 1917 agricultural reform; this outcome has been associated with the political survival strategies that the dominant party used during its period of rule. The work of Albertus et al. (2015) use variables such as state-level PRI vote shares in presidential elections, land distribution,

federal public investment, net migration, and arid land to conclude that land distribution helped the PRI party to maintain power. This strategy, combined with low investment in public infrastructure that limited productivity, kept the peasantry poor and left the agricultural sector underdeveloped - a case of a poverty trap. This situation created a poverty trap, inhibiting the long-term development of some regions more than others.

The conclusions of Albertus et al. (2015) do not address the local level, where the PRI's punishment system operated. Utilizing state-level elections may not be optimal for capturing local trends, which could be significant in understanding how these communities engaged with the political system. This punishment system operated through the Comisariado ejidal, the ejido's official legal representative to the government; this representative and local officials from the Comision Nacional Agraria were responsible for mobilizing the peasantry to vote for the state party. This dynamic was predominantly focused at the municipal and ejido level; therefore, the use of state-level data might not capture some of the dynamics occurring at these more localized levels of representation.

On the other hand, since the president, through the National Agrarian Commission, was legally responsible for granting land to communities that requested it, the use of presidential election data seems to be appropriate to capture the primary dynamics of the clientelist system.

The first agricultural reform was fundamental for the PRI party to strengthen its power. This reform enabled the party to establish clientelist networks in the rural sector, ensuring its survival for 70 years. On the contrary, the second agricultural reform of 1992 started as a way for the PRI to regain popular support and also to clean their image internationally. Unfortunately for this institution, the reform eliminated one of its major pillars of power, but concurrently, it ushered in a period of democratic transition and apparent growth.

Finally, on a similar stance, Magaloni (2006) analyses the strategies that the PRI party used to remain in power and the ejido as electoral machinery; those strategies were vote-buying, electoral fraud, and repression that diminished the opportunities of opposition parties to gain support. This paper suggests that hegemonic regimes, like the PRI, still hold elections as a means to distribute power among elites, give the appearance of substantial popular support, and invite opposition parties to participate in, and support, the system, thus becoming dependent on it. The work uses a decision-theoretic problem that calculates the expected utility of joining the hegemonic party. This utility is the

perception of a higher chance of winning elections by joining the ruling party, which is why hegemonic parties create an image of invincibility. Also, to model the electoral support in autocracies, the work uses a voter's utility function to support or not the hegemonic party.

One important conclusion of this paper is that one imperative strategy that the party used was establishing the fear of economic punishment (political budget cycles) to keep support even in times of economic downturns. The study provides limited empirical evidence, but it introduces more economic variables to facilitate a more in-depth examination of the economic punishment argument.

2.3.2. The Second Agricultural Reform and the Beginning of the End of the PRI Party Dominance

The ejido as a system of political control started to make its contradictions obvious in the late '80s when the agricultural sector was falling behind in productivity, gross production and the level of investment. The second agricultural reform in Mexico began as a group proposition inside the PRI party, the technocrats. This group came to power in 1988 with the arrival of President Carlos Salinas. He and his group saw the land right system in Mexico as an impediment for a certain comparative advantage that the agricultural sector had against their American counterparts. This advantage expressed in lower labour costs became a priority when Mexico, Canada and the USA agreed on a Free Trade Agreement or NAFTA. Consequently, in 1992, President Carlos Salinas introduced a reform to Article 27, aiming to terminate the land grant program and enhance the land rights system within the ejido.

The reform consisted of the possibility of ejidatarios to request property certificates with rights to rent and sell to other ejidatarios, the possibility to use the ejido as collateral to request credits, the option to vote to privatize the ejido fully, and the creation of an ejido registry to monitor the changes in ownership, National Agrarian Registry (Registro Agrario Nacional, RAN). The responsibilities for executing the reform were assigned to the Programa de Certificación de Derechos Ejidales y Titulación de Solares (PROCEDE), a nationwide program aimed at certifying as many ejidos as possible.

< Insert Figure 2.1 here >

< Insert Figure 2. 2 here >

The program covered the period from 1993 to 2006, eventually certifying 92% of all ejidos by the end of its life (De Janvry et al., 1997). However, the number of ejidos that were fully or partially privatized or acquired dominio pleno was low. Ejidos that were privatized since the start of the reform in 2009 accounted for 7% of the total, and when accounting for the area, they made up only 0.002% (Sinkler, 2014). Therefore, in our sample, dominio pleno constitutes a small part of the total, and in one of the robustness checks using data from 1991 to 1994, the share of fully privatized ejidos was even smaller.

This Reform and its political and economic effects have been controversial, with studies finding both positive and negative effects. However, the one thing certain is that this reform came as a proposition to the elites inside the party as a political survival tool to adapt to a more democratic environment.

In relation to the second agricultural reform and other important structural reforms that the PRI implemented in this period, De Janvry et al. (1997) hypothesized that the North American Free Trade Agreement (NAFTA) opened opportunities for Mexican farmers to leverage their comparative advantage of lower prices. However, at the same time, the lack of public infrastructure, lack of credits and low productivity was a huge impediment for the ejidos to adapt to this situation. The study concluded that few ejidatarios pursued an entrepreneurial strategy due to the aforementioned problems. The conclusion could be of high interest as the elements described are essential components that the ruling party used to maintain the loyalty of the peasantry. However, this strategy damaged the long-term development of the agricultural system, thereby reaffirming that a corrupt system is detrimental to any society.

The relationship between agricultural productivity and land property rights has been an important concept in studying economic development in general and an interesting niche for studying the PROCEDE certification program effects. Johnson (2001) found that this program failed to increase the capital intensity and productivity of ejido agriculture. This result was apparently due to lack of access to credit, a small quantity of full privatisation of ejidos, and a lack of public infrastructure.

On the contrary, the work seems to suggest this result is more related to the reduction of transaction costs associated to the participation in the credit markets and a lack of alternative or informal markets for the farmers to get credits. This work used ejido-level data, a model of credit use under asset rationing, and a logit model of participation in PROCEDE to draw its conclusions. This work comprises two different techniques that could complicate the final analysis of this situation because each of the models has different

constraints. These could affect the final results, particularly when dealing with a utility maximization problem combined with a probabilistic model.

As an unfortunate consequence of the reform, diminished negotiation power resulted in reduced public investment. Ramirez-Alvarez (2019) found lower growth in households with water and electricity in ejidos that transitioned to full private ownership compared to those that remained communal. In addition, the study seemed to indicate lower voter turnout rates in local elections. The paper suggests that without the capacity of the ejido's commissioner leader to deliver votes to the PRI party, the elites in power had no incentive to coax citizens with public infrastructure. This result is based on a 'difference in differences' matching procedure used to create an appropriate counterfactual for ejidos that have adopted dominio pleno.

Also, the work of Ramirez-Alvarez (2019) calculates a propensity score using a probit model to use it as part of the procedure to obtain an Average Treatment Effect on the Treated. This procedure seems interesting but, at the same time, challenging due to a highly complicated empirical strategy. In addition, it could be interesting to use federal election results to find a similar result because an essential part of the public investment comes from the central government since the work uses just local election results. Also, it could be of interest as well the inclusion of the PRD party to not just give the PAN party the sole representativity of the political competition, as the work uses just a local standard deviation of the PAN share of votes. The reason for that is because, in the years of the 1992 reform, the PAN and PRD parties gain in certain regions almost the same share of votes, thus, sharing a similar electoral weight.

Therefore, it seems that the topic of the investment class theory is relatively new, with research mainly focused on financial assets for developed countries, and research focused on non-financial assets for developing countries. For Mexico, all the works seem to identify that the granting property titles to landless farmers, ejidatarios, weaker the PRI political power due to a change in ejidatarios' political preferences, change originated in the newly acquired assets; the new owners of those assets became more sensible to politics that could damage the value of the newly privatized ejidos. What has not been studied in more detail is the PRI simultaneous manipulation of public and municipality to attract voters still and at the same time preserve the support of its main voters, ejidatarios, despite the apparent change in political preference due to the PROCEDE program rollout, a program in charge of the emission of new titles for ejidatarios.

2.4. Fiscal Decentralization and Public Investment Strategies: Political Influence and Voter Manipulation in Mexico.

Mexico's political economy in the 1990s was defined by fiscal decentralization and the strategic allocation of public and municipal investments. However, the autonomy granted to local governments was possibly not total, as the influence of the Institutional Revolutionary Party (PRI) could have persisted subtly. Similarly, the distribution of investments may have been influenced by political bias, favouring regions of significant political benefit. Furthermore, these investments may have been moulded by political competition and decentralization demands. Hence, these elements highlight the intricate relationship between fiscal policies and political strategies This continues the thread from our earlier sections on how political motivations intertwine with economic shifts, such as property rights distribution and farming reforms. This further clarifies the vital role of asset ownership and changing rural political preferences in fiscal strategizing, emphasizing the complex bond between economics and politics.

2.4.1. Fiscal Decentralization: Local Budget Control and Federal Influence

Fiscal decentralization in Mexico is historically entwined with political power dynamics. Despite decentralization giving states and municipalities more financial control, the allocation of public investment—mainly from federal taxes—stayed highly discretionary. This was particularly apparent in the 1990s, when the Institutional Revolutionary Party (PRI) leveraged these resources for voter appeal (Garman et al., 2001).

During the 1990s, the Mexican government maintained substantial control over approximately half of all discretionary and earmarked funds. Under Presidents de la Madrid and Salinas de Gortari in the late 1980s and early 1990s, several federal programs were centralized, directing significant funding to state and municipal governments. These politically driven moves aimed to secure support for the incumbent president, especially among low-income communities. However, as the PRI's influence lessened during Zedillo's presidency, executive control over these discretionary investment programs was challenged, leading to attempts to boost the proportion of 'participaciones' relative to these programs (Garman et al., 2001).

Fiscal decentralization is recognized as a potent tool for improving government efficiency and driving regional economic growth, particularly in nations undergoing democratization (Cohen et al., 1999; Falleti 2005; Hernández-Trillo and Jarillo-Dobling, 2008; Arends, 2021). However, benefits might be obstructed due to political alignment, favoritism towards partisan allies, and control over local government funding (Tiebout 1956;

Oates,1968; Salmon, 1987; Pierson, 1995). Moreover, partial decentralization could introduce distortions, impeding potential benefits, specifically if it is contingent on political alignment or favouritism. [3]

In Mexico, decentralization initiated in the 19th century was slowed by the PRI regime's central control over taxes and expenditures (Hernandez Trillo et al., 2002; Smith, 2012; Diaz-Cayeros, 2006). The 1980 National System of Fiscal Coordination (NSFC) sought to address this, offering a platform for intergovernmental cooperation and resource reallocation, transferring local tax authority to the federal government in return for stable federal allocations (Hernandez Trillo et al., 2002). Specifically, fiscal reforms, especially those to article 115 of the national Constitution in 1983, gave municipalities authority over several public services and corresponding taxation rights. To boost local governments' fiscal autonomy, President Salinas established the PRONASOL program for municipal infrastructure funding and devolved education expenditures to states, followed by President Zedillo's delegation of health expenditure management to states (Smith, 2012).

Despite previous decentralization efforts, the Zedillo administration sought to protect the regime by maintaining some fiscal law authority, reducing PRI's fiscal authority (Selee 2006; Smith 2012; Rodriguez 2018). Fiscal reforms modified state, local, and federal tax collection, introducing Item 33 and Item 28 funds, which became crucial to local fiscal policy. Still, local governments remained under federal supervision, with limited discretionary spending due to high non-discretionary funds. However, allocation transparency improved, resulting in a fairer per capita distribution (Courchene and Diaz-Cayeros, 2000).

The Zedillo-led reforms in the mid-90s, although focusing solely on expenditures, neglected revenue components, thus failing to devolve taxation authority to mayors (Sempere and Sobarzo, 1998; Hernández-Trillo and Jarillo-Rabling, 2008; Guigale et al., 2000; Smith, 2012). This left local governments still heavily reliant on federal funding (Courchene and Diaz-Cayeros, 2000). The PRI's decline and the PAN's rise with Vicente Fox's election in

[3] A quite substantial strand of the literature has demonstrated that governments routinely use their authority to benefit their allies and potential voters. Particularly, this phenomenon has been experienced in countries of a wide array political structures. As an example, in Brazil and Spain, aligned mayors receive more central government transfers if aligned with the President or regional governor respectively (Brollo & Nannicini, 2012; Curto-Grau et al., 2018), and in the United States, aligned state level politicians receive more federal grants in counties more prone to vote for the republican party (Ansolabehere & Snyder, 2006).

2000 signaled a power shift. Nevertheless, local governments remained dependent on federal transfers and tax devolutions, reducing the political impact of individual taxation (Guigale et al., 2000; Hernandez Trillo et al., 2002; Smith, 2012; Hammett, 2006; Selee 2006).

In summary, fiscal decentralization in Mexico has been a complex process, intertwined with political power dynamics. While decentralization allowed regional governments more control over their finances, discretionary public investment allocation, largely from federal taxes, was a political tool. Even the 1990s' reforms aimed at local governments' fiscal autonomy were expenditure-focused, leaving them dependent on federal funding. Therefore, despite decentralization efforts, political manoeuvring and persistent centralization of fiscal authority highlighted the complexity of Mexico's fiscal decentralization process.

2.4.2. Strategic Allocation of Public and Municipal Investments in Mexico: Voter Manipulation and clientelism in Competitive Political Landscapes.

The interplay between public and municipal investment is vital in competitive politics for shaping voter behaviour, as witnessed during Mexico's democratic transition in the 1990s (Rodriguez-Oreggia et al., 2002). The Institutional Revolutionary Party (PRI) may have utilized public investment as a strategic tool to retain power, possibly employing 'political opportunism' and 'local pork-barrel politics' (Armesto, 2009).

Specifically, Municipal investment also plays a significant role in response to political competition and decentralization pressures (Magaloni et al., 2007). Politicians may increase investment in public goods to appeal to larger, diverse electorates, decreasing clientelism in developing municipalities. These investments facilitate public goods provision and function as strategic tools for securing voter support. Aligned municipalities might strategically increase public infrastructure expenditures to influence voter behaviour, possibly receiving slightly higher federal transfers (De la Garza and Lopez-Videla, 2020; Gainza and Livert, 2021). Studies by Filipovich et al. (2018) and Abbott et al. (2017) suggest additional influencing factors, such as poverty traps and authoritarian regime survival, indicating a more complex interplay between public investment and political outcomes.

After the loss of the ejido, the PRI utilized public and municipal investment as a clientelistic strategy to retain support (De La Calle and Orriols, 2010). Though strategies like vote buying may lead to resource over-redistribution and hinder growth, they have historically been effective electorally (Vicente and Wantchekon, 2009). These strategies

were likely an attempt by the PRI to manage changing socioeconomic and electoral landscapes (Magaloni et al., 2007). The PRI's public and municipal investment strategy can also be seen within the context of Mexico's fiscal decentralization in the 1990s (Garman et al., 2001). However, this approach's success was likely limited due to local governments' dependence on federal funding (Courchene and Diaz-Cayeros, 2000).

In conclusion, public and municipal investments under PRI rule in Mexico represent a calculated strategy to secure electoral support. Despite risks, these strategies demonstrate how public resources are strategically used to influence political outcomes, with investment channeled towards high-return areas and public goods provision targeted due to political competition and decentralization.

Thus, by combining the theory that analysed the PRI's policy instruments manipulation as a political survival strategy, the core voter hypothesis, with the theoretical arguments of the investment class theory developed in Section 2.2.1, we conclude with the following hypotheses:

Hypothesis 1a: The PRI substituted in part the role of the ejido with the manipulation of public and municipality investment to keep the rural voters loyal and to retain a certain level of votes despite the change in political preferences.

Hypothesis 1b: Once the PRI started to grant property titles, ejidatarios gradually changed their political preferences, as in the fashion of the investment class theory, and began to deflect to the opposition, especially in places with a higher concentration of ejidos.

2.5. Political structure inside Mexico

Mexico's political and subnational composition is highly complicated due to the range of different subdivisions and functions each one has. Also, the territory each one covers has political and economic implications that make each of them interesting study subjects. Especially the political subdivisions close to the people and in charge of regulating the public investment budget are the most important. Finally, one aspect to highlight is that since 1991 those subdivisions have not dramatically changed, easing their study.

The three levels of government in Mexico are the Federation, the States, and the Municipalities, with the latter being the lowest level or subnational division in the country. The municipality is vital for any economic study because it is responsible for administering crucial services such as property tax collection, public security through police force management, provision of drinking water, drainage and sewage services, waste treatment and disposal, and public infrastructure construction. Specifically, the most important

person in the municipality is its president or mayor, who is responsible for carrying out the city council's decisions.

In recent years, the number of municipalities fluctuated around 2,500, providing us with a large number of observations for analysing the political effect of the agricultural reform. Those municipalities are in 32 states with high legal autonomy but subjected to the Federation or the central power. All of those subnational subdivisions have their own elections, but also, at the federal level, there are some elections closely related to the local environment, the congressional elections. These latter elections are crucial because the lower house of Congress must approve the expenditure budget, which includes the amount of money transferred to municipalities and states. During the period under study, this money accounted for, on average, 65 percent of the total budget of the municipalities.

The Mexican Congress, the lower house of the Legislative branch, has comprised 500 deputies since 1986. Of these, 300 are chosen by the principle of relative majority[4] and 200 by proportional representation, and they serve three-year terms.[5] In order to elect representatives at the proportional representation scheme, the country is divided into five constituencies or districts with 40 possible deputies in total for each of them for a total number of 200 deputies. In these constituencies, the number of deputies that each party obtains depends on its percentage of votes.

The Mexican electoral system has a complicated structure with various ways and levels to determine the winner in each election. These levels have their specific calendars and organizers, and in recent years, these organizers have transitioned from being part of the government to becoming more autonomous institutions.

For federal elections, the public agency responsible for their organization is the Instituto Nacional Electoral (INE) (English: National Electoral Institute), formerly known as the Federal Electoral Institute (Instituto Federal Electoral, IFE).The INE is an autonomous government agency formed with the old unit in the minister of the interior that was in charge of the same function. The INE/IFE was established in 1990 by then-Mexican President Carlos Salinas to respond to popular demand for more honest and free elections.

[4] Relative majority - This is when the greatest number of votes is obtained among all the participants in an election, even if the absolute majority (50%+1) is not reached.

[5] Proportional representation: An electoral system in which the percentage of votes received in an election determines the number of seats to be allocated in a commission.

The PRI party had dominated these elections since 1929, and the majority of the time, these elections were rigged favouring them.

The president accepted those petitions from the people of Mexico due to the contested 1988 election. This election was characterized by the alleged fraud committed by the PRI against Cuauhtemoc Cardenas of the National Democratic Front (Spanish: Frente Democrático Nacional), a left-wing coalition formed in 1988. This fraud severely tarnished the image of the PRI and President Carlos Salinas, who attempted to restore it through the creation of the IFE (Hamnett, 2006; Kirkwood, 2009; Russell, 2011).

Since 1988 there have been three main parties with some other minor parties acting as a multiparty system; nevertheless, in practice, the three main parties have won more than 80% of votes in all the federal elections since 1988. These parties are the Institutional Revolutionary Party (Spanish: Partido Revolucionario Institucional, PRI), which ruled the country for 70 years undisputed, The Party of the Democratic Revolution (PRD, Spanish: Partido de la Revolución Democrática), and The National Action Party (Spanish: Partido Acción Nacional, PAN).

Of those parties, the PRI was the only one whose percentage vote share in the period of 1991 to 1997 collapsed, losing on average almost 30 % of votes. This situation meant the party lost its majority in the lower house at the 97 elections, a majority maintained since 1929. That loss is, among other things to the change of the property rights system of the agricultural land because this system was the base for a clientelist operation among peasants or ejidatarios. Some scholars believe that when this system was partially dismantled, it constituted one of the main factors in the falling of the PRI.

2.6. Empirical Design

In this section, we first describe the data and outline the empirical model used to test the hypotheses developed in Section 3. We then discuss the identification threats that can arise when estimating the causal effect of the PRI policy instrument manipulation on its political outcomes.

2.6.1. Data and variables

As discussed in section 2.3.2, the 1992 agricultural reform seemed to signal the beginning of the end of PRI dominance due to a change in political preferences, and at the same time, its attempt to adapt to the use of less illegal methods to attract voters like public or municipality investment. The empirical analysis of this paper is based on a dataset at the municipality level comprised of around 2496 observations; this dataset is conformed of several economic and political variables, including the PRI vote share change. First, our source of information on the electoral outcomes comes from the National Electoral Institute (INE); this data is composed of the electoral results for the federal congressional elections of 1991, 1994 and 1997, which then will be used to calculate our dependent variable. Second, the economic variables were obtained from the National Institute of Statistics and Geography (INEGI). Specifically, the municipality GDP came from the National Economic Census created by the same institution, public investment from State and Municipal Database System (SIMBAD) also from INEGI. The illiteracy rate, households with electricity and the local native population, came from the Mexican Censuses of 1990 and 2000, and the population counting of 1995; finally, the local Gini index came from the National Council for the Evaluation of Social Development Policies (CONEVAL). In the same fashion as other works (Kurtz, 2004; Magaloni, 2006; Albertus et al., 2015), we use PRI vote share data to analyse voter support for the PRI. According to Albertus et al. (2015), this data should be carefully treated because it could capture the effect of fraudulent practices of the PRI party as vote-buying, especially at the local level; this warning is especially relevant for data prior to 1992 when the central government organised the elections, but in our case, those practices are at a certain degree, avoided due to the creation of the INE in 1991. This institution was created to avoid corrupt practices on elections and to organise all elections; the INE was comprised of representatives of all parties and common citizens; therefore, at least to a certain degree, this situation could mean that the data on votes is less prone to capture some of those practices, or at least, in a much lower magnitude than older data.

Due to the nature of our data, and as explained above, we could argue that these corrupt practices, if they were present at a certain scale, could be just random noise or uncorrelated with land titling and public investment. One possible effect of this situation could be a downward estimation of the coefficients in our model, but with robust standard errors and state fixed effects, this effect could be avoided to a certain degree.

Some of the variables mentioned above were then converted into per-capita terms dividing them by the population of each municipality, specifically, public investment, illiteracy rate, and local GDP. Households with electricity represent the percentage of households with that service concerning the total number of households in a municipality. The variables local population density and local rural population were constructed using data from the same sources. The local population density originated from dividing the population of each municipality by their municipality surface. The rural population was constructed by the number of people living in locations with less than 2500 inhabitants in each municipality divided by the total population of each of these sub-national divisions. Finally, the PRI vote share represents the percentage change of the party's votes concerning the total votes cast.

As a final step and to have a concise point of comparison, we standardised all the values to avoid inconsistencies in the measurement units. In our case, we selected a simple standardisation with a mean equal to zero and a standard deviation be one. Table 2.1A contains a complete set of summary statistics for this, and other variables used in the analyses.

< Insert Table 2.1A here >

The average percentage change of the public investment in the study period was 4,419%, and the change in municipality investment was equal to 710.49 % on average. This result indicates that the PRI increased the public and municipality investment in a massive proportion; this result could indicate that after losing the ejido as a punishment system for its principal voters, the party substituted with public investment once the negative effect of the ejido certification started to occur. In the same fashion, the change in certification during the whole period was on average of 51%; this could mean that on average the half of ejidos were certified by 1997. This advancement of the program could mean that once the 1992 reform was enacted, the process started a successful path that could create a significant electoral impact starting in the 1994 election. Therefore, this database is quite valuable due to its level of disaggregation and the possibility of measuring two important effects occurring

simultaneously, the investment class theory and a vote targeting by the then-hegemonic party.

Additionally, Figures 2.4 and 2.5 show the evolution of public and municipal investment in Mexico, in the aftermath of the 1992 reform that led to the dissolution of the ejido system. This trend could be further supported by the summary statistics overview presented earlier, which might indicate a significant surge in both public and municipal investments. We argue that this surge is associated with key political events in Mexico, such as the electoral downfall of the Institutional Revolutionary Party (PRI) in 1994 and the loss of the PRI majority in the federal congress in 1997.

< Insert Figure 2.4 here >

< Insert Table 2.5 here >

In particular the PRI could have strategically leveraged public investment as a survival tactic during this period of political turbulence. This conjecture possibly aligns with the "Investor Class Theory" (Duca and Saving, 2008), which postulates that shifts in stock ownership might instigate changes in political preferences among voters. In the context of Mexico, the PRI could have endeavoured to avert a shift in political preferences among ejidatarios (peasant farmers) by possibly amplifying public and municipal investments and implementing the property titles granting process through the Programa de Certificación de Derechos Ejidales y Titulación de Solares (PROCEDE).

However, the PRI's dominance began to wane, possibly due to the ejidos certification process disrupting their clientelist operation. The process, granting ejidatarios property titles, may have led to a political shift towards the PAN after the '92 reform. While these figures highlight the political and structural shifts in Mexico during the 1990s, they raise potential issues in our analysis, such as endogeneity in the surge of investments. These issues will be addressed through the paper's later econometric techniques, like state fixed effects and first differences approach, allowing control for unobservable variables and addressing endogeneity in regression. This should provide a deeper understanding of these complex dynamics. Thus, Figures 2.4 and 2.5 indicate the strategic use of investments in Mexico and potential impact on the PRI's political outcomes, but more detailed analysis will follow in subsequent sections.

2.6.2. Empirical Model Specification

To examine the impact on the party political outcomes of the investment class theory effect and the PRI manipulation of the policy instrument, public or municipality investment, we employ an estimation strategy that exploits the observed heterogeneity on the change of public or municipality investment and the ejido certification process, on the different municipalities, and its effect on the electoral results change from the PRI in the elections to the Mexican Congress in 1991 and 1997; this implies that we are using data before and after the 1992 agricultural reform that ended the ejido as a communal agricultural land plot to properly capture its impact. In 1991 the PRI faced an easy election due to the clientelist networks and punishment systems established in decades prior winning the majority of the elections at stake on that election. In 1997, the party lost for the first time since 1929 the majority in the Congress and other key political positions in Mexico, scoring an average loss of votes equal to 26%.[6]

This method builds on the idea that municipalities receiving more public or municipality investment, specially targeted to ejidatarios, and where the certification rollout is considerable, experienced a higher dose of treatment. This result meant those municipalities should exhibit stronger post-reform support for the PRI if the two independent variables effect is considered, and at the same time, a higher negative effect of the investment class theory if we just analyse the Procede rollout.

This result could mean that the party was in part successful in attracting political support and therefore more able to survive politically, but also that the PRI was particularly affected by the change in political preferences that the end of the ejido caused. Specifically, we followed a strategy based on the works of Cantoni et al. (2019), Carruthers and Wanamaker (2015) and Morgan-Collins (2019) of an implementation of a difference-in-differences specification. In this case we estimate the impact of the public or municipality investment and the certification process change on the PRI's per cent vote, and using the variables defined in the previous section, we propose a baseline regression specification as follows:

$$\begin{aligned}\Delta\left(SharePRI_{ij,1997-1991}\right) &= \theta_s + \beta\Delta(Ejidp_{ij,1997-1991}) + \delta\Delta\left(muninv_{ij,1997-1991}\right) \\ &+ \upsilon\Delta\left(muninv_{ij,1997-1991}\right) * \Delta(Ejidp_{ij,1997-1991}) + \Delta\left(x_{ij,1997-1991}\right)\gamma + \varepsilon_{ij}\end{aligned} \quad (2.1)$$

[6] We are not taking in to account the 1994 election where the PRI started to lose positions in a more evident way, but instead we are taking the full effect of the whole period.

Where $\Delta\left(SharePRI_{ij,1997-1991}\right)$ is the percentage vote share difference between 1997 and 1991 for municipality *i* and state *j*. As mentioned above, in our baseline equation, this variable is the percentage share change with respect to total votes. The main independent variables are the public investment percentage share change (1997-1991) and the ejido certification percentage share in municipality *i* and state *j*, $\Delta\left(muninv_{ij,1997-1991}\right)$ and $\Delta(Ejidp_{ij,1997-1991})$ respectively.

Also, $\Delta\left(x_{ij,1997-1991}\right)$ is a set of municipal-level covariates all being the percentage share differences for municipality *i* and state *j*; in addition, θ_s is set of state fixed effects.

Finally, $\Delta\left(x_{ij,1997-1991}\right)$ is a set of controls comprised of the percentage change of illiteracy rate, population density, rain-fed agricultural land, households with electricity, per-capita GDP, local native population and local Gini index.

As an additional measurement of the effect of policy instruments manipulation, there is also a second estimation equation as the one presented above, but instead of municipality investment, we substitute this information vector with public investment. This equation is structured in the same fashion as equation 2.1 as follows:

$$\Delta\left(SharePRI_{ij,1997-1991}\right) = \theta_s + \beta\Delta(Ejidp_{ij,1997-1991}) + \delta\Delta\left(publicinv_{ij,1997-1991}\right) + \upsilon\Delta\left(Publicinv_{ij,1997-1991}\right) * \Delta(Ejidp_{ij,1997-1991}) + \Delta\left(x_{ij,1997-1991}\right)\gamma + \varepsilon_{ij} \quad (2.2)$$

Therefore, in order to take care of certain municipal-level omitted factors that may affect the PRI support in each municipality, we proposed the above equations to achieve that goal.

Particularly, our empirical strategy draws on a combination of state fixed effects and a differences-in-differences approach to systematically examine the sudden surge in municipal and public investment and changes in ejido certification patterns on the PRI vote share. The use of first differences permits us to control for unobservable municipal characteristics, such as the broader political climate, pressures of devolution, and recurring patterns in public infrastructure spending at the municipality level. Hence, this methodology equips us to capture the dynamic landscape of political shifts, which is especially crucial in

the context of Mexico's 1992 agricultural reform. The use of state fixed effects would allow us to control for shocks at the state level.

Specifically, our decision to employ a first difference estimation over levels estimation is informed by critical methodological considerations. This specification enables us to identify differences in PRI's propensity to modify investment levels among municipalities and assess the influence of pre-existing trends on our results. It also resolves the incompatibility with De Janvry et al. (2014)'s study due to lack of municipal fixed effects in levels estimates in their work. This consideration is significant given the different data spans between our study (1991-1997) and theirs (1994-2009) and their use of electoral sections and not municipalities as in our case.

Thus, our refined methodology could deepen understanding of "Investment Class Theory" and distributive politics. We aim to use a differences-in-differences approach to analyse changes in PRI's vote share and the interplay of two policy tools: property title granting and public investment manipulation. This illuminates the dynamic political landscape during Mexico's 1992 agricultural reform, marked by the PRI's active policy manipulation to sway voters. Hence, our research provides a robust, comprehensive exploration of these intricate dynamics, setting a precedent for future studies in this field.

2.6.3. Identification Threats

Mexico offers an ideal setting for exploring the causal impact of the investment class theory effect and policy instruments manipulation on the electoral outcomes. This situation is due that our study case meets all the case selection criteria desirable in a quasi-random experiment, as stated in Morgan-Collins(2019).[7] First, the political parties that participated in the elections of the period between 1991 and 1997 did not change, and the electoral system remained almost the same during this period; that situation allows us to compare party vote changes before and after the period in which we suspect of the use of public investment to attract votes as a response to the 1992 agricultural reform. Second, the level of public and municipality investment was not dependent on any other reform or

[7] The work of Morgan-Collins (2019) is based on the impact on electoral outcomes of newly enfranchised groups. In our case, ejidatarios were always allowed to vote; therefore, this group was not newly enfranchised, but liberated of the mandatory support for the PRI party; Nevertheless, the empirical setting of this work highly adjusts to our own empirical strategy and the characteristics that the study case should possess.

administrative constrain other than its approval by a Congress still dominated by the PRI, and thus there are no concerns of multiple treatments.

The case of Mexico, however, poses two additional advantages that are essential for our identification strategy. First, the change that triggered the new PRI's electoral strategy came as a result of exogenous factors as NAFTA, and the vision of certain wing of the party on how to dynamize the agricultural sector, and it was not the result of peasants or other parties claims; this settlement avoids the problem of reverse causality; namely, peasants voting for the PRI just in exchange of the full privatization of their ejidos, in fact, the PROCEDE program was costly in time and extremely bureaucratic not attracting many peasants, especially at the beginning. Second, the elections held during those years were organized externally by the IFE in a predefined schedule being exogenous to economic conditions and parties' influence.

One concern associated with our identification strategy is that the Procede program and public or municipality investment, depending on the estimation made, could have affected other outcomes and not just the PRI vote share, as per-capita GDP and then made voters support other parties. To address this issue, we estimate an alternative model with per-capita GDP percentage change at the municipality level to test for alternative explanations of the effect of the land titling program combined with public or municipality investment manipulation.

Additionally, given the changes in Mexico's political structure during the 1990s, such as the dismantling of ejido and policy manipulations by the Institutional Revolutionary Party (PRI), examining the exogeneity of public and municipal investment is crucial. This exogeneity mainly stems from Mexico's fiscal policy setup, largely shaped by the central government in the 1990s, limiting local influence on investment decisions and echoing the central elite capture of public investment (Hernandez Trillo et al., 2002; Hernández-Trillo and Jarillo-Rabling, 2008; Bardhan and Mookherjee, 2006; Galiani et al., 2008).

Evidence of pork barrel politics, where fund allocation benefits certain political interests, further substantiates the exogeneity argument (Lawson, 2000; Hernández-Trillo and Jarillo-Rabling, 2008; Armesto, 2009; Abbott et al., 2017). Notably, the regional distribution of funds, largely controlled by the central government, deviates from redistribution and efficiency criteria (Hernandez Trillo et al., 2002; Rodríguez-Oreggia and Rodríguez-Pose, 2004; Hernández-Trillo and Jarillo-Rabling, 2008). However, despite these points, the literature suggests endogeneity problems due to factors such as reverse

causality, correlation of explanatory variables with the error term, and noise (Duffy-Deno and Eberts, 1991; Eisner, 1991; Gramlich, 1994; Holtz-Eakin, 1994; Button, 1998). In the Mexican context, state fixed effects, variables in differences, and controls like population density can substantially mitigate these concerns (Rodríguez-Oreggia and Rodríguez-Pose, 2004).

Thus, Investigating Mexico's electoral outcomes between 1991 to 1997 allows us to assess investment class theory and policy manipulation impacts due to the stable political and electoral systems. Exogenous factors and an alternative model accounting for per-capita GDP change at the municipality level help address potential confounders like the Procede program and public investment influencing outcomes beyond the PRI vote share. The central government's control over investment decisions and the evidence of pork barrel politics reinforces the exogeneity argument at the municipal level, minimizing endogeneity concerns. Consequently, Mexico's unique institutional structure provides an optimal setting to examine the complex interplay between investment strategies, policy manipulation, and electoral outcomes.

2.7. Empirical Findings

2.7.1. Baseline results: The Investment Class Theory

To test our main argument that the land titling program affected the PRI probability to survive politically, despite the use of the manipulation of the municipality and public investment combined with more granted property certificates to ejidos; we examine the interaction effect in the study period of our policy instruments on the PRI vote share change.

It is worth noting that even though the PRI's level of support through time was not the same in every region, and the party's deterioration in votes was also different in every state (Albertus et al., 2015), we proceeded to test Hypothesis 1a and 1b. To test our hypotheses, we use an incremental strategy and then estimate alternative specifications where we progressively add new controls.

In particular, we begin by estimating the change of the PRI vote share, $\Delta(\mathrm{SharePRI}_{ij,1997-1991})$, on a change in the PROCEDE program's title granting. We then added state fixed effects, the change in municipality investment with and without state fixed effects, and finally adding the variables comprised on the municipality-level covariates, $\Delta(\mathrm{x}_{ij,1997-1991})$.

We then repeat the same procedure, but instead of the change in municipality investment, we use public investment change; this change was made to understand better how the local knowledge of mayors is essential to use the policy instrument manipulation more efficiently.

In the context of our analysis, the strategy's logic could be rooted in the differential management of local resources. Specifically, local mayors might handle municipal investment, while public investment could be allocated by federal or state governments. This distinction might be pivotal in assessing the PRI's vote targeting (Magaloni et al., 2007). It's worth noting that local populations could have shown a preference for resources distributed by local authorities, as higher-level authorities might have exhibited a bias against underprivileged communities (Bardhan et al., 2008).

In response to shifting socioeconomic and electoral landscapes, the PRI might have strategically used public and municipal investments. They could have leveraged fiscal decentralization to strategically allocate these investments, although their effectiveness might have been curtailed by local governments' dependency on federal funding (Courchene and Diaz-Cayeros, 2000; Garman et al., 2001).

Interestingly, the PRI could have significantly increased public and municipal investment, potentially substituting it for the ejido system once the negative impact of ejido certification began. However, the certification process, which granted property titles to ejidatarios, might have triggered a shift in their political preferences towards the National Action Party (PAN) post the '92 agricultural reform. Thus, the PRI's strategic use of public and municipal investments might underscore their calculated efforts to navigate the political landscape, mitigate commitment issues, and secure electoral support, despite inherent risks. This approach could highlight the adaptive nature of political investment strategies, with public investment often directed towards areas promising maximum political returns, and municipal investment primarily targeting public goods provision and infrastructure development in response to political competition and decentralization.

Columns (1)-(5) of Table 2.1B display the corresponding results of this identification procedure. In a more detailed analysis, Column (1) reports estimates using the maximum municipality sample (2,298 observations for the difference of whole sample period, 1991 to 1997). The OLS specification in Column (1) yields a small and statistically significant negative coefficient on the PRI vote share change once we run this variable on the change in ejidos certified by PROCEDE.

< Insert Table 2.1B here >

The negative coefficient observed in the OLS specification could be indicative of a shift in political preferences among ejidatarios following the certification process. The process of certification, which bestowed land ownership rights upon ejidatarios, could have liberated them from their commitment to back the PRI, thus substantiating the credibility of the Investor Class Theory in a nation such as Mexico.

Additionally, these first results could indicate that certified ejidos became a valuable asset, similar to a stock, and in the fashion of the investment class theory, once free of the obligation to support the PRI party due to the certification process, and with the property of their lands, the ejidatarios became more prone to support parties with market-friendly policy proposals, in this case, the PAN party, similarly as in the case of the Republican party in the USA (Duca and Saving, 2008). This support change could be originated by the importance of keeping or increasing the value of the ejidos. This new objective could make the ejidatarios more sensitive to policies that could make their lands more valuable and introduce beliefs closer to the workings of the free market, similarly as in Di Tella et al. (2007).

Once we added state fixed effects in Column (2) to account for any unknown heterogeneity, the coefficient became statistically not significant. This result could originate from particularities in how the voters, in this case, ejidatarios, were exposed differently to the PROCEDE program in each state and municipality.

In model (3), we add the percentage difference in municipality investment and an interaction term composed of that difference and the difference in certification for the 1997-1991 period to exclude fixed effects. We observed that the increase in municipality investment and the PROCEDE certification rollout alone are factors that affect the PRI performance in the elections. However, once we add the combined effect of both variables, we could see a pattern of more certificates combined with more investment, especially in deprived rural communities, allows the PRI to keep a certain level of power and could diminish the negative effect of the investment class theory. This mechanism could be explained by the fact that more infrastructure around the ejido communities could increase their value and make the ejidatarios remain in a certain degree loyal to the PRI as a difference with De Janvry et al., (2014). In this paper, the researchers just analysed the impact of

certificates without considering other strategies as targeting voters with economic concessions to substitute in part the loss of ejidatarios as captive voters. The inclusion of municipality investment is an interesting addition that could explain why the party lost power more gradually than it could have been thought.

Thus, the inclusion of municipality investment in the model adds an additional layer of precision to the analysis. This inclusion allows us to account for the potential strategic use of public investment by the PRI as a means to mitigate the negative effects of the investment class theory. Moreover, it provides a more comprehensive understanding of the PRI's adaptive strategies in response to the changing political landscape. The strategic allocation of resources, particularly in deprived rural communities, could have been a calculated move to maintain a certain level of power and loyalty among ejidatarios. This nuanced approach, which takes into account not only the certification process but also the strategic use of municipality investment, could offer a more robust explanation for the gradual loss of power by the PRI.

We thus follow the key identification strategy described previously in section 2.5.2, displaying those results in Column (5); when we add the control variables, fixed community characteristics, the coefficient increased moderately. This column is quite revealing in several ways. First, the results of Column (5) provides a possible indication that certification titles weakened the PRI electorally due to the investment class theory, with the negative coefficient of the change in certification indicating a change in political preference due to this process, a result similar as in De Janvry et al. (2014); Castañeda Dower and Pfutze, (2015); De Janvry et al. (2011). Second, that municipality investment also seems to damage the ability of the PRI to keep some electoral power due to a negative coefficient as the one found in the certification change variable. Lastly, what is striking about the correlation coefficient is that the combination of the manipulation of the policy instrument, municipality investment, and the increase of certification seemed to help the party to keep a certain level of electoral power.

A possible interpretation of the latter finding is that this result could be related to the strategy of targeting the core voter, ejidatarios, to avoid to a certain degree, the effect in the change in political allegiance of Mexican peasants. This change in political preference could be diminished with the increase of public investment that indirectly could have augmented the value of the ejido as an asset; this increase in value could have been

appealing to the new capitalistic-in-ideology ejidatarios with the result of a certain number remaining loyal to the party.

Our results imply that the PRI may have strategically boosted public and municipality investment to counteract the negative fallout of the ejido certification process on its voter base. This certification, conferring property titles to ejidatarios, appears to have shifted political preferences towards the PAN post-'92 agricultural reform (De Janvry et al., 2014). This tendency amplified in areas with more valuable land. Hence, despite the negative coefficient in our regression table indicative of the investor class theory, this combination of increased investment and title granting might have maintained some PRI support. Therefore, what seems like a discrepancy in the municipality investment's standalone and combined impact with certification isn't a contradiction but hints at the PRI's intricate manipulation of public resources and response to evolving voter preferences (Hernandez-Trillo et al., 2002; Rodriguez-Oreggia et al., 2002; Rodríguez-Oreggia and Rodríguez-Pose, 2004; Hernández-Trillo and Jarillo-Rabling, 2008; Drazen and Eslava, 2010; De Janvry et al., 2014; Soto Zazueta, 2016).

Similarly, in table 2.1C, we estimated the same model with the only difference of a change of municipality investment for public investment, a type of investment distributed directly by the federal government instead of the municipality mayors. This change is partly due to the fact that there was a high dependence of these national subdivisions of the share of the central government transfers on their annual budget, around 65 per cent of the total during the years after the 1992 agricultural reform that ended the ejido (Lopez Gonzalez, 2004).

< Insert Table 2.1C here >

Therefore, it was an interesting alternative to see if a resource distributed from the top of the political structure could be even more effective than municipality investment, distributed by local mayors, despite the lack of local knowledge of specific necessities of each municipality that just mayors could have. In Column (1), we have a similar result as in table 1A, where a greater quantity of land certificates seems to be associated with a PRI' gradual loss of electoral success.

Also, as can be seen from Column (3), with the addition of the interaction term in a similar fashion as in the last table, the interaction term has a coefficient with a negative sign that could indicate a negative impact of more public investment and more ejidos certified.

This result indicates that public investment as a difference from municipality investment possesses an opposite dynamic probably related to how those resources are assigned. The former being managed by the central government with a lack of local knowledge of the needs of each municipality and the latter managed by mayors with more local knowledge on how to funnel resources; those PRI mayors could have played a major role in distributing the resources under their control making it easier to target rural voters.

In Column (4), while adding fixed effects improves the model's explanatory power and produces more reliable estimates, the interaction coefficient remains statistically not significant, and the sign remains negative. We thus follow the key identification strategy described in section 2.5.2, obtaining the results displayed In Column (5). Once fixed, municipality characteristics are held constant with the addition of the control variables, the interaction term became positive but still not significant.

This last result could be related to the nature of the public investment; mainly centred in big infrastructure projects like highways, wastewater treatment plants, railroads, oil refineries; as a difference with municipality investment more related to projects that are smaller in scale but more visible for possible voters, as street paving or sewage works.

Therefore, public investment is a redistributive good that is not well suited to attract voters, especially in small towns or rural communities, because central government investments tend to discriminate by wealth and normally are one-time benefits that do not generate electoral support (Bardhan et al.,2008; De Janvry et al. 2014). This discrimination is especially evident because normally big cities or wealthier regions attract more of those investments due to scale economies, the concentration of previous levels of capital, bigger productivity, and agglomeration effects (Rosenthal and Strange, 2004).

Examining the negative coefficient for public investment and the contrasting sign of our interaction term, it appears the PRI amplified public investment in response to the ejido certification process's repercussions. This surge could be seen as an alternative taken by the PRI to partially substitute the ejido system, which was essential in pre 1992 agricultural reform dynamics. Yet, despite the apparent contradiction, the combined use of increased public investment and title grants to ejidatarios might have preserved a level of support for the PRI (De Janvry et al., 2014; Hernandez-Trillo et al., 2002; Rodriguez-Oreggia et al., 2002; Rodríguez-Oreggia and Rodríguez-Pose, 2004; Hernández-Trillo and Jarillo-Rabling, 2008; Drazen and Eslava, 2010; Soto Zazueta, 2016).

More specifically, the negative public investment coefficient could stem from two main issues. First, federal authorities leading public investment might lack the local knowledge required for effective targeting ejidatarios with monetary transfers (Bardhan et al., 2008; Armesto, 2009; Albertus et al., 2012; Dellmuth and Stoffel, 2012; Golden and Min, 2013). Second, public investment levels being lower than municipal investment could result in less appeal to voters. Contrarily, municipal investment tends to be more localized, hence impacting ejido land values more significantly due to a fairer resource distribution, possibly generating more commercial value for ejidos Thus, the combined effect of these factors – poor targeting of lower investments – might explain this result. Hence, these seemingly contradictory observations might reveal intricate dynamics underpinning public investment strategy.

2.7.2. Robustness tests

2.7.2.1. Dealing with outliers

Continuing with the analysis of outliers in our data, we concentrate our efforts on identifying these atypical values in the dependent variable. We proceed to execute this task using the Cook's Distance method to find outliers; this method consists of measuring the effect of deleted observations and then calculating Cook's distance, which is equal to the sum of all changes in the regression model when a certain observation is removed from the model. After that calculation, the method aids in removing observations with the largest Cook's distance, which tend to be outliers.

Once we calculate the Cook's distance of each observation, we eliminate the outliers from the original sample. The process eliminates approximately 5 per cent of observations, from 2298 to 2184 for the first model and from 1809 to 1756 for the final model structure, including state fixed effects and a vector of municipal-level covariates. After this procedure, we obtain the results depicted in Table 2.1D

< Insert Table 2.1D here >

Results in Column (1) still indicates that the certification process was damaging for the PRI electoral expectations of remaining in power. The coefficient is still negative, statistically significant, and comparatively larger with respect to estimation results with outliers. In Column (2), we see as well as in previous results, that when adding state fixed effect to the model, the coefficient decreases significatively and lost significance. In Column (3), when we drop the state fixed effects and add municipality investment per cent change

and the interaction term between that investment and the change in certification, we obtain a positive and significant coefficient for the interaction term. This result could still indicate that the combination of the policy instrument and the concession of more ejido property titles was advantageous for the PRI political survival.

Building on the analysis, it is worth noting that the interaction coefficient of municipality investment and certification maintains its statistical significance even when outliers are removed. This observation is particularly intriguing as it suggests that the strategic interplay between municipality investment and certification process was not merely an anomaly or a product of extreme values in the data, but a consistent pattern that holds true across the majority of observations.

In the context of the PRI's political strategy, this finding could be interpreted as evidence of the party's adaptive response to the changing political landscape. Specifically, it seems that the PRI was able to leverage municipality investment as a tool to mitigate the negative electoral implications of the certification process. By increasing municipality investment, particularly in deprived rural communities, the PRI could have enhanced the value of ejido lands, thereby incentivizing ejidatarios to remain loyal to the party despite the shift in political preferences induced by the certification process.

This nuanced understanding of the PRI's strategy underscores the importance of considering the interplay between different policy instruments when analysing political dynamics. It also highlights the potential of econometric techniques, such as the Cook's Distance method, to provide valuable insights into these dynamics by enabling a more precise identification of influential observations and outliers (Jensen and Ramirez, 1998).

Table 2.1E provides a similar message when we change municipality investment for public investment. A striking difference with the previous table is that the coefficient for the interaction term is negative and not statistically significant. This result gives a possible indication that investment from higher levels of government seems not to be as efficient as municipality investment, delivered by local mayors with more local knowledge of the needs of that particular region. It could be related to the fact that this public investment tends to be funnelled to medium to big cities or regions with more profitable locations and less or no ejidos in their territory.

< Insert Table 2.1E here >

In light of the results presented in Table 2.1E, it becomes evident that public investment does not hold the same level of significance as municipality investment in the context of the PRI's political strategy. The interaction term between public investment and certification process, unlike its counterpart in the municipality investment model, is not statistically significant. This lack of significance could be attributed to the nature of public investment, which is often directed towards larger infrastructure projects and tends to be concentrated in wealthier regions and big cities (Bardhan et al., 2008; De Janvry et al., 2014). Such investments, while substantial, may not directly impact the value of ejido lands or resonate with the rural communities and smaller towns that form the PRI's electoral base.

Moreover, the allocation of public investment is often influenced by factors such as scale economies, the concentration of previous levels of capital, and agglomeration effects, which tend to favour wealthier regions and big cities (Rosenthal and Strange, 2004). This bias in the distribution of public investment could further undermine its electoral effectiveness, particularly in rural communities where the PRI's political survival hinges on the value of ejido lands. In contrast, municipality investment, managed by local mayors with a better understanding of local needs, can be more effectively targeted towards rural voters and thus have a more significant impact on the value of ejido lands.

Lastly, while public investment represents a significant component of the PRI's political strategy, its impact on the party's electoral prospects appears to be limited. This finding underscores the importance of understanding the distinct dynamics of different types of investment and their implications for political strategies and outcomes. It also highlights the need for further research to explore these dynamics in greater depth and detail.

Overall, these findings affirm that outliers' removal in the data analysis robustly upholds the results. The interaction coefficient of municipality investment and certification process remains statistically significant, suggesting a consistent pattern of the PRI's political strategy, which appears to be adapted to the shifting political landscape. Remarkably, PRI appears to leverage municipality investment to mitigate the certification process's negative electoral implications, especially in deprived rural communities. However, the interaction term between public investment and the certification process doesn't mirror the same statistical significance, pointing to a probable bias in public investment towards wealthier regions and big cities. Hence, while public investment is a crucial facet of the PRI's strategy, its influence on the party's electoral prospects seems constrained. These

insights underscore the need to comprehend the distinct dynamics of various investment types and their implications on political strategies, thereby emphasizing the call for deeper, more detailed research.

2.7.2.2. Testing for a Differential Level of Economic Growth

The existence of a positive relationship between the level of economic development and the manipulation of policy instruments to gain votes, as depicted in Table 2.1F, is very important for our study. This relationship is because, in the case of Mexico, the areas that were characterised by higher levels of economic activity have always been the area around Mexico City and the US-Mexico border areas where we would expect to get more materialistic and less sensible to vote-buying strategies in comparison with the southern regions that tend to be poorer.

< Insert Table 2.1F here >

It can be seen from the data in Column (1) that before including state fixed effects for municipalities with High GDP per capita, the coefficient from the interaction term is small and not statistically significant. When we add state fixed effects in Column (2), the interaction term coefficient diminishes in size and remains not significant. In Column (3), while adding new controls improves the model's explanatory power and produces more reliable estimates, the interaction coefficient for municipality investment and the ejido certification process increases in size but remains not significant.

The last results could indicate a failure of the PRI mixed strategy to politically survive in areas where voters are already changing mentality and are more interested in making their assets more valuable. Therefore, we would expect a not statistically significant coefficient to indicate a possible lack of effect of the manipulation strategy made by the PRI to remain in power. It is still worth mentioning that the coefficient sign remains positive, indicating that despite the lack of significance, there is still a positive effect of the combination of municipality investment and the certification process as elements that could help the PRI remain in power in those areas.

As shown in Column (4), a positive and statistically significant effect is found for the interaction term of policy instruments for municipalities with below the median GDP Per Capita, municipality investment and an increase in the certification process, which becomes statistically insignificant, Column (6), when we control for some municipality level

characteristics between the period of the study, 1997-1991. In line with the above arguments, the effect of the survival strategy followed by PRI, despite the lack of significance of the interaction term, is still much larger in low development municipalities, possibly indicating ejidatarios with a less materialistic and more in need of any type of government support, making them more prone to still supporting the then-hegemonic party.

More concretely, the analysis in Table 2.1F might suggest a nuanced relationship between economic development and the effectiveness of the PRI's electoral strategy. In regions with higher economic activity, the PRI's approach of combining municipality investment with the ejido certification process could be less effective. These areas, traditionally more materialistic and less susceptible to vote-buying strategies, might resist the PRI's political use of public resources (Bardhan et al., 2008).

Interestingly, the interaction term between municipality investment and the ejido certification process was not statistically significant in these economically advanced regions. This could suggest a shift in voter preferences, with voters in these regions possibly becoming more interested in enhancing the value of their assets rather than being swayed by the PRI's political manoeuvring (Duca and Saving, 2008).

On the other hand, in municipalities with below the median GDP per capita, the interaction term between municipality investment and the increase in the certification process was positive and statistically significant. This might suggest that the PRI's strategy could be more effective in less economically developed regions, where voters might be more likely to be swayed by government support and less focused on materialistic considerations (Di Tella et al., 2007). However, when controlling for certain municipality-level characteristics, the interaction term became statistically insignificant, indicating that other factors at the municipality level might also play a significant role in shaping electoral outcomes (Jensen and Ramirez, 1998).

The results, displayed in columns (1), (2) and (3) of Table 2.1G, generally show positive and statistically coefficients for the interaction term, for the policy instruments, and negative and significant coefficients of public investment for Municipalities with High GDP Per Capita. However, for municipalities with low GDP per capita, the coefficients for the change in public investment and the interaction term became (Column (6)) statistically insignificant once we control for municipalities characteristics. One striking result is that this type of investment seemed inefficient to attract low-income voters due to a possible average

inherent discrimination against poor areas that investment from central governments usually have similarly (see Barhdan et al., 2008).

< Insert Table 2.1G here >

More concretely and using arguments already highlighted, in wealthier municipalities, the PRI's manipulation of policy instruments could have been more effective, while public investment might not have been as influential. In contrast, for poorer municipalities, public investment and the manipulation of policy instruments might not have been as effective in swaying voters. Hence, despite the lack of statistical significance in poorer municipalities, the positive sign of the coefficient for the interaction term in wealthier municipalities might suggest a potential positive effect of the combination of policy instruments and public investment in these areas. This could be seen as a testament to the PRI's adaptability and resilience in the face of changing economic and political landscapes (Duca and Saving, 2008).

2.7.2.3. Regional validity

Did the manipulation of policy instruments, public or municipality investment and the Procede program rollout have an even effect in each region of Mexico? To answer this question, we utilise again the same model structure and data as in the original estimations in tables 2.1B and 2.1C with the difference of the data being divided by regions; North, Centre and South.

< Insert Figure 2.3 here >

This division will allow us to find regional differences with the rollout of the certification program and the application of the public and municipality investment by the PRI party. The results, displayed in columns (1), (2) and (3) of Table 2.1H, shows positive coefficients for the interaction term, change in municipality investment, and change in the land property titles granted to ejidatarios for municipalities in the southern region. However, the coefficient for the change in municipality investment is negative, and after adding state fixed effects, the coefficient lost significance.

< Insert Table 2.1H here >

Moreover, the regional analysis in Table 2.1H could provide a more detailed understanding of the PRI's strategy. The positive coefficients for the interaction term, change in municipality investment, and change in the land property titles granted to ejidatarios for municipalities in the southern region could suggest that the PRI's strategy was particularly effective in these areas (Rodriguez-Oreggia et al., 2002). However, the negative coefficient for the change in municipality investment, which lost significance after adding state fixed effects, might indicate that the PRI's strategy was less effective in other regions. This could be due to regional variations in political dynamics, economic conditions, and the distribution of ejidatarios (Garman et al., 2001).

Hence, these findings underscore the importance of considering regional differences when analysing the impact of policy instruments and political strategies. It might also suggest that the PRI's strategy was not uniformly effective across all regions, but was instead shaped by the unique characteristics and needs of each region (similarly as in Bardhan et al., 2008). This detailed understanding of the PRI's strategy could provide valuable insights into the complex interplay between political dynamics, economic conditions, and policy instruments in shaping electoral outcomes.

Another possible interpretation of the former finding is that even municipality investment makes the ejidos more valuable because most of this investment is also destined for smaller infrastructure projects as paving streets, installation of drinking water pipes, and street lighting. This type of infrastructure is more visible for possible voters, and it makes any ejido more valuable than ejidos with almost no public infrastructure. Therefore, if the ejido as a private property possesses more market value, ejidatarios will start changing their political preferences, as stated in the investment class theory, and start voting for the PAN party, a right-wing party with more pro-market policy proposals. On the contrary, once the certification process is used combined with an increase in municipality investment(column(3)), the positive interaction term coefficient, the PRI survival strategy seems to help them retain some power.

On the other two regions, the southern states present the biggest positive impact of the policy instrument combined with the per cent ejido land. This result is in some degree shocking because we could believe that poorer states could be more sensitive to these public concessions, or as indicated by Masaki(2018), the PRI party could be applying a strategy of giving more money to the centre of the country where historically, since 1988, the PRD party, the most prominent left-wing party at the time, had more support (Kirkwood, 2006; Russell,

2001). We could argue then if the party simultaneously targeted not traditionally loyal and loyal voters but gave the former more priority.

To provide further empirical support for a regional difference on the effect of policy instruments manipulation, we regress the change in certification of ejidos, the change in municipality investment, the interaction term of those variables, and the control variables described in section 2.5.2 using a subsample of municipalities located in the northern region (Figure 1). As shown in Table 2.4A columns (4), (5) and (6), a negative and statistically no significant effect is found for the main explanatory variables and the interaction term. Despite that result, the difference with the southern region is that the increase in municipality investment seems to aid moderately the PRI party to keep some power, or at least the effect described in the investment class theory seems to be not present in this region.

A possible explanation for this result is that in the Northern region, the PAN party started to experience electoral victories in local elections since 1982, and as described in Castañeda Dower and Pfutze (2015), ejidatarios living in municipalities with PAN governments already deflected to this party prior to the Procede program; therefore, the ejidatarios on those places had already started to vote for the right-wing party years before that program, and that precondition made the case of granting titles not a reason to vote against the PRI, but just reinforcement for the support for the right-wing political organisation.

If we now turn to the analysis in columns (7), (8), and (9) of the same table, we found similar results for main explanatory variables and interaction coefficient. However, with an important difference, the interaction coefficient is still positive and bigger than in the North of Mexico despite being not statistically significant. This result could be related to the fact that in the centre and south of the country, there was on average more support for the PRI party than in the North. This last characteristic could be related to higher poverty levels and less economic development in the centre, especially in the south, combined with more ejidos and ejidatarios with smaller and usually less valuable ejidos than in the North. Also, there is evidence that the rollout of the property titles program started first with smaller ejidos, with larger ejidos, most of them in the North of the country, treated later (see De Janvry et al., 2014).

Turning now to the analysis made in Table 2.1F, where we substituted municipality investment for public investment, columns (1)-(3) display the corresponding results for the

Southern region. We found similar results in table 2.1H for the main explanatory variables and interaction coefficient, a positive coefficient for the interaction term, a negative coefficient for the change in public investment, and a positive coefficient for the change in ejido certification. These results are statistically insignificant but are an important result because they could indicate that the rollout process for ejido titles in the Sothern region helped the PRI barely stay in power. On the other hand, due to its nature, the public investment, mainly destined for extensive infrastructure programs, could be rarer for this region due to the lower level of development than the other two regions.

< Insert Table 2.1F here >

In the next section of the table, in columns (4), (5) and (6), we find evidence that the combination of the two policy instruments manipulation, more ejido property titles and more public investment, was not sufficient to help the PRI to maintain political power despite the apparent existence of this strategy, where the coefficient for the interaction term is negative and statistically not significant. Despite this result, we could say that there is still a negative, weak link between the change in public investment and the change in the certification process with the PRI percentage vote change.

What stands out in the table is the result in Column (9), where we can see that the combination of more public investment and more certificates were given to ejidatarios were enough for the PRI to maintain certain power in the centre of the country; this result is important because the interaction coefficient is statistically significant and positive. The last evidence could suggest that despite having ejidatarios changing their political preferences in the other two regions, it is in the centre of the country, where Mexico City is located and where there is significant infrastructure investment, that the public investment combined with the titling process was in part successful in keeping certain power for the PRI. This result could be due to more sensitivity of ejidatarios to big infrastructure projects and a relative abundance of ejidos. This abundance could have reduced ejidos' market value and make ejidatarios not consider their parcels a desirable asset. Therefore, the investment class theory effect, a change in political preferences due to a recently acquired asset, could have been comparatively small with the other regions.

2.7.2.4. Testing Alternative Explanations

To explore if there are alternative explanations for our hypothesis, the combination of more ejido titles and public investment aided the PRI to remain in power due to vote

targeting, and the same time help to diminishes in certain level the effect of the investment class theory, we propose an alternative estimation using the change in the Per-capita GDP as the dependent variable. This strategy tries to corroborate that the economy did not absorb the effect of the policy instruments manipulation and that manipulation effectively altered the voting process.

Further analysis of Table 2.1JA reveals that in Column (5), where the complete model is estimated, the interaction and the coefficients of the independent variables are statistically insignificant. This result indicates that in theory, the effect of manipulating the policy instruments affected the electoral results more significantly. Therefore, this result could indicate that the strategy followed by the PRI was quite successful in changing the election results rather than affecting the local or regional economies and could also suggest a genuine intention of the party to use public resources to substitute the ejido as a way to get captive votes.

< Insert Table 2.1J here >

Finally, results in table 2.1K are similar to those of table 2.1J in which they are also statistically not significant and in some of them equal to zero with the difference of the change of municipality investment for public investment change; therefore, there is another good evidence of a possible consciously manipulation of public resources for the PRI party to survive politically.

< Insert Table 2.1K here >

Building on the findings presented in Table 2.1J and Table 2.1K, it could be argued that the manipulation of policy instruments, specifically public and municipality investment, and the rollout of the Procede program, had a more significant impact on electoral outcomes than on local or regional economies. This observation might suggest that the PRI's strategy was primarily geared towards altering the voting process rather than stimulating economic growth (Sinkler, 2014).

Moreover, the lack of statistical significance in the interaction and independent variables in Table 2.1J and Table 2.1K might indicate that the economic absorption of policy manipulation was limited. This could be interpreted as evidence that the PRI's strategy was

not merely about economic manipulation but also involved a conscious effort to influence electoral outcomes. This interpretation aligns with the notion that the PRI might have strategically used public resources to substitute the ejido as a means of securing captive votes (Magaloni et al., 2007). In light of these findings, it could be posited that the PRI's strategy was not only successful in changing election results but also in preserving the support of its main voters, the ejidatarios, despite the apparent change in political preference due to the Procede program rollout.

2.7.2.5. Testing Alternative Political Trends: the PAN Party and the Investor Class Theory.

Throughout the study period, the PAN saw an increase in vote share, coinciding with a decline for the PRI. This significant shift may impact regression analysis outcomes, potentially due to the correlation between property ownership and voting patterns. Notably, the market-friendly policies of PAN could attract property owners, thereby increasing their vote share. Specifically, the Investor Class Theory suggests that full property rights via ejido certification might cause a conservative voting shift in PAN's favor. Public and municipal investment, which could sway this shift, provides added insight. If such investment aligns with PAN's policies, it might amplify the shift, while contradiction could mitigate it. The PRI's commitment issues related to public and municipal investment, and the resulting strategic adaptations, could also be involved.[8]

The PRI, responding to the loss of ejido as a voter control mechanism, increased public and municipal investment, which could have influenced voters' decisions. However, this could create a paradox where urbanizing areas with higher human capital and income experience a decline in public services, due to parcel privatization leading to fragmented rural communities with differentiated demands and less negotiation power. Particularly, the certification process, which saw 51% of ejidos certified by 1997, might have boosted PAN's

[8] Public and municipal investments, while seemingly beneficial, can potentially create a credibility issue due to their inability to generate self-enforcing political exchanges. This is primarily because these investments, being non-excludable or irreversible, fail to incentivize voters, making them unattractive for politicians seeking support (Robinson and Verdier, 2002; Albertus and Kaplan, 2011). This commitment problem is prevalent in clientelistic arrangements (Keefer and Vlaicu, 2005; Stokes, 2009). For instance, the PRI in Mexico used state and municipal revenue sharing as clientelistic transfers to substitute the dissolution of the ejido as a clientelist network (Diaz-Cayeros et al., 2006). However, the lack of commitment inherent in these types of goods could be a reason for their apparent lack of success. Alternatives such as distributing public employment or irreversible transfers like land are often more effective (Alesina et al., 2000; Albertus, 2013).

vote share. By incorporating these factors into an analysis of PAN's electoral dynamics, we could gain more understanding of how public and municipal investment and ejido certification influence PRI's political longevity.

Thus, to test whether any effect on the PAN vote share change captured by certification of ejidos is associated with the use of public and municipal resources by the PRI, we use equations (2.1) and (2.2) with the variable $\Delta(SharePAN_{ij,1997-1991})$ as the new dependent vector as follows:

$$\begin{aligned}\Delta(SharePAN_{ij,1997-1991}) &= \theta_s + \beta\Delta(Ejidp_{ij,1997-1991}) + \delta\Delta(muninv_{ij,1997-1991}) \\ &+ \upsilon\Delta(muninv_{ij,1997-1991}) * \Delta(Ejidp_{ij,1997-1991}) + \Delta(x_{ij,1997-1991})\gamma + \varepsilon_{ij}\end{aligned} \quad (2.3)$$

Where $\Delta(SharePAN_{ij,1997-1991})$ is the percentage vote share difference between 1997 and 1991 for municipality *i* and state *j*. As mentioned above, in our baseline equation, this variable is the percentage share change with respect to total votes. Therefore, for this equation, the parameter of interest the one represented by the interaction term υ; This parameter represents the differential effect of changes in certification of ejidos and possible manipulations of the municipality investment by the PRI government in relation to the electoral preferences of ejidatarios. The municipality controls are the same as in Eq. (2.1) and (2.2), first differences and state fixed effects were employed again.

In a similar fashion as with the case of the PRI vote share change, an additional measurement of the effect of policy instruments manipulation, there is also an additional estimation equation as the one presented above, but instead of municipality investment, we substitute this information vector with public investment. This equation is structured in the same fashion as previous as follows:

$$\begin{aligned}\Delta(SharePAN_{ij,1997-1991}) &= \theta_s + \beta\Delta(Ejidp_{ij,1997-1991}) + \delta\Delta(publicinv_{ij,1997-1991}) \\ &+ \upsilon\Delta(Publicinv_{ij,1997-1991}) * \Delta(Ejidp_{ij,1997-1991}) + \Delta(x_{ij,1997-1991})\gamma + \varepsilon_{ij}\end{aligned} \quad (2.4)$$

For this equation, the parameter of interest is also the interaction term υ. This parameter represents the differential effect of changes in certification of ejidos and possible manipulations of the PRI government of public investment in relation to the electoral preferences of ejidatarios. The municipality controls are the same as in Eq. (2.1) and (2.2), first differences and state fixed effects were employed again.

Similar to our previous analysis of PRI's electoral dynamics, we analyse PAN's vote share dynamics, focusing on key findings from Table 2.2A and 2.2B. Public and municipal investments show two different impacts. Evidence indicates PRI's use of these investments, directing public investment towards larger projects and distributing municipal ones locally (Ward and Rodríguez, 1999; Courchene and Diaz-Cayeros, 2000; Rodriguez-Oreggia et al., 2002; Armesto, 2009; Langston, 2010; De la Garza and Lopez-Videla, 2020; Diaz-Cayeros, Magaloni, and Ruiz-Euler, 2014; Vicente and Wantchekon, 2009). This may have aimed to retain ejidatarios' loyalty, especially in rural areas.

< Insert Table 2.2A here >

< Insert Table 2.2B here >

The coefficient for public investment interaction in Table 2.2A is significant, suggesting a benefit to PRI and disadvantage to PAN, possibly due to public investment's larger scale, often associated with PRI by voters. Nevertheless, this strategy's effectiveness may be limited, particularly in rural and smaller towns, due to the urban focus of investments and the lack of ongoing electoral support from one-time benefits like central government investments (Magaloni, 2007; Bardhan et al.,2008; Armesto, 2009; De Janvry et al. 2014; Abbott et al., 2017).

Municipal investment's coefficient in Table 2.2B is negative but insignificant, implying no substantial negative influence on PAN. This aligns with the investor class theory, favouring PAN post the 1992 agricultural reform (De Janvry et al., 2014). Hence, while PRI may have influenced votes through public investment, PAN might have benefitted from certification. Public investment and certification's interaction coefficient is significant. Public investment, a more controllable factor for PRI, may have allowed the manipulation of voting behaviour, maintaining support for PRI, potentially affecting PAN's electoral performance.

Thus, our results suggest differential impacts of public and municipal investment on electoral outcomes, particularly for PRI. While both our study and De Janvry et al. (2014) agree on land certification's significant impact on electoral outcomes, favouring PAN, we diverge in our analysis of public and municipal investment. We posit public investment could disadvantage PAN and benefit PRI, an aspect not addressed by that paper. We also highlight PRI's strategic resource allocation to retain power in impoverished rural areas, whereas aforementioned work suggest that electoral dynamics could influence the certification rollout.

Results from Tables 2.2C and 2.2D further highlight differential impacts of public and municipal investments on electoral outcomes. Table 2.2C's interaction coefficients become significant once outliers are removed, suggesting a more average response to policy from potential PAN voters. Meanwhile, Table 2.2D's insignificant interaction coefficient might reflect PRI's strategic response to the ejido certification process, which, without outliers, could have benefitted PAN more, indicating a shift in political preferences post the 1992 agricultural reform (De Janvry et al., 2014).

< Insert Table 2.2C here >

< Insert Table 2.2D here >

The interaction coefficient in column (5) of Table 2.2D, which is statistically insignificant, may reflect PRI's strategic response to the certification process' adverse effects by augmenting public and municipal investments, which might have benefitted PAN more in the absence of outliers. Outliers in municipal investment, due to its localized and equitable distribution, can noticeably impact ejido land values, distorting investment effects and leading to one-time benefits lacking sustained electoral support (Bardhan et al.,2008; Vicente and Wantchekon, 2009).

Further analysis from Tables 2.2E and 2.2F suggest different impacts of public and municipal investment on electoral outcomes. Table 2.2F's interaction coefficients in column (6) remain significant and negative when split by economic development, implying PRI's potential strategy of combining public investment with certification to preserve support and curb investor class theory's effect, particularly in less economically developed municipalities (Scott, 1972; Bueno de Mesquita et al., 2003; Magaloni, 2008; De Janvry et al., 2014).

< Insert Table 2.2E here >

< Insert Table 2.2F here >

PRI's strategic augmentation of public and municipal investments potentially neutralized the certification process' adverse effects, which pushed ejidatarios towards PAN post the '92 reform. Despite the initial shift towards PAN, public investment may have balanced political preferences, with ejidatarios associating equitably distributed municipal investment with PAN and enhancing land values in politically competitive environments.

Finally, the analysis of Tables 2.2G and 2.2H, specifically columns (3), (6), and (9), offers a nuanced perspective on the impacts of public and municipal investment on electoral

outcomes when the sample is separated by regions. The interaction coefficient in column (9) of Table 2.2H remains statistically significant and negative, reinforcing previous results. This suggests that the PRI's combined strategy of increased public investment and certification could have been somewhat successful in mitigating the loss of support to the PAN party, particularly in municipalities in the centre of Mexico, where the majority of ejidos and economic activity are located (De Janvry et al., 2014).

< Insert Table 2.2G here >

< Insert Table 2.2H here >

Overall, municipal investment, which is more localized and evenly distributed, could have a more significant impact on the value of ejido lands. The certification process, which provided ejidatarios with property titles, might have ignited a shift in political preferences, with ejidatarios seemingly favouring the PAN after the '92 agricultural reform. However, the combination of increased public investment and the granting of titles to ejidatarios might have been somewhat successful in maintaining a certain level of support for the PRI, especially among ejidatarios (De Janvry et al., 2014; Sinkler, 2014; Larreguy et al., 2015).

2.8. Conclusions

This paper argues that when the reform that ended the ejido era in Mexico was enacted, the PRI party used policy instruments, primarily public and municipal investment in ejidos, to maintain power and mitigate the negative impact of the change in political preferences, the investment class theory, caused by the Procede programme.

To determine whether that assertion was correct, we hypothesised that once the then-hegemonic party dissolved the ejido with the 1992 agricultural reform, rural voters began to shift their political preferences to the PAN party, a right-wing institution with more market-friendly proposals, particularly in areas with a higher concentration of ejidos, such as the south and centre of the country (see table 2.3). This result in accordance with the Investment Class Theory (Nadler,2000; Nadler, 1999). Once the PRI noticed that loss in support, it attempted to manipulate public and municipal investment to mitigate the negative effects of the Procede programme.

< Insert Table 2.3 here >

To test if this hypothesis was correct, we proposed an empirical design based on first difference estimations with state fixed effects and robust standard errors. Despite the negative impact of the investment class theory that the ejidatarios appeared to be

exposed, this mechanism proved to be successful in capturing the positive effect of a change in public or municipal investment on certification percentage change on the PRI vote share.

With that first result, we then tried to be sure about the validity of this outcome by the implementation of several robustness mechanisms. Those mechanisms helped to prove that the effect was not just different depending on the region and on the concentration level of ejidos, but also that our policy instruments affected the PRI's electoral outcomes, our dependent variable, exclusively and no other economic or societal variables.

This result helped us in assure that the public and municipality investment manipulation of the PRI was successful in diminishing to a certain degree the negative effect of the change in political preferences, more votes to the PAN as in De Janvry et al. (2014), the congressional elections in our case, but at the end could not have been successful enough due to the result of losing the legislative majority in 1997.

In addition, these results also indicated that in a surprising manner, that ejidos in municipalities with more economic growth, expressed as municipalities above the median per-capita GDP growth, and previous opposition victories, mainly municipalities in northern states, were less sensitive to the effect of the newly acquired assets but more sensitive to public investment. As a difference, ejidos in municipalities with less economic growth and located in the centre and especially in the south of the country were more sensitive to municipality investment. The lack of support generated by public investment in poor municipalities could be generated by a feeling of lack of commitment of the national authorities. This lack of commitment and a more market-oriented feeling could make even poor ejidos change their support for the only party with market-oriented policies, the PAN party.

Also, if we take into account the combined effect of more titles granted and more public investment, the centre ejidos responded positively to this combination of public policies more than the other two regions (see table 2.1I). When we changed the public investment for municipality investment, the ejidos that presented a more positive impact of the interaction term were the ones located in the southern region, with more poverty levels and normally smaller in size ejidos and more numerous than in the North or south (see table 2.1H).

The above result could have originated in the fact that due to more local knowledge on how to funnel resources, especially municipality investment, the PRI mayors could have played a major role in distributing the resources under their control than with an investment coming from the Federal or State governments (see Bardhan et al., 2008). This manipulation of resources could be convincing evidence of targeting the core voter.

In addition, poorer voters are more needed for financial support; therefore, the coefficient of the interaction term, using public or municipality investment, is bigger in low GDP per capita municipalities. In richer municipalities, the coefficient is smaller or negative, meaning less support.

It's worth highlighting that the impact of the Investor Class Theory was less persistent in the North of the country, as shown in Castaneda-Dower and Pfutze's study (2015). The influence of gaining an asset on political preferences seemed to wane if an individual had already changed their political allegiance before acquiring the asset. In the North, the decrease in support for the PRI began in 1983, culminating with the PAN's gubernatorial win in Baja California in 1989, marking the first time the PRI lost a gubernatorial race since 1929 (Kirkwood, 2006; Hammett, 2009).

Furthermore, the rise in the PAN vote share throughout the study period can be seen as a manifestation of a shift in political preferences among rural voters. This shift could be linked to the PAN's market-friendly policies which appealed to ejidatarios, especially property-owning voters and those in regions with a high concentration of ejidos. This result is in line with the Investment Class Theory (Nadler, 2000; Nadler, 1999), suggesting that acquiring assets can prompt a change in political preferences towards parties favouring market-friendly policies.

Moreover, the liberation of ejidatarios from their obligation to support the PRI, a consequence of the 1992 agricultural reform, further boosted the PAN's vote share. This newfound freedom enabled ejidatarios to consider other political options, leading to a shift towards parties with more market-friendly policies. This change was likely facilitated by the PRI's strategy of ramping up public and municipal investments, potentially creating an environment conducive to political exploration. The certification process during the study period, which resulted in about 51% of ejidos being certified by 1997, could also have contributed to the increased vote share for the PAN. Coupled with the PRI's investment strategy, this could have influenced the political leanings of ejidatarios, boosting the PAN's vote share. However, the contrasting effects of public and municipal investment on

electoral outcomes, as shown in Tables 2.2A and 2.2B, imply that public investment could possibly disadvantage the PAN party while benefiting the PRI.

Therefore, the removal of outliers in Tables 2.2C and 2.2D might provide a more average response from voters to public investment and certification policies pertaining to the PAN party. This suggests that while the PAN's market-friendly policies and the liberation of ejidatarios from their obligation to support the PRI contributed to the rise in the PAN's vote share, other elements, such as public and municipal investment, may also have played a part.

Overall, the study of the ejido and how this unique agricultural property system, created after the Mexican Revolution, affected the future economic development of the country is extremely important due to its massive scale in size and time, almost 50 percent of the country is occupied by ejidos and the ejido creation continued for almost 70 years until 1992. Also, how the relation of political survival strategies, including the manipulation of public resources, and legal property systems affects the political preferences of individuals is an important area that in Economics has not been completely explored, especially for the Mexican economy, and could be of significant importance for creating development strategies that could aid a country like Mexico to develop in a more efficient way and to avoid past mistakes.

Finally, we can conclude that in the dynamic political landscape of Mexico during the studied period, a multitude of factors collectively shaped the electoral outcomes. The notable shift in political preferences among rural voters was driven by the PAN's market-friendly policies and the liberation of ejidatarios from their obligation to support the PRI, significantly contributing to the PAN's vote share increase. Simultaneously, a change in political preferences induced by the acquisition of an asset posed a threat to parties without market-friendly policies, catalysing a rightward shift. Despite this change, the PRI demonstrated resilience by leveraging public and municipal spending, an influential tool utilized effectively to preserve the loyalty of their main voter base and bolster electoral results. This strategic manipulation of investments and the certification process allowed the PRI to buffer the negative impacts of shifting political preferences. Thus, the period was marked by the delicate dance of attracting new votes by the PAN and the active mitigation of adverse effects by the PRI.

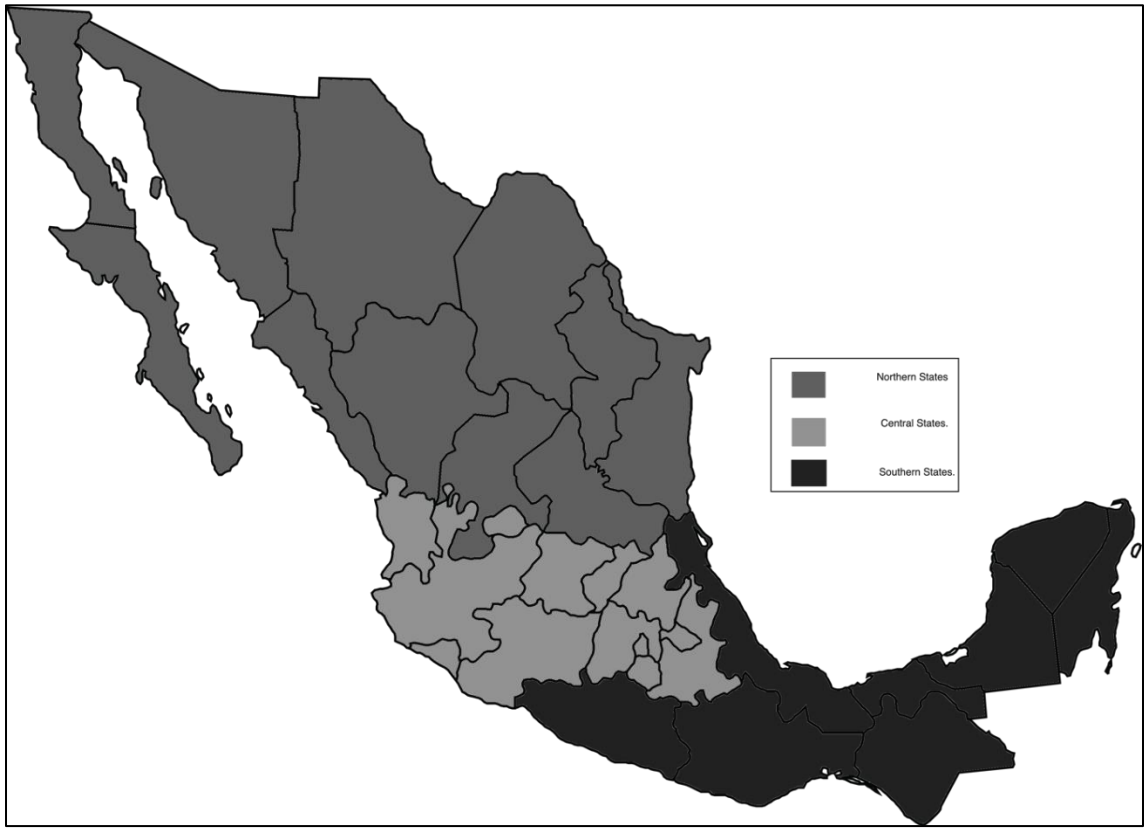
A possible extension the work could be based on expanding the sample until 2007 when the titling program ended for two reasons; First, to have the total change of the ejido

surface that was certified due to more data available; Second, with that extra data to be able to measure not just the effect of public investment on the PRI political outcomes but also on other related variables as economic development in a similar manner as in Rodrik and Wacziarg (2005), in where they relate the democratic transition of Mexico on the years of the end of the ejido to economic growth.

Chapter Appendices

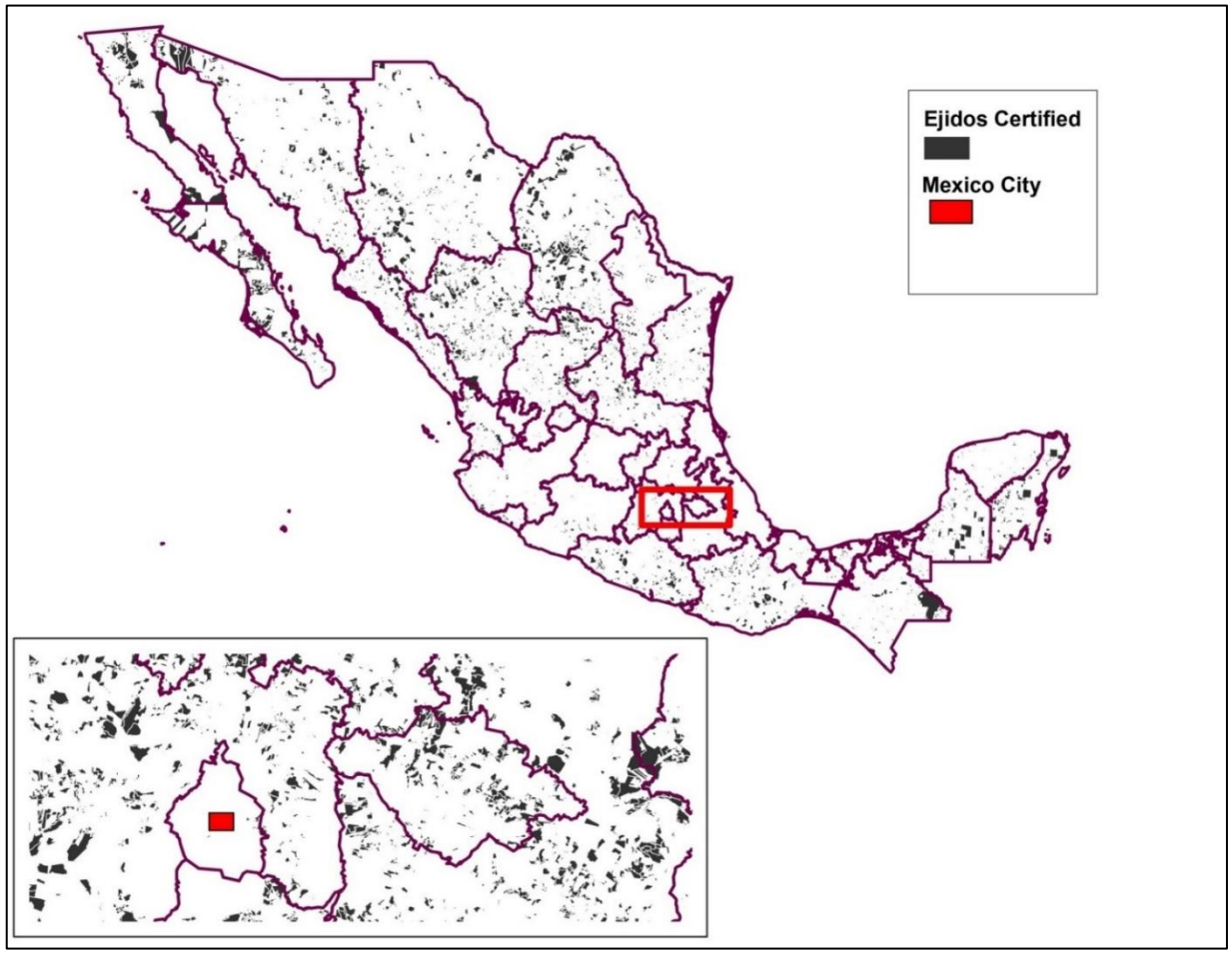
2.A Chapter 2 Figures

Figure 2.1 Regional Subdivision of Mexico



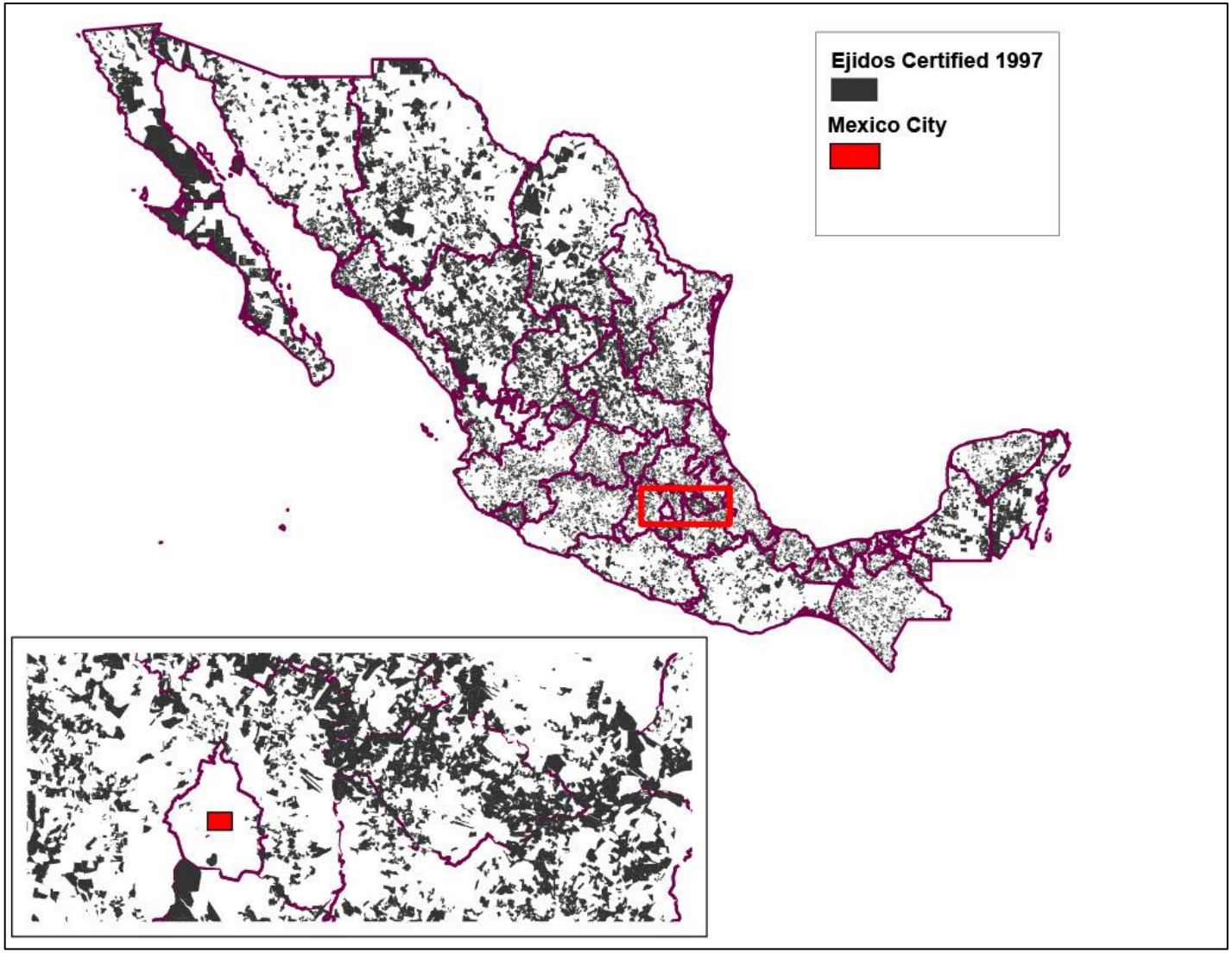
Regional subdivision of Mexico employed for the subregional estimations calculated in tables 2.4A and 2.4B.

Figure 2.2 Ejidos Certified by the Procede Program In 1994



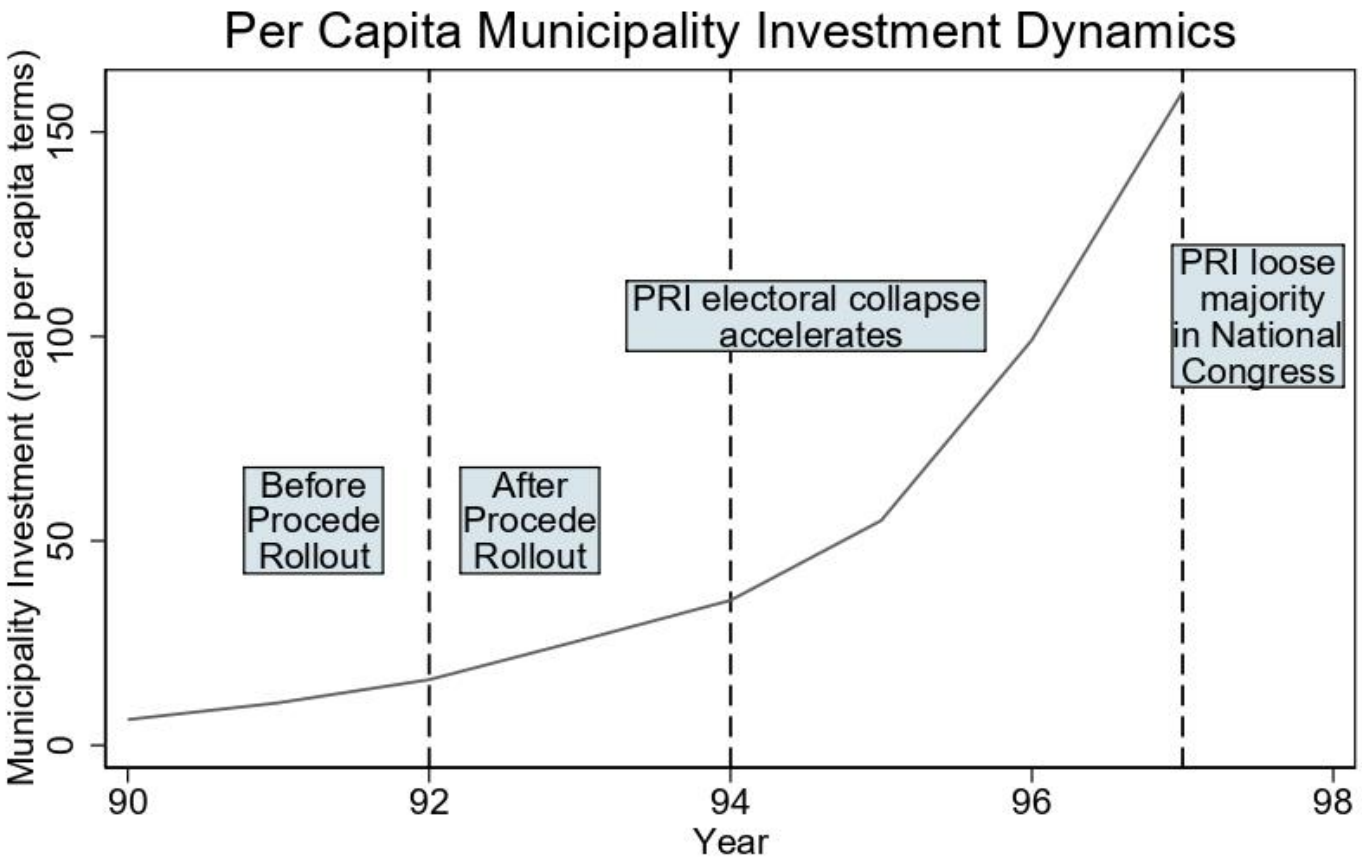
Data come from Registro Agrario Nacional (RAN), National Agrarian Registry (RAN) in English. The number of ejidos reported is th
per state by 1994.

Figure 2.3 Ejidos Certified by the Procede Program In 1997



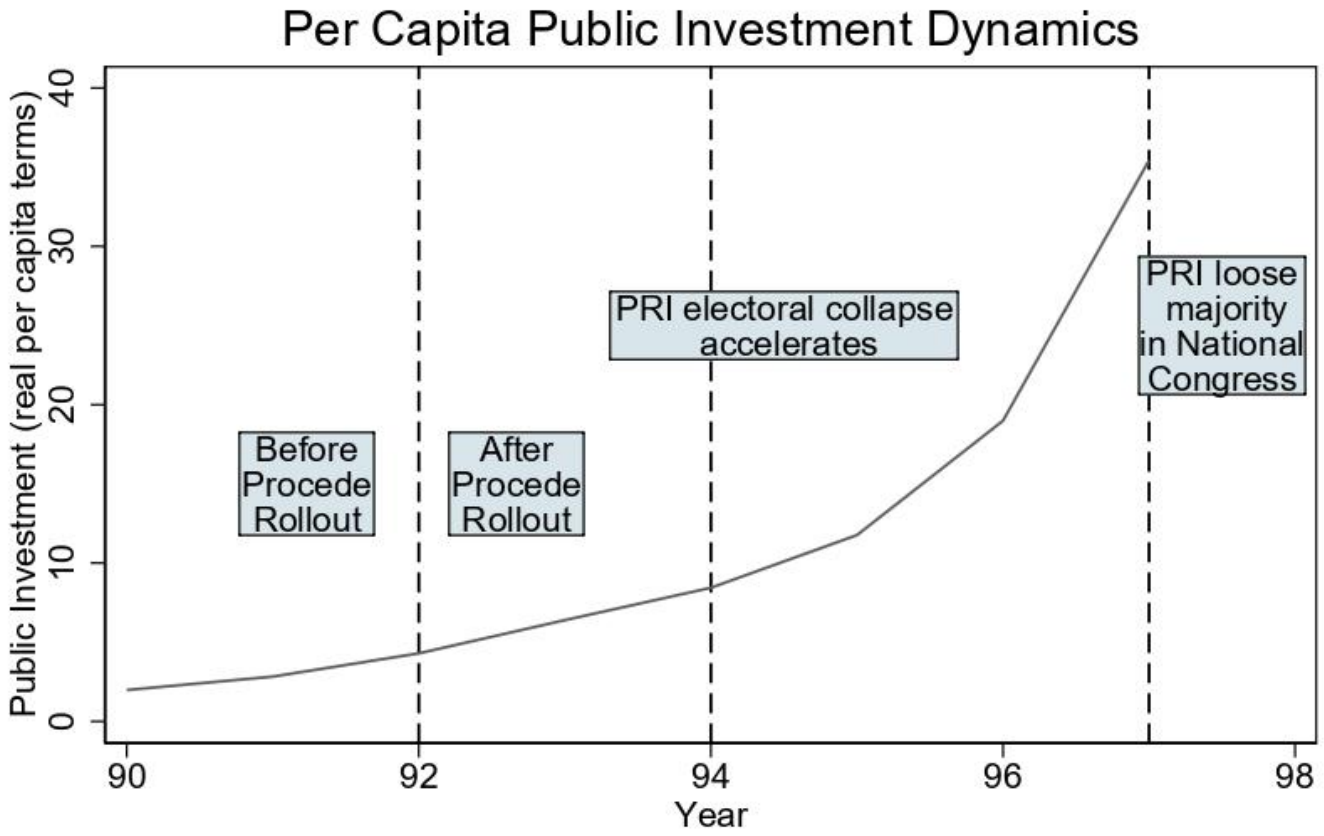
Data come from Registro Agrario Nacional (RAN), National Agrarian Registry (RAN) in English. The number of ejidos reported

Figure 2.4 Per-Capita Municipality Investment Evolution



Note: This graph shows the yearly behaviour in real per-capita terms of municipality investment over the study period.
Source: INEGI's Municipality finances report.

Figure 2.5 Per-Capita Public Investment Evolution



Note: This graph shows the yearly behaviour in real per-capita terms of public investment over the study period.
Source: INEGI's Municipality finances report.

2.B Chapter 2 Tables

Table 2.1A: Summary Statistics.

	Mean	Std. Dev.	No.observations	Minimum	Maximum
Δ PRI vote Share	-26.51	20.35	2447	-82.22	126.91
Δ PAN vote Share	5.31	15.05	2305	-1	263.9724
Δ certification ejidos	51.11	33.76	2331	-0.00	100.00
Δ Public Investment	4419.48	61943.65	2038	-99.96	2.0e+06
Δ municipality investment	710.49	7881.54	2155	-74.41	3.7e+05
Control Variables:					
Δ Illiteracy rate	-9.03	8.91	2356	-60.84	61.75
Δ Population density	6.92	13.41	2350	-50.46	133.64
Δ per-capita GDP	-24.82	48.56	2330	-97.61	1450.66
Δ native population	6.53	12.13	2462	-35.36	135.51
Δ Gini Index	8.90	9.67	2489	-20.91	113.30
Δ households with electricity	-395.85	20221.79	2356	-9.8e+05	2009.84
Δ rain fed agricultural land	6.84	82.70	2191	-100.00	1475.60
Sample size	2496				

The table presents a statistical summary of key regression variables for the period 1997-1991, all expressed as percentage changes, including control variables. Data is sourced from INEGI. The dependent variable, Δ PRI vote Share, represents the percentage change in the ratio of PRI vote share to total votes in Mexican municipalities. The main independent variables include Δ Certification ejidos, indicating the percentage change in the PROCEDE certification program, and Δ Public Investment and Δ Mun Investment, signifying the percentage change in per-capita public and municipal investment respectively. Control variables, measured as ratios to the local population, include population density, the ratio of households with electricity, the Gini index per municipality, and the ratio of rain-fed crops area to the total municipality.

Table 2.1B: The Effect of the Municipality Investment on Ejido Percentage Share change on the PRI Vote Share.

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	-0.089***	-0.016	-0.142***	-0.053	-0.041
	(-3.74)	(-0.62)	(-4.04)	(-1.47)	(-1.06)
Δ municipality investment			-0.855**	-0.672*	-0.728*
			(-2.30)	(-1.72)	(-1.67)
Δ municipality investment*Δ certification ejidos			0.876**	0.702*	0.760*
			(2.34)	(1.78)	(1.73)
Control variables:					
Δ Illiteracy rate					0.022
					(0.80)
Δ Population density					0.119
					(1.53)
Δ per-capita GDP					0.047***
					(4.21)
Δ native population					-0.207***
					(-2.66)
Δ Gini Index					0.022
					(0.78)
Δ households with electricity					0.061**
					(2.06)
Δ rain fed agricultural land					0.011
					(0.57)
Observations	2298	2298	2041	2041	1809
R Squared	0.01	0.16	0.01	0.18	0.20
State FE	No	YES	NO	YES	YES

The dependent variable is the PRI vote share percentage change between the congressional elections for the period 1997-1991. Δ certification ejidos is equal to the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ municipality investment is equal to the percentage change in the per-capita municipality investment for the period 1997-1991. (2),(4) and (5) were estimated using state fixed effects. Robust standard errors are used, and t-statistics are reported in the parentheses. The coefficients are standardized beta coefficients. , ***,**,* . Statistically significant at the 1%, 5% and 10% confidence level respectively.

Table 2.1C The Effect of the Public Investment on Ejido Percentage Share change on the PRI Vote Share.

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	-0.089***	-0.016	-0.060**	0.015	0.028
	(-3.74)	(-0.62)	(-2.27)	(0.53)	(0.95)
Δ Public Investment			0.003	0.028	-0.191
			(0.10)	(0.89)	(-1.47)
Δ public investment*Δ certification ejidos			-0.029	-0.033	0.177
			(-1.28)	(-1.18)	(1.39)
Control variables:					
Δ Illiteracy rate					0.021
					(0.76)
Δ Population density					0.093
					(1.13)
Δ per-capita GDP					0.048***
					(4.11)
Δ native population					-0.191**
					(-2.29)
Δ Gini Index					0.026
					(0.90)
Δ households with electricity					0.058**
					(2.16)
Δ rain fed agricultural land					0.016
					(0.79)
Observations	2298	2298	1932	1932	1718
R Squared	0.01	0.16	0.00	0.17	0.19
State FE	NO	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PRI vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.1D: The Effect of the Municipality Investment on Ejido Percentage Share on the PRI Vote Share (Cook's Method).

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	-0.133***	-0.034	-0.156***	-0.042	-0.044
	(-6.33)	(-1.44)	(-4.85)	(-1.38)	(-1.36)
Δ municipality investment			-0.006	0.036	0.038
			(-0.18)	(1.04)	(1.03)
Δ municipality investment*Δ certification ejidos			0.076**	0.072*	0.083**
			(2.19)	(1.68)	(1.99)
Control Variables:					
Δ Illiteracy rate					0.013
					(0.49)
Δ Population density					0.138*
					(1.93)
Δ per-capita GDP					0.061***
					(5.95)
Δ native population					-0.214***
					(-3.08)
Δ Gini Index					0.052**
					(2.00)
Δ households with electricity					0.060***
					(2.84)
Δ rain fed agricultural land					0.006
					(0.36)
Observations	2184	2255	1956	1988	1756
R Squared	0.02	0.19	0.02	0.22	0.25
State FE	No	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PRI vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Municipality Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. Outliers were excluded using the Cook's Method. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.1E The Effect of the Public Investment on Ejido Percentage Share change on the PRI Vote Share (Cook's Method).

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	-0.133***	-0.033	-0.099***	-0.004	-0.002
	(-6.33)	(-1.41)	(-4.08)	(-0.14)	(-0.06)
Δ Public Investment			0.023	0.122	0.130
			(0.57)	(1.55)	(0.96)
Δ public investment*Δ certification ejidos			-0.034	-0.120	-0.141
			(-0.87)	(-1.59)	(-1.06)
Control Variables:					
Δ Illiteracy rate					0.021
					(0.76)
Δ Population density					0.119
					(1.62)
Δ per-capita GDP					0.061***
					(5.71)
Δ native population					-0.214***
					(-2.97)
Δ Gini Index					0.062**
					(2.27)
Δ households with electricity					0.071***
					(3.56)
Δ rain fed agricultural land					0.014
					(0.76)
Observations	2184	2251	1889	1883	1664
R Squared	0.02	0.19	0.01	0.20	0.24
State FE	NO	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PRI vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. Outliers were excluded using the Cook's Method. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.1F The Effect of the Public Investment on Ejido Percentage Share change on the PRI Vote Share:Testing for differential level of economic growth.

	High GDP Per Capita			Low GDP Per Capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ certification ejidos	-0.086	0.021	-0.002	-0.173***	-0.113**	-0.068
	(-1.63)	(0.34)	(-0.03)	(-3.83)	(-2.57)	(-1.52)
Δ municipality investment	0.021	0.025	0.008	-1.231*	-1.130	-0.988
	(0.42)	(0.49)	(0.15)	(-1.84)	(-1.62)	(-1.38)
Δ municipality investment*Δ certification ejidos	0.098	0.073	0.111	1.253*	1.168*	1.026
	(1.08)	(0.70)	(0.98)	(1.87)	(1.66)	(1.42)
Control variables:						
Δ Illiteracy rate			0.002			0.041
			(0.06)			(1.03)
Δ Population density			0.202			0.072
			(1.56)			(0.79)
Δ per-capita GDP			0.059***			-0.104***
			(5.90)			(-2.70)
Δ native population			-0.298**			-0.131
			(-2.21)			(-1.50)
Δ Gini Index			0.041			-0.020
			(1.01)			(-0.51)
Δ households with electricity			0.022			0.090**
			(0.62)			(2.14)
Δ rain fed agricultural land			-0.041***			0.059***
			(-2.76)			(4.09)
Observations	949	949	830	1067	1067	979
R Squared	0.01	0.18	0.20	0.02	0.22	0.25
State FE	NO	YES	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PRI vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Mun Investment is an indicator of the percentage change of the percapita municipality investment to total municipality population. All variables are Standardized. All estimates in columns (1)-(3) were estimated using a subsample of municipalities with above the median per-capita GDP. Estimations in columns (4)-(6) were estimated using a subsample of municipalities with below the median per-capita GDP. (2), (3), (5) and (6) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.1G The effect of Public Investment on ejidos on the PRI vote share: Testing for differential level of economic growth

	High GDP Per Capita			Low GDP Per Capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ certification ejidos	-0.044	0.047	0.056	-0.081**	-0.026	0.004
	(-1.15)	(1.10)	(1.21)	(-2.23)	(-0.69)	(0.09)
Δ Public Investment	-0.043***	-0.096***	-0.099***	0.030***	0.065***	0.093
	(-2.93)	(-4.61)	(-4.69)	(3.04)	(4.11)	(0.61)
Δ public investment*Δ certification ejidos	0.011	0.085**	0.086**	-0.061***	-0.072***	-0.106
	(0.49)	(2.14)	(2.22)	(-5.08)	(-5.99)	(-0.73)
Control variables:						
Δ Illiteracy rate			0.005			0.040
			(0.12)			(0.97)
Δ Population density			0.180			0.029
			(1.31)			(0.31)
Δ per-capita GDP			0.056***			-0.098**
			(5.69)			(-2.40)
Δ native population			-0.294**			-0.094
			(-2.05)			(-1.00)
Δ Gini Index			0.044			-0.008
			(1.02)			(-0.19)
Δ households with electricity			0.036			0.080**
			(0.97)			(2.11)
Δ rain fed agricultural land			-0.038**			0.063***
			(-2.45)			(4.28)
Observations	904	904	795	1005	1005	923
R Squared	0.00	0.17	0.19	0.01	0.20	0.23
FE	NO	YES	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PRI vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are standardized. All estimates in columns (1)-(3) were estimated using a subsample of municipalities with above the median per-capita GDP. Estimations in columns (4)-(6) were estimated using a subsample of municipalities with below the median per-capita GDP. (2), (3), (5) and (6) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.1H The Effect of The Municipality Investment on Ejido Percentage Share Change on the PRI Vote Share: Testing for Regional Differences.

	Southern Region			Northern Region			Centre Region.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Δ certification ejidos	-0.106*	-0.038	-0.037	-0.071	-0.092	-0.015	-0.043	-0.052	-0.044
	(-1.65)	(-0.62)	(-0.58)	(-0.79)	(-1.06)	(-0.11)	(-1.00)	(-1.23)	(-1.04)
Δ municipality investment	-1.161*	-0.820	-0.922	0.032	-0.016	0.040	0.123**	0.039	0.004
	(-1.66)	(-1.20)	(-1.27)	(0.35)	(-0.18)	(0.24)	(2.51)	(0.83)	(0.08)
Δ municipality investment*Δ certification ejidos	1.179*	0.855	0.958	0.082	0.151	0.045	-0.105*	0.049	0.082
	(1.68)	(1.24)	(1.31)	(0.64)	(1.14)	(0.22)	(-1.75)	(0.74)	(1.35)
Control Variables:									
Δ Illiteracy rate			0.010			-0.026			0.079*
			(0.27)			(-0.40)			(1.68)
Δ Population density			0.049			0.473*			0.158
			(0.45)			(1.81)			(1.48)
Δ per-capita GDP			0.032			0.040			0.077***
			(0.72)			(0.69)			(7.14)
Δ native population			-0.126			-0.492**			-0.273***
			(-1.15)			(-1.98)			(-2.79)
Δ Gini Index			-0.017			0.105*			0.079
			(-0.47)			(1.78)			(1.61)
Δ households with electricity			0.070			0.067			0.036
			(1.53)			(1.47)			(1.27)
Δ rain fed agricultural land			-0.025***			0.045			0.043
			(-2.67)			(0.61)			(1.20)
Observations	863	863	837	422	422	341	756	756	631
R SQUARED	0.01	0.13	0.15	0.01	0.18	0.17	0.01	0.25	0.32
State FE	No	YES	Yes	NO	YES	YES	No	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PRI vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Mun Investment is an indicator of the percentage change of the percapita municipality investment to total municipality population. All variables are Standardized. Columns (1)-(3) were estimated using a subsample of municipalities for Mexico's southern region. (4)-(6) were estimated using a subsample of municipalities for Mexico's northern region. (7)-(9) were estimated using a subsample of municipalities for Mexico's centre region. Columns (2), (3), (5), (6), (8) and (9) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.1I The Effect of the Public Investment On Ejido Percentage Share Change on the PRI Vote Share: Testing for Regional Differences.

	Southern Region			Northern Region			Centre Region.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Δ certification ejidos	-0.003	0.037	0.040	-0.023	-0.033	0.000	-0.087**	-0.044	-0.027
	(-0.08)	(0.97)	(1.03)	(-0.44)	(-0.66)	(0.01)	(-2.29)	(-1.17)	(-0.71)
Δ Public Investment	-0.017	-0.003	-0.018	0.067	-0.047	0.108	0.010	0.037	-0.513**
	(-0.61)	(-0.14)	(-0.63)	(0.75)	(-0.40)	(0.71)	(0.23)	(0.59)	(-2.20)
Δ public investment*Δ certification ejidos	0.023	0.022	0.032	0.017	0.130	-0.066	-0.054	-0.049	0.481**
	(0.55)	(0.55)	(0.79)	(0.12)	(0.80)	(-0.47)	(-1.31)	(-0.90)	(2.11)
Control Variables:									
Δ Illiteracy rate			0.011			-0.051			0.090*
			(0.30)			(-0.78)			(1.83)
Δ Population density			0.008			0.360			0.208*
			(0.07)			(1.26)			(1.79)
Δ per-capita GDP			0.040			0.030			0.077***
			(0.87)			(0.49)			(6.81)
Δ native population			-0.087			-0.417			-0.331***
			(-0.76)			(-1.53)			(-3.05)
Δ Gini Index			-0.011			0.116**			0.076
			(-0.30)			(1.98)			(1.49)
Δ households with electricity			0.063			0.050			0.051*
			(1.46)			(1.07)			(1.91)
Δ rain fed agricultural land			-0.023**			0.045			0.057
			(-2.49)			(0.59)			(1.53)
Observations	837	837	812	385	385	315	710	710	591
R SQUARED	0.00	0.12	0.14	0.01	0.17	0.17	0.01	0.24	0.31
State FE	NO	YES	YES	NO	YES	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PRI vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. Columns (1)-(3) were estimated using a subsample of municipalities for Mexico's southern region. (4)-(6) were estimated using a subsample of municipalities for Mexico's northern region. (7)-(9) were estimated using a subsample of municipalities for Mexico's centre region. Columns (2), (3), (5), (6), (8) and (9) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.1J The Effect of the Municipality Investment on Ejido Percentage Share Change on Per-Capita GDP: Testing for Alternative Explanations.

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	0.036	0.016	0.042	0.013	0.011
	(1.42)	(0.87)	(1.17)	(0.47)	(0.39)
Δ municipality investment			0.000	-0.000	-0.000
			(0.16)	(-0.36)	(-0.42)
Δ municipality investment*Δ certification ejidos			-0.000	0.000	0.000
			(-0.21)	(0.32)	(0.33)
Control Variables:					
Δ Illiteracy rate					0.074
					(0.85)
Δ Population density					-0.838***
					(-4.64)
Δ native population					-0.112
					(-0.45)
Δ Gini Index					-0.426**
					(-2.54)
Δ households with electricity					-0.009
					(-1.09)
Δ rain fed agricultural land					0.006
					(0.93)
Observations	2186	2186	2026	2026	1814
R SQUARED	0.00	0.07	0.00	0.07	0.12
State FE	No	YES	No	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the Municipality GDP per capita change for 1997-1991. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Mun Investment is an indicator of the percentage change of the percapita municipality investment to total municipality population. All variables are Standardized. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively

Table 2.1K The Effect of the Public Investment on Ejido Percentage Share on per-capita GDP: Testing for alternative explanations

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	0.036	0.016	0.041	0.017	0.018
	(1.42)	(0.87)	(1.37)	(0.83)	(0.93)
Δ Public Investment			-0.000	0.000	-0.000
			(-0.29)	(0.82)	(-0.23)
Δ public investment*Δ certification ejidos			-0.000	-0.000	0.000
			(-1.08)	(-1.41)	(0.09)
Control Variables:					
Δ Illiteracy rate					0.095
					(1.05)
Δ Population density					-0.831***
					(-4.24)
Δ native population					-0.123
					(-0.47)
Δ Gini Index					-0.442**
					(-2.52)
Δ households with electricity					-0.008
					(-0.95)
Δ rain fed agricultural land					0.006
					(0.79)
Observations	2186	2186	1918	1918	1723
R SQUARED	0.00	0.07	0.00	0.07	0.12
State FE	No	Yes	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the Municipality GDP per capita change for 1997-1991. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2A: The Effect of the Municipality Investment on Ejido Percentage Share change on the PAN Vote Share.

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	0.063***	0.072***	0.058***	0.072***	0.029
	(0.018)	(0.020)	(0.018)	(0.021)	(0.100)
Δ Mun Investment			0.188***	0.232**	0.028
			(0.068)	(0.092)	(0.271)
Δ certification ejidos # Δ Mun Investment			-0.305***	-0.394***	-0.320
			(0.105)	(0.142)	(0.250)
Control Variables:					
Δ Illiteracy rate					0.036
					(0.031)
Δ Population density					-0.143
					(0.097)
Δ Rural Population					-0.020
					(0.024)
Δ households with electricity					0.233**
					(0.104)
Δ per-capita GDP					-0.052
					(0.034)
Δ native population					0.095*
					(0.050)
Δ Gini Index					0.000
					(0.023)
Δ rain fed agricultural land					-0.000
					(0.012)
No of Observations	2071	2071	1930	1930	1776
R Squared	0.005	0.085	0.007	0.100	0.156
State FE	NO	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Mun Investment is an indicator of the percentage change of the percapita municipality investment to total municipality population. All variables are Standardized. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2B: The Effect of the Public Investment on Ejido Percentage Share change on the PAN Vote Share.

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	0.063***	0.072***	0.065***	0.078***	0.068
	(0.018)	(0.020)	(0.020)	(0.023)	(0.108)
Δ Public Investment			-0.022**	-0.005	-0.098*
			(0.010)	(0.009)	(0.052)
Δ certification ejidos # Δ Public Investment			-0.020*	-0.025***	-0.113**
			(0.010)	(0.009)	(0.053)
Control Variables:					
Δ Illiteracy rate					0.030
					(0.031)
Δ Population density					-0.162*
					(0.095)
Δ Rural Population					-0.019
					(0.025)
Δ households with electricity					0.166**
					(0.069)
Δ per-capita GDP					-0.067*
					(0.036)
Δ native population					0.140***
					(0.047)
Δ Gini Index					0.005
					(0.022)
Δ rain fed agricultural land					0.002
					(0.013)
No of Observations	2071	2071	1829	1829	1704
R Squared	0.005	0.085	0.006	0.091	0.139
State FE	NO	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2C: The Effect of the Municipality Investment on Ejido Percentage Share on the PAN Vote Share (Cook's Method).

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	0.029***	0.039***	0.025***	0.033***	-0.006
	(0.007)	(0.008)	(0.007)	(0.008)	(0.023)
Δ Mun Investment			-0.355***	0.010	-0.083
			(0.087)	(0.134)	(0.133)
Δ certification ejidos # Δ Mun Investment			-0.327***	-0.350***	-0.303***
			(0.082)	(0.087)	(0.084)
Control Variables:					
Δ Illiteracy rate					0.022***
					(0.008)
Δ Population density					-0.106***
					(0.033)
Δ Rural Population					-0.009**
					(0.005)
Δ households with electricity					0.135***
					(0.023)
Δ per-capita GDP					-0.009
					(0.008)
Δ native population					0.075***
					(0.024)
Δ Gini Index					0.007
					(0.007)
Δ rain fed agricultural land					0.009
					(0.006)
No of Observations	1292	1292	1292	1292	1292
R Squared	0.009	0.332	0.022	0.337	0.382
State FE	NO	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Mun Investment is an indicator of the percentage change of the percapita municipality investment to total municipality population. All variables are Standardized. Outliers were excluded using the Cook's Method. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2D: The Effect of the Public Investment on Ejido Percentage Share change on the PAN Vote Share (Cook's Method).

	(1)	(2)	(3)	(4)	(5)
Δ certification ejidos	0.029***	0.038***	0.020**	0.035***	-0.029
	(0.007)	(0.007)	(0.009)	(0.009)	(0.024)
Δ Public Investment			-0.181*	-0.063	-0.083
			(0.104)	(0.086)	(0.090)
Δ certification ejidos # Δ Public Investment			-0.139	-0.051	-0.072
			(0.095)	(0.077)	(0.081)
Control Variables:					
Δ Illiteracy rate					0.028***
					(0.008)
Δ Population density					-0.141***
					(0.034)
Δ Rural Population					-0.010**
					(0.004)
Δ households with electricity					0.101***
					(0.021)
Δ per-capita GDP					-0.013
					(0.008)
Δ native population					0.085***
					(0.025)
Δ Gini Index					0.008
					(0.007)
Δ rain fed agricultural land					0.007
					(0.006)
No of Observations	1230	1230	1230	1230	1230
R Squared	0.011	0.327	0.012	0.327	0.368
State FE	NO	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. Outliers were excluded using the Cook's Method. All estimates in columns (2), (4) and (5) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2E: The Effect of the Municipality Investment on Ejido Percentage Share change on the PAN Vote Share: Testing for differential level of economic growth.

	High GDP Per Capita			Low GDP Per Capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ certification ejidos	0.037*	0.033	-0.009	0.048**	0.052*	-0.012
	(0.020)	(0.022)	(0.046)	(0.023)	(0.028)	(0.114)
Δ Mun Investment	0.166**	0.197**	0.490	-0.480*	0.199	0.016
	(0.068)	(0.088)	(0.442)	(0.261)	(0.323)	(0.285)
Δ certification ejidos # Δ Mun Investment	-0.262**	-0.318**	0.073	-0.217	-0.295**	-0.195
	(0.105)	(0.136)	(0.318)	(0.175)	(0.149)	(0.271)
Control Variables:						
Δ Illiteracy rate			0.004			0.030
			(0.023)			(0.036)
Δ Population density			-0.009			-0.218*
			(0.038)			(0.116)
Δ Rural Population			0.009			-0.033
			(0.006)			(0.032)
Δ households with electricity			0.237***			0.217**
			(0.057)			(0.108)
Δ per-capita GDP			0.022			-0.051
			(0.024)			(0.036)
Δ native population			0.001			0.131**
			(0.018)			(0.066)
Δ Gini Index			0.059***			-0.014
			(0.018)			(0.026)
Δ rain fed agricultural land			0.005			-0.004
			(0.010)			(0.014)
No of Observations	357	357	233	1573	1573	1543
R Squared	0.047	0.265	0.402	0.005	0.102	0.160
State FE	NO	YES	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Mun Investment is an indicator of the percentage change of the percapita municipality investment to total municipality population. All variables are Standardized. All estimates in columns (1)-(3) were estimated using a subsample of municipalities with above the median per-capita GDP. Estimations in columns (4)-(6) were estimated using a subsample of municipalities with below the median per-capita GDP. (2), (3), (5) and (6) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2F: The Effect of the Public Investment on Ejido Percentage Share Change On The PAN Vote Share: Testing for Differential Level of Economic Growth.

	High GDP Per Capita			Low GDP Per Capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ certification ejidos	0.026	0.007	0.288	0.044*	0.052*	0.036
	(0.030)	(0.034)	(0.255)	(0.026)	(0.030)	(0.124)
Δ Public Investment	-0.490	-0.748	4.029	-0.026**	-0.007	-0.081
	(0.539)	(0.623)	(3.596)	(0.010)	(0.010)	(0.055)
Δ certification ejidos # Δ Public Investment	-0.397	-0.670	4.753	-0.015	-0.019**	-0.101*
	(0.480)	(0.545)	(4.080)	(0.011)	(0.009)	(0.058)
Control Variables:						
Δ Illiteracy rate			0.009			0.023
			(0.025)			(0.036)
Δ Population density			-0.021			-0.235**
			(0.039)			(0.118)
Δ Rural Population			0.010*			-0.032
			(0.006)			(0.034)
Δ households with electricity			0.253***			0.147**
			(0.059)			(0.072)
Δ per-capita GDP			0.025			-0.067*
			(0.023)			(0.038)
Δ native population			-0.004			0.190***
			(0.020)			(0.065)
Δ Gini Index			0.062***			-0.008
			(0.018)			(0.025)
Δ Rain fed agricultural land			0.009			-0.003
			(0.009)			(0.015)
No of Observations	335	335	220	1494	1494	1484
R Squared	0.046	0.264	0.425	0.002	0.092	0.143
State FE	NO	YES	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. All estimates in columns (1)-(3) were estimated using a subsample of municipalities with above the median per-capita GDP. Estimations in columns (4)-(6) were estimated using a subsample of municipalities with below the median per-capita GDP. (2), (3), (5) and (6) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2G: The Effect of the Municipality Investment on Ejido Percentage Share Change on the PAN Vote Share: Testing for regional differences.

	Southern Region			Northern Region			Centre Region		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Δ certification ejidos	-0.010	0.042	-0.101	0.086	0.085	0.036	0.080***	0.074***	0.156
	(0.033)	(0.036)	(0.095)	(0.074)	(0.082)	(0.200)	(0.020)	(0.023)	(0.161)
Δ Mun Investment	0.033	0.164	0.472	-1.188	-2.120	-5.783*	-0.034	0.002	-0.241
	(0.083)	(0.113)	(0.422)	(1.402)	(2.072)	(3.401)	(0.280)	(0.349)	(0.344)
Δ certification ejidos # Δ Mun Investment	-0.068	-0.288	-0.061	-0.272	-0.753	0.712	-0.539***	-0.479***	-0.484
	(0.129)	(0.176)	(0.297)	(0.843)	(0.983)	(1.249)	(0.183)	(0.179)	(0.685)
Control Variables:									
Δ Illiteracy rate			0.056			-0.049			0.053*
			(0.042)			(0.074)			(0.031)
Δ Population density			-0.236**			-0.349			0.053
			(0.108)			(0.286)			(0.151)
Δ Rural Population			-0.062			0.150*			-0.001
			(0.059)			(0.078)			(0.009)
Δ households with electricity			0.269			0.184			0.194
			(0.169)			(0.128)			(0.156)
Δ per-capita GDP			-0.023			-0.105			-0.054**
			(0.055)			(0.078)			(0.027)
Δ native population			0.110*			0.159			0.012
			(0.065)			(0.159)			(0.092)
Δ Gini Index			0.001			0.055			-0.039
			(0.029)			(0.078)			(0.027)
Δ rain fed agricultural land			0.074			0.013			-0.022
			(0.187)			(0.011)			(0.022)
No of Observations	803	803	782	419	419	320	708	708	674
R Squared	0.000	0.084	0.150	0.035	0.158	0.217	0.037	0.058	0.149
State FE	NO	YES	YES	NO	YES	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Mun Investment is an indicator of the percentage change of the percapita municipality investment to total municipality population. All variables are Standardized. Columns (1)-(3) were estimated using a subsample of municipalities for Mexico's southern region. (4)-(6) were estimated using a subsample of municipalities for Mexico's northern region. (7)-(9) were estimated using a subsample of municipalities for Mexico's centre region. Columns (2), (3), (5), (6), (8) and (9) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.2H The Effect of the Public Investment on Ejido Percentage Share Change on the PAN Vote Share: Testing for regional Differences.

	Southern Region			Northern Region			Centre Region		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Δ certification ejidos	-0.099	-0.086	-0.156	0.129	0.094	0.039	0.101***	0.092***	0.197
	(0.065)	(0.056)	(0.096)	(0.187)	(0.189)	(0.345)	(0.020)	(0.024)	(0.159)
Δ Public Investment	0.260	2.104	1.427	0.085	-2.339	-6.594*	-0.014	-0.007	-0.134***
	(1.462)	(1.298)	(1.249)	(1.981)	(2.199)	(3.479)	(0.010)	(0.009)	(0.048)
Δ certification ejidos # Δ Public Investment	-1.424	-1.908**	-0.828	0.327	-0.507	-1.587	-0.026**	-0.026***	-0.156***
	(1.013)	(0.965)	(1.001)	(2.241)	(2.185)	(1.991)	(0.010)	(0.009)	(0.050)
Control Variables:									
Δ Illiteracy rate			0.034			-0.032			0.062*
			(0.037)			(0.081)			(0.032)
Δ Population density			-0.282***			-0.272			0.073
			(0.097)			(0.263)			(0.154)
Δ Rural Population			-0.061			0.179**			-0.001
			(0.062)			(0.076)			(0.009)
Δ households with electricity			0.132*			0.179			0.185
			(0.074)			(0.122)			(0.157)
Δ per-capita GDP			-0.025			-0.136			-0.067**
			(0.054)			(0.083)			(0.029)
Δ native population			0.145**			0.244			0.009
			(0.064)			(0.154)			(0.099)
Δ Gini Index			0.015			0.059			-0.045
			(0.026)			(0.079)			(0.031)
Δ rain fed agricultural land			0.121			0.013			-0.031
			(0.191)			(0.012)			(0.023)
No of Observations	778	778	661	384	384	299	667	667	544
R Squared	0.001	0.079	0.126	0.038	0.151	0.231	0.035	0.055	0.152
State FE	NO	YES	YES	NO	YES	YES	NO	YES	YES

The table reports OLS estimates of equation (1) for the period 1991-1997. The dependent variable is the percentage change ratio of the PAN vote share to total votes casted for municipalities in Mexico. Δ certification ejidos is an indicator of the percentage change in the certification program (PROCEDE) for the period 1997-1991. Δ Public Investment is an indicator of the percentage change of the percapita public investment to total municipality population. All variables are Standardized. Columns (1)-(3) were estimated using a subsample of municipalities for Mexico's southern region. (4)-(6) were estimated using a subsample of municipalities for Mexico's northern region. (7)-(9) were estimated using a subsample of municipalities for Mexico's centre region. Columns (2), (3), (5), (6), (8) and (9) include state fixed-Effects. Controls are measured as percentage changes and include: (i) Δ Illiteracy rate; (ii) Δ Population density; (iii) Δ Rural Population; (iv) Δ households with electricity; (v) Δ per-capita GDP; (vi) Δ native population; (vii) Δ Gini Index; (viii) Δ rain fed agricultural land. Robust standard errors, , are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 2.6 Descriptive Statistics for Ejidos

Region	State.	Number of ejidos.	Ejido average size.
North	Baja California	235	102.47
	Baja California Sur	96	433.90
	Chihuahua	966	70.98
	Coahuila De Zaragoza	879	59.69
	Durango	1,109	60.29
	Nuevo Leon	598	23.48
	San Luis Potosi	1,392	71.53
	Sinaloa	1,300	25.50
	Sonora	973	63.99
	Tamaulipas	1,355	16.19
	Zacatecas	759	19.45
	Total	9,662	
South	Campeche	375	42.36
	Chiapas	2,780	7.62
	Guerrero	1,202	25.40
	Oaxaca	1,360	14.36
	Quintana Roo	281	71.53
	Tabasco	798	10.10
	Veracruz De Ignacio De La Llave	3,608	4.33
	Yucatan	713	19.45
	Total	11,117	
Centre	Aguascalientes	182	9.61
	Ciudad De Mexico	20	1.50
	Colima	167	13.37
	Guanajuato	1,518	7.29
	Hidalgo	1,108	4.48
	Jalisco	1,405	10.10
	Mexico	1,156	3.78
	Michoacan De Ocampo	1,813	10.29
	Morelos	217	7.33
	Nayarit	377	32.55
	Puebla	1,125	5.17
	Queretaro	371	9.57
	Tlaxcala	244	2.47
	Total	9,703	

Data come from Registro Agrario Nacional (RAN), National Agrarian Registry (RAN) in English. The number of ejidos reported is the total per state. Ejido average size is reported as the average ejido area per state in square kilometres.

Chapter 3 Cartel Operations and Local Finances

This chapter explores how cartels and political favouritism drive the allocation and generation of local resources across constituencies. Particularly, we study the extent to which the favouritism between Mexican cartels activities and the PRI regime in Mexico affects the creation and distribution of local resources for the 1991-2006 period. We use panel data regression to study municipal governments in Mexico's main sources of income and expenses. We find that municipalities with cartel presence during the PRI regime obtain on average more public resources transferred by the central government and an increase in taxation particularly after the end of the regime. This increase in public resources in municipalities with cartel presence and belonging to the PRI could indicate political favouritism. After 2001, criminal organisations in Mexico may have increased taxation through their legal activities. Additionally, there is no evidence that narco-political favouritism is limited to a single region. These findings provide evidence that criminal activity and political economy forces influence the creation and distribution of local public resources in Mexico.

3.1. Introduction

The Mexican drug cartels and their drug trafficking operations have been a major problem for decades. More specifically, the dynamics of trafficking in Mexico appeared to be driven primarily by political competition and partisan conflict, especially during the country's transition to democracy, the outbreak of criminal wars, and the subsequent large-scale criminal violence. In other words, drug trafficking dynamics may have an impact on a number of parameters, including local fiscal resources, because of their significance to the socioeconomic and political functioning of Municipalities' economies (Trejo and Ley, 2020). Particularly, there is the possibility that the change in this trafficking behaviour, which occurred primarily at the end of the PRI regime, influenced the creation of local funds in these municipalities.

More concretely, in recent years, demand for marijuana (Toro 1995; Astorga 2005; Swanson 2020) and, more recently, cocaine has fuelled the growth of Mexico's illicit drug trafficking structure (Arends, 2021; Grillo 2011). These organisations' behaviour has evolved over time, spreading to new domains (Trejo and Ley, 2020). Because of the PRI regime's tight

control over the country's political structure, drug cartels or OCGs were able to establish impunity agreements or informal protection networks, particularly at the gubernatorial level (O'Neill, 2009; Dube et al., 2013). Nevertheless, the PRI's electoral decline in the 1990s made illegal pact formation and implementation more difficult. Interestingly, due to an increase in US firearms and a shift in drug production from marijuana to cocaine, newly democratised municipalities experienced an even greater increase in drug-related violence than those still subject to PRI rule (Dube et al., 2013; Trejo and Ley, 2018). Moreover, it appears that the local violence and socioeconomic instability in Mexico were exacerbated when narcotics transportation and sales by Mexican cartels were now complemented by mafia-like operations of these groups. Specifically, the decrease in local government protection by subnational security forces has coincided with an increase in extortion, fraud, and prostitution by these organisations (Trejo and Ley, 2020). Thus, infiltration of municipal institutions like property tax offices and local business regulatory offices to maximise cartel earnings became common after 2000 (Gurrea 2013; Trejo and Ley, 2020). Some scholars claim that Mexican cartels tried to establish regional criminal administrations in order to exert influence in local governments. Additionally, in Mexico, drug gangs or other organised criminal groups (cartels or OCGs) often resort to high-profile criminal violence against mayors in an effort to consolidate power at the municipal level. This is especially true of politically nonaligned mayors, who are seen as more vulnerable than their aligned counterparts, and of mayors in neighbouring municipalities due to the "contagion effect" (Trejo and Ley, 2019).

Particularly, regarding this situation, Arias (2018) analysed the impact of criminal organisations on policymaking using the divided policy field, violence and friction, and the mediated policy making models. The author focused on the development and implementation of government fiscal policies in regions with significant violent conflicts, such as many parts of Mexico. He found that in countries such as Colombia or Mexico, gangs or cartels frequently interfere in the formulation of state policies in order to gain control over funds associated with government programmes or even central transfers. Following a similar rationale, Murphy and Rossi (2020) showed a positive association between cartel presence and improved public services and tax revenues. Thus, local cartel dynamics seem to be an essential component of local resource levels.

Furthermore, favouritism related to the association between the PRI (Institutional Revolutionary Party) and cartels in Mexico is a significant issue that has been studied and documented by various researchers (See Wright, 2010; Vajda, 2016). One of the main factors

contributing to this favouritism is the practice of bribery by the cartels. Many high-level officials and police officers have been found to have collaborated with criminal enterprises, often in exchange for financial or other forms of personal gain. This collaboration has facilitated the infiltration of state institutions by the cartels, leading to the presence of corruption or favouritism at the highest levels of Mexican policy. In addition to bribery, there is also evidence of favouritism from the cartels to the PRI. In some cases, cartels have helped PRI candidates win elections, in exchange for access to more resources and influence within the government. This type of partisanship has allowed certain cartels to channel more resources from the central government to the municipalities in which they operate, giving them an advantage over their rivals (Trejo and Ley, 2020). Overall, it is clear that favouritism related to the association between the PRI and cartels in Mexico is a complex issue that is correlated with a variety of factors, including bribery, political collaboration with criminal enterprises, and infiltration of state institutions (Campbell, 2010; Hussain, 2014; Trejo and Ley, 2020). Hence, this favouritism has had significant consequences for the country, including the presence of corruption at the highest levels of government and an uneven distribution of resources.

Moreover, it has been well documented that the penetration of cartels into local governments in Mexico has had a significant impact on the allocation of public budget resources (Brenneman, 2012; Merino et al., 2013; Trejo and Ley, 2020). Thus, the level of narco political favouritism present in the allocation of public budget for a given municipality is a key factor in determining the availability of local resources (Diaz-Cayeros and Silva Castaneda, 2004; Trillo and Rabling, 2007; Langston, 2010). This favouritism can occur in a number of ways, including the allocation of resources to municipalities controlled by allied cartels, the diversion of funds from one municipality to another with ties to a particular cartel, and the manipulation of procurement processes to benefit certain contractors or businesses related to those cartels (Le Moglie and Sorrenti, 2017; Murphy and Rossi, 2020; Trejo and Ley, 2020). The presence of cartel influence in local governments can also lead to the allocation of resources in a manner that is not based on local needs, but rather on political or economic considerations. This can result in a distorted distribution of resources and a lack of fairness in the allocation process.

Specifically, we empirically tested the following prediction: cartel local operations have played a significant role in municipal fiscal policies and revenue generation, having a positive impact at the micro level, especially during the PRI regime. To achieve this we employed a sample on municipality level information in Mexico over the period 1990-2006

in an annual basis for around 2,250 municipalities across the country. This means that our data includes 2,250 municipalities during these years, which is approximately equal to 88% of all municipalities in Mexico.

Hence, our research suggests that the PRI regime in Mexico from 1991 to 2000 may have used tagged transfers to benefit cartels that could have increased public investment in certain municipalities with cartel presence. This collusion could have provided criminal organizations with state protection and involved government officials in the drug trade. The collapse of state-funded protection rackets may have led to an increase in violence in illicit markets. The allocation of public subsidies to businesses at the municipal level in Italy, as studied by Barone and Narciso (2015), reveals that organized crime increases the likelihood of receiving public funds, the amount received, and corruption in the public sector. We could argue that similar effects could occur in the overall use of public investment not just in the aforementioned area for the Mexican case. Hence, the PRI's power monopoly and centralized enforcement in Mexico regulated illegal markets through protection rackets (Snyder and Duran-Martinez, 2009; Dube et al., 2013). However, political competition and anti-corruption reforms in the late 1990s weakened the PRI's grip and hindered government-cartel coordination (Trejo and Ley, 2020). Therefore we could claim that the association between the state and cartels could have led to narco-political favouritism in the country as studied by Arias (2018). In addition, Drug trafficking organizations (DTOs) may have supported municipal candidates due to competition and cartel threats as the country became more democratic (Ponce, 2019), contributing to the prevalence of seized municipal governments, drug-related violence, cartel-controlled regions, and narco-political favouritism in Mexico. Nevertheless, the destabilization of cartel activity may have resulted in territorial contestation, expansion, and warfare between rival cartels, prompting politicians to increase law enforcement and cartel-state violence (Kalyvas, 2015; Trejo and Ley, 2020). Moreover, our analysis of cartel presence by region shows that the Centre and North regions received more public funding, but the overall regional analysis suggests that this increase in public resources in cartel-dominated municipalities may be a nationwide phenomenon rather than specific to these regions. This result rules out a regional correlation despite the North's proximity to the US and higher cartel presence, or the Center's economic importance relative to the South (Courchene and Daz-Cayeros, 2000; Dube et al., 2013; Trejo and Ley, 2020).

Likewise, we found that after 2001, when the PRI regime ended, tax revenues seemed to increase more substantially compared to the previous period. This could be

related to the increase in cartel operations in municipalities regardless of any type of favouritism. This growth in operations may have been associated to increased demand for marijuana and cocaine during this time period (Toro 1995; Astorga, 2005; Grillo 2011; Swanson, 2020; Arends, 2021). Hence, with the increase in profits linked with this new level of demand, drug lords and criminal allies may have established de facto subnational governance systems, allowing them to control local economies and allocate resources, including investing in social capital and increasing taxation through legal activities (Le Moglie and Sorrenti, 2017; Murphy and Rossi, 2020). Thus, while the presence of cartels can have both positive and negative impacts at the municipal level, it is important to note that their activities are illegal and can have destructive consequences for communities.

Also, this research explores the complex interplay between cartel presence, political alignment, and their impact on fiscal variables, mainly public investment and taxes. Two distinct measures of political alignment were incorporated into the model: one reflecting the alignment between the mayor and the president, and another assessing the alignment between the mayor and the state government. The findings reveal that the presence of cartels significantly influences public investment and taxes, even when controlling for political alignment. This suggests that the effect of cartels on these fiscal variables is not merely a byproduct of political alignment, but an indication of narco-political favouritism. The study also uncovers a potential negative effect on local economies in certain income sources in areas where there are differences in the political alignment of local and federal governments and where cartels are active. This could be attributed to economic disruptions caused by territorial disputes among cartels, which are often exacerbated when political alignment shifts.

In addition, this study examines the influence of organized crime on fiscal variables across different regions in Mexico during the PRI regime (1991-2000). Notably, the North and Centre regions show a higher statistical significance in terms of 'Public Investment' and 'Tagged Transfers' linked to organized crime, suggesting a more profound impact of narco-political favouritism in these areas. Conversely, in the economically deprived Southern region, cartel activities appear to exacerbate poverty and inequality, leading to increased corruption and favouritism.

Thus, one contribution of this work to the literature is the examination of the effect of cartel presence on socio-economic outcomes, specifically homicides and economic development in general, in the context of the relationship between cartels and the ruling political party, the PRI, in Mexico. The evidence suggests that the PRI was a stabilizing factor

in terms of cartel violence (Trejo and Ley, 2018). However, the defeat of the PRI and the resulting shift in power dynamics has led to the emergence of de facto subnational governance systems controlled by cartels, which have significant impacts on resource allocation and taxation at the local level (Chabat, 2005). These governance systems are often maintained through the use of armed clientelism and other techniques that allow cartels to suppress local unrest and gain support from local authorities (Eaton, 2006; Arends, 2021).

Also, we contribute to the literature on the effect of Narco political favouritism on the subnational allocation of public resources by examining this phenomenon regarding the granting of preferential treatment to drug cartels in exchange for illicit or illegal favours. Previous research has shown that political favouritism, especially from the PRI regime in Mexico, can have a significant impact on the allocation of public resources at the subnational level, and is often driven by factors such as political competition, partisan alignment, and voter turnout (Díaz Cayeros and Silva Castañeda, 2004; Hernandez-Trillo and Jarillo-Rabling, 2007; Langston, 2010). However, narco-favoritism represents a unique form of corruption that seems to be driven by the collusion between certain actors, such as the PRI and drug cartels, and results in the misallocation of resources or the granting of preferential treatment to these groups. There is evidence indicating that the PRI's authoritarian regime in Mexico exercised significant control over society, leading to a situation where it was desirable for organized criminal groups to seek the protection of political and governmental actors and secure favourable treatment through resource favouritism in municipalities where they had a presence (Morris, 1991; Beith, 2013; Flores Pérez, 2014).

Consequently, those results are also consistent with Arends's (2021) assertion that criminal organisations seek control of municipal finances in order to use those resources for their own purposes. Thus, it is evident that cartels in our case may attempt to influence state and federal policymakers in order to redirect funds to municipalities where they operate, particularly during the 1990s. This can have a positive impact on local resources, as the influx of funding can be used to improve infrastructure, provide social services, and stimulate economic development. However, it is important to note that the primary motivation for such actions is often self-serving, as cartels seek to gain an advantage over their rivals or to protect their own operations. Thus, the influence of cartels on local fiscal levels and policy decision-making, particularly during the PRI regime era, cannot be denied. The remainder of the paper is organized as follows. Section 3.2 defines the main sample of

interest and the sources of data. Section 3.3 describes the empirical strategy. Section 3.4 reports the results. Section 3.5 present the conclusions.

3.2. Data and variables

We now turn to examine empirically whether Local fiscal dynamics are driven by cartel presence and test the conditionality of this effect during the years PRI was in power. In this section, we describe our sampling procedure, discuss the key variables included in our study, and define our empirical strategy.

The empirical analysis of this paper is based on municipality level information in Mexico over the period 1990-2006. We excluded the years 2007-2010 since the War on Drugs, launched by the administration of Felipe Calderón in that year, may have led to significant distortions. [9] Particularly on this matter, Osorio (2015) argues that newly elected leaders, such as President Calderon, may implement aggressive anti-criminal policies in response to voter concerns, potentially prompting violent retaliation by the criminal groups under attack. Hence, for the case of Mexico, this additional level of violence could be an external shock that could result in biased estimation results. Moreover, it has been established that military presence after 2006 increased violence[10] by enabling cartels to acquire high-powered weapons in response to anti-insurgency military campaigns, which were then used to confront rival cartels. Subsequently, due to the army's deployment of these tactics, the murder rate among civilians increased, which could have had a negative effect on municipal economies (Flores-Macías,2018; Trejo and Ley, 2020).

Thus, an argument for the exclusion of the subsequent years after 2006 is based mainly on possible adverse effects of this conflict on the revenue side of the localities in our sample. Specifically, and in accordance with some researches, this type of environments characterized by high levels of civilian violence, appear to have fiscal effects that tend to limit real economic activity, therefore, reducing the state's fiscal capacity overall (Gupta et al., 2002; Chowdhury and Murshed, 2016). Additionally, other external shocks as the

[9] Particularly, during 2006-2012 period, the Federal Government of Felipe De Jesus Calderon Hinojosa launched large-scale security joint operations using the military operations to face the growing cartel threats to the country stability. It is worth noting that the War on Drugs and the outbreak of state–cartel wars intensified drug violence in a higher level than previous years. In the case of President Calderon, it has been documented that the beginning of this policy was also an attempt to legitimise his government following a highly contentious election in which he narrowly won and in which the losing candidate, Andres Manuel Lopez Obrador, actively contested the results (Trejo & Ley, 2020).

[10] The spatial competition model created by Rasmussen et al. (1993) may provide an additional explanation for the explosion in the number of fatalities. This Model suggests that increased drug enforcement in one jurisdiction simply transfers the drug problem to neighbouring jurisdictions, resulting in an increase in violent crime rates across all neighbouring regions.

increase in military expenditures that could also be associated with a reordering of public expenditures, could also alter the local fiscal dynamics. Specifically, Bel and Holst (2018) discovered that the increase in military spending to combat drug trafficking had a positive impact on economic growth per capita in the Mexican states, whereas the war on drugs as a whole had a negative impact on this rate. Hence, in order to clearly capture the effects of cartel presence on local fiscal dynamics, we are attempting to isolate this type of distorting shocks in our study in order to make our final findings more robust.

Hence, the sample is formed by administrative reports taken from various sources of data provided by INEGI (Mexican Statistical and Geographical Agency) and some ad hoc procedures, in an annual basis for around 2,250 municipalities across the country. This means that our data Includes 2,250 municipalities during these years that is approximately equal to 88% of all municipalities in Mexico. Additionally, to reduce noise in the data, we exclude cases that correspond to municipalities not yet formed in 1990. Descriptive statistics and sources of the variables employed throughout the analysis, are provided in Table 3.1

3.2.2. Main Variables

3.2.2.1. Dependent variables

For the construction of our dependent variable we consulted the annual municipal administration reports on local public finances published by the Mexican National Institute of Statistics and Geography (INEGI). Concretely, we employed municipality level data on revenues and expenditures in Concretely, we employed municipality level data on revenues and expenditures in accordance with the most aggregated fiscal categories available called Capitulos (i.e., sections). In particular, the following fiscal variables are reported on the revenue side: social security fees, extra fees paid for public services, private business fees, other income, remaining revenue from previous fiscal years, public business fees, service fees, financing, taxes, tagged transfers, and federal government transfers. Regarding expenses chapters, INEGI reports the following categories: movable, immovable and intangible assets, financial investment, other expenses, public debt, unforeseen expenses, goods and services expenses, municipality transfers, operating costs, wages, and public investment.

All fiscal variables described below, are measured as the log per 10,000 inhabitants plus 1. Regarding expenses, we utilised the following most relevant elements of the expenses category, which accounted for approximately 75% of the total expenses:

Total municipality expenses. This data includes information on the total expenses reported by a municipality in a particular year. Thus, this category aggregates the rest of the other expenses Chapters into a one single vector.

Public investment. This vector includes reports on allocations for productive projects and other investments destined to increase the country's capital assets for public use as stated by INEGI. This variable represented on average for the period studied, 26.96 percent of the total local expenses. According to Hernandez Trillo et al. (2002), most public investment at the local level is made through direct federal funds, which are largely allocated on a discretionary basis. Because of this, governors, finance ministers, and even mayors (less so because of a lack of actual decision power in this matter) often engage in intense lobbying to secure access to as many resources as possible.

Total wages. It includes the compensation of personnel in the service of public entities, such as wages, salaries, allowances, fees similar to salaries, social security benefits and expenses, labour obligations, and other benefits derived from an employment relationship with respect to each municipality; they may be permanent or temporary in nature. This element represented approximately a 26.08 percent of the total category for the period.

Operating costs. These are allocations to cover the expenses of all contracted services by each local entity with private individuals or public sector institutions, as well as official services required for the fulfilment of public service-related activities. Its contribution to this category for the period was on average of 12.25 percent.

Municipality transfers. This item includes allocations to the public and private sectors, public agencies and corporations, and economic support provided by each municipality as part of its economic and social policy. The amount and distribution mechanism of this resource are related to each municipality's development objectives and priorities. This component comprised roughly 9.63 percent of the total expenses.

With regards to the analysis of revenues, it is worth noting that the majority of these resources are originated as federally collected taxes that are then transferred back to states and municipalities.[11] In particular, the main fiscal elements related to revenues in the country are regulated by the National System of Fiscal Coordination (NSFC) through the

[11] The fact that 70% of all tax revenue comes from federal sources, including oil royalties and value-added, corporate, and individual income taxes, is extremely significant. Property taxes, payroll taxes, and user fees are the only direct sources of revenue for local and state governments (Hernandez Trillo et al., 2002; Díaz Cayeros & Silva Castañeda,2004; Langston, 2010).

Fiscal Coordination Law (Ley de Coordinación Fiscal, LCF). In particular, by this system, states and municipalities relinquish their authority to levy the primary taxes within their respective jurisdictions. Consequently, the NSFC can be viewed as a revenue-sharing system that distributes federal funds to the states and municipalities (Hernandez Trillo et al., 2002).[12] Therefore, to complement this analysis, we additionally used the subsequent revenue categories for each municipality. As in the case of expenses, we employ in the analysis that follows the most important fiscal categories that account for approximately 80% of the total budget:[13]

Federal Government Transfers. This vector represents monetary transfers made by the federal government to states and municipalities; these transfers were established by the central government under a specific legal attribution and are composed mostly of tax devolution funds mainly discretional and with no particular purpose. Concretely, this chapter contributed on approximately 53.57 percent of the total local revenues. Particularly, the federal government first provides these funds to the states, which are then transferred to municipalities. The amount of these resources is based on local needs and are authorized by each state congress (Diaz Cayeros, 1995; Hernandez Trillo et al., 2002). Additionally, for a more discretionary transfers a fiscal element named Item 28 (Ramo 28) was established. More specifically, this last element, as defined by the Law of Fiscal Coordination, is composed by discretionary transfers from the federal government to states and municipalities based on pre-defined ruler. This rule is based on population of each state and municipality and their own capacity to generate part of their revenue (Hernandez Trillo et al., 2002; Díaz Cayeros and Silva Castañeda,2004).

Tagged Transfers. This variable consists of funds allocated for specific public investment projects defined according to specific formulas dependent on the particular socio-economic characteristics of each state and municipality. This element on average represented

[12] The NSFC has undergone different changes, but funds have always been distributed to the states and municipalities through a formula. This formula it supposes homogeneity in regions and thus homogeneity in the costs of public services; Additionally, despite the relinquish of the majority of their tax collection attributions, states and municipalities still collect certain local taxes, and thus, this formula rewards states that increase their tax collection capacities by assigning them more resources. Some criticism to this system is that his element favours rich states because they have a broader tax base (Arellano, 1994; Hernández-Trillo, 1998; Hernandez Trillo et al., 2002).

[13] While subnational governments are now responsible for independently allocating a larger portion of their budget, federal and state governments must still approve more than half of what they spend. According to Diaz Cayeros and Silva Castaneda (2002), only 14 cents per peso of the 31 cents per peso of general government expenditures derived from these transfers are accounted for as discretionary during the 1990's. The remaining funds are allocated to predetermined, particular activities.

approximately a 20.73 percent of the total revenues for the period. Examples of this category are the financing of the elementary education system, mainly through the payment of teachers' salary, or expenses destined to the maintenance of local clinics and salaries to the health personnel working there (Hernandez-Trillo and Jarillo-Rabling, 2007). Particularly, one budgetary item was created to aid in these expenses responsibilities, Item 33 (Ramo 33). This item was established in 1998 to consolidate all tagged transfers. Additionally for a more discretionary transfers a similar element named Item 28 (Ramo 28) was also established. (Hernandez Trillo et al., 2002; Díaz Cayeros and Silva Castañeda,2004; Hernandez-Trillo and Jarillo-Rabling, 2007; Langston, 2010).

Total Taxes. This item is equal to the local annual tax collection reported by each municipality in our sample. Its average contribution for this category for the period was equal to 4.74 percent. The main taxes collected by municipalities are property taxes and fees related to public services like drinkable water and public security (Diaz Cayeros and Silva Castaneda, 2002; Hernández-Trillo and Jarillo-Rabling, 2008).

3.2.2.2. Main Independent Variables

As a result of the reorganisation of cartels and the subsequent party rotation locally, it is feasible to state that the electoral defeat of the PRI[14] was a definitory event regarding the drug trade organizations behaviour at the national level (O'Neil, 2009), leading to expanding operations in new municipalities. Our aim is to investigate of cartel presence affect public finances of municipalities especially during the PRI era. To this aim, we implement in our analysis the following two variables:

New Cartel Presence. It takes the value of 1 if a new cartel operates in municipality i and year t, and 0 otherwise. Thus, we identified instances in which a new cartel started operations in a municipality by tracking the initial appearance by name of each of these criminal syndicates included in the original dataset generated by Coscia and Rios (2012). Specifically, this original database tracked the cartel dynamics for the 1991-2010 period for the main 10 cartels operating in the country. Concretely, the main cartels identified in this dataset are Sinaloa, Zetas, Cartel del Golfo, Beltran-Leyva, Tijuana, Familia Michoacana, Cartel de Juarez, Teo, Azul, Barbie. In particular, for the creation of this database, the authors established an algorithm that evaluates historical and present Google News articles

[14] Specifically, there were two political parties in the presidency during the period of study: the PRI party, which governed the country from 1990 to 2000, and the PAN party, which took over immediately after the country's transition to democracy in 2000 (Diaz-Cayeros & Magaloni, 2001).

pertaining to cartel presence. In other words, if a given combination of each municipality and cartel name query item exceeds a certain threshold, the algorithm recognises this occurrence as a likely indicator of the presence of that particular cartel in that municipality for a given year.

Additionally, we construct the variable '**PRI Rule'** that takes the value between years 1991-2000, and 0 otherwise. Due to anecdotal and empirical evidence of the historical involvement of the PRI regime with drug cartels, especially by establishing illegal protection pacts (see, Osorio, 2016; Trejo and Ley, 2018; Trejo and Ley, 2020), this variable constitutes an indicator if cartel presence is a key element for the level of local resources, particularly during the PRI regime era.

3.2.2.3. Municipality Level Controls

Finally, the control variables introduced in the regression models are based on a review of established research on cartel violence, political alignment and their dynamics, concretely for the Mexican case (Villareal, 2002; Trejo and Ley, 2016; Murphy and Rossi, 2020; Trejo and Ley,2018; Trejo and Ley, 2020; De la Garza and Lopez-Videla, 2020). In particular, we control for a number of observable community characteristics that are expected to affect the dynamics of local finances, captured by the vector X_i. Concretely, these variables were obtained from data compiled by the National Institute of Statistics and Geography from the Mexican Census (INEGI) and from the National System of Municipal Information (SNIM). These variables are: (i) Log ratio of local gross value added; (ii) Pop Ratio with Social Security; (iii) Schooling years; (iv)Log Local Homicides ratio; (v)Young Population Ratio; (vi) Loc Female Ratio.

Gross value added: Measured as the log local gross value added per 10,000 inhabitants plus 1. Hence, the rationale is that economic development can affect both the behaviour of local authorities regarding public policy, and the probability of cartels to expand their operations.

Pop Ratio with Social Security. INEGI defines people with access to social security as those who receive medical services through an employment benefit. Thus, this vector is the ratio of the public social security-eligible inhabitants to the total population in a municipality. Particularly, we obtained this data from INEGI's 1990, 2000, and 2010 censuses and 1995 and 2005 population count. Then, to populate the panel we interpolated this indicator for each sample year. According to the disorganisation theory, a socially disorganised

community lacks the means to exercise informal social control over its members' conduct (Bursik, 1988; Sampson and Groves, 1989; Pare, 2006). This lack of control could lead to higher crime rates. Thus, we are attempting to identify an additional aspect of economic deprivation that may contribute to a rise in government-reported violence that could distort our results.

Schooling years. This indicator is the average number of years of schooling for population aged 15-and-over. According to some research, a municipality's schooling years may indicate economic deprivation and higher crime levels (See Villareal, 2002; Dube et al., 2013; Bel and Holst, 2018). Additionally, there is some evidence on the relationship between the level of education to social norms and to crime in a region (Sickles and Williams; 2008).

Local homicides log. This variable is measured as the log homicides per 10,000 inhabitants plus 1. Previous research shows a link between gun violence and the homicide rate (Cook, 1983; Duggan, 2001; Miller et al., 2002; Cook and Ludwig, 2004; Hepburn and Hemenway, 2004). As a result, we use this indicator to account for the external impacts of this type of violence on cartel presence and local economic dynamics. Potential impacts associated to the use of this control include shocks regarding the lack of state presence, particularly public safety, and overall violence trends, not just those associated with drug trafficking organisations (See Skaperdas, 2001; Chicoine, 2011; Trejo and Ley, 2018).

Young Population Ratio. This variable is composed by the male population aged 15 to 29 to the total inhabitants in a municipality. Regarding the use of this variable as control, there is evidence linking age and violent crime in terms of these external shocks (Villareal, 2002). Furthermore, Trejo and Ley (2016) claim that Mexican municipalities with more young men have more cartel violence, particularly in areas with more availability of poor young men. As a result, the use of this variable, would allow us to control for age structure to avoid distortions caused by differences in young population between municipalities, particularly regarding unaccounted effects on local crime.

Female Ratio. This variable is the ratio of households headed by a female to the total households in the municipality. Specifically, this institution recognises as the female head of household a person who is considered as such by its members. This recognition is given to the senior member of the group who is either the primary source of income, the oldest person, or the decision-maker. Particularly, as shown by Trejo and Ley (2016), municipalities with a higher percentage of female-headed households — where cartels usually recruit

street gang foot soldiers to fight their wars — experienced more non-drug-related violence. Hence, we control for alternative channels that could increase intercartel wars violence and affect local economic vectors.

[Insert Table 3.1, here]

3.3.3. Empirical Design

To study the effect of new cartel presence on the main components of local fiscal revenues and expenses we start by estimating the following empirical specification:

$$Y_{it} = \alpha + \beta_1 New\ Cartel\ Presence_{it} + \gamma X_i + \theta_i + \theta_t + \varepsilon_{it} \quad (3.1)$$

Where Y_{it} is a fiscal component of municipality i in a year t representing each of the fiscal components described in the previous section. Also, the key explanatory variable of interest is $\text{New Cartel Presence}_{it}$ that captures the presence of a new cartel in a particular municipality i in a year t. The parameter of interest in Equation (3.1) is thus β_1 that captures the effect of the operation of a new cartel on our fiscal component variable. Moreover, X_i denotes the set of municipal characteristics described above to control for alternative forces that could impact municipal public finances (see, e.g., Skaperdas, 2001; Chicoine, 2011; Trejo and Ley, 2016; Trejo and Ley, 2018). The model also adds municipality, θ_i, and year fixed-effects, θ_t, to control for time-invariant municipality characteristics and shocks common to all municipalities. Finally, to account for possible correlations between municipalities from the same state, the error term $\varepsilon_{it}$is clustered at the state level i.

In addition, to test whether any effect on the fiscal components captured by New Cartel Presence is associated with the time in which the PRI was in power, we augment equation (3.1) with the variable PRI Rule and its interaction term with New Cartel Presence as follows:[15]

[15] Similar to De la Garza and Lopez-Videla (2020), we would expect that being politically aligned with the PRI, especially during their regime, would be crucial for receiving more or fewer resources in the form of transfers. Thus, we would anticipate that PRI mayors would receive more resources from the central government during the PRI period, while PAN mayors would receive fewer amounts of resources, particularly tagged transfers for the same period.

$$Y_{it} = \alpha + \beta_1 \text{New Cartel Presence}_{it} + \beta_2 \text{New Cartel Presence}_{it} * PRI\ Rule_{it} + \gamma X_i + \theta_i + \theta_t + \varepsilon_t \quad (3.2)$$

Given that PRI Rule is constant within municipality years, only the coefficients of 'New Cartel Presence' and the interaction term between the latter and 'PRI Rule' are estimated. Therefore, for this equation, the parameter of interest is β_2; This parameter represents the differential effect of new cartel operations in relation to the PRI regime on the available local resources. The municipality controls are the same as in Eq. (3.1), and the time and municipality fixed effects were employed again. The error term $\varepsilon_{it}$is clustered at the state level i level as in the previous equation.

3.4. Empirical Analysis

3.3.3. Main results

Our baseline results are reported in Table (3.2). Specifically, Columns (1) to (5) report the coefficients for 'Total Mun Expenses' and its main sub-components, whereas columns (6)-(8) the effect on the main fiscal resources. Regarding the latter, the coefficient on cartel presence is positive and statistically significant in columns (2) and (8), at the 5 and 1 per cent levels respectively, when associated with ' Public Investment' and 'Total Taxes'. The coefficient in column (8) indicates that the presence of new criminal organisations in municipalities stimulates local economic activity, and in turn tax collection. Of course, we cannot exclude the possibility that cartels indirectly increase local business dynamics through money laundering and other illicit activities (Sciarrone and Storti, 2014; Le Moglie and Sorrenti, 2017; Murphy and Rossi, 2020). On average, cartel presence seems to increase 'Public Investment' and 'Total Taxes' by 3.1 and 6.2 per cent relative to the mean. In turn, as can be seen in column (2), cartel presence is positively associated with Public Investment at the 5 per cent level.

[Insert Table 3.2, here]

Moreover, these findings could underscore the complex ties between criminal organizations and local political structures, as analysed by Trejo and Ley (2018) and Osorio (2012). Furthermore, this could also be potentially related to an increase in violent activities, particularly during election periods, due to criminal infiltration. Hence, this combination of elements highlighted previously could partially explain the positive and statistically significant coefficients linked to 'Public Investment' and 'Total Taxes'. The increase in these factors might be a reaction to a possible collusion of the PRI and heightened violence and

instability in these regions. Furthermore, the idea that cartel presence can boost local economic activity, thus enhancing tax collection, has been put forward by Le Moglie and Sorrenti (2017), particularly if it is related to legal activities of criminal groups. Interestingly, this phenomenon of tax increment appears more prevalent in the post-PRI period, coinciding with the faster rise in cartel violence and a greater dependence of local finances on federal funds, compared to the PRI era (Hernandez Trillo et al., 2002; Hernández-Trillo and Jarillo-Rabling, 2008).

Additionally, our study also analyses a possible differential treatment of municipalities with cartel presence by the PRI central government due to informal connections with these drug trade organisations (Richards, 1998; Bunker, 2013; Arias,2018; Trejo and Ley, 2020).[16] Thus, Table (3.3) adds the 'New cartel presence' and 'PRI rule' interaction term to Eq. (3.1) to account for possible PRI effects. As can be seen in column (6) 'Fed Gov Transfers' increases in municipalities with cartel presence and appears to be driven by the years that PRI was in power. The interaction term is positive and statistically significant at the 1 per cent level for 'Public Investment'. Regarding the magnitude of this coefficient, 'Public Investment' seem to increase by 5.9 %. Moreover, the coefficient for 'Tagged transfers' related to this interaction term is positive and statistically significant at 1% level. More concretely, narco-political favouritism seems to increase these types of resources in 17.89%. This seems to be the driving force for increased Public Investment, given that the interaction term for total taxes is negative and statistically significant at the 1% level. This indicates that cartel presence that increased the years following 2001 and until 2006 contributed to local economic activity at the municipal level increasing taxes. Overall, evidence so far indicates that cartel presence during PRI rule plays a significant role in local public finances.

[Insert Table 3.3, here]

In addition, as hinted by the findings of Trejo and Ley (2018) and Trejo and Ley (2020) our own results in table 3.3 point at the potential for criminal organizations to shape local politics, contributing to increased 'Fed Gov Transfers' and 'Public Investment'. This increase might reflect the PRI's strategies to regulate regions under cartel influence, possibly owing to collaboration with these syndicates. Such understanding concurs with insights from the

[16] A possible explanation of this preferential treatment is that, in accordance with Bunker (2013) under the PRI, Mexico's major cartels, each with their own territories (plazas), were subordinate to the state whose officials and elite families profited from the drug trade. This relationship with the state changed under Vincente Fox (2000–2006) and Felipe Calderón (2006–2012).

observations made by Hernandez Trillo et al. (2002) and Hernández-Trillo and Jarillo-Rabling (2008), which highlight the pivotal role of fiscal resources for local governments, suggesting that a surge in these resources could enhance public services, potentially as a strategy to gain favour with the local population in regions affected by cartels (Rodriguez-Oreggia et al., 2002; Rodríguez-Oreggia and Rodríguez-Pose, 2004; Flores Pérez, 2014; Navarro, 2014).

Interestingly, results presented in our Table 3.3 could indicate a negative coefficient for the interaction between 'New Cartel Presence' and 'PRI Rule', when 'Fed Gov Transfers' is the dependent variable, as evidenced in column (6). This outcome initially could appear counterintuitive, contradicting our hypothesis of increased transfers under the PRI rule in cartel-present municipalities as a form of narco-political favouritism. However, a careful dissection of Figure (3.1) that presents the conditional effects of Public investments and Tagged transfers might aid in reconciling this contradiction. Panel (a) illustrates a positive influence of the end of the PRI regime and the presence of cartels on 'Fed Gov Transfers'. Conversely, Panel (b) shows a rise in 'Tagged Transfers' when Cartel presence and PRI rule coexist, a phenomenon likely attributable to the relative flexibility and limited accountability associated with these transfers. Specifically, we place a particular emphasis on federal government transfers. From our analysis, it seems that the negative coefficient lacks statistical significance during the years of the PRI regime. This finding presents a notable contrast with the tagged transfers, which demonstrate statistical significance throughout the entire period of study, including the time span of the PRI regime. Despite these contrasting observations, the auxiliary evidence could potentially reinforce our proposition. This hypothesis posits a potential nexus of narco-political favouritism that existed between the then-hegemonic party and the drug cartels.

[Insert Figure 3.1, here]

Additionally, the diverging trends observed in 'Fed Gov Transfers' and 'Tagged Transfers' could be explained by their distinctive characteristics. On the one hand, 'Fed Gov Transfers' aim for regional homogeneity in public services and are significantly influenced by local tax collection capacities, as per Arellano (1994), Hernández-Trillo (1998), and Hernandez Trillo et al. (2002). In this context, municipalities with a strong cartel influence might have experienced a decrease in taxable economic activities due to intensifying violence and crime, leading to diminished 'Fed Gov Transfers'. This aligns with Robles et al.'s (2013) assertion that turf wars and related crimes can negatively impact the local economy, thus explaining the negative coefficient for federal transfers when both Cartel presence and

PRI rule are present. On the other hand, the increase in 'Tagged Transfers', as theorized by Magaloni (2007) and Hernández-Trillo and Jarillo-Rabling (2008), could be a manifestation of the PRI's survival strategies, which potentially included favouring cartel-active regions and these criminal organizations. Collectively, these findings, consistent with Trejo and Ley (2018) and Trejo and Ley (2020), underscore the intricate, multifaceted dynamics between organized crime, politics, and fiscal policies at the local level in Mexico.

3.4.2. Robustness checks

3.4.2.1. Political Alignment Alternative Effects

To exclude the possibility that cartel presence is correlated with political alignment and that our previous results could be attributed to this correlation we add the term 'Political Alignment' to Eq. (1). Specifically, we use two versions of political alignment: (i) one that takes the value 1 when the mayor and the president are from the same party and zero otherwise. (ii) A second version used in a subsequent step, 'Political Alignment State', measures the extent of alignment between the mayor and the state government, offering a score of 1 when there is alignment, and 0 in the absence thereof. Given that we are interested on the effects of state alignment - in cases that the mayor belongs to the PRI party. This allows us to corroborate if municipal alignment that recaches the federal government through the state government has any effect on local finances. Hence, this approach could allow for a more nuanced understanding of political alignment on state and national scales. These alignments could possibly result in differential treatment, particularly in matters of finances and local crime-fighting aid (Drazen and Eslava, 2010; Timmons and Broid, 2013; Trejo and Ley, 2016; De la Garza and Lopez-Videla, 2020; Fukumoto et al., 2020; Trejo and Ley, 2020). Consequently, we aim to estimate the following equations, considering these two variables:

$$\begin{aligned} fiscal\_var_{it} = \alpha + \beta_1 New\ Cartel\ Presence_{it} \\ + \beta_2 Political\ Alignment_{it} + \beta_3 New\ Cartel\ Presence_{it} \\ * Political\ Alignment_{it} + \gamma X_i + \theta_i + \theta_t + \varepsilon_t \end{aligned} \quad (3.3)$$

Here, the main parameters of interest are β_1 and β_3. β_1 allows us to observe is cartel presence retains its effect irrespective of political alignment between the government and local authorities.[17] Moreover, β_3 allows us to infer if the effect of cartel presence is driven

[17] This element is relevant for some particularities in our study, one is that in accordance with Trejo and Ley (2018) governors are essential with regards to fight organized crime. This is specifically significant due to the fact that the scale and seriousness of this thread surpasses the capacity of mayors to respond to this problem. Secondly, after some fiscal reforms were implemented in prior years, it was legally established that any federal transfers are state funds and, as such, were subject

by municipalities that are also politically aligned. In the latter case we cannot exclude the possibility that we simply capture a politically alignment effect.

Similarly, in a second version of this first equation we have the following specification:

$$fiscal\_var_{it} = \alpha + \beta_1 New\ Cartel\ Presence_{it} + \beta_2 Political\ Alignment\ state_{it} + \beta_3 New\ Cartel\ Presence_{it} * Political\ Alignment\ state_{it} + \gamma X_i + \theta_i + \theta_t + \varepsilon_t \quad (3.4)$$

In this second version, similarly as in the previous equation, the main parameters of interest are β_1, and β_3. Regarding the first coefficient, a similar logic applies. For the case of the coefficients, β_3, it would allow us to infer if the effect of cartel presence is driven by municipalities that are also politically aligned with state governors.

Therefore, the results presented in Table (3.4) and Table (3.5) indicate that controlling for political alignment does not affect the effect on public investment and taxes as observed in Table (3.2). Given the significance level of 1% for the coefficient 'New Cartel Presence' in Table (3.4) for 'Public investment' and of 5% for 'Tagged Transfers', we could argue that these components are still significantly influenced by cartel activity on their levels even after controlling for political alignment. In addition, column (8) indicates that cartel presence remains as a positive shock for local tax collection, similar to Murphy and Rossi (2020). According to Arends (2021) criminal syndicates seek municipal financial control to fund their operations. Hence, Illegal groups could lobby local and federal authorities for more resources for a municipality. Regarding the interaction effect, the corresponding coefficient for public investment total taxes and Fed Gov Transfers is negative and statistically significant at 5% respectively. Therefore, our results do not seem to be driven by the political alignment of mayors. In Table (3.5), we use Eq. (3.3) to regress our fiscal components, but with the use of the alternative indicator for political aliment, 'Pol Alignment Alt' defined previously. Results for one more time survive when controlling for political alignment.

[Insert Tables 3.4 and 3.5, here]

to a certain level of control by each state legislature, which typically aligned to governors' requests; this situation was particularly prevalent during the years of the PRI regime period in the 1990's (Hernández-Trillo & Jarillo-Dabling, 2008).

Moreover, Table 3.5 sheds light on the nuanced dynamic of political alignment, factoring in an additional variable that discerns the differing degrees of alignment. As evidenced in column (6), the positive and statistically significant coefficient for Pol Alignment state for Tagged transfers might suggest a tendency towards favouritism between cartel-aligned mayors and state-level alignment. However, the negative coefficient for total taxes in column (8) within cartel-involved and politically aligned municipalities could hint at a decrease in these resources, which may be an indirect consequence of efforts at different government levels to manage local cartel activities, subsequently impacting local economic activity and taxation (Trejo and Ley, 2020). Another plausible explanation for this observed relationship could be the economic disruptions triggered by cartel territorial disputes during shifts in political alignment across various government echelons (Trejo and Ley, 2018), compounded by potential large-scale Federal interventions in response to heightening violence (Trejo and Ley, 2016).

Additionally, the interaction coefficient, indicative of the interplay between new cartel presence and political alignment, registers negative and statistically significant coefficients for tagged transfers and total taxes in columns (7) and (8). This finding might echo assertions made by authors such as Osorio (2012) and Trejo and Ley (2020) about the crucial role of government cooperation in all tiers in countering organized crime. A conjecture for this observation could be the strategic behaviours of cartels, which, according to Diaz Cayeros et al. (2012), may fluctuate between 'stationary bandits' and 'roving bandits'. Stationary bandits, incentivised to minimise predation for long-term benefits, could contrast with roving bandits who may intensify resource exploitation for immediate gains, potentially influencing tax collection in regions with significant cartel competition. Moreover, these notions, supported by broader literature underscoring the non-linear relationship between violence and economic performance (Osorio, 2012), further hint at the intricate relationship between political alignment, cartel presence, and tax collection. Therefore, coupled with the potential dampening impact on economic activity associated with escalating violence (Castillo et al., 2014; Guerrero 2011; Dell, 2015; Calderon et al., 2015), these findings suggest that more comprehensive investigations are required to decipher these complex dynamics.

3.4.2.2. Regional Differences

We attempt to test whether the direction and magnitude of the effect of organised crime presence on our fiscal variables differs for municipalities located in different regions of Mexico during the PRI regime (1991-2000). Thus, we conduct the analysis described in Eq. (3.2) separately for the Centre, North, and South regions as part of these measures.

Specifically, given the historical higher presence of cartels in the northern states, we want to test if the effect is only driven by this region. Thus, regional differences could raise local resources through cartel activities in some states more than others. If 'New cartel presence' captures a regional difference in cartel-related illicit activities, our measures could be biased. Additionally, we could argue that following Courchene and Díaz-Cayeros (2000), the reason to divide our sample in regions could aid to disentangle differential trends in the fiscal behaviour of each region. In particular the higher level of economic integration of the Northern states of Mexico with the southern states of the USA due to NAFTA, their economic dynamics differ from other states in the country. Consequently, isolating these types of effects in our relevant variables is a crucial aspect of this study.

Rodriguez-Pose and Sánchez-Reaza's (2004) research on the role of regional disparities in economic development further illuminates this point. They argue that historical policies such as land reform can lead to inherent regional disparities which, in turn, may create variances in how organized crime affects local finances. Furthermore, the idea from Bel and Holst (2018) about the influence of political factors on the distribution of public resources can be relevant here. Political alignment and past policy implementations could play a role in shaping the economic landscape of a region, subsequently affecting the impact of organized crime on fiscal variables.

In Table (3.6) we report results for the North, Centre and South region in panels (A), (B) and (C) respectively. Focusing the interaction term for ‘Public Investment’, the results seem to be driven by the Centre and North Regions due to a statistically significance level of a 1% as reported in column (2) in Panels (A) and (B). This outcome could be related again to the narco-political favouritism dynamics that seems to exist in the country as previously discussed. Additionally, the coefficient for ‘Tagged Transfers’ in the centre region is statistically significant at 1% for this region. It is well documented that poverty and economic deprivation (Shaw and McKay,1942) can lead to a range of negative social and economic outcomes, including increased crime and corruption. In the southern region of Mexico, it is likely that these factors contribute to the prevalence of cartel activity and the associated corruption. Poverty can create a sense of desperation and lack of opportunities, leading individuals to turn to illegal activities such as drug trafficking as a means of survival. Economic inequality can also create conditions in which powerful criminal organizations can exert influence over local governments and institutions, leading to favouritism and corruption. Furthermore, the negative economic impacts of cartel activity, such as violence and instability, can further exacerbate poverty and inequality in affected areas. This creates

a vicious cycle in which poverty, inequality, and cartel activity are all interconnected and reinforcing. Overall, it is reasonable to argue that the higher levels of poverty and economic inequality in the southern region of Mexico may contribute to the prevalence of favouritism and corruption in municipalities with cartel presence.

[Insert Table 3.6, here]

Furthermore, drawing from Tavares (2007), the concept of fiscal decentralization may have significant implications in the context of organized crime. Decentralization could serve as a moderating mechanism against the adverse effects of organized crime on fiscal variables, particularly in regions with strong cartel influence. This argument aligns with the perspective provided by Winters et al. (2002) on the role of decentralization in improving public service delivery and reducing corruption. However, Rondinelli et al.'s (1983) insights into the potential challenges accompanying decentralization must also be taken into account. These challenges could create complications in regions attempting to manage the effects of organized crime on their fiscal dynamics. Furthermore, the work of Dube et al. (2013) and Ch et al. (2018) provides interesting perspectives on the economic factors driving organized crime and its impact on fiscal variables. Economic conditions, such as commodity price shocks and economic inequality, could also greatly influence the presence and impact of organized crime in different regions. In sum, addressing organized crime's impact on fiscal variables necessitates a multi-faceted approach that includes understanding regional differences, economic inequality, and the potential benefits and challenges of fiscal decentralization.

3.5. Conclusions

The presence of cartels and their drug trafficking operations in Mexico has been a longstanding issue for several decades. This problem has been extensively studied by researchers, who have identified several key factors that contribute to the dynamics of drug trafficking in the country (Trejo and Ley, 2018; Sobrino, 2019; Murphy and Rossi, 2020; Trejo and Ley, 2020). One of the main drivers of drug trafficking in Mexico has been political competition and partisan conflict. Specifically, during the transition to democracy in Mexico, the political landscape underwent significant changes, and this period was marked by a high level of political competition and polarization. This political environment has been linked to the emergence and growth of cartels in Mexico, particularly during the outbreak of wars

between them and the subsequent large-scale criminal violence after the end of apparent illegal pacts between them and the PRI (the Institutional Revolutionary Party, which held power in Mexico for much of the 20th century) (Trejo and Ley, 2018). Hence, given the importance of drug trafficking for the socioeconomic and political functioning of municipalities in Mexico, it is likely that these dynamics have affected a variety of parameters, including local fiscal resources. In particular, the shift in trafficking behaviour at the end of the PRI regime may have had an impact on the generation of funds in these municipalities, which is also a subject of interest in studies on this topic.

Particularly, our findings seem to indicate that municipalities received more tagged transfers under the PRI, which may have contributed to an increase in public investment between 1991 and 2000. Consequently, it is possible that the PRI used tagged transfers to benefit local cartels. Specifically, state-sponsored protection rackets financed by public investment may have maintained order and peaceful coexistence in illicit markets, but their collapse may have led to an increase in violence. This collusion could also have provided criminal organisations with state protection and involved government officials in the drug trade. Barone and Narciso (2015) discovered that the Italian mafia influenced the allocation of public subsidies to businesses at the municipal level. This analysis revealed that organised crime increases the likelihood of receiving public funds, the amount received, and corruption in the public sector. Consequently, by comparing the similarities in the operation of Mexican cartels and Italian mafia, we could argue that similar effects could exist not just in funds destined to boost business's activity but in the overall use of public investment in Mexico. Furthermore, there is evidence that the PRI's power monopoly and centralised enforcement in Mexico regulated illegal markets via protection rackets (Snyder and Duran-Martinez, 2009; Dube et al., 2013). During the PRI regime, violence was relatively low due to patron-client relationships between drug traffickers, the police, and local elected officials. Late in the 1990s, however, political competition and anti-corruption reforms weakened the PRI's grip, while changes in the cocaine trade and the behaviour of Mexican cartels hampered government-cartel coordination (Trejo and Ley, 2020). Hence, these observed behaviours between state officials and the cartel suggest narco-political favouritism, as in Arias (2018). The researcher investigated the impact of criminal organisations on Mexican policy. The study focuses on how these groups attempt to influence state policy in order to control government funds. Through civic groups, criminal organisations can influence local policy, particularly public investment, according to this study. Hence, local cartels could have cultivated advantageous relationships with state administrators and influenced policy

initiatives, such as the expansion of central transfers. Additionally, due to competition and cartel threats, drug trafficking organisations (DTOs) may have supported municipal candidates as the country became more democratic (Ponce, 2019). This may explain the prevalence of seized municipal governments, drug-related violence, cartel-controlled regions, and narco-political favouritism in Mexico. Therefore, destabilisation of cartel activity may have resulted in territorial contestation, expansion, and warfare between rival cartels, prompting politicians to increase law enforcement and cartel-state violence (Kalyvas, 2015; Trejo and Ley, 2020). In addition, our analysis of cartel presence by region reveals that the Centre and North received a greater amount of public funding. The regional analysis as a whole suggests that this increase in public resources in municipalities dominated by cartels may be a nationwide occurrence. This result rules out the existence of a possible regional correlation, despite the north's proximity to the United States and higher cartel presence, or the center's economic importance relative to the south (Courchene and Daz-Cayeros, 2000; Dube et al., 2013; Trejo and Ley, 2020).

While the study has extensively discussed the relationship between cartels and the PRI, it could also be important to consider the broader political alignment and its potential implications on the dynamics of drug trafficking. Our study suggests that the presence of cartels in local governments could have a significant impact on the allocation of public budget resources, potentially leading to a distorted distribution of resources and a lack of fairness in the allocation process (Trejo and Ley, 2020). This narco-political favouritism, as it has been termed, might have allowed certain cartels to channel more resources from the central government to the municipalities where they operate, possibly giving them an advantage over their rivals. This favouritism could have had significant consequences for the country, including the presence of corruption at the highest levels of government and an uneven distribution of resources (Campbell, 2010; Hussain, 2014). Therefore, the political alignment of the cartels and the government, particularly the PRI, could have played a significant role in shaping the fiscal policies and revenue generation at the municipal level.

Moreover, we found that after 2001, when the PRI regime ended, tax revenues seemed to increase more substantially compared to the previous period. This could be related to the increase in cartel operations in municipalities regardless of any type of favouritism. Concretely, after the PRI regime ended in 2001, local tax revenues may have increased due to drug cartel growth and behaviour changes in drug trafficking dynamics. This growth in operations could have been related to the increased demand for marijuana and cocaine during these years (Toro 1995; Astorga, 2005; Grillo 2011; Swanson, 2020; Arends,

2021). In addition, another change in these dynamics could be related to the PRI's electoral decline that made illegal pacts harder to form and implement, increasing subnational violence (O'Neil, 2009; Dube et al., 2013; Trejo and Ley, 2018). More specifically, it appears that shifts in drug trafficking trends have led to the emergence of de facto subnational governance systems controlled by drug lords and their criminal allies. These systems allow the organizations to exert influence over local economies through resource allocation and manipulation of local taxation (Chabat, 2005). Furthermore, drug trafficking may have provided an incentive for these organizations to seek control over local governments in order to gain local support through armed clientelism and preferential treatment (Eaton, 2006; Yashar, 2018; Arends, 2021). With this newfound influence, cartels may have invested in social capital in order to evade authorities, transferring resources to local communities and increasing taxation through the expansion of their legal activities (Le Moglie and Sorrenti, 2017; Murphy and Rossi, 2020). While the presence of cartels can have both positive and negative impacts at the municipal level, it is important to note that the expansion of mafia-type organizations into new territories is often accompanied by their involvement in illegal activities, such as money laundering (Sciarrone and Storti, 2014; Scognamiglio, 2018). Thus, this phenomenon can have negative consequences for the community, including increased violence and corruption.

Furthermore, the study has shown that after the end of the PRI regime in 2001, local tax revenues may have increased due to drug cartel growth and changes in drug trafficking dynamics. However, it would also be crucial to consider the role of political alignment in this shift. Our study suggests that the penetration of cartels into local governments in Mexico could have had a significant impact on the allocation of public budget resources (Trejo and Ley, 2020). This includes the potential allocation of resources to municipalities controlled by allied cartels, the possible diversion of funds from one municipality to another with ties to a particular cartel, and the potential manipulation of procurement processes to benefit certain contractors or businesses related to those cartels (Le Moglie and Sorrenti, 2017; Murphy and Rossi, 2020). Therefore, the political alignment of the cartels and the government, particularly after the end of the PRI regime, could have significantly influenced the fiscal dynamics at the municipal level. This influence might not only have affected the allocation of resources but also the overall economic activity and tax collection in these municipalities.

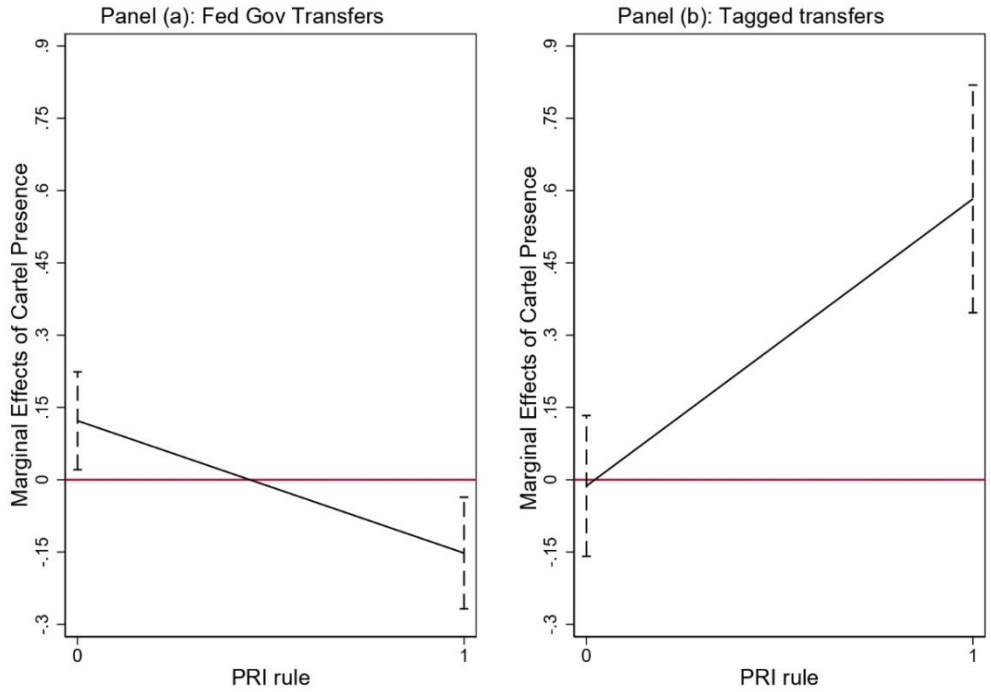
Altogether, our paper contributes to the existing studies on drug-related criminal organizations in Mexico and their connections with local communities and political systems by demonstrating a positive association between cartel presence in municipalities and local

fiscal outcomes. Specifically, our research adds to the literature on the impact of cartel presence on socio-economic outcomes and the effect of favouritism on the subnational allocation of public resources. While previous research has examined political favouritism, our work provides evidence of narco-favouritism, which could complement our understanding of this phenomenon. Nevertheless, further research is needed to fully understand the impact of cartels on local fiscal resources and to identify potential policy interventions that could mitigate their negative effects.

Chapter Appendices

3.A Chapter 3 Figures

Figure 3.1 Conditional Effect of Cartel Presence on Local Fiscal Income Sources



Notes. This graph shows the conditional effects of 'Fed Gov Transfers' and 'Tagged transfers' with and without PRI rule at the municipality level. The conditional effects in panels (a) and (b) are calculated based on the specifications of columns (6) and (7)

3.B Chapter 3 Tables

Table 3.1: Summary Statistics

	N	Mean	Sd	Min	Max	Sources
Main Regressors:						
New Cartel Presence	46013	.0932345	.290764	0	1	Own calculations based on Dube et al. (2016) and Coscia and Rios (2012)
Political Alignment	46013	.4904701	.4999146	0	1	Own calculations based on electoral data from Centro de Investigación para el Desarrollo, A.C. (CIDAC)
Pol Alignment Alt	46013	.9970226	.8930288	0	2	Own calculations based on electoral data from CIDAC
PRI Rule	46013	.4959903	.4999894	0	1	Own calculations
Municipality Expenses:						
Total Mun Expenses	46013	5.997287	2.251425	0	10.1293	National Institute of Statistics and Geography (INEGI)
Public Investment	46013	4.331262	2.420322	0	9.462114	INEGI
Total Wages	46013	4.487214	2.177323	0	9.227359	INEGI
Operating costs	46013	3.734238	2.176842	0	9.038163	INEGI
Municipality Income:						
Municipality transfers	46013	3.43834	2.0769	0	8.76498	INEGI
Fed Gov Transfers	46013	5.121433	2.314891	0	9.614271	INEGI
Tagged transfers	46013	3.331121	3.231595	0	9.606502	INEGI
Total Taxes	46013	2.544263	1.67661	0	8.392207	INEGI
Municipality Controls:						
Log Local Gross value added	46013	2.183813	1.527317	.0017022	10.08641	INEGI
Pop Ratio with Social Sec	46013	.2708322	.2364171	0	.9591195	INEGI
Schooling years	46013	5.490142	1.666297	.6444458	12.58358	INEGI
Log Local Homicides ratio	46013	.4577739	.6416239	0	4.875764	INEGI
Young Population Ratio	46013	.1236785	.0166595	.0215054	.2258307	INEGI
Female Ratio	46013	.1955971	.056033	0	.5945946	INEGI
Observations	46013					

The table reports number of observations, the mean, standard deviation, minimum and maximum values of the main regression variables. The values of the fiscal variables for municipalities in Mexico are measured as log of per capita versions plus 1. The variable new cartel presence takes the value 1 after a cartel commence operations in a municipality, and zero otherwise. The variable political alignment takes the value 1 if a mayor belongs to the same party as the President, and zero otherwise. The variable political alignment alternative takes the value of 1 if a mayor belongs to the same party as the governor of the state, 2 if a mayor belongs to the same party as the President and governor, and zero otherwise. The variable PRI rule takes the value of 1 if the PRI is in power at the federal level, and zero otherwise. Municipality characteristics are measured for the whole period of the sample. The variables corresponding to homicides and local gross value added are measured as log of per capita versions plus 1. The rest of controls are measured as ratios to total local population.

Table 3.2: New Cartel Presence and Local Fiscal Dynamics: Before 2006

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Municipality Expenses Sources					Municipality Income Sources		
	Total Mun Expenses	Public Investment	Total Wages	Operating costs	Municipality transfers	Fed Gov Transfers	Tagged transfers	Total Taxes
New Cartel Presence	0.057	0.137**	-0.006	0.003	-0.041	0.070	0.102	0.159***
	(0.047)	(0.061)	(0.044)	(0.060)	(0.056)	(0.048)	(0.072)	(0.036)
Municipality Controls:								
Log Local Gross value added	-0.102***	0.021	0.104***	-0.074**	0.024	0.022	0.194***	0.200***
	(0.033)	(0.044)	(0.036)	(0.032)	(0.032)	(0.039)	(0.049)	(0.023)
Pop Ratio with Social Sec	0.409***	0.335***	0.168**	0.558***	0.362***	0.228**	0.407***	0.144***
	(0.075)	(0.108)	(0.085)	(0.092)	(0.083)	(0.095)	(0.109)	(0.056)
Schooling years	-0.097*	0.016	0.046	-0.077	-0.044	-0.005	-0.003	0.028
	(0.053)	(0.058)	(0.053)	(0.055)	(0.044)	(0.057)	(0.065)	(0.033)
Log Local Homicides ratio	-0.022	0.012	0.007	-0.004	0.031*	0.018	0.071***	0.016
	(0.021)	(0.023)	(0.019)	(0.019)	(0.018)	(0.022)	(0.025)	(0.011)
Young Population Ratio	-0.816	1.548	-0.561	1.954	2.615	1.215	-3.385	-4.803***
	(1.722)	(2.198)	(1.847)	(1.989)	(1.659)	(2.098)	(2.251)	(1.079)
Female Ratio	-0.211	-2.109**	0.112	0.954	-1.110	0.785	-0.707	1.214**
	(0.893)	(1.073)	(0.848)	(0.978)	(0.825)	(0.994)	(1.086)	(0.576)
No of Observations	36815	36815	36815	36815	36815	36815	36815	36815
R Squared	0.292	0.292	0.345	0.438	0.401	0.234	0.621	0.293
Mun. and year FE	YES	YES	YES	YES	YES	YES	YES	YES

The table reports OLS estimates of equation (1) for the period 1990-2006 , for the fiscal variables. The dependent variables are the fiscal variables for municipalities in Mexico measured as log of per capita versions plus 1. New Cartel Presence is a dichotomous indicator of whether a municipality has at least 1 new organized crime group operating locally. All estimates include municipality and year fixed-effects. Controls include: (i) the Log ratio of local gross value added; (ii) Population ratio of access to social security; (iii) Schooling years ; (iv) the Log Homicides ratio; (v) the Young males' (15-29) ratio; (vi) Female Ratio. Robust standard errors. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 3.3: New Cartel Presence and Local Fiscal Dynamics: Controlling for PRI rule (Before 2006)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Municipality Expenses Sources					Municipality Income Sources		
	Total Mun Expenses	Public Investment	Total Wages	Operating costs	Municipality transfers	Fed Gov Transfers	Tagged transfers	Total Taxes
New Cartel Presence	0.047	0.088	-0.012	0.030	-0.029	0.122**	-0.013	0.195***
	(0.053)	(0.066)	(0.048)	(0.061)	(0.058)	(0.052)	(0.075)	(0.039)
New Cartel Presence # PRI Rule	0.049	0.258***	0.033	-0.142**	-0.064	-0.274***	0.596***	-0.187***
	(0.053)	(0.077)	(0.054)	(0.068)	(0.072)	(0.060)	(0.120)	(0.051)
Municipality Controls:								
Log Local Gross value added	-0.102***	0.022	0.104***	-0.074**	0.024	0.022	0.194***	0.200***
	(0.033)	(0.044)	(0.036)	(0.032)	(0.032)	(0.039)	(0.049)	(0.023)
Pop Ratio with Social Sec	0.409***	0.332***	0.168**	0.559***	0.363***	0.230**	0.402***	0.146***
	(0.076)	(0.108)	(0.085)	(0.092)	(0.084)	(0.095)	(0.109)	(0.056)
Schooling years	-0.096*	0.018	0.046	-0.078	-0.045	-0.007	0.002	0.026
	(0.053)	(0.058)	(0.053)	(0.055)	(0.044)	(0.057)	(0.065)	(0.033)
Log Local Homicides ratio	-0.023	0.012	0.007	-0.004	0.031*	0.019	0.071***	0.016
	(0.021)	(0.023)	(0.019)	(0.019)	(0.018)	(0.022)	(0.025)	(0.011)
Young Population Ratio	-0.851	1.367	-0.584	2.053	2.660	1.407	-3.802*	-4.672***
	(1.724)	(2.200)	(1.848)	(1.993)	(1.661)	(2.099)	(2.251)	(1.080)
Female Ratio	-0.201	-2.060*	0.118	0.927	-1.122	0.733	-0.594	1.179**
	(0.894)	(1.074)	(0.849)	(0.979)	(0.825)	(0.995)	(1.086)	(0.576)
No of Observations	36815	36815	36815	36815	36815	36815	36815	36815
R Squared	0.292	0.292	0.345	0.438	0.401	0.234	0.622	0.294
Mun. and year FE	YES	YES	YES	YES	YES	YES	YES	YES

The table reports OLS estimates of equation (1) for the period 1990-2006 , for the fiscal variables. The dependent variables are the fiscal variables for municipalities in Mexico measured as log of per capita versions plus 1. All estimations are augmented with interactions between the PRI rule variable and measures of New Cartel Presence New Cartel Presence is a dichotomous indicator of whether a municipality has at least 1 new organized crime group operating locally. All estimates include municipality and year fixed-effects. Controls include: (i) the Log ratio of local gross value added; (ii) Population ratio of access to social security; (iii) Schooling years ; (iv) the Log Homicides ratio; (v) the Young males' (15-29) ratio; (vi) Female Ratio. Robust standard errors. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 3.4: Local Fiscal Variables and New Cartel Presence: Controlling for Political Alignment (Before 2006)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Municipality Expenses Sources					Municipality Income Sources		
	Total Mun Expenses	Public Investment	Total Wages	Operating costs	Municipality transfers	Fed Gov Transfers	Tagged transfers	Total Taxes
New Cartel Presence	0.088*	0.182***	0.018	-0.001	-0.023	0.113**	0.115	0.188***
	(0.051)	(0.066)	(0.048)	(0.063)	(0.062)	(0.052)	(0.079)	(0.042)
Political Alignment	0.072***	0.167***	0.040*	-0.045*	0.100***	0.036	0.286***	0.032**
	(0.024)	(0.030)	(0.023)	(0.024)	(0.024)	(0.026)	(0.036)	(0.015)
New Cartel Presence # Political Alignment	-0.106*	-0.159**	-0.080	0.016	-0.068	-0.139**	-0.075	-0.097**
	(0.062)	(0.081)	(0.053)	(0.071)	(0.067)	(0.061)	(0.108)	(0.046)
Municipality Controls:								
Log Local Gross value added	-0.107***	0.011	0.101***	-0.071**	0.018	0.020	0.175***	0.198***
	(0.033)	(0.043)	(0.036)	(0.032)	(0.031)	(0.039)	(0.048)	(0.023)
Pop Ratio with Social Sec	0.418***	0.355***	0.173**	0.553***	0.375***	0.233**	0.442***	0.148***
	(0.076)	(0.108)	(0.085)	(0.092)	(0.084)	(0.095)	(0.108)	(0.056)
Schooling years	-0.099*	0.010	0.045	-0.075	-0.048	-0.006	-0.013	0.027
	(0.053)	(0.057)	(0.053)	(0.056)	(0.044)	(0.057)	(0.063)	(0.033)
Log Local Homicides ratio	-0.023	0.011	0.006	-0.003	0.030*	0.018	0.069***	0.016
	(0.021)	(0.023)	(0.019)	(0.019)	(0.018)	(0.022)	(0.025)	(0.011)
Young Population Ratio	-0.720	1.756	-0.505	1.902	2.736*	1.278	-3.062	-4.751***
	(1.723)	(2.194)	(1.846)	(1.987)	(1.658)	(2.097)	(2.237)	(1.079)
Female Ratio	-0.256	-2.221**	0.088	0.986	-1.179	0.769	-0.914	1.198**
	(0.893)	(1.069)	(0.848)	(0.976)	(0.825)	(0.995)	(1.075)	(0.577)
No of Observations	36815	36815	36815	36815	36815	36815	36815	36815
R Squared	0.292	0.293	0.345	0.438	0.402	0.234	0.622	0.293
Mun. and year FE	YES	YES	YES	YES	YES	YES	YES	YES

The table reports OLS estimates of equation (1), for the period 1990-2006, augmented with interactions between the political alignment variable and measures of new cartel presence. The dependent variables are the fiscal variables for municipalities in Mexico measured as log of per capita versions plus 1. New Cartel Presence is a dichotomous indicator of whether a municipality has at least 1 new organized crime group operating locally. The variable political alignment takes the value 1 if a mayor belongs to the same party as the President, and zero otherwise. All estimates include municipality and year fixed-effects. Controls include: (i) the Log ratio of local gross value added; (ii) Population ratio of access to social security; (iii) Schooling years ; (iv) the Log Homicides ratio; (v) the Young males' (15-29) ratio; (vi) Female Ratio. Robust standard errors. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 3.5: Local Fiscal Variables and New Cartel Presence: Controlling for Political Alignment (Alternative Measure) (Before 2006).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Municipality Expenses Sources					Municipality Income Sources		
	Total Mun Expenses	Public Investment	Total Wages	Operating costs	Municipality transfers	Fed Gov Transfers	Tagged transfers	Total Taxes
New Cartel Presence	0.075	0.225***	0.041	-0.002	-0.026	0.110*	0.210**	0.241***
	(0.058)	(0.080)	(0.053)	(0.074)	(0.071)	(0.057)	(0.091)	(0.052)
Pol Alignment state	-0.033	0.077***	-0.045**	-0.159***	-0.037	0.007	0.123***	-0.032**
	(0.024)	(0.029)	(0.022)	(0.024)	(0.023)	(0.024)	(0.035)	(0.014)
New Cartel Presence # Pol Alignment state	-0.025	-0.169**	-0.070	0.043	-0.018	-0.072	-0.216*	-0.136**
	(0.068)	(0.085)	(0.061)	(0.080)	(0.080)	(0.064)	(0.110)	(0.058)
Municipality Controls:								
Pop Ratio with Social Sec	0.409***	0.339***	0.168**	0.554***	0.362***	0.229**	0.413***	0.146***
	(0.076)	(0.108)	(0.085)	(0.092)	(0.083)	(0.095)	(0.108)	(0.056)
Log Local Homicides ratio	-0.022	0.011	0.008	-0.001	0.031*	0.018	0.069***	0.017
	(0.021)	(0.023)	(0.019)	(0.019)	(0.018)	(0.022)	(0.025)	(0.011)
Female Ratio	-0.188	-2.182**	0.139	1.077	-1.084	0.773	-0.818	1.225**
	(0.893)	(1.069)	(0.849)	(0.965)	(0.824)	(0.995)	(1.079)	(0.577)
Log Local Gross value added	-0.100***	0.016	0.107***	-0.062*	0.027	0.022	0.184***	0.202***
	(0.033)	(0.043)	(0.036)	(0.032)	(0.032)	(0.039)	(0.048)	(0.023)
Schooling years	-0.096*	0.013	0.047	-0.073	-0.043	-0.005	-0.007	0.028
	(0.053)	(0.057)	(0.053)	(0.055)	(0.044)	(0.057)	(0.064)	(0.033)
Young Population Ratio	-0.909	1.744	-0.691	1.520	2.513	1.229	-3.066	-4.903***
	(1.724)	(2.195)	(1.847)	(1.969)	(1.660)	(2.096)	(2.235)	(1.081)
No of Observations	36815	36815	36815	36815	36815	36815	36815	36815
R Squared	0.292	0.292	0.345	0.439	0.401	0.234	0.622	0.294
Mun. and year FE	YES	YES	YES	YES	YES	YES	YES	YES

The table reports OLS estimates of equation (1), for the period 1990-2006, augmented with interactions between the alternative political alignment variable and measures of new cartel presence. The dependent variables are the fiscal variables for municipalities in Mexico measured as log of per capita versions plus 1. New Cartel Presence is a dichotomous indicator of whether a municipality has at least 1 new organized crime group operating locally. The variable political alignment state takes the value 1 if a mayor belongs to the same party as the governor of the state, and zero otherwise. All estimates include municipality and year fixed-effects. Controls include: (i) the Log ratio of local gross value added; (ii) Population ratio of access to social security; (iii) Schooling years ; (iv) the Log Homicides ratio; (v) the Young males' (15-29) ratio; (vi) Female Ratio. Robust standard errors. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively

Table 3.6: New Cartel Presence and Local Fiscal Dynamics: Controlling by PRI Rule (By region)

Panel A: Estimations for the Centre Region	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Municipality Expenses Sources				Municipality Income Sources		
	Total Mun Expenses	Public Investment	Total Wages	Operating costs	Municipality transfers	Fed Gov Transfers	Tagged transfers	Total Taxes
New Cartel Presence	-0.299***	-0.352***	-0.223***	-0.030	-0.298***	-0.168**	-0.468***	0.005
	(0.067)	(0.098)	(0.067)	(0.096)	(0.069)	(0.071)	(0.124)	(0.065)
New Cartel Presence # PRI Rule	0.209**	0.619***	0.108	-0.019	0.020	0.035	0.658***	-0.026
	(0.105)	(0.127)	(0.104)	(0.113)	(0.123)	(0.106)	(0.232)	(0.111)
Municipality Controls:								
Log Local Gross value added	-0.058	-0.018	0.027	0.099**	0.074**	0.065	0.027	0.166***
	(0.036)	(0.049)	(0.040)	(0.040)	(0.038)	(0.041)	(0.067)	(0.029)
Pop Ratio with Social Sec	-0.078	0.223*	-0.007	0.339***	0.123	0.088	0.270**	-0.043
	(0.085)	(0.127)	(0.093)	(0.124)	(0.096)	(0.101)	(0.125)	(0.074)
Schooling years	-0.033	-0.212***	-0.027	-0.050	-0.062	-0.053	-0.200***	-0.012
	(0.054)	(0.069)	(0.061)	(0.084)	(0.058)	(0.057)	(0.074)	(0.049)
Log Local Homicides ratio	-0.017	-0.049	-0.081***	-0.044	0.025	-0.064**	-0.035	-0.044**
	(0.027)	(0.034)	(0.027)	(0.031)	(0.029)	(0.029)	(0.040)	(0.018)
Young Population Ratio	1.295	9.556***	-0.730	-7.836***	-0.238	-3.661*	14.843***	-2.279
	(1.863)	(2.689)	(1.920)	(2.857)	(2.361)	(2.090)	(3.178)	(1.644)
Female Ratio	4.867***	4.192***	1.958*	5.050***	1.151	3.435***	0.132	4.159***
	(0.956)	(1.422)	(1.033)	(1.352)	(1.184)	(1.041)	(1.701)	(0.873)
No of Observations	16448	16448	16448	16448	16448	16448	16448	16448
R Squared	0.442	0.413	0.475	0.464	0.459	0.330	0.686	0.386
Mun. and year FE	YES	YES	YES	YES	YES	YES	YES	YES
Panel B: Estimates for the Northern Region								
New Cartel Presence	-0.106*	-0.220***	-0.112**	-0.069	-0.067	-0.018	-0.023	-0.052
	(0.060)	(0.084)	(0.054)	(0.076)	(0.086)	(0.054)	(0.085)	(0.045)
New Cartel Presence # PRI Rule	0.094	0.542***	0.110*	-0.148*	-0.056	0.019	0.102	0.014
	(0.061)	(0.093)	(0.057)	(0.090)	(0.099)	(0.056)	(0.125)	(0.060)
Municipality Controls:								
Log Local Gross value added	-0.006	-0.035	0.023	0.037	0.030	0.043	-0.129**	0.049
	(0.031)	(0.061)	(0.032)	(0.044)	(0.045)	(0.034)	(0.056)	(0.033)
Pop Ratio with Social Sec	0.120	-0.181	-0.065	0.217	0.145	0.063	0.681***	-0.106
	(0.112)	(0.190)	(0.092)	(0.163)	(0.169)	(0.094)	(0.193)	(0.094)
Schooling years	-0.017	-0.051	-0.138**	0.356***	-0.021	-0.245***	-0.285***	-0.059
	(0.062)	(0.112)	(0.066)	(0.120)	(0.114)	(0.075)	(0.104)	(0.054)
Log Local Homicides ratio	-0.001	-0.028	0.040**	0.008	0.035	0.026	0.062	-0.011
	(0.021)	(0.032)	(0.018)	(0.032)	(0.034)	(0.021)	(0.045)	(0.017)
Young Population Ratio	4.209**	1.691	1.936	6.746**	10.336***	2.002	8.830**	-1.149
	(2.088)	(3.716)	(2.336)	(3.369)	(3.379)	(2.652)	(3.833)	(2.097)
Female Ratio	-1.738*	-2.083	-0.605	-2.704*	0.034	-0.319	0.452	-0.483
	(0.904)	(1.579)	(0.919)	(1.500)	(1.681)	(1.118)	(1.582)	(1.046)
No of Observations	6970	6970	6970	6970	6970	6970	6970	6970
R Squared	0.583	0.476	0.642	0.548	0.528	0.521	0.751	0.516
Mun. and year FE	YES	YES	YES	YES	YES	YES	YES	YES
Panel C: Estimates for the South Region								
New Cartel Presence	0.353	0.770***	0.413*	0.216	0.361	0.584**	0.703**	0.656***
	(0.293)	(0.267)	(0.238)	(0.215)	(0.224)	(0.282)	(0.284)	(0.159)
New Cartel Presence # PRI Rule	-0.101	-0.568*	-0.040	-0.193	-0.152	-0.537*	-0.599*	-0.462***
	(0.194)	(0.324)	(0.241)	(0.291)	(0.250)	(0.291)	(0.362)	(0.153)
Municipality Controls:								
Log Local Gross value added	-0.245***	-0.074	0.133	-0.097	-0.024	-0.036	0.174*	0.204***
	(0.075)	(0.092)	(0.082)	(0.067)	(0.068)	(0.091)	(0.092)	(0.045)
Pop Ratio with Social Sec	1.098***	0.082	0.447	1.155***	0.593**	0.394	-0.024	0.306**
	(0.226)	(0.307)	(0.294)	(0.215)	(0.233)	(0.333)	(0.291)	(0.146)
Schooling years	-0.166*	0.145	0.081	-0.216***	-0.002	0.088	0.113	0.064
	(0.093)	(0.092)	(0.093)	(0.080)	(0.071)	(0.103)	(0.097)	(0.055)
Log Local Homicides ratio	-0.034	0.030	0.044	0.053**	0.040	0.032	0.082**	0.049***
	(0.035)	(0.036)	(0.032)	(0.027)	(0.026)	(0.037)	(0.036)	(0.017)
Young Population Ratio	-1.932	2.981	2.292	-3.240	0.565	6.399	-3.034	-1.955
	(3.374)	(3.890)	(3.538)	(3.313)	(2.831)	(4.041)	(3.652)	(1.774)
Female Ratio	-1.037	-3.404**	0.177	-0.656	-1.539	-0.167	-0.532	0.972
	(1.524)	(1.673)	(1.446)	(1.487)	(1.276)	(1.744)	(1.573)	(0.888)
No of Observations	13013	13013	13013	13013	13013	13013	13013	13013
R Squared	0.221	0.225	0.222	0.433	0.371	0.222	0.563	0.181
Mun. and year FE	YES	YES	YES	YES	YES	YES	YES	YES

Panel (A) report OLS estimates of equation (1) for the period 1990-2006 for municipalities in the North of Mexico, for the Fiscal variables and New cartel presence. Panel (B) and Panel (C) follow a similar structure for municipalities on the Centre and the South of Mexico, respectively for the same period. All estimations are augmented with interactions between the PRI rule variable and measures of New Cartel Presence The dependent variables are the fiscal variables for municipalities in Mexico measured as log of per capita versions plus 1. New Cartel Presence is a dichotomous indicator of whether a municipality has at least 1 new organized crime group operating locally. All estimates include municipality and year fixed-effects. Controls include: (i) the Log ratio of local gross value added; (ii) Population ratio of access to social security; (iii) Schooling years ; (iv) the Log Homicides ratio; (v) the Young males' (15-29) ratio; (vi) Female Ratio. Robust standard errors. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Chapter 4 Subnational democratization and the onset of the Mexican drug war

This Chapter examines empirically the main cause of turf wars at the municipal level between 1995-2006. In particular, we highlight the significant role of a large-scale land titling reform (PROCEDE) that secured property rights for the electorate breaking the clientelistic linkages between the latter and the state party that dominated the political landscape for seven decades. Our results indicate that political change at the municipality level after the rollout of PROCEDE is a significant determinant of organized crime deaths (OCDs). This is because the fall of clientelistic links due to the titling programme that signifies the strong local roots of the PRI, disrupts the equilibrium between corrupted local officials and drug cartels making the latter more vulnerable to expansion operations of rivals resulting in more OCDs. Moreover, we provide evidence that a municipal change and in a lesser degree, state level change at the gubernational level are a disruptive factor. Finally, consistent with expectations we show that the main driving force of the increase of OCDs is local cartel expansion operations.

4.1. Introduction

High levels of drug trade-related violence pose a significant challenge for the interior stability of many countries in the developing world. The escalation of violence in Mexico between 2007-2012 that claimed over 70,000 lives is by far the most daunting example of such violence (see Shirk and Wallman, 2015), attracting scholarly research in an attempt to decode its development (see, e.g., Dube et al., 2013; Dell, 2015; Dube et al., 2016; Trejo and Ley, 2018).[18] According to the literature, one of the main determinants of this escalation was the large-scale efforts to combat drug trafficking, spearheaded by the leader of Mexico's conservative National Action Party (PAN) Felipe Calderon while in office (2006-2012) (see, e.g., Calderon et al., 2015; Dell, 2015). Nonetheless, the death toll since 2007 seems to have its origins in the 1990s turf wars involving the main drug trafficking organisations operating in the country (Osorio, 2016; Trejo and Ley, 2018). Related to that, according to Dell (2015) the escalation of violence after 2007 is concentrated in municipalities with an above average pre-period homicide rate. To this end, the present paper

[18] Additional negative consequences of this escalation include, among others, deterred economic growth (Enamorado et al., 2014), reduced labour force participation (Velasquez, 2019), decreased birth weight (Brown, 2018), as well as school completion rates (Brown & Velasquez, 2017).

seeks to examine empirically the main cause of turf wars at the municipal level between 1995-2006 – that seems to be associated with the escalation observed after 2007.[19]

One of the main explanations for the pre-period drug trade-related violence, as put forward in the previous literature, was the breakdown of informal networks of protection between the state and cartels due to the subnational democratisation process. (Astorga, 2005; Snyder and Durán-Martínez, 2009; Dube et al., 2013; Trejo and Ley, 2018). In particular, the Institutional Revolutionary Party (PRI) dominated the political landscape in Mexico for seven decades both nationally and subnationally. During the hegemony of the PRI, the power structure was extremely centralized and violence remained relatively low for decades, due to the consolidated relationships between drug traffickers and corrupted local state officials.[20] However, the rise of subnational democratic pluralism during the 1990s, which eventually reached the national level in 2000 with the electoral win of PAN, undermined the long-standing implicit agreements, causing turf wars between cartels and an increase in drug trade-related deaths.

A parallel strand of literature attempts to explain what caused the break in PRI hegemony. For decades, PRI established local clientelisitc links through the institution of ejido (Magaloni, 2006; de Janvry et al., 2014; Albertus et al., 2015; Castaneda Dower and Pfutze, 2015). The latter was instituted as a result of popular demand from landless peasants and former estate workers after the Mexican revolution in 1917. However, the PRI primarily used it to develop clientelistic links in rural areas of the country. That was achieved through the legal restrictions imposed on ejido members (called ejidatarios) – the most important of which was the discretion of the state party to revoke land rights (Sabloff, 1981; Mackinlay, 2011; Larreguy, 2013. In the beginning of the 1990s, the Carlos Salinas administration, headed by technocrats inside the PRI, attempted to increase the competitiveness and growth prospects of ejidos ahead of the North American Free Trade Agreement (NAFTA) through the implementation of PROCEDE (Programa de Certificación de Derechos Ejidales y Titulación de Solares Urbanos), which provided land tenure to ejidatarios. According to previous literature, the land certification programme, whose rollout lasted between

[19] Actually, according to our data, in municipalities that had at least one drug related death until 2006, the rate of drug related killings after 2007 is 258 percent higher. This observation applies also when we split the sample between the north, the centre and the south of Mexico, with higher pre and post period deviations observed in the centre and the south.

[20] It should be noted that PRI attempted with administrative reforms to reduce corruption among state officials (e.g., mass firings, rotation of police officers and civilian officials), though without any success (see, Snyder & Durán-Martínez, 2009).

1993-2007, broke the clientelistic links locally leading to the gradual subnational democratisation in municipalities and states first, eventually reaching the national level in 2000 (see, De Janvry et al., 2014; Castaneda Dower and Pfutze, 2015).[21]

Taking into account the link between the rollout of PROCEDE and subnational democratisation, and the latter with the onset of the Mexican drug war during the 1990s we examine whether mayorship and gubernational turnovers from PRI after the implementation of PROCEDE lead to an increase of organised crime deaths (OCDs) between 1995-2006. In particular, using the Criminal Violence in Mexico (CVM) dataset of Trejo and Ley (2018) that records drug trade-related deaths at the municipal level, our results indicate that political change at the municipality level after the rollout of PROCEDE is a significant determinant of OCDs. This is because the fall of clientelistic links due to the titling programme that signifies the strong local roots of the PRI, disrupts the equilibrium between corrupted local officials and drug cartels making the latter more vulnerable to expansion operations of rivals resulting in more OCDs. Moreover, we provide evidence that a municipal change and a change at the gubernational level are a disruptive factor in this phenomenon. This is because state officials are higher in the ranking and cover wider geographical areas within the Mexican territory (see Trejo and Ley, 2018), thus a simultaneous change augment the extent of disruption of government protection towards cartels causing even higher instability and more OCDs. These findings are robust, among others, when we employ an instrumental variable (IV) approach to mitigate endogeneity concerns of the rollout of PROCEDE; when we attempt to rule out that confounders are driving the results - e.g., increased cultivation of illicit crops due to the rollout of PROCEDE; when we break our sample before and after 2000 - that PAN came in power; and when we break the sample into the three major areas of Mexico (north, centre, and south) to test if our results are driven by the more violent municipalities in the north. Furthermore, consistent with expectations, using the novel dataset constructed by Coscia and Rios (2012) that track the presence of ten criminal organizations at the municipality level, we provide evidence that the driving force of the increase of OCDs is local cartel expansion operations.

Our paper contributes to the literature that explores the implications of subnational democratic pluralism on OCDs prior to escalation of violence in 2007 (see, e.g., O'Neil, 2009;

[21] The architects of the reform did not seem to have taken into account the potential negative electoral effects for the ruling party. In contrast, they may have hoped that peasants would reward the PRI at the ballot box for a popular reform that would enhance the growth prospects of ejidatarios (see, De Janvry et al., 2014).

Snyder and Durán-Martínez, 2009). According to Dube et al. (2013), access to guns from the United States increased the homicide rate along the border between 2002-2006. The authors provide also evidence that political competition in municipal elections played a mediating role between guns and violence because it contributed to the destabilization of criminal organisations. Moreover, Trejo and Ley (2018) contribute to the literature recording in the CVM dataset drug trade-related violence at the municipal level between 1995-2006, providing evidence that their local increase is positively correlated with gubernational power alteration. We complement these studies, attempting to provide causal evidence of the effect of the subnational democratisation wave on turf wars between cartels that in turn increase OCDs.

This paper contributes also to a broader literature that explores the determinants of the Mexican drug war. Dube et al. (2016) show that exogenous movements in the Mexican maize price stemming from weather conditions in US maize-growing regions, cause changes in marijuana and opium cultivation and drug trade-related violence within the Mexican territory between 1990-2010. Moreover, Rios (2015) shows that an increase in the number of localities where different parties controlled different levels of government between 1990-2010, makes more likely drug traffickers to violate the long-standing informal prohibition on selling cocaine within the country. Furthermore, Osorio (2012), using a machine-generated database of daily event data at the municipal level in Mexico from 2000 to 2010, shows that rising subnational electoral competition, which undermines peaceful configurations between authorities and criminals, causes an increase in violence. According to the author, an increase in the effective number of parties and divided governments is associated with the intensification of local law enforcement. Related to that, Dell (2015) examines the role of enforcement policy, and the launch of the campaign of war on drugs by the administration of Felipe Calderon, to show that drug-trade violence rises substantially between 2006-2010 in municipalities after the close election of mayors from the PAN political party. Finally, Dell et al. (2019) provide evidence that trade-induced manufacturing job losses in urban areas increase drug trade-related homicides between 2007-2010 in municipalities that criminal organisations are present.

Additionally, compared to other works on the field of rural violence in Mexico, our work offers a distinct perspective on the issue, contributing a nuanced understanding of organized crime deaths (OCDs). While the study by Castañeda Dower and Pfutze (2020) underscores the reduction of overall violence through land certification by mitigating land disputes, we delve into how political transition and land certification concurrently instigate a rise in OCDs by disrupting established power structures. The ensuing instability paves the way for increased cartel-related violence, a phenomenon distinct from the overall violent deaths they examine. Thus, our study

elucidates the paradoxical nature of land certification's impact, where it can both abate general violence and exacerbate organized crime violence. Hence, this divergence underscores the necessity of differentiating between general and organized crime-related violence when evaluating rural Mexico's socio-political changes.

The rest of the paper is organized as follows. Section 2 provides a description of the Mexican context and the mechanisms that link PROCEDE and the wave of subnational democratisation with OCDs. Section 3 describes the main variables and the empirical strategy. Section 4 presents the main econometric results and robustness checks. Finally, Section 5 offers some concluding remarks.

4.2. The Mexican context

4.2.1. Ejidos and the Downfall of PRI

4.2.1.1. Ejidos

According to Article 27 of the 1917 constitution established after the Mexican revolution, land was provided in the form of ejidos as a popular demand mostly of landless peasants and those who used to work in haciendas - large landholdings controlled by one family part of the elite in power (see, Sabloff, 1981; De Janvry et al., 1997). The importance of the ejido institution can be seen in its coverage of roughly 32,000 ejidos equivalent to almost half the country's territory (Deininger and Bresciani, 2001a; De Janvry et al., 2001).[22] Each ejido represents a community, consisting of mostly household-farm units, around a rural locality to which land has been granted by the government. A notable characteristic of this type of communal property was its legal restrictions imposed to ejidatarios. In particular, the latter had to work their land directly, they were not allowed to hire external workers, and they were not permitted to rent or sell the land. Moreover, absences for more than two years could lead to the loss of land rights. However, to prevent the atomisation of the ejido, ejidatarios could transfer their land plots to one unique heir.[23]

The internal structure of ejidos consisted of: (i) the general assembly, the highest authority inside it, formed by all ejido members; (ii) the executive board (comisariado ejidal), made of six elected ejidatarios under the leadership of a president; and (iii) the oversight council

[22] Around 2,000 of these refer to pre-colonial indigenous communities with a slightly different regime.

[23] On top of that, the federal government was in charge, among other things, of legal arbitration inside ejidos and among ejidatarios, and especially giving collective credit and insurance for specific crops through a state-owned agricultural bank and insurance company, in which all ejidatarios were co-liable (De Janvry et al., 2001; Johnson, 2001; Albertus et al., 2015).

also composed of six elected members in charge of checking the performance of the assembly and the executive boards (see, e.g., Baitenmann,1998). Political connections to access public goods and services were so important that the president of the executive board was actually a local power broker of the PRI party (De Janvry et al., 2001; Holzner, 2003). Overall, for decades the PRI gained an economic monopoly through the intense legal regulation of ejidos, and a political monopoly over these lands through the legal attributions of the president of Mexico as the sole authority in charge of the land granting process (see, e.g., Castaneda Dower and Pfutze, 2015).[24]

4.2.1.2. Ejidos and Clientelism

According to the literature, clientelism is an asymmetric political exchange formed between a patron and a client where the former supplies goods in exchange for loyalty from the latter (Kitschelt and Wilkinson, 2007; Stokes, 2008; Hicken, 2011). In Mexico, this network was formed by the power vested to local ejido leaders who were actually the local strongmen (caciques) of the PRI party, and the ejidatarios who were the "clients" (Lawson, 2000; Villareal, 2002; Magaloni,2006; Albertus et al., 2012; Castaneda Dower and Pfutze, 2015). These caciques were given discretionary power to control the exchange and access of goods, services, sources of credit and commercialisation through their allegiance to the PRI. In that way they were in position to reward loyal ejidatarios and punish those who did not pledge allegiance to the party (Sabloff,1981; Mackinlay, 2011; Larreguy, 2013). In turn, caciques were enjoying the rents associated with their powerful position. There is evidence, for instance, that caciques were able to redistribute land in their favour (Bartra and Huerta, 1980). Moreover, their better local knowledge of political conditions allowed them to monitor more closely the rural farmer's electoral support for the state party (Villareal, 2002). In ejidos, voting behaviour was easy to supervise since being small rural communities allowed the PRI successfully to apply a clientelistic scheme (Larreguy, 2013).

In that regard, Johnson (2001) argued that ejidos was the preferred political instrument of the PRI to control elections. The reason behind this was related to the fact that those lands represented a visible sign of the government's commitment to the Mexican revolution's main

[24] To mitigate imposed restrictions, ejidatarios started to participate in secondary markets. More specifically, those secondary markets were based on illegal land transactions, informal settlements on ejido lands of more than one heir and the clandestine hiring of workers to help with the cultivation operations (Gordillo de Anda et al., 1994; Murphy & Rossi, 2016). However, those secondary markets were insufficient to compensate for the economic inefficiencies of the ejido.

demands, including giving land to the landless. The ejido was a key element in this system by allowing the party to control rural votes and aiding the PRI to win elections by extensive margins. These electoral victories were essential to legitimise the regime and to demonstrate a generalised support for the PRI rule (Klesner et al.,2001; Larreguy, 2013).

4.2.1.3. The Rollout Of PROCEDE

In the beginning of the 1990s the Carlos Salinas administration, headed by technocrats inside the PRI, attempted to increase the competitiveness of ejidos. The primary strategy followed was to end legal restrictions on ejidatarios (e.g., renting lands or hiring external labour). This was achieved through the amendment of Article 27 of the Mexican constitution that opened the possibility of ejido privatisation. This new bill was presented in 1991 and soon was approved by the Mexican Congress and state legislatures in 1992. Ejidatarios have been consistently plagued by low productivity and high poverty (Cornelius and Myhre, 1998). With this reform, the aim of technocrats was to recapitalize the sector and increase its export potential in the context of the just negotiated NAFTA. According to De Janvry et al. (2014) there is no evidence that the reform's architects took the potential negative effects on the ruling party's clientelistic links with the local societies into account. On top of that, the government may have hoped that ejidatarios would actually reward the PRI at the ballot box for a reform that would enhance the growth prospects of ejidatarios.

The implementation of this reform was made through the scheme of PROCEDE (Programa de Certificación de Derechos Ejidales y Titulación de Solares Urbanos). The programme's aim was the establishment of boundaries for the ejido as a whole and for individual land plots within the ejido, providing land tenure and certificates of property rights to ejidatarios (World Bank, 2001). Participation in PROCEDE was voluntary, and agrarian communities could freely apply to participate in the certification process. The process was initiated by an informational meeting between the officials and ejidatarios.[25] If there was an interest, an assembly was summoned (Asamblea de Información y Anuencia) and if the majority of ejidatarios voted in favour, they were allowing authorities to measure the ejido and create a contour map with subdivisions. Once disputes between ejidatarios over land were resolved and all the requirements of the programme

[25] It should be noted that these assembly informational meetings followed a sequential approach indirectly creating a spatial pattern (see, Castaneda Dower & Pfutze, 2015). In particular, the government officials started these meetings in ejidos with greater accessibility. Normally, these ejidos were close to the capitals of each of the states or close to large cities. Subsequently, the agents would then go to the more remote ejidos to continue this process.

had been met, a final assembly was summoned to vote the agreed partition of land (Asamblea de Delimitación, Destino y Asignación de Tierras). Following this meeting, ejidatarios received certificates of ownership, and the possession of their land could not be contested (De Janvry et al., 1997; Johnson, 2001). Contrary to expectations, the implementation of the programme took much longer than expected. In particular, it took approximately 15 years to complete, ending in 2007, covering more than 90% of ejidos within the Mexican territory.

4.2.1.4. PROCEDE And Subnational Democratisation

The PRI dominated the political landscape in Mexico for seven decades, both nationally and sub nationally. At the subnational level, the PRI had won every gubernatorial election in Mexico's 31 states up until 1988, until the first loss in 1989 in the state Baja California. At the municipal level, as of 1990, less than 10% of municipalities had ever been governed by a party other than the PRI (see Castaneda Dower and Pfutze, 2015). However, up until 2006, the center-right PAN obtained 10 governorships, the center-left PRD won six, and around two-thirds of Mexican municipalities were run by parties other than the PRI. According to studies, PROCEDE broke the clientelistic links locally leading to the gradual subnational democratisation in municipalities and states first, eventually reaching the national level with the victory of the main opposition party, PAN, in 2000. De Janvry et al. (2014) show that granting property rights induced a conservative shift toward the right-wing party PAN in federal elections between 1994-2009, consistent with the investor class theory. Moreover, Castaneda Dower and Pfutze (2015) analysed data from 10,000 local elections held in Mexico between 1990 and 2010, showing that land certification significantly increased the number of votes for the main opposition parties in municipal elections. However, this effect dissipated once the PRI had already lost at least one mayoral election. The main conclusion of this paper is that issuing of land titles increased the cost of maintaining clientelistic links weakening the party's local roots.

Along the same lines, Larreguy (2013) provides evidence of how local PRI party brokers mobilize voters for local elections in Mexico – whereas Larreguy et al. (2015) found that a land titling federal program - Committee for the Regularisation of Land Ownership (CORETT) - that reached nearly 2.16 million urban households over a period of 35 years helped federal officials who were credited with the reform but harmed local officials who lost clientelistic links. Finally, Albertus et al. (2015) provide evidence that the institution of ejidos served the PRI to retain political power in rural Mexico, despite the gradual modernisation of the economy. Using data at the state level from 1917 to 1992, the authors found that ejidos were more likely to be established during election years where rural unrest was more prone to happen. In addition, PRI's electoral

support eroded less in states where more ejidos were established. This result signifies once again the importance of ejidos for the PRI to retain voters.

4.2.2. The Mexican Drug War

The war on drugs in Mexico that escalated dramatically between 2007-2010, has its origins in the 1990s turf wars involving the main drug trafficking organisations of the time operating in the country (Dell, 2015; Osorio, 2016; Trejo and Ley, 2018). In particular, during the term of PAN's leader, Felipe Calderon (2006-2012), and his war on drugs campaign, Mexico experienced more than 70,000 OCDs (Shirk and Wallman, 2015). Related to that, according to Dell (2015) between 2007-2010 drug-trade violence rose substantially in municipalities following electoral victories by the incumbent PAN. This is attributed to drug cartels contesting areas in which traffickers have become weaker after close election of PAN mayors who implement locally the campaign of war on drugs (see, also, Osorio, 2015). Moreover, according to this study this escalation is concentrated in municipalities with an above average pre-period homicide rate. In other words, violence that was already present locally but on a much lower scale years before, is a key element in understanding its subsequent escalation.[26]

According to the literature, a significant determinant of drug trade-related violence prior to the escalation was the breakdown of informal networks of protection between the state and cartels due to the subnational democratisation process (Astorga, 2005; O'Neill, 2009; Snyder and Durán-Martínez, 2009; Osorio, 2016). During the hegemony of the PRI nationally and subnationally, the power structure was extremely centralized and violence remained relatively low for decades, due to the consolidated relationships between drug traffickers and corrupted state officials.[27] The subnational democratic pluralism during the 1990s - prior to the federal government's launch of the war on drugs - destabilized this equilibrium. In particular, municipal

[26] As an example of this phenomenon, despite the constant war between the Tijuana and the Arellano-Felix criminal organisations for the control of the main access point to the California market, the violence grew to new levels after 2007 when the Calderon government deployed the army to fight these organization (See Madrazo & Guerrero,2012). Another example of the increase in violence is the case of Apatzingán in the state of Michoacan. A previous turf war had been initiated between the Gulf Cartel and its private army, the Zetas, against the Valencia brothers' organization, previously protected by the PRI local authorities, in 2002. Nevertheless, after the military intervention in 2006, the violence level sharply increased (Maldonado, 2012; Trejo & Ley, 2016).

[27] These informal networls of protection can be crated through the penetration of state officials by cartels with bribes and coercion (Snyder and Durán-Martínez, 2009), or through corrupted state officials that may seek to regulate illicit profitable activities in exchange for rents (Astorga, 2005).

and gubernational electoral victories of opposition (non-PRI) parties undermined the long-standing implicit agreements between corrupted local officials and criminal organisations, weakening the latter and causing turf wars between rivals and an increase in drug trade-related violence.

Consistent with this, empirical evidence has been provided showing the detrimental effect of gubernatorial and municipal level changes of authorities on drug trade-related violence. Regarding gubernational changes, Trejo and Ley (2018) demonstrated that their spread within the Mexican territory was strongly associated with a rise in violence between 1995 and 2006. According to the authors, state-level political alternations that broke long-standing informal networks of protection incentivised drug lords to create private militias to defend themselves from the expansion of other drug cartels.[28] Fundamentally, Trejo and Ley (2018) suggest that political alternation signals the weakness of local criminal groups, attracting the attention of rivals causing turf wars and an increase in OCDs.

However, evidence also suggests that changes at the municipal level matter. Specifically, according to Dube et al. (2013), the 2004 expiration of the U.S. Federal Assault Weapons Ban had a spillover on gun supply in Mexican municipalities resulting in differential increases in homicides close to the non-California border states between 2002-2006. The authors also provide evidence that political competition in municipal elections played a mediating role between guns and violence due to its contribution to the destabilization of criminal organisations. According to the authors, many municipalities that experienced turnover in PRI mayorships, which undermined informal sanctions, witnessed an increase in violence. Along the same lines, Rios (2015) provide evidence that when the number of localities where different parties controlled different levels of government increase between 1990-2010, makes more likely drug traffickers to violate the long-

[28] According to Trejo and Ley (2018), during the 1980s the PRI's intelligence agency, the federal security directorate (DFS) led by military personnel, regulated the criminal underworld. Drug trafficking was on the rise at that time, and it was at that moment when protection networks between the PRI regime and the criminal groups were mainly established. Nevertheless, corruption and political repression related cases compelled the Mexican government to disband the agency, resulting in many of the agents to migrate at the state level. The political transition in the 1990s disturbed those networks when the newly elected governments replaced those security officials with new personnel unaware of previous protection pacts.

standing informal prohibition on selling cocaine within the country setting the conditions for a violent war between drug cartels to erupt.[29]

Taking into account the link between the rollout of PROCEDE and subnational democratization, and the latter's association with the onset of the Mexican drug war during the 1990s, we expect subnational democratization at the municipal level after the implementation of PROCEDE to increase OCDs. This is because political alteration at the municipality level after the rollout of PROCEDE, and the fall of patron-client relationships due to the titling programme, signifies the strong local roots of the PRI. Such a political change disrupts the equilibrium between corrupted local officials and drug cartels, making the latter vulnerable to expansion operations of rivals that can result in more OCDs. Moreover, we would expect even higher instability if a municipal change was combined with a change at the gubernational level. This is because state officials are higher in the ranking and cover wider geographical areas within the Mexican territory, thus a simultaneous change could augment the extent of disruption of government protection towards cartels. As a result, we would expect a simultaneous political change at the municipal and state levels after the implementation of PROCEDE to cause an even higher increase of OCDs.

4.3. Data and empirical strategy

4.3.1. Data and main variables

Our data about OCDs are retrieved from the CVM dataset. The latter has been constructed by Trejo and Ley (2018) and is available for the 1995-2006 period, recording drug trade-related violence at the municipal level. Our dependent variable takes the value one if there is an *OCD*, and zero otherwise.[30] An advantage of the CMV is that it considers only murders that can be attributed directly to drug cartels violence. This information has been put together from the three most widely circulated daily newspapers in Mexico: El Universal (1995-2006), Reforma (1995-2006), and El Financiero (1997-2006).[31] When news reports did not include the name of the

[29] To safeguard their operations from government attacks and against rivals, the main drug trafficking organisations in Mexico like the Sinaloa cartel started to create private militias. This operation was done mainly by recruiting defectors from the state judicial police, the army and other security corporations. Despite being used first as a mean of defence, the cartels started to use those armies to conquer rival territories causing the majority of drug trade-related deaths in the mid 1990s and early 2000s in Mexico (O'Neil, 2009; Trejo & Ley, 2020).

[30] However, later in the analysis we also experiment with a continuous dependent variable.

[31] Specifically, Reforma is the most specialised source of drug trafficking news in Mexico (Shirk & Wallman, 2015). More concretely, El Universal covers the Pacific and Gulf coasts regions as well as the centre of

criminal organisations involved, Trejo and Ley (2018) relied on three indicators to decide whether to include a murder in the data set: the use of assault weapons, signs of torture and brutal violence, and written messages left on the bodies.[32] Figure 1 maps areas affected by OCDs at the municipality level.

[Insert Figure 4.1 here]

Regarding the land reform PROCEDE, the National Agrarian Registry (Registro Agrario Nacional, RAN) provides the exact dates land titles were issued for each ejido. using the ArcGIS software we match this information with a shapefile that contains polygons of these ejidos to calculate the variable *PROCEDE* between 1993-2007, as the percentage of certified ejido area in each municipality, to the total ejido area of the municipality.

Regarding political variables, data are retrieved by Trejo and Ley (2018) whose primary source is Centro de Investigación para el Desarrollo, A.C. (CIDAC). The latter is publicly accessible and contain electoral results in Mexico since 1980. In Mexico, gubernational and local elections take place every six and three years, respectively, but the precise years are staggered across states.[33] To examine the effect of mayorship turnovers we construct the variable *PRI municipio break* that takes the value of one after the win of a non-PRI party in local elections. Moreover, to quantify the effect of a state change in a similar manner as in Trejo and Ley (2018) we construct the variable *PRI state break* that takes the value of one after the win of a non-PRI party in state level elections.

Mexico, whereas El Financiero mainly covers the centre of the country. Nonetheless, the three publications adequately cover the southern region of the nation.

[32] Since there are no credible sources for information on cartel violence prior to 1995, the research is limited to events that occurred after that year. One reason of this lack of information is that Reforma newspaper did not start publishing this sort of information until 1995, when it became a major source (Trejo & Ley, 2018).

[33] Municipal elections are managed at the state level, with only slight variations in how each jurisdiction conducts them -with the exception of areas that use indigenous customary voting methods. Voters cast a single ballot for a political party or coalition, and the party that receives more votes gains the mayor's office. The same applies for gubernational elections and the elected governor face a single-term limit.

Overall, our dataset is comprised of 1,850 municipalities over the period of analysis. Our sample excludes municipalities not yet formed in 1990, and those that opted for a non-party based local administration based on traditional institutions (usos y costumbres) (see, e.g., Castaneda Dower and Pfutze, 2015; Trejo and Ley, 2018; Trejo and Ley, 2021). Also, following Dube et al., (2016), we exclude close to 90 urban municipalities as ejido land coverage is predominantly a rural phenomenon that affected the welfare of the rural population. In addition, their inclusion may lead us to overestimate the impact on drug-related homicides. This is because densely populated areas with significantly lower ejido land coverage witnessed a sharper increase in violence in the second half of our sample during the rollout of PROCEDE.

4.3.2. Empirical Specification

We expect that a political change after the rollout of PROCEDE to increase OCDs. To test this we estimate the following regression model (see Castaneda Dower and Pfutze, 2015; Castaneda Dower and Pfutze, 2020):

$$OCD_{it} = \alpha + \beta_1 PROCEDE_{it} + \beta_1 PRI\ break_{it} + \beta_3\ PROCEDE_{it} * PRI\ break_{it} + \gamma X_i * \varphi_y + \theta_i + \theta_t + \varepsilon_{it} \qquad (4.1)$$

Where OCD_{it} denotes our binary indicator of organised crime deaths in municipality i and year t; $PROCEDE_{it}$ is the ratio of certified ejido area to total ejido area in municipality i and year t; $PRI\ break_{it}$ stands for the variables *PRI municipio break* and *PRI state break* as described in section 4.3.1, capturing the effect of democratic transition at the municipal and state levels, respectively; X_i denotes a set of predetermined municipal characteristics measured before the beginning of our sample in order to reduce endogeneity concerns (see, e.g., Bahar et al., 2021). Interactions of these variables and year dummies (φ_y) aim to account flexibly for potential differential non-parametric trends on a number of municipal characteristics. In particular, to control for municipal socioeconomic characteristics that can affect OCDs we include the following variables: (i) *Log population 90*; (ii) *Young males' ratio 90*; (iii) *Adult females' ratio 90*; (iv) *Access to electricity 90*; (v) *Indigenous ratio 90*. Furthermore, to account for the effect of state presence on OCDs we include: (vi) *Log homicides 90-92*; (vii) *Log distance to border*; (viii) *Log distance to nearest police station*; (ix) *Log distance to nearest military region*; (x) *Log distance to nearest air force base*. A plausible argument on their use is that in places with a weak state, criminal groups are more prone to resort to violence to settle conflicts over the control of local drug markets, resulting in an increase in drug-related mortality (see Skaperdas, 2001). Lastly, we also included two variables to capture the effect of crop suitability on OCDs. In particular, we include: (xi) *Log*

Maize suitability and (xii) *Log drug crop suitability*. The former aims to control for the effect of shocks in the production of maize that in turn can affect the production of illicit crops and cartel activity (see Dube et al., 2016). The latter aims to directly proxy for illicit crop suitability that in turn can affect cartel activity.[34] Explicit definitions, descriptive statistics and sources of the variables employed throughout the analysis, are provided in Table 4.A1 in the Appendix 4.C. The model also includes municipality, θ_i, and year fixed-effects, ϑ_t, to control for time-invariant municipality characteristics and shocks common to all municipalities. Finally, ε_{it} is the error term clustered at the prefecture *i* level.

As already mentioned, the certification process was carried out mostly by state authorities, with teams working from the state capitals moving from one ejido to the next, possibly creating a spatial pattern (Castaneda Dower and Pfutze, 2015; 2020). Apart from distance, other important determinants seemed to be flat topography, and shared boundaries with other ejidos that had already been certified. Moreover, according to Castaneda Dower and Pfutze (2020) the rollout of PROCEDE was largely uncorrelated with a large set of municipal characteristics, supporting further the quasi-random nature of each implementation. On top of that, according to De Janvry et al. (2014) the PROCEDE program was orthogonal to prior trends in electoral support. Specifically, since the procedure was largely a top-down Federal programme, the authors argued that ejidatarios had a limited intervention in the program's rollout dynamics. Despite this, to alleviate endogeneity concerns of our estimates we also adopt a two-stage-least-square (2SLS) approach, using the first informational meeting as an instrument for the rollout of PROCEDE (see, Castaneda Dower and Pfutze, 2015).

4.4. Empirical Analysis

4.4.1. Main Results

Our baseline results are reported in Table 4.1 Columns (1) and (2) report results when *PRI municipio break* is the political variable of the estimated equation, whereas in columns (3) and (4) it is replaced with the variable *PRI state break* that captures state level democratic transition. Moreover, odd-numbered columns report results with municipal and year fixed-effects, whereas even-numbered columns add the predetermined municipal characteristics. As can be seen, the coefficient of the variable *PROCEDE* is negative and statistically significant in column (2) at the 10% level – though this result does not appear robust throughout the analysis. Therefore, despite

[34] In particular, following Dube et al. (2016) we use average marijuana and poppy eradication between 1990-1992 (i.e., before the implementation of PROCEDE and the start of our sample) as a proxy for drug crop suitability.

the implementation of PROCEDE, in municipalities without political change where implicit agreements are not disrupted inter-cartel violence does not seem to be affected. Moreover, in columns (1) and (2), the variable *PRI municipio break* has a negative and statistically significant effect on OCDs. This result indicates that political change in municipalities without the implementation of PROCEDE, where the clientelistic roots of PRI are probably weaker and informal networks of protection more difficult to establish and maintain attract less cartel activity and result in less cartel deaths. More importantly, consistent to expectations the interaction term in columns (1) and (2) is positive and statistically significant at the 1% level. Also, according to panel (a) of Figure 1 the effect of PROCEDE on municipalities that we observe a break in PRI hegemony (PRI mun. break=1), is positive and statistically significant. This is because political change after the implementation of PROCEDE signifies the strong local roots of the PRI that get disrupted along with the established agreements with drug cartels. This disruption makes cartels more vulnerable to expansion operations of rivals resulting in an increase of inter-cartel violence. According to the estimates in column (2), the interaction between *PROCEDE* and *PRI municipio* increases the probability of OCDs by around 1.9 percent. Given that the mean value of the dependent variable is 2.3 per cent this is a substantial effect. Results in columns (3) and (4) despite being non statistically significant for our interaction term, they still point at the same phenomenon consistent with Trejo and Ley (2018) who argue that the effect of political change at the state level is essential for informal networks of protection that when disrupted fuel inter-cartel violence. Particularly if we focus on the results for the political variable, despite not being our main focus in the analysis, that takes into account PRI breaks at the state level (=1) and is positive and statistically significant at the 10% and 5 % level for the aforementioned columns.

[Insert Table 4.1, here]

[Insert Figure .2, here]

In Table 4.A2 of the Appendix 4.C we present our first robustness checks of our findings. In particular, in columns (1) and (2) we re-run estimates of columns (2) and (4) of Table 1, replacing the *PROCEDE* variable to be measured as the log certified area per 10,000 inhabitants plus 1. Moreover, columns (3) and (4) follow a similar structure though this time we replace the dichotomous dependent variable with the log count of organized crime deaths per 10,000 inhabitants plus 1. Furthermore, in columns (5) and (6) we proceed to replace both variables, with those described above. As can be seen, in the majority of cases, particularly for PRI municipio break, the interaction term remains positive and statistically significant. Next, in columns (7) and (8) we conduct a falsification test using as dependent variable the log count of accidents and

suicides per 10,000 people plus 1. As can be seen, the interaction term turns negative for the break at the municipio level, and positive for the state level political change, and it is statistically insignificant for both cases. Overall, results so far are consistent to our expectations.

Additionally, we could state that our results do not contradict the general consensus on the topic of rural violence in Mexico. Particularly, if we analyse the findings from the research by Castañeda Dower and Pfutze (2020) we could conclude that they do not necessarily contradict the results of our study. Rather, they delve into a different aspect of the multifaceted reality of rural Mexico, providing a broader context for the phenomena we observed. Castañeda Dower and Pfutze focus on the relationship between land certification and the average levels of violent deaths, their main contention being that clarified land ownership reduces disputes and consequently, decreases overall violence. Our study, however, examines a specific subset of violence: organized crime deaths (OCDs), a phenomenon driven by cartel dynamics rather than rural disputes. As Castañeda Dower and Pfutze articulate, land certification could very well reduce general levels of violence by mitigating land disputes. Nevertheless, our work focuses on the intricate interplay between political transition, land certification, and organized crime violence. The disruption of longstanding political systems and clientelistic linkages - catalyzed by both land certification and political transitions - can destabilize the status quo and provoke an increase in cartel-related violence as rival factions seek to capitalize on this newfound vulnerability.

Furthermore, Castañeda Dower and Pfutze consider the influence of tenure security and local authorities' control over land distribution in shaping violence levels. On the other hand, our research underscores how the breakdown of established political and social structures, due to political transitions and land titling, leads to an increase in OCDs. This difference in focus can explain the apparent discrepancy between the two studies' conclusions. While the clarification of property rights can result in less overall violence as Castañeda Dower and Pfutze suggest, it can simultaneously heighten organized crime violence, a distinct type of conflict that our research investigates. Hence, it's essential to differentiate between general violent deaths and those related to organized crime when discussing land certification and political transition in rural Mexico.

4.4.2. Robustness checks

4.4.2.1. Correlation or causation?

One important concern for our estimates is that that land certification may lead to a loss of social control by local authorities, resulting in an increase in the cultivation of illicit crops that in turn can raise drug trade-related deaths. If this is the case, and PROCEDE rollout captures an increase

in illicit drug production, then our measure shows simply a correlation. To show that this is not the case, in Table 4.2 we augment Equation (4.1) with the interaction of our political variable and four different variables of illicit drug production – namely *Log marijuana eradication*, *Log poppy eradication*, *Log Marijuana seizures* and *Log poppy seizures*. As can be seen, in columns (1)-(4) we add one variable at the time, interacted also with the political variable *PRI municiapio break*, whereas the specification in column (5) includes all new variables and their interaction terms. Columns (6)-(10) follow a similar structure when the political variable is *PRI state break* instead. Particularly, in all cases for the municipality level break of power, our estimates for the interaction term are stable and statistically significant at the 1% level, disregarding this concern.

[Insert Table 4.2, here]

To alleviate further endogeneity concerns of the rollout of PROCEDE, our next exercise is to implement a two-stage-least-square (2SLS) strategy employing the first informational meeting by authorities as an instrument for certification (see, also, De Janvry et al., 2014; Castaneda Dower and Pfutze, 2015). In particular, our *Instrument* is the proportion of ejidos to the total number of ejidos in the municipality that had their first meeting prior to certification. To use it, it must satisfy both the exclusion restriction and the relevance requirements. Castaneda Dower and Pfutze (2015) provide a lengthy discussion to support the exclusion restriction requirement. They show that their instrument is not correlated with municipal socioeconomic or political characteristics. The most important correlates are the geographic characteristics of distance to the capital and the ruggedness of the terrain. In Table 4.A3 in the Appendix 4.C, we provide consistent evidence for the correlates of average speed of first informational meetings. As can be seen, our estimates return significant coefficients for ruggedness, highway presence, distance to air force base and indigenous population all of which are related to closeness or remoteness from the State city centre were the process is initiated. As such the instrument could be interpreted as a proxy measure of remoteness to the state capital. This can raise issues if remoteness can affect directly cartel deaths, and not only through the certification of ejidos. Someone could argue that remoteness can affect cartel deaths if in these areas there is weak state presence, higher drug crop suitability or other characteristics (e.g., development) that make them more susceptible to illicit drug production. Yet, our exclusion restriction is a reasonable one, particularly because we control for several state presence measures (e.g., distance to police station, homicide rate 90-92), maize and drug crop suitability and other important trends of municipal characteristics (e.g., access to electricity) that could both correlate with remoteness and the probability of having a

cartel death. Moreover, any correlation between remoteness and cartel deaths should result in very different estimates between Table 1 and Table 3 (that we present our IV estimates), which is not the case.

Columns (1)-(2) and (4)-(5) show results for the first stage regressions. The two pairs of columns show estimates on the certification variable *PROCEDE* and its interaction term with the political variable. The first two columns correspond to the model where *PRI municipio break* is the political variable, whereas in columns (4)-(5) the latter is replaced with *PRI state break*. Effectively what we have is two endogenous variables (PROCEDE and its interaction with the political variable) and two exogenous variables (Instrument and its interaction with the political variable). As can be seen, the instrument and its interaction term are highly significant and enter with the expected sign. In addition, the Kleibergen Paap F-statistic of excluded instrument is always very large. Therefore, our instrument satisfies also the relevance requirement. The IV estimates are reported in columns (3) and (6). In the case for the municipality break, the interaction term remains positive and statistically significant, and the coefficient for the state level break becomes negative but statistically non-significant; thus, these results do not differ substantially from those in Table 1. These results support the claim that the rollout of PROCEDE can be treated as quasi-random and OLS estimates are unbiased and efficient. As an additional indication, in columns (9)-(10) of Table A2 in the Appendix we add municipality time trends in the full OLS specifications of columns (2) and (4) of Table 1. Once more, the interaction terms are positive and statistically significant at the 1% level. More importantly, the coefficients with and without municipality time trends do not differ substantially indicating that our original results do not suffer from omitted variable bias.

[Insert Table 4.3, here]

4.4.2.2. Sample restrictions

The next important robustness check is to break the sample in two sub-periods. In particular, in columns (1) and (2) of Table 4.4 we re-run the specification of column (2) in Table 4.1 for the sub-periods 1995-1999 and 2000-2006. Columns (3) and (4) of Table 4.4 follow the same structure for the specification of column (4) in Table 4.1. The logic is to support our argument that we capture the effect of democratisation at the local level, rather than the effect of a national shock due to the election of PAN in 2000. As can be seen, although the magnitude of the interaction term increases in the second part of the sample - still the majority of interaction terms remain positive and statistically significant with the exception of the result in column (3) for the PRI state break.

[Insert Table 4.4, here]

Finally, in Table 5, we divide the sample into the three major areas of Mexico: north, centre, and south. In particular, columns (1)-(3) re-run the specification of column (2) in Table 1, whereas columns (4)-(6) the specification of column (4) in Table 1. This test allows to explore if our results are driven by the more violent municipalities in northern Mexico. According to the results, this is not the case. In particular, interaction terms for the democratic pluralism at the municipio level are positive, whereas the ones corresponding to the state level transition are non-statistically significant invalidating our concern that local democratic pluralism inflated violence only in the north of Mexico.

[Insert Table 4.5, here]

4.4.3. Cartel Activity

The empirical analysis so far added evidence on the collapse of informal protection networks between local authorities and cartels due to democratisation and the subsequent increase in intercartel deaths. This violence is inextricably linked to the geographic expansion of cartel operations, which fuelled a rise in confrontations between criminal syndicates. To this end, in the last step of our empirical analysis we replace the dependent variable *OCD* with the variables *Any cartel*, *Multiple cartels*, and *First cartel presence* that we obtain from Dube et al. (2016) whose primary source is Coscia and Rios (2012). The novel dataset constructed by Coscia and Rios (2012) tracks the presence of ten drug cartels at the municipality level within the Mexican territory. In particular, the authors employ a search algorithm that queries archived publications in Google News. This algorithm identifies the presence of a criminal organization in a municipality if the frequency of hits for a particular municipality–organization pair exceeds a threshold determined by the searchable material available for a given municipality–year. Using this data Dube et al. (2016) construct the three aforementioned variables. The variable *Any cartel* captures whether any cartel is present in the municipality; the variable *Multiple cartels* is an indicator for the operation of multiple cartels in that municipality; and the variable *First cartel presence* is an indicator for the first year in which any cartel is present in that municipality. Before estimating Equation (4.1) with these measures of cartel activity, it should be noted that we enrich the set of controls with the variables *Log marijuana eradication*, *Log poppy eradication*, *Log Marijuana seizures* and *Log poppy seizures*. The reason is that we want to capture cartel expansion cases, and not cartel presence linked to incidents of drug eradication and seizures.

Results are reported in Table 4.6. Columns (1) and (2) report estimates when the dependent variable is *Any cartel* for specifications that the political variables are *PRI municipio* break and *PRI state break*, respectively. Columns (3)-(4) and (5)-(6) follow a similar structure when the dependent variables are *Multiple cartels* and *First cartel presence*, respectively. As can be seen, the specification with the most relevant dependent variable to capture cartel expansion operations (i.e., *First cartel presence*) returns positive and statistically significant effects for the interaction terms in columns (5) and statistically non-significant if we only considering pluralism at the state level in column (6). Moreover, as shown in Figure 3 the effect of a municipal political change after the implementation of PROCEDE (panel e) increases the probability of cartel expansion operations. This effect is also observed when we have a transition at the state levels (panel f). Moreover, when we employ the 2SLS strategy (discussed above) in Table A4 in the Appendix, the same specification returns even stronger results, particularly for the municipio level political alternation; thus, hinting at its importance in the phenomenon analyse in this work. It should be noted that the effect of the interaction term in column (2) seems also strong throughout. This result indicates that the effect of a combined transition at state levels after the implementation of PROCEDE remains an important element that increases the probability of *Any cartel* presence. Overall, these results are consistent with our expectations. In particular, political transition in municipalities that PRI has strong roots disrupted implicit agreements between local authorities and cartels causing expansion operations from rivals and an increase in drug trade-related violence.

[Insert Table 4.6, here]

[Insert Figure 4.3, here]

4.5. Conclusions

After the dissolution of state protection rackets created during the 1940s and up to the 1980s, turf wars erupted within the Mexican territory involving the main drug trafficking organisations operating in the country. Especially relevant for the fall of informal networks of protection between criminal organisations and corrupted state officials was the gradual subnational democratisation in municipalities and states first, eventually reaching the national level with the victory of the main opposition party, PAN, in 2000. According to previous studies a large-scale land titling reform (PROCEDE) that secured property rights for the electorate breaking the clientelistic linkages between the latter and the PRI that dominated the political landscape for seven decades is of paramount importance for this development.

Taking into account the link between the rollout of PROCEDE and subnational democratisation, and the latter with the onset of the Mexican drug war during the 1990s we examine whether mayorship and gubernational turnovers from PRI after the implementation of PROCEDE lead to an increase of OCDs between 1995-2006. Consistent with expectations a political change at the municipality level after the rollout of PROCEDE is a significant determinant of OCDs.

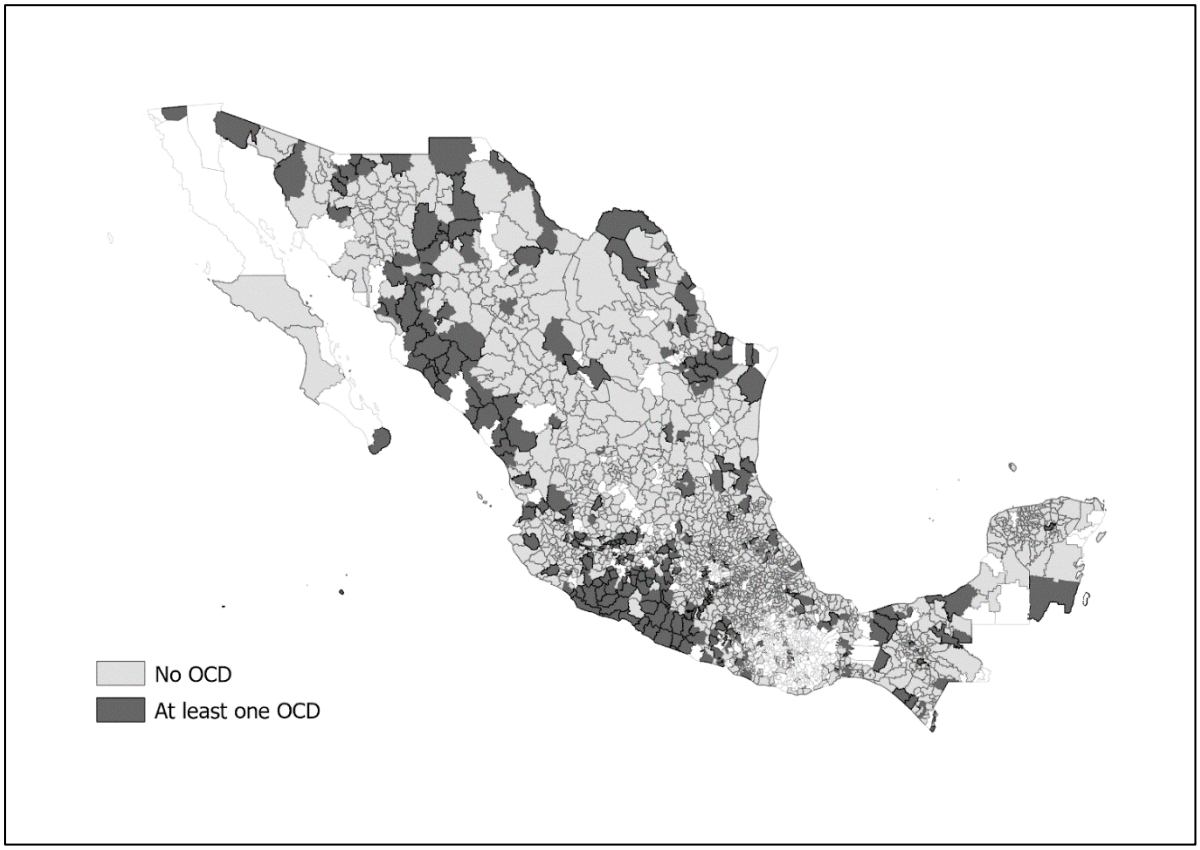
This is because the fall of clientelistic links due to the titling programme that signifies the strong local roots of the PRI, disrupts the equilibrium between corrupted local officials and drug cartels making the latter more vulnerable to expansion operations of rivals resulting in more OCDs. Moreover, we provide evidence that a municipal change and in a lesser manner a change at the gubernational level is detrimental for the stability at the local level, particularly for the level of OCDs. This is because state officials are higher in the ranking and cover wider geographical areas within the Mexican territory, thus a simultaneous change augment the extent of disruption of government protection towards cartels causing even higher instability and more OCDs. Finally, we provide evidence that the driving force of the increase of OCDs is local cartel expansion operations. Overall, although the Mexican drug war escalated dramatically since 2007, its origin is in the 1990s turf wars between rival cartels that spread around the Mexican territory due to the gradual subnational democratisation process.

Additionally, the findings of our research, which suggest an increase in organized crime deaths (OCDs) linked to political transitions and land certification, do not contradict but rather complement the results of other studies of related topics as Castañeda Dower and Pfutze's study. They delve into the effects of land certification on general violence, concluding that clarified land ownership diminishes disputes and consequently reduces violence levels. Our focus, however, lies in understanding the dynamics of cartel-related violence, which appears to increase with the disruption of longstanding political systems and clientelistic linkages, triggered by both political transitions and land certification. This seemingly paradoxical situation underlines the complexity of the Mexican social fabric, where certain policies might alleviate one form of conflict while intensifying another. Hence, the multifaceted nature of violence in rural Mexico, with distinctions between general violent deaths and those associated with organized crime, must be appreciated when discussing land certification and political transition effects.

Chapter Appendices

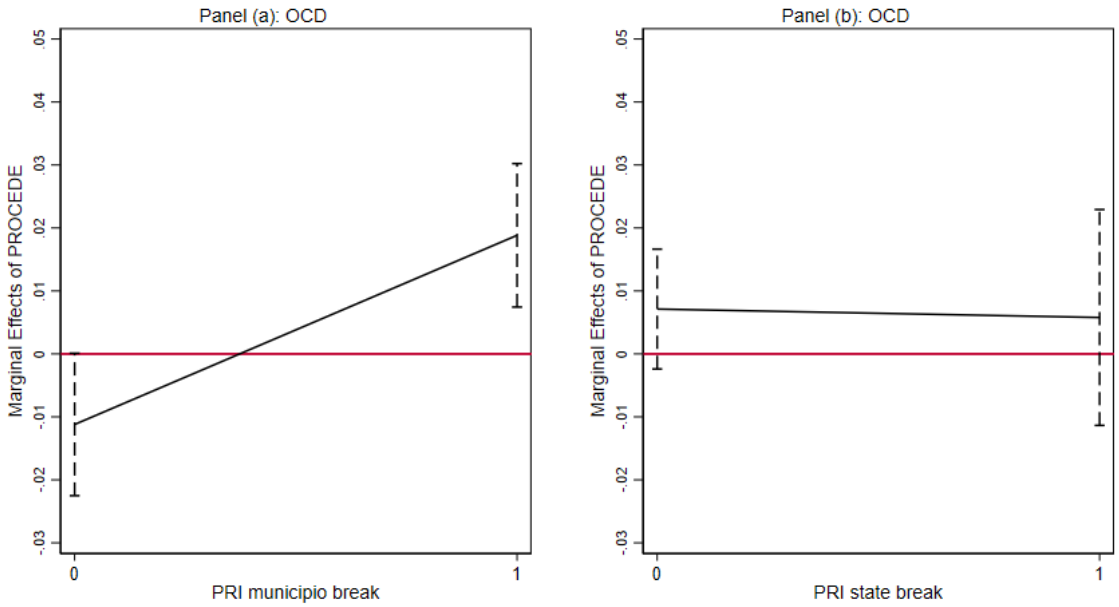
4.A Chapter 4 Figures

Figure 4.1 Organised Crime Deaths (OCD), 1995-2006



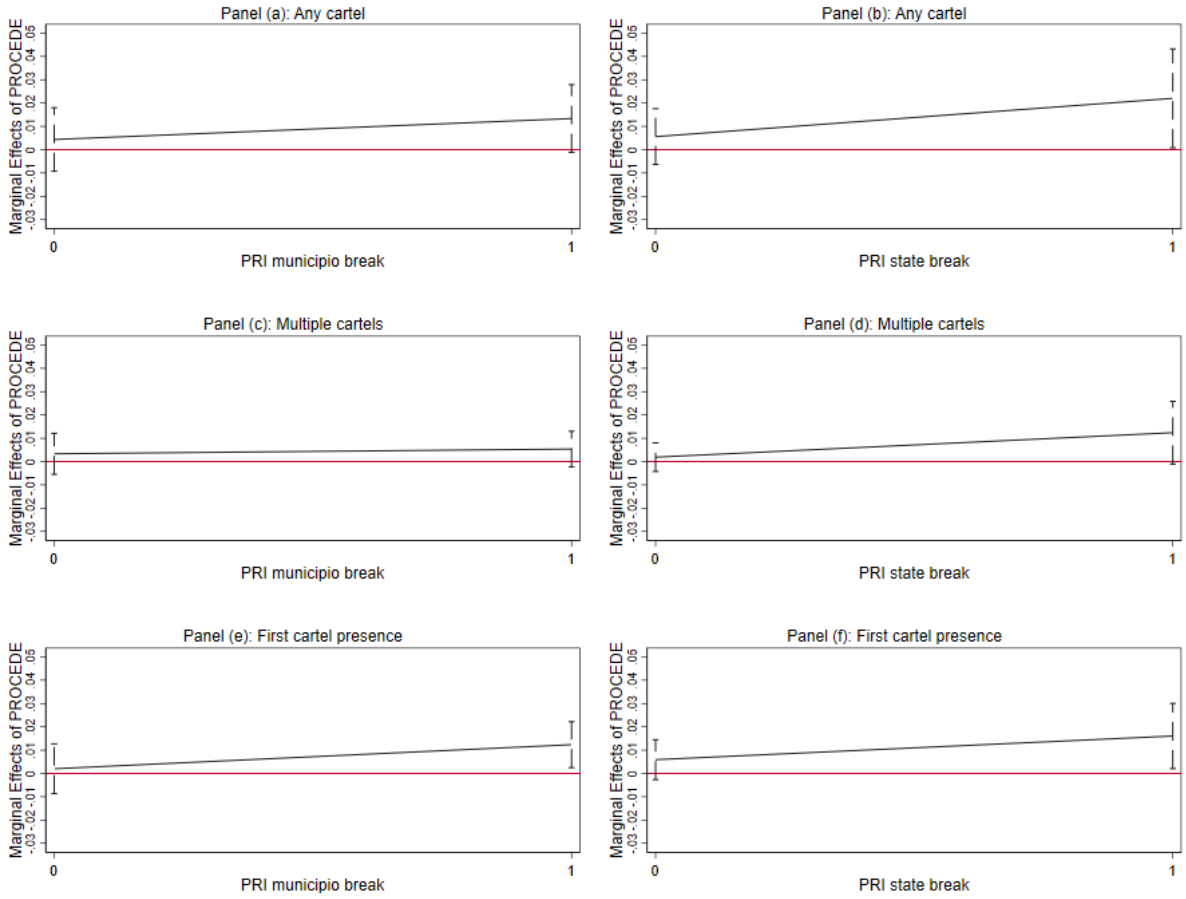
Notes: This map shows municipalities with at least one OCD between 1995-2006. White polygons indicate municipalities that do not appear in the sample. The data come from Trejo and Ley (2018).

Figure 4.2. Conditional Effect of PROCEDE on OCD



Notes. This graph shows the conditional effects of 'PROCEDE' with and without PRI break at the subnational level. The conditional effects in panels (a) and (b) are calculated based on the specifications of columns (2) and (4) of Table 1. All other covariates are held constant at their means. Dashed lines signify 95% confidence intervals. Red horizontal line marks marginal effect of 0.

Figure 4.3 Conditional Effect of PROCEDE on Cartel Activity



Notes. This graph shows the conditional effects of 'PROCEDE' with and without PRI break at the subnational level. The conditional effects in panels (a)-(f) are calculated based on the estimates of columns (1)-(6) of Table 6. All other covariates are held constant at their means. Dashed lines signify 95% confidence intervals. Red horizontal line marks marginal effect of 0.

4.B Chapter 4 Tables

Table 4.1. PROCEDE rollout, subnational democratization and Organised crime deaths (OCD)

	(1)	(2)	(3)	(4)
Political variable:	*PRI municipio break*		*PRI state break*	
PROCEDE	-0.009	-0.011*	0.006	0.007
	(0.006)	(0.006)	(0.005)	(0.005)
Political variable	-0.017***	-0.020***	0.013*	0.019**
	(0.006)	(0.006)	(0.007)	(0.008)
PROCEDE Political var.*	0.029***	0.030***	0.005	-0.001
	(0.007)	(0.007)	(0.008)	(0.009)
No of Observations	22512	22512	22512	22512
R Squared	0.019	0.060	0.019	0.060
Mun. and year FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: The table reports OLS estimates of equation (1). The dependent variable OCD is a dichotomous indicator of whether a municipality has at least 1 organized crime death. The variable PROCEDE is the proportion of certified area of ejidos to the total area of ejidos in a municipality. The variable PRI municipio break takes the value 1 after a win in local elections of a non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. All estimates include municipality and year fixed-effects. Controls include the interaction of year dummies and: (i) the Log population in 1990, (ii) the Young males' (15-29) ratio in 1990; (iii) the Adult females' ratio in 1990; (iv) the Access to electricity in 1990; (v) the Indigenous ratio in 1990; (vi) the Log Homicides in 1990-92; (vii) the Log distance to border; (viii) the Log distance to nearest police station; (ix) the Log distance to nearest military region; (x) the Log distance to nearest security air force base; (xi) the Maize suitability; (xii) the Log drug crop suitability. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 4.2. PROCEDE rollout, subnational democratization and OCD: controlling for illicit drug production

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PRI municipio break					*PRI state break*				
PROCEDE	-0.011*	-0.011*	-0.011*	-0.011*	-0.010*	0.007	0.008	0.007	0.007	0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Political variable	-0.017***	-0.019***	-0.020***	-0.020***	-0.017***	0.016**	0.021***	0.016**	0.018**	0.014**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
PROCEDE Political var.*	0.029***	0.029***	0.030***	0.030***	0.029***	-0.000	-0.003	-0.001	-0.001	-0.000
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)
Log Marijuana eradication	0.010				0.007	-0.004				-0.010
	(0.006)				(0.007)	(0.006)				(0.006)
Log Marijuana er.*Political variable	-0.016*				-0.015	0.013				0.021*
	(0.009)				(0.009)	(0.012)				(0.012)
Log poppy eradication		0.011			0.003		0.012			0.018**
		(0.009)			(0.010)		(0.009)			(0.009)
*Log poppy eradication*Political variable*		-0.008			0.006		-0.034**			-0.061***
		(0.013)			(0.015)		(0.014)			(0.019)
Log marijuana seizures			0.001		-0.001			-0.005		-0.005
			(0.004)		(0.003)			(0.003)		(0.003)
*Log marijuana seizures*Political variable*			-0.004		-0.001			0.010*		0.008*
			(0.004)		(0.004)			(0.005)		(0.005)
Log poppy seizures				0.084**	0.081**				0.038	0.037
				(0.036)	(0.037)				(0.027)	(0.026)
*Log poppy seizures*Political variable*				-0.073*	-0.067*				-0.002	0.012
				(0.038)	(0.040)				(0.063)	(0.060)
No of Observations	22512	22512	22512	22512	22512	22512	22512	22512	22512	22512
R Squared	0.060	0.060	0.060	0.061	0.062	0.060	0.060	0.061	0.061	0.063
Mun. and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table reports OLS estimates of equation (1), augmented with interactions between the 'Political variable' and measures of illicit drugs production. The dependent variable OCD is a dichotomous indicator of whether a municipality has at least 1 organised crime death. The variable PROCEDE is the proportion of certified area of ejidos to the total area of ejidos in a municipality. The variable PRI municipio break takes the value 1 after a win in local elections of a non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. Log marijuana and poppy eradication are measured as log of area eradicated per 10,000 hectares plus 1. Log Marijuana and poppy seizures are measured as the log of kilograms seized plus 1. All estimates include municipality and year fixed effects, and the same controls as in even-numbered columns of Table 1. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 4.3. PROCEDE rollout, subnational democratization and OCD: 2SLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Political variable:		*PRI municipio break*			*PRI state break*	
	First stage		2SLS	First stage		2SLS
Dependent variable:	PROCEDE	PROCEDE* Political var.		PROCEDE	PROCEDE* Political var.	
Instrument	0.292***	-0.209***		0.300***	-0.086***	
	(0.016)	(0.012)		(0.015)	(0.008)	
Instrument*Political var.	0.022	0.707***		0.014	0.754***	
	(0.019)	(0.019)		(0.021)	(0.030)	
Political variable	-0.006	0.095***	-0.024***	-0.013	0.120***	0.032***
	(0.016)	(0.017)	(0.009)	(0.019)	(0.027)	(0.010)
PROCEDE			-0.018			-0.008
			(0.018)			(0.018)
PROCEDE* Political var.			0.032**			-0.015
			(0.012)			(0.013)
No of Observations	19968	19968	19968	19968	19968	19968
R Squared			0.065			0.065
First stage F-stat			201.080			211.246
Mun. and year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) and (2) show first stage results for PROCEDE and its interaction term with the "Political variable", for the specification where the latter is PRI municipio break. Columns (4) and (5) follow a similar structure when the "Political variable" is PRI break. Columns (3) and (6) report 2SLS regressions of equation (2). The dependent variable OCD is a dichotomous indicator of whether a municipality has at least 1 organised crime death. The variable PROCEDE is the proportion of certified area of ejidos to the total area of ejidos in a municipality. The variable PRI municipio break takes the value 1 after a win in local elections of a non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. The variable Instrument is the proportion of ejidos to the total number of ejidos in the municipality that had had their first informational meeting prior to certification. All estimates include municipality and year fixed effects, and the same controls as in even-numbered columns of Table 1. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 4.4. PROCEDE rollout, subnational democratization and OCD: Before and after 2000.

	(1)	(2)	(3)	(4)
Period:	<2000	>=2000	<2000	>=2000
Political variable:	*PRI municipio break*		*PRI state break*	
PROCEDE	-0.002	-0.022*	0.009	0.002
	(0.007)	(0.012)	(0.006)	(0.009)
Political variable	-0.016*	-0.034***	-0.004	-0.009
	(0.009)	(0.010)	(0.017)	(0.015)
PROCEDE Political var.*	0.026**	0.050***	0.008	0.038**
	(0.011)	(0.011)	(0.019)	(0.016)
No of Observations	9380	13132	9380	13132
R Squared	0.031	0.074	0.030	0.074
Mun. and year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: Columns (1) and (3) report OLS estimates of equation (1) for the period 1995-1999, for the variables *PRI municipio break* and *PRI break*, respectively. Columns (2) and (4) follow a similar structure for the period 2000-2006. The dependent variable OCD is a dichotomous indicator of whether a municipality has at least 1 organised crime death. The variable PROCEDE is the proportion of certified area of ejidos to the total area of ejidos in a municipality. The variable PRI municipio break takes the value 1 after a win in local elections of a non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. All estimates include municipality and year fixed effects, and the same controls as in even-numbered columns of Table 1. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 4.5. PROCEDE rollout, subnational democratization and OCD: by region

	(1)	(2)	(3)	(4)	(5)	(6)
Region:	*North*	*Centre*	*South*	*North*	*Centre*	*South*
Political variable:	*PRI municipio break*			*PRI state break*		
PROCEDE	0.001	-0.003	-0.009	0.032*	0.018**	-0.005
	(0.018)	(0.008)	(0.007)	(0.019)	(0.007)	(0.006)
Political variable	-0.009	-0.028***	-0.003	-0.005	0.054***	0.003
	(0.019)	(0.009)	(0.007)	(0.019)	(0.014)	(0.011)
PROCEDE Political var.*	0.043*	0.027***	0.013*	-0.034	-0.010	0.019
	(0.024)	(0.009)	(0.008)	(0.022)	(0.015)	(0.013)
No of Observations	5184	9360	7968	5184	9360	7968
R Squared	0.117	0.087	0.049	0.117	0.091	0.050
Mun. and year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) and (4) report OLS estimates of equation (1) for municipalities in the North of Mexico, for the variables PRI municipio break and PRI break, respectively. Columns (2) and (4) and (3) and (6) follow a similar structure for municipalities on the Centre and the South of Mexico, respectively. The dependent variable OCD is a dichotomous indicator of whether a municipality has at least 1 organised crime death. The variable PROCEDE is the proportion of certified area of ejidos to the total area of ejidos in a municipality. The variable PRI municipio break takes the value 1 after a win in local elections of a non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. All estimates include municipality and year fixed effects, and the same controls as in even-numbered columns of Table 1. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 4.6. PROCEDE rollout, subnational democratization and cartel activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent var.:	Any cartel		Multiple cartels		First cartel presence	
Political variable:	PRI municipio break	PRI state break	PRI municipio break	PRI state break	PRI municipio break	PRI state break
PROCEDE	0.004	0.006	0.003	0.002	0.002	0.006
	(0.007)	(0.006)	(0.004)	(0.003)	(0.005)	(0.004)
Political variable	-0.018***	-0.005	-0.010***	-0.002	-0.016***	-0.001
	(0.006)	(0.008)	(0.003)	(0.005)	(0.004)	(0.005)
PROCEDE Political var.*	0.009	0.016*	0.002	0.011	0.010*	0.010
	(0.008)	(0.010)	(0.005)	(0.006)	(0.006)	(0.006)
No of Observations	22512	22512	22512	22512	21629	21629
R Squared	0.136	0.136	0.099	0.098	0.093	0.093
Mun. and year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Illicit drugs controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1), (3) and (5) report OLS estimates of equation (1) when the dependent variables are Any cartel, Multiple cartels and First cartel presence respectively, and the 'Political variable' is PRI municipio break. Columns (2), (4) and (6) follow a similar structure when the 'Political variable' is PRI break. Any cartel, Multiple cartels, and First cartel presence are dichotomous indicators of whether a municipality has any cartel, multiple cartels, or a cartel operating for the first time, respectively. The variable PROCEDE is the proportion of certified area of ejidos to the total area of ejidos in a municipality. The variable PRI municipio break takes the value 1 after a win in local elections of a non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. All estimates include municipality and year fixed effects, and the same controls as in even-numbered columns of Table 1. Additional illicit drugs controls include Log marijuana and poppy eradication and Log Marijuana and poppy seizures as defined in Table 2. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

4.C Chapter 4 Additional Tests

Table 4.A1. Definition of variables, data sources and descriptive statistics

Variable name	Description	Obs.	Mean	SD	Min	Max	Sources
OCD	Dummy variable that takes the value 1 if there is an organized crime death in the municipality, and 0 otherwise	22512	0.023	0.149	0.000	1.000	Trejo and Ley (2018)
Any cartel	Dummy variable that takes the value 1 if any cartel operates in the municipality, and 0 otherwise	22512	0.028	0.166	0.000	1.000	Dube et al. (2016)
Multiple cartels	Dummy variable that takes the value 1 if multiple cartels operate in the municipality, and 0 otherwise	22512	0.009	0.092	0.000	1.000	Dube et al. (2016)
First cartel presence	Dummy variable that takes the value 1 if a cartel operates for the first time in the municipality, and 0 otherwise	21629	0.013	0.114	0.000	1.000	Dube et al. (2016)
PRI municipio break	Dummy variable that takes the value 1 after the win of a non-PRI party in local elections, and zero otherwise	22512	0.612	0.487	0.000	1.000	Own calculations based on Trejo and Ley (2018)
PRI state break	Dummy variable that takes the value 1 after the win of a non-PRI party in state level elections, and zero otherwise	22512	0.289	0.453	0.000	1.000	Own calculations based on Trejo and Ley (2018)
PROCEDE	The proportion of certified ejido area to the total area of ejidos in the municipality	22512	0.617	0.374	0.000	1.000	Own calculations based on National Agrarian Registry
Instrument	The proportion of ejidos to the total number of ejidos in the municipality that had had their first informational meeting prior to certification	19968	0.748	0.317	0.000	1.000	Castaneda Dower and Pfutze (2015)
Log marijuana eradication	Log of marijuana area eradicated in the municipality per 10,000 hectares plus 1	22512	0.168	0.542	0.000	6.344	Dube et al. (2016)
Log poppy eradication	Log of poppy area eradicated in the municipality per 10,000 hectares plus 1	22512	0.070	0.399	0.000	6.962	Dube et al. (2016)
Log raw marijuana seizures	Log of marijuana kilograms seized in the municipality plus 1	22512	0.197	1.001	0.000	10.002	Dube et al. (2016)
Log opium gum seizures	Log of opium gums seized in the municipality plus 1	22512	0.008	0.126	0.000	4.813	Dube et al. (2016)
Log population 90	Log of population of the municipality in 1990	1876	9.443	1.078	5.932	12.461	National Institute of Statistics and Geography (INEGI)
Young males' ratio 90	The ratio of young males (15-29) to the total population of the municipality in 1990	1876	0.128	0.016	0.043	0.213	INEGI
Adult females' ratio 90	The ratio of adult females to the total population of the municipality in 1990	1876	0.258	0.023	0.188	0.364	INEGI
Access to electricity 90	The ratio of dwellings with electricity to the total number of dwellings in the municipality in 1990	1876	0.753	0.211	0.000	0.990	INEGI
Indigenous ratio 90	The ratio of indigenous population to the total population of the municipality in 1990	1876	0.142	0.250	0.000	0.871	INEGI
Log homicides 90-92	Log homicides of the municipality per 10,000 people plus 1 between 1990-1992	1876	1.023	0.936	0.000	4.523	INEGI
Log distance to border	Log distance to border	1876	5.952	0.679	1.931	6.727	Dube et al. (2016)
Log distance to nearest police station	Log distance to nearest police station	1876	3.249	0.737	0.185	5.326	Dube et al. (2016)
Log distance to nearest military region	Log distance to nearest military region	1876	3.644	0.683	0.691	5.230	Dube et al. (2016)
Log distance to nearest air force base	Log distance to nearest air force base	1876	4.331	0.681	0.561	5.505	Dube et al. (2016)
Maize suitability	Average agro-climatically attainable yield for maize (measured in kg DW/ha) for each municipality	1876	6.594	1.688	1.422	9.313	Dube et al. (2016)
Log drug crop suitability	Log of marijuana and poppy area eradicated in the municipality between 1990-1992 per 10,000 hectares plus 1	1876	0.136	0.387	0.000	3.759	Dube et al. (2016)

Table 4.A2. PROCEDE rollout, subnational democratization and Organised crime deaths (OCD): Alternative measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent var.:	OCD		Log OCD pc		Log OCD pc		Log suicides and accidents		OCD	
PROCEDE:	Log PROCEDE pc		PROCEDE		Log PROCEDE pc		PROCEDE		PROCEDE	
Political var.:	PRI municipio break	PRI state break	PRI municipio break	PRI state break	PRI municipio break	PRI state break	PRI municipio break	PRI state break	PRI municipio break	PRI state break
PROCEDE	-0.001	0.001	-0.005	0.009*	-0.000	0.001	0.048	0.028	-0.009	-0.002
	(0.001)	(0.001)	(0.006)	(0.005)	(0.002)	(0.001)	(0.033)	(0.027)	(0.007)	(0.006)
Political var.	-0.019***	0.014	-0.015**	0.020**	-0.013**	0.011	0.047*	-0.035	-0.009	-0.027**
	(0.005)	(0.009)	(0.006)	(0.008)	(0.005)	(0.010)	(0.026)	(0.032)	(0.007)	(0.012)
Interaction	0.005***	0.001	0.022***	-0.002	0.003**	0.002	-0.028	0.018	0.023***	0.035***
	(0.001)	(0.002)	(0.007)	(0.010)	(0.001)	(0.002)	(0.034)	(0.038)	(0.008)	(0.013)
No of Observations	22512	22512	22512	22512	22512	22512	22512	22512	22512	22512
R Squared	0.059	0.060	0.048	0.049	0.048	0.049	0.014	0.014	0.192	0.192
Mun. and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipio trends	No	No	No	No	No	No	No	No	Yes	Yes

Notes: The table reports OLS estimates of Equation (1). The dependent variable in columns (1) - (2) and (9)-(10) is a dichotomous indicator of whether a municipality has at least 1 organised crime death. The dependent in columns (3) - (6) is measured as the log count of organized crime deaths per 10,000 people plus 1. The dependent in columns (7) - (8) is measured as the log count of accidents and suicides per 10,000 people plus 1. The variable PROCEDE in columns (1) - (2) and (5) - (6) it is measured as log certified area per 10,000 people plus 1. The variable PROCEDE in columns (3) - (4) and (7) – (10) is the proportion of certified area of ejidos to the total area of ejidos. The variable *PRI municipio break* takes the value 1 after the win of non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. All estimates include municipality and year fixed-effects, and the following controls interacted with year dummies: (i) the Log population in 1990, (ii) the Young males' (15-29) ratio in 1990; (iii) the Adult females' ratio in 1990; (iv) the Access to electricity in 1990; (v) the Indigenous ratio in 1990; (vi) the Log Homicides in 1990-92; (vii) the Log distance to border; (viii) the Log distance to nearest police station; (ix) the Log distance to nearest military region; (x) the Log distance to nearest security air force base; (xi) the Maize suitability; (xii) the Log drug crop suitability. Columns (9) – (10) include municipality-specific time trends. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 4.A3. Regression of instrument on baseline variables

	(1)
Dependent var.	Average speed of having the first meeting by mun.
Log population 90	0.015
	(0.009)
Young males' ratio 90	-0.228
	(0.390)
Adult females' ratio 90	-0.186
	(0.327)
Access to electricity 90	0.046
	(0.044)
Access to sewage 90	0.037
	(0.046)
Access to toilet 90	-0.031
	(0.036)
Unemployment rate 90	-0.802
	(0.545)
Indigenous ratio 90	-0.144***
	(0.038)
Log homicides 90-92	-0.005
	(0.009)
Turnout 90-92	0.016
	(0.042)
Pan mayor 90-92	-0.024
	(0.021)
Log distance to border	-0.009
	(0.010)
Log distance to nearest police station	-0.004
	(0.010)
Log distance to nearest military region	-0.004
	(0.010)
Log distance to nearest air force base	0.033**
	(0.013)
Highway presence	0.023**
	(0.011)
Rugged	-0.000***
	(0.000)
Maize suitability	-0.004
	(0.004)
Log drug crop suitability	-0.013
	(0.016)
Log municipio area	0.005
	(0.007)
No of Observations	1651
R Squared	0.326

Notes: The dependent variable is the average time since the first informational meeting during 1993-2007. The estimate includes state fixed effects. Robust standard errors are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Table 4.A4: PROCEDE rollout, subnational democratization and cartel activity: 2SLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Any cartel		Multiple cartels		First cartel presence	
Political variable:	*PRI municipio break*	*PRI state break*	*PRI municipio break*	*PRI state break*	*PRI municipio break*	*PRI state break*
PROCEDE	-0.015	-0.011	-0.018*	-0.018*	-0.031**	-0.023
	(0.020)	(0.020)	(0.010)	(0.010)	(0.015)	(0.014)
Political variable	-0.025***	0.012	-0.012***	0.005	-0.027***	0.010
	(0.008)	(0.012)	(0.004)	(0.007)	(0.006)	(0.009)
Interaction	0.019	-0.005	0.004	0.001	0.028***	-0.003
	(0.012)	(0.016)	(0.007)	(0.009)	(0.008)	(0.012)
No of Observations	19968	19968	19968	19968	19113	19113
R Squared	0.136	0.136	0.097	0.096	0.096	0.095
First stage F-stat	200.900	211.002	200.900	211.002	195.494	203.852
Mun. and year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Illicit drugs controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The Table reports 2SLS regressions of equation (2). The dependent variables Any cartel, Multiple cartels, and First cartel presence are dichotomous indicators of whether a municipality has any cartel, multiple cartels, or a cartel operating for the first time, respectively. The variable PROCEDE is the proportion of certified area of ejidos to the total area of ejidos in the municipality. The variable PRI municipio break takes the value 1 after the win of non-PRI mayor, and zero otherwise. The variable PRI state break takes value 0 when there is no alteration in a gubernational office, and it takes the value 1 after an electoral loss of PRI in gubernatorial elections. The instrument used is the proportion of ejidos to the total number of ejidos in the municipality that had had their first informational meeting prior to certification. All estimates include municipality and year fixed effects, and the same controls as in even-numbered columns of Table 1. Additional illicit drugs controls include Log marijuana and poppy eradication and Log Marijuana and poppy seizures as defined in Table 2. Robust standard errors, clustered by municipality, are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5%, 1% level respectively.

Chapter 5 Conclusions

This thesis analyses three distinct scenarios that are motivated by three major political economy events in the recent past in Mexico, namely, the 1992 agricultural reform the led to the privatization of the ejido sector in Mexico that partially led to the PRI downfall, the relationship between the rollout of the land certification program (PROCEDE) in Mexico and the onset of the country's drug war in the 1990s, and the possible favouritism between the PRI regime and cartels that led to an increasing influence of cartel local operations on municipal fiscal policies and revenue generation in Mexico. By taking cues from these events it allows this thesis to contribute to the existing literature in the most meaningful way possible. The first empirical chapter examines the causes leading to the electoral collapse of the PRI regime, potentially linked to shifts in ejidatarios' preferences upon acquiring full property rights. Incorporating additional sources of information, such as the effects of the 1992 agricultural reform and strategic public and municipal investments, allows for a richer analysis and more meaningful insights into the underlying dynamics of this political shift. The following empirical chapter looks at the possible association and subsequent favouritism that could exist between the PRI regime and cartels operating in Municipalities across Mexico. By using local fiscal data, this chapter provides insights into how a possible narco-political favouritism could have existed particularly during the PRI regime. The subsequent chapter, chapter 4 analysed the increasing level of violence that seemed to follow the PRI regime collapse in the country, particularly after the rollout of the PROCEDE program. By examining the impact of this regime downfall in the levels of violence related to cartels, particularly regarding its implication in the possible end of impunity pacts between local governments and these criminal groups, we show results in line with overall theoretical expectations. This includes an analysis of the impact of the simultaneous rotation of different levels of government.

5.1. Summary of Findings

Chapter 2 presents analysis on the drivers of public and municipality investment, and a granting property titles program, PROCEDE, on the political outcomes of the PRI. The study found evidence that the PRI party in Mexico used increased investment in certain municipalities, particularly those with more ejidos (communal land holdings), as a tactic to gain support from impoverished peasants and maintain political influence in response to the 1992 agricultural reform enacted by the government. We also found a negative effect of the reform on the PRI's vote share. Particularly, the use of policy instruments in conjunction with the concept of an "investment class theory" helps to further understand the PRI's tactics for

maintaining voter support and political power. To test if this hypothesis was correct, we proposed an empirical design based on first difference estimations with state fixed effects and robust standard errors; this mechanism proved to be successful in capture the positive effect of the change in public or municipality investment on certification percentage change on the PRI vote share despite the negative impact of the investment class theory the ejidatarios seemed to be exposed. With that first result, we then tried to be sure about the validity of this outcome by the implementation of several robustness mechanisms. Those mechanisms helped to prove that the effect was not just different depending on the region and on the concentration level of ejidos, but also that our policy instruments affected the PRI's electoral outcomes, our dependent variable, exclusively and no other economic or societal variables. Particularly, the analysis of the PAN's vote share complements the original results. Despite the initial indication that ejido certification favoured the PAN party post the 1992 agricultural reform, a deeper examination suggests a more nuanced impact. When coupled with strategic public and municipal investments, this process may have also helped bolster PRI's electoral prospects by somewhat tempering the sway of the investor class theory. This reveals a complex interplay: the freedom of ejidatarios leading to a shift towards market-friendly PAN, countered by PRI's investment strategy and the certification process. Thus, the electoral landscape was not merely dictated by ejidatarios' liberation, but was shaped by an intricate balance of reform, investment, and certification.

In chapter 3, we explored the longstanding issue with drug cartels and their drug trafficking operations and their probable association with local politicians. This chapter has described several factors contributing to the dynamics of drug trafficking in the country, including political competition and partisan conflict. Particularly, our findings suggest that municipalities received more tagged transfers under the PRI, which may have contributed to an increase in public investment between 1991 and 2000. This collusion could also have provided criminal organizations with state protection and involved government officials in the drug trade. There is evidence that the PRI's power monopoly and centralized enforcement in Mexico regulated illegal markets via protection rackets. During the PRI regime, violence was relatively low due to patron-client relationships between drug traffickers, the police, and local elected officials. However, late in the 1990s, political competition and anti-corruption reforms weakened the PRI's grip, while changes in the cocaine trade and the behaviour of Mexican cartels hampered government-cartel coordination. Therefore, the observed behaviours between state officials and the cartel suggest narco-political favouritism. Specifically, local cartels may have cultivated

advantageous relationships with state administrators and influenced policy initiatives, such as the expansion of central transfers. Due to competition and cartel threats, drug trafficking organizations (DTOs) may have supported local politicians in exchange for favourable treatment and protection from rivals. This support could have been provided through campaign contributions, vote buying, or violence. Moreover, we also found that after 2001, when the PRI regime ended, tax revenues seemed to increase more substantially compared to the previous period. This could be related to the increase in cartel operations in municipalities regardless of any type of favouritism. Concretely, after the PRI regime ended in 2001, local tax revenues may have increased due to drug cartel growth and behaviour changes in drug trafficking dynamics.

The final empirical chapter, chapter 4, explores whether mayoral and gubernatorial turnover from the PRI party to other parties after the implementation of PROCEDE (a land titling program in Mexico) was linked to an increase in instances of organized crime violence (OCDs) between 1995-2006. The results showed that political change at the municipal level after the rollout of PROCEDE was a significant factor in the occurrence of OCDs. This is because the loss of clientelistic links, which were strong in the PRI and disrupted by the titling program, made drug cartels more vulnerable to expansion by rival cartels, leading to more instances of OCDs. Additionally, we found that when political change occurred at state levels, this effect is also detrimental as similarly as other studies; thus also leading to an increase on the level of OCDs, as state officials have more power and cover wider areas within Mexico, leading to more disruption of government protection for cartels and greater instability. The study also found that the main cause of the increase in OCDs was the expansion of local cartels. Overall, the study suggests that the origins of the Mexican drug war can be traced back to the 1990s, when turf wars between rival cartels spread across the country due to the democratization process at the subnational level.

5.2. Policy Implications, Limitations and Future Research

Since the relationship between politics and organized crime is complex and multifaceted, political regimes and institutions play a key role in shaping the distribution of state power and the policies adopted by states. As such, politics has a significant influence on the dynamics of organized crime, including the dominance of monopolistic or competitive criminal industries and the prospects for peace and violence in the criminal underworld (Schelling, 1971; Buchanan, 1973; Skaperdas, 2001). In the case of drug trafficking and cartel influence in Mexico, the collapse of the PRI party and the resulting political competition and polarization have been linked to the emergence and growth of cartels in the country. Thus,

one policy implication related to the growing influence of cartels in Mexico and the collapse of the PRI party is the need for effective anti-corruption measures and strengthened democratic institutions. The PRI's monopoly on power and centralized enforcement practices, which included protection rackets for illegal markets, contributed to the emergence and growth of cartels in the country (Trejo and Ley, 2020). The shift in trafficking behaviour at the end of the PRI regime and the resulting increase in violence may have been due in part to the weakening of the PRI's grip and the disruption of government-cartel coordination (Astorga and Shirk, 2010; Trejo and Ley, 2018). Particularly, in order to address the ongoing issue of drug trafficking and cartel influence in Mexico, it is essential to establish and enforce strong anti-corruption measures to prevent collusion between government officials and criminal organizations. This may include measures such as stricter campaign finance regulations and increased transparency in the allocation of public funds. Additionally, strengthening democratic institutions, such as free and fair elections and an independent judiciary, can help to reduce political polarization and competition, which may also contribute to the growth of cartels. By addressing corruption and bolstering democratic practices, policy makers can work to mitigate the influence of cartels and address the ongoing issue of drug trafficking in Mexico.

Specifically, for chapter 2, a possible extension the work could be based on expanding the sample until 2007 when the titling program ended for two reasons; First, to have the total change of the ejido surface that was certified due to more data available; Second, with that extra data we could be able to measure not just the effect of public investment on the PRI political outcomes but also on other related variables as economic development in a similar manner as in Rodrik and Wacziarg (2005), in where they relate the democratic transition of Mexico on the years of the end of the ejido to economic growth.

Regarding chapter 3, despite the fact that political change at the municipality level after the rollout of PROCEDE is a significant determinant of OCDs (organized crime dynamics), expanding this study over a longer period of time period would provide a more comprehensive understanding of the long-term impacts of political change on OCDs in Mexico. This long-term analysis could lead to the development of more effective policy interventions to address the issue of drug trafficking and political influence of cartels in the country. Additionally, further research is needed to identify the most effective strategies for reducing the negative impacts of these organizations on local communities, mainly violence levels. One potential enhancement to the study could be the incorporation of the

impact of additional shocks, such as the implementation of the North American Free Trade Agreement in 1992 in Mexico, on the system under examination. This could provide further insight into the effects of external influences on this complex phenomenon and could potentially offer an even more comprehensive understanding of cartel related violence and its intertwine with politics.

While our research in chapter 4 has contributed to the understanding of the impact of cartels on local fiscal resources in Mexico and the role of narco-political favouritism in the allocation of public resources, further research is needed to fully understand these dynamics and identify potential policy interventions that could mitigate the negative effects of cartels on local economies. While these findings provide insight into the relationship between cartels and local fiscal resources, more research is needed to fully understand the mechanisms through which these drug trade organizations influence legal economy dynamics and the long-term shocks of such influence on socio-economic outcomes at the municipality level.

In summary, this thesis contributes to the various relevant strands of literature on topics such as local fiscal dynamics, political transition in Mexico, and the socioeconomic effects of cartels at the municipality level. The research presented in this thesis builds upon and develops existing scholarly work on the political economy and crime literatures. While there are limitations to this research, several future avenues for further study have been identified. The implications of this research are important for policy makers and social scientists, given the motivation and framing of each chapter. Overall, this thesis contributes to a deeper understanding of the complex interplay between politics, economics, and crime, and the ways in which these factors shape the dynamics of cartels in Mexico.

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