Land property rights and international migration: Evidence from Mexico

Land Property Rights and International Migration: Evidence from Mexico

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Abstract

In this paper, I ask whether there is a relationship between land property rights and international migration. In order to identify the impact of property rights, I consider a country-wide land certification program that took place in Mexico in the 1990s. My identification strategy exploits the staggered implementation and the households' eligibility for the program. I find that the program increased the eligible households' likelihood of having one or more members abroad by 12 percent. In terms of the number of migrants, my coefficient estimates explain 26 percent of the 1994-1997 increase in migrants from ejido areas and 13-15 percent of the increase from all of Mexico. Consistent with our theoretical model, the impact is strongest for households without a land will. This implies that land inheritance issues drive at least part of the effect.

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Email address: michele.valsecchi@economics.gu.se. All errors are my own.

1 Introduction

From 1990 to 2005, the share of Mexicans in the United States increased from 5.2 percent to 10.2 percent (Hanson (2010)). During the same period, remittances from the US to Mexico rose from US$2.5 billion to US$21.7 billion, with an average of US$7.5 billion, or 59% of the net FDI (World Bank (2010)). Mexico is the main source of both legal and illegal immigration to the US. In 2004, 56 percent of the 10.3 million Mexicans in the US were there illegally (Passel (2005)). Hence, illegal immigration causes huge pressure on the US government to limit border crossing (Hanson and Spilimbergo (1999)), drives the political fortunes of US Governors (Hanson (2005)) and stands high on the agenda of every US presidential candidate. Understanding what drives this migration flow is critical for any assessment of future patterns and policy design (Hanson (2006)).

Although recent studies attribute a large share of this rise in migration to demographic factors (Hanson and McIntosh (2009), Hanson and McIntosh (2010)), the Mexican government implemented various policies in the 1990s that may have affected migration, and rigorous quantitative evidence of the effect of these policies on migration has been lacking (Hanson (2006)). I contribute to the literature by showing that changes in land property rights in the 1990s affected migration to the US. The research questions are: (1) Is there a relationship between land property rights and Mexico-US migration? (2) If there is, do better defined property rights slow down or speed up migration flows?

In order to identify the impact of property rights on migration behavior, I make use of the land certification program *Procede*, which was implemented throughout the 1990s and targeted all ejido land in the country. *Ejidos* are areas of land allocated in usufruct to groups of farmers, called *ejidatarios*, and cover about 60 percent of all agricultural land in the country (Velez (1995)). Procede provided households with certificates for their housing plot, their individual agricultural plots, and their right to use the common land. By providing certainty over land rights, the certificates may have led households

to reoptimize their labor supply in favor of off-farm activities, like migration. In order to account for potential omitted variable bias, I exploit program timing and households' eligibility for the program. I find that the program increased the eligible households' likelihood of having one or more members abroad by 12 percent. In terms of number of migrants, my coefficient estimates for eligible households explain 26 percent of the 1994-1997 increase in Mexican migrants from ejido areas and 13-15 percent of the increase from all of Mexico.

The paper also contributes to the literature on land property rights and titling programs, and to the literature on international migration. Concerning the latter, Hanson (2010) argues in his recent survey that it is very challenging to reconcile the level of global migrants (about 3 percent of the global population) with large and persistent wage differentials across countries. Notwithstanding the recent rise in global migration, the rate is not as high as would be expected if wage differentials were the main driver.[1] This is even more puzzling in the case of Mexico, where borders are porous and illegal migration is widespread. Hanson (2006) calculates that, at the existing wage rates (confirmed by Rosenzweig (2007)), it takes less than two months for a migrant with 5-8 years of education to recoup the costs of crossing the border. The present paper contributes to this literature by identifying another strong yet neglected cost of migration: tenure insecurity.

I also contribute to the literature on land titling programs. In the last decade, research has mainly aimed at estimating the impact on investments (see Pande and Udry (2006), Deininger and Feder (2009), and Galiani and Schargrodsky (2011) for excellent reviews), whereas "the relationship between land tenure and off-farm labor market participation is under-researched, especially in rural areas of developing coun-

[1] It could also be that cross-country wage differentials are lower than the average earning differences if migrants' self-selection is positive. This may not apply to Mexico, as Chiquiar and Hanson (2005) find that selection there is intermediate. Evidence is not conclusive, though; see Orrenius and Zavodny (2005), Mishra (2007), Ibarraran and Lubotsky (2007), Fernandez-Huertas (2010), Caponi (2006) and McKenzie and Rapoport (2010).

tries" (Deininger and Feder (2009):256). For urban areas, the evidence is mixed. Field (2007) finds a positive impact on labor supply outside the home among urban squatters in Peru, while Galiani and Schargrodsky (2010) find no impact among urban squatters in Buenos Aires. Whether urban property rights have an impact on labor supply outside the home may depend on whether the labor supply was constrained prior to the change in property rights (Galiani and Schargrodsky (2011)). For rural areas, Do and Iyer (2008) find a positive impact on off-farm labor supply among rural households in Vietnam, although it is ten times smaller than the impact identified by Field (2007).[2] To my knowledge, there is no evidence on the impact of land certification on migration, which is the natural extension of the study of non-farm labor participation. Because Mexican household members can now leave their land (and even rent it out) without fear of being expropriated or losing their inheritance, they may be able to migrate to seek higher-income work in urban areas or the US.

The major added value of the paper is the identification strategy. Property rights are typically endogenous to household behavior (Besley and Ghatak (2010)). In order to tackle the corresponding identification challenge, I take the following steps. First, I consider a land certification program that provides a neat source of discontinuity in de facto property rights between certified and non-certified communities. Second, I use survey data on the same households prior to the program to control for all unobserved time-invariant differences between program and non-program areas that may be correlated with migration behavior. Third, I control for time-varying differences between program and non-program areas, which may still be correlated with migration behavior, by using state-year (and even municipality-year) fixed effects and detailed information on border issues, migration networks, and involvement in markets and government programs.[3]

[2] Field (2007) finds an increase equal to 3.04 working hours outside the home per week per working household member, while Do and Iyer (2008) find an increase equal to 0.36, almost ten times smaller. In the latter paper, there is no descriptive statistic on labor supply before (and after) the program, so we cannot speculate on the extent to which the labor supply was constrained.

[3] This identification strategy is what distinguishes the present paper from Mullan, Grosjean, and

2 Context: Procede in Mexican ejidos[4]

Following the 1911 revolution, the Mexican government established the policy that groups of farmers could receive non-transferable land in usufruct, free of charge. The ejido is the agrarian institution that is endowed with such land and which is generated with this application (Quesnel (2003)). The ejidatarios are the farmers who applied for such land. They could decide whether to divide part or all of the land into individual plots. Each of them received one individual plot and access to the common land. Individual plots were used mainly for rainfed agriculture, while common land was used mainly for cattle and livestock grazing (Procuraduaria Agraria (2010)).

Throughout the decades, ejidos came to include an estimated 3.2 million ejidatarios in about 30,000 ejidos and to constitute 56 percent of the national land usable for agriculture (World Bank (1999)).[5] Ejidos became characterized by levels of capital endowment significantly lower than in the private sector (World Bank (2001)) and by extreme poverty (Velez (1995)).

The 1992 Agrarian Law grants ejidatarios full property rights to their urban plots, the rights to sell (exclusively to members of the same ejido) and rent out their individual plots, and the right to use the common land, but not to transfer it. The law confirms the use rights for all plot types, and introduces the transfer rights for urban and individual plots. In addition, it introduces the rights to use wage labor and to leave the individual plots fallow for more than two years. Because of the limits on the right to sell, it is virtually impossible to use land as collateral to obtain credit.[6]

Kontoleon (2011) and de la Rupelle, Quheng, Shi, and Vendryes (2009), who look at rural-urban migration in China, and de Braw and Mueller (2009), who look at internal migration in Ethiopia. In contrast to them, we use a land certification program to identify the causal impact of land property rights on migration, rather than self-reported tenure security or land transferability.

[4] See the working paper version Valsecchi (2010) for references to the Mexican legislation.

[5] The remaining land used for agriculture is private property and is not considered in this study.

[6] A plot can be used as collateral only with credit institutions that already have commercial relationships with the ejido, and, in case of default, the credit institutions can seize the plot only for the amount of time necessary to get the money (Art. 46). Hence, we do not expect certificates to have increased access to credit. Acquisition of full property rights (dominio pleno) requires an additional deliberation of

At the end of 1993, the government launched a massive certification program, called Procede. As part of the program, ejidatarios' rights over land were documented with certificates issued by the National Agrarian Registry (RAN).

Certificates for individual plots (certificado parcelario) included the name of the ejidatario, the size and position of the plot, and the list of bordering neighbors. The certificates replaced the old certificates (certificado de derechos agrarios), which included only the name, ejido affiliation, and manner of acquisition of the plot (Del Rey Poveda (2005):162,166). Certificates of access to common land reported the ejidatario's name and the proportion of the common land he/she had the right to use.

Procede aimed to provide certificates to all ejidatarios, i.e., they were all *eligible* for the program. Non-eligible landed households in the ejidos were households with no formal rights to land, either because they had no blood ties with the farmers in the ejido, or because they had blood ties but the household head did not inherit the land. This group came to possess land through occupation of empty plots or acquisition through black markets, and ended up constituting 37.2 percent of agrarian subjects (World Bank (2001):13-14). They did have the right to buy one urban plot (but not to trade it further), which made them eligible for a housing title, but did not give them rights to individual or common land, making them *non-eligible* for certificates.

Rather than simply imposing the program on communities, government officials visited and informed them. Adoption required the consent of a large majority of ejidatarios. The issuance of certificates was relatively successful. Procede resulted in the issuance of certificates to more than 3 million households (World Bank (2001)).

The Procede certification program constituted a *de facto* change in land property rights (as opposed to the *de jure* change made in the Agrarian Law), because, rather than providing rights, it improved ejidatarios' ability to take advantage of their formal property rights.

the ejido Assembly and an individual application of the ejidatario to the RAN (Art. 81-82). In practice, very few Assemblies seem to have done so. Only 6/248 ejidos in our sample have adopted dominio pleno.

3 Conceptual framework

How can we expect better land property rights to affect migration? The seminal paper by Besley (1995) and the recent survey by Besley and Ghatak (2010) provide a framework which, applied to this context, suggests that better property rights unambiguously increase investments via a lower fear of expropriation (by the state and by other households) and greater gains from trade.[7] International migration is a highly remunerative type of off-farm labor supply. A simple extension of Besley's framework to include off-farm labor supply predicts a decrease in off-farm labor supply if the investments stimulated by land tenure improvements are labor-intensive (e.g., manure, land clearing, and adoption of labor-intensive crops) and an increase if these investments are capital intensive (e.g., machinery, fertilizer, and cattle).[8]

In this paper, I formalize an additional mechanism recently suggested by Galiani and Schargrodsky (2010): the fear of expropriation from within the family.[9] Before the 1992 Agrarian Law, ejidatarios transmitted rights over land only through inheritance. The heir had to be unique, but the ejidatario could choose him/her by stating an order of preference. If he did not do so, the law gave priority to the wife/husband and then to the children, where the order among the latter was left unspecified. If the inheritance went to the children, the ejido Assembly intervened to determine the heir. When doing so, the Assembly took into account the ability and willingness of the potential heir(s) to take charge of the inheritance (Del Rey Poveda (2005):163,173).

This encouraged strategic behavior by the potential heirs (Del Rey Poveda (2005):182) and created an incentive against migration. Potential heirs signaled an ability to take charge of the land and a willingness to remain in the ejido; leaving was a clear signal of

[7] A third channel, collateralizability of land, does not seem to be at work in our context (section 2).

[8] This channel refers to migration as a self-funding strategy, which is supported by evidence of a positive impact of migration (or remittances) on agricultural technology (Mendola (2008)), household investments (Yang (2008)), and entrepeneurship (Woodruff and Zenteno (2007)). See also de Janvry, Gordillo, and Sadoulet (1997) for a description of the migration-subsistence strategy of Mexican farmers.

[9] "The lack of titles may also impede the division of wealth among family members, forcing claimants to live together to enjoy and retain usufructuary rights" (Galiani and Schargrodsky (2010):708).

weak attachment to the land (Del Rey Poveda (2005):170,184). This is consistent with anecdotal evidence from Western Mexico:

> The child who looks after the parents until their death develops certain rights to the property. This may sometimes lead to awkward situations among brothers and sisters who do not want one sibling to look after their parents too much and in this way create claims to the land. (...) Alternatively, a son who has migrated to the United States and declares that he does not intend to come back, may be replaced as heir by a son in the village. (Nuijten (2003):486).

The 1992 Agrarian Law maintains the same inheritance rule with one caveat: potential heirs have three months to make an agreement among themselves or the Agrarian Tribunal (rather than the ejido Assembly) will proceed to sell the land within the ejido and split the revenue among the children in equal shares (Del Rey Poveda (2005):163; Riveros Fragoso (2005):44).

There is strong evidence that resorting to the Agrarian Tribunal to settle disputes over land inheritance has been a feasible option. The Agrarian Tribunal dealt with more than 104,000 cases concerning land inheritance out of a total of 315,000 during the period 1992-2005 (Morales Jurado and Colin Salgado (2006):229). Land inheritance is by far the primary issue dealt with, in terms of number of cases. Even more interestingly, data from the Procuraduria Agraria show that the number of land inheritance law cases has increased dramatically in ejidos that implemented the program (Figure 1).

Thus, certification improves access to courts; potential heirs can now contest land inheritance through outright negotiation in the shadow of the Agrarian Tribunal and no longer have to be present in the ejido. In the Online Appendix (Section 8.1), I formalize the mechanism by using a two- period extension of the basic agricultural model (Singh, Squire, and Strauss (1986)).

4 Data and estimation method

4.1 Data

I consider the 1994 and 1997 ejido surveys.[10] The surveys were designed to be nationally representative of all ejidos (and comunidades) in Mexico and provide information on 1,286 panel households.[11]

The surveys provide detailed information on household members' demographic characteristics, past migration experiences, current migration experiences of household head's children living outside the house, use of land, equipment, and ejido characteristics.[12]

4.2 Migration to the United States

Mexicans started migrating to the US from rural areas following the construction of railroads in the early 20th century and the *Bracero* program from 1942 to 1964 (Hanson (2006)). de Janvry, Gordillo, and Sadoulet (1997) show that the variation in migration experience among ejidatarios' cohorts is consistent with them having been part of this migration flow. Out-migration is historically high in the northern and central regions. These regions also constitute the primary location of ejidos; my final sample of ejido households is located primarily in the Central (29.48 percent) and Northern (22.57) regions, followed by the Gulf (17.28), South Pacific (16.95) and North Pacific (13.71)

[10] The 1994 survey was carried out by the Mexican Ministry of Agrarian Reform (Segreteria de Reforma Agraria, SRA) in collaboration with the University of California, Berkeley. Ejidos were selected from each state except Chiapas, where conflict prevented fieldwork. Details can be found in de Janvry, Gordillo, and Sadoulet (1997). The 1997 survey was carried out by the Ministry of Agrarian Reform with the World Bank, following the same survey design as in 1994.

[11] The attrition rate was only 4.0%. See World Bank (1999): Annex 2 for details. The program started between 1993 and 1994, i.e., only a few months before the 1994 survey, which was conducted during the summer. We exclude 14 households that belong to ejidos with missing information regarding the program; 108 households that belong to ejidos that completed the program before the 1994 survey; 15 households that are private landowners; 110 households that have unclear status (to be specified later); and 113 households that belong to comunidades instead of ejidos. The final sample has 926 households in 221 ejidos.

[12] These data have been used by several other authors to study a variety of issues: ejido reforms (World Bank (1999), World Bank (2001), Munoz-Pina, De Janvry, and Sadoulet (2003), migration (Winters, de Janvry, and Sadoulet (2001) and Davis and Winters (2001)), off-farm activities (de Janvry and Sadoulet (2001)) and cash transfer programs (Sadoulet, Janvry, and Davis (2001)).

areas. The distribution of ejido households across Mexican states is positively but not perfectly correlated with the 1994 population distribution for all of Mexico (the state-level correlation is 0.44). In turn, state migration rates are positively correlated with the distribution of ejido households (0.30), but not with the population distribution (-0.02).[13]

In order to identify migrant households, I construct a binary indicator taking the value one if any household member who is currently living at home has been in the US within the previous three years, or if any child of the household head currently lives in the US. Migrant households amount to 15 percent in 1994 and 29 percent in 1997. The average number of migrants per household is 0.3 in 1994 and 0.72 in 1997. These migration rates are consistent with Winters, de Janvry, and Sadoulet (2001) for 1994 and with Davis and Winters (2001) for 1997. The increase in the number of migrants from 1994 to 1997 (0.420) corresponds to about 1,384,281 additional migrants (both temporary and permanent).[14] The U.S. Immigration and Naturalization Service (2003) provides some yearly estimates of the number of Mexicans who entered the US illegally during the period 1990-1999; the number of additional migrants for the period 1994-1997 is 1,873,000 illegal entrants. These estimates rely on assumptions of under-counting and should be used cautiously. According to Hanson (2006), the true flow could be 15 percent higher than the estimate reported by the INS, i.e., 2,153,950 entrants. During the same period, the number of legal Mexican migrants was 511,883 (U.S. Immigration and Naturalization Service (1999)). Hence, the total number of migrants is between 2,384,883 and 2,665,883. Based on these estimates, the 1994-1997 increase in the number of migrants from Mexican ejidos corresponds to 52-58 percent of the number of Mexicans

[13] Conteo de Poblacion y Vivienda (1995). Own calculations. Migration is defined as the share of the population that migrated to the United States within the previous five years.

[14] The number of additional migrants is obtained by multiplying the number of ejidos (26,796, according to World Bank 2001) by the average number of landed households per ejido (123) and the increase in the number of migrants per landed household (0.420). Using the estimates in Winters and Davis (2001), one obtains 875,184 additional migrants, perhaps because their method includes comunidades, which typically have low migration rates.

who entered the US. This is consistent with migration stemming primarily from rural areas and ejido households constituting a large fraction of the rural population.[15]

4.3 Econometric strategy

The conceptual framework discussed in Section 3 predicts that an increase in land property rights causes a decrease in on-farm labor supply and an increase in off-farm labor supply. The prediction is valid at both the individual and household level. In this section, I will test the prediction at the household level. Because the household surveys are rich in questions about household members' migration experiences, but not about their on-farm labor supply, I will focus on the former. The outcome of interest is household migration status (see Sub-section 4.2). As a robustness check, I will also report the results for the number and share of migrant members.

In order to identify the impact of the program on household migration behavior, I exploit the gradual introduction of the certification program. The 1997 ejido survey contains detailed information on the implementation of the program. Ejidos that completed the program before the 1997 survey are termed "program areas," whereas those that did not are termed "non-program areas." Households in non-program areas constitute my main control group. Ejidatarios in program areas benefit from the program, as they receive the certificate for their houses and their individual plots, as well as for access to common land.

Program timing may be far from random: government officials may have offered the program according to ease of entry; the decision to take up the program by the ejido Assembly may have suffered from collective action problems and from the resolution of internal land conflicts. Table 1 shows the explanations for the decision whether to implement the program, as reported by the ejido leader (*comisario ejidal*). As can be seen, the primary reasons to implement the program were tenure security (88.3%),

[15] According to de Janvry (1995) ejidos include 70 percent of all Mexican farmers.

followed by willingness to solve boundary issues (29.7%); the primary reason not to implement the program was lack of information (30.4%), tax avoidance (15.9%), and boundary issues (15.9%). Overall, these explanations are certainly interesting, yet the only surprising feature is the small role played by land transaction motives. I will make use of some of this information later in the analysis.

In Table 2, I compare some observable ejido characteristics across program and non-program areas prior to the program (Columns 1-3). Program areas have a higher percentage of parceled land relative to common land, fewer ejidatarios, a more equal distribution of parceled land, better infrastructure (access to paved roads, electricity, drinking water, existence of an assembly hall), and fewer boundary problems. This is consistent with World Bank (1999) and World Bank (2001).

Non-random program timing may be problematic if the determinants of program implementation are correlated with household migration behavior. In order to correct for this *potential* bias, I take the following steps. First, I exploit the panel dimension of the dataset and estimate a Difference in Difference (DD) specification. This step controls for all time invariant determinants of migration behavior that might be correlated with program implementation. Second, I address residual endogeneity concerns by controlling for a wide range of household characteristics suggested by the literature on migration. Third, I include various regional time fixed effects.

This estimation strategy is carried out for eligible and, separately, ineligible households. In order to identify eligible and ineligible households, I make use of pre-program (1994) data on possession of an ejido certificate.[16] Households with a pre-program ejido certificate are termed "eligible," whereas those without are termed "non-eligible." The definition is time-invariant.

The comparison of eligible household characteristics across program and non-program

[16] According to Estados Unidos Mexicanos (1971) (Art. 69) and to Del Rey Poveda (2005):166, ejidatarios' rights are acknowledged by certification (certificado de derechos agrarios). Indeed, these certificates constitute the basis for the delivery of the new certificates (Art. 4 Transitorios, Estados Unidos Mexicanos (1992)). See Online Appendix (Section 8.9) for further details.

areas *prior* to the program (Table 3, Columns 5-7) suggests little or no statistically significant difference. Community self-selection into the program with respect to migration behavior, if any, seems to be negative. With respect to household composition variables, the only difference seems to be in household migration assets, proxied by the number of siblings of the household head who are currently abroad (Winters, de Janvry, and Sadoulet (2001)). There are some slight differences in terms of equipment and cattle, and I will control for them. Households' pre-program tenure security is unobserved, but there are strong theoretical reasons to expect tenure security to be correlated with the intensity of land transactions (Besley (1995), Deininger and Feder (2009), and Besley and Ghatak (2010)). Table 3 shows that land transactions were relatively widespread prior to the program, and that their intensity does not differ across groups.[17] The comparison of ineligible households' characteristics across program and non-program areas (Columns 8-10) leads to very similar conclusions.[18]

My baseline specification is the following Linear Probability Model (LPM):

$$y_{sikt} = \alpha_k + \beta w_{it} + \gamma_{st} + \Gamma' Z_{ikt} + \varepsilon_{ikt},$$

where $y_{sikt} \in \{0, 1\}$ is the migration status at time t of household k in ejido i in state s, α_k indicates household fixed effects, $w_{it} \in \{0, 1\}$ takes value 1 in 1997 for ejidos that completed the program before the 1997 survey, γ_{st} indicates state-year fixed effects, Z_{ikt} is a vector of household level controls, and ε_{ikt} is the error term clustered at the ejido level.

Because households in early program areas (1994-1995) had more time to adjust their migration behavior than households in late program areas (1996-1997), I will re-estimate the previous specification using program timing, which takes the value 2 for

[17] This is consistent with case studies (Nuijten (2003)) suggesting that informal tenure security was relatively strong and supported widespread black markets. In fact, pre-1992 land transactions were illegal but widely accepted within ejidos (Yates (1981):181, and NACLA (1976):18, cited in Heath (1990):34).

[18] Table A1 (Online Appendix) confirms the comparability of the two groups across program and non-program areas with 1997 data.

early program areas and the value 1 for late program areas.[19]

Based on the previous descriptive statistics, as well as those comparing migrant to non-migrant households,[20] I include the following household-level controls (Z_{ik}) in the model: composition (age of the household head, number of adult members, fraction of females among adult members, average literacy, average schooling of adult members), migration assets (number of siblings of the household head who are living abroad), land assets (land used in 1994), machinery and work animals (binary indicators for tractor, any machinery, cattle, and work animals).[21]

The inclusion of state-year fixed effects absorbs possible differences in program implementation across Mexican states. Because the program was implemented and coordinated by the state offices of the Procuraduria Agraria (the government agency in charge of assisting the ejidos in the certification process), differences in state capacity might have affected the supply of the certification program.[22]

The coefficient of interest (β) is identified by the comparison of program and non-program areas within the same state. It corresponds to the impact of Procede on migration as long as the difference in migration behavior across program and non-program areas within the same state, due to factors other than the program and the included controls, is constant over time.[23] I relax this identification assumption by controlling

[19] In Table A2, we compare eligible and ineligible households across early and late program areas. Notwithstanding the limited sample size, households show remarkably few differences.

[20] Migrant households are bigger and are associated with a greater number of household head's siblings living abroad, with greater land assets, and with better dwelling characteristics. This is consistent with existing findings in the migration literature. On the other hand, migrant household heads are older and less educated (but equally literate). Adult members' schooling is similar across the two groups. This would be surprising (see Chiquiar and Hanson (2005)) if average education in ejidos (3-4 years of schooling) was not well below the national average.

[21] In line with the program evaluation literature (Duflo, Glennerster, and Kremer (2007), Lin (2013)), we substitute the 1997 values of control variables which might be affected by the program with their baseline value interacted with a 1997 indicator. We do this for the household migration and land assets, and for the animal and equipment indicators.

[22] Field (2007) includes city dummies in her cross-sectional analysis of urban titling in Peru to address similar concerns. Do and Iyer (2008) also argue that state capacity is likely to be the primary reason driving heterogeneity in the supply of land certificates in Vietnam. See the Online Appendix (Section 8.2) for a more detailed discussion.

[23] In an earlier version of the paper, we addressed all potential concerns of self-selection into the

for time-varying omitted variables potentially correlated with the program and with migration behavior after the presentation of the baseline results.

5 Results

5.1 Impact of the program on eligible and ineligible households

Table 4, Panel A, shows the coefficient estimates associated with the DD specification and eligible households. Without controlling for any time-invariant and time-varying characteristics, the coefficient estimate associated with eligible households in program areas is positive, large (0.109) and statistically significant. I then control for household characteristics (Column 2), ejido fixed effects (Column 3), and household fixed effects (Column 4); the coefficient remains positive, large (0.119-0.124) and precisely estimated. The result is robust to the use of alternative dependent variables, such as the number of migrants (Column 5) and the ratio of migrants to adult household members (Column 6).[24] The coefficient estimate associated with the timing variable (Columns 7-9) is positive and significant, and its magnitude (0.081) is consistent with the baseline estimates. In Section 6, I will investigate the sensitivity of this finding to various additional robustness tests.

Panel B shows the estimated impact of Procede on ineligible households. The coefficient estimates are generally negative, small and always statistically insignificant.[25]

Panels C through E abstract from the distinction between eligible and ineligible

program by using a DDD identification strategy comparing eligible to ineligible households. Results can be found in the Online Appendix (Section 8.3) and Valsecchi (2010). Because, ultimately, the DDD strategy is vulnerable to spillover effects of the program on ineligible households in program areas, we directly address endogeneity concerns with the current DD strategy. We thank an anonymous referee for this suggestion.

[24] Consistent with decreasing marginal returns to agriculture, each additional adult increases the likelihood of migration by 2.5 percent. Consistent with the cattle-migration strategy suggested by de Janvry, Gordillo, and Sadoulet (1997), cattle assets increase the likelihood of migration status by about 8 percent (not always precisely estimated). These results can be found in the working paper version.

[25] See Section 6.3 for further discussion of the effect of the program for ineligible households.

households and estimate the impact of the program on the entire sample. This will make it easier to compare the findings of this paper with future work using more aggregated data. First, I simply group together the sample of eligible and ineligible households used previously and re-estimate the baseline specification. Panel C shows that the impact of the program is positive, still relatively large (0.079 in the specification with household fixed effects and household controls), and precisely estimated. The estimate is robust across alternative specifications. Second, I include some of the households excluded from the analysis because I could not exactly determine their eligibility status prior to the program.[26] Specifically, I include households who report certified and uncertified ejidal plots, and communal land in individual exploitation, in the baseline survey. I continue to exclude households who reported privately owned plots, because the latter certainly belonged to areas outside the ejido and were not subject to the program. Panel D shows that the impact of the program is positive, large (0.069), and precisely estimated. Finally, I include even the remaining 40 households who reported ejido plots and privately owned plots in the baseline survey. Panel E shows that the impact of the program is still positive, but smaller (0.051) and imprecisely estimated. Note that the magnitude is economically significant even in this last estimation, and it might be that the effect would have been more precisely estimated with a larger sample size.

Next, I discuss the size of the baseline estimates for eligible households (Panel A). A coefficient estimate of 0.12 is very large. It constitutes an increase in migration rates of 75 percent relative to their 1994 average migration status (0.16) and 85.7 percent relative to their 1994-1997 time trend (0.14). Because eligible households in program areas are 49.7 percent of all eligible households, my coefficient estimate explains 42.6 percent of their overall 1994-1997 increase in migration. The land certification program appears to

[26] These are the 110 households with unclear status mentioned in Section 4, footnote 11. They are composed of: 14 households with certified ejidal plots and communal land in individual exploitation; 51 households with certified and uncertified ejidal plots; 5 households with a mix of the previous categories; 33 households with certified ejidal plots and privately owned plots; and 7 households with a mixe of the previous categories and privately owned plots. Details are in the Online Appendix (Section 8.9).

have had a profound impact on ejidatarios' migration behavior. In terms of number of migrants, my coefficient estimate (0.351) corresponds to 354,904 additional migrants.[27] As discussed in Sub-section 4.2, the number of migrants from Mexican ejidos during the period 1994-1997 equaled 1,384,281 people, while the total number of Mexican migrants ranged between 2,384,883 and 2,665,883 people. Hence, the coefficient estimates explain 25.6 percent of the increase in Mexico-US migration from the ejido sector and 13.3-14.9 percent of the entire Mexico-US migration.[28]

This magnitude can be explained in terms of the great degree of tenure insecurity in the absence of certification. However, it is also consistent with the coefficient capturing part of the legal changes introduced by the 1992 Agrarian Law, Estados Unidos Mexicanos (1992) (see Section 2). This would be the case if, for example, eligible households in non-program areas had not been aware of the legal changes prior to the certification program, or presumed that the new legal rights were conditional on certification. In this case, the impact of the program would capture not just the de facto change in property rights, but also the de jure one.

In the rest of the empirical analysis I will focus on eligible households only.

5.2 Impact of program certificates on eligible households

The baseline results in the previous section are estimates of the average impact of the program on eligible households' migration behavior, i.e., the Intent To Treat (ITT) effect of the program certificate, rather than estimates of the Average Treatment Effect (ATE) of the program certificate. The main reason for this is that not all eligible households

[27] This magnitude is the result of the following calculation: 26,796 (ejidos, according to World Bank (2001)) *97/187 (share of program areas) *298/467*114 (average number of eligible households in program areas) *0.351 (impact on the number of migrants).

[28] Computing the additional number of migrants based on the coefficient estimates for eligible households only (Panel A) implicitly assumes no effect of the program for ineligible households. This is consistent with the small and insignificant effect found in Panel B. Nonetheless, I can relax this assumption by using the coefficient estimates for all households in the baseline sample (Panel C: 0.198). In this case the additional number of migrants is 303,788. Hence, the coefficient explains 21.9 percent of the increase in Mexico-US migration from the ejido sector and 11.4-12.7 percent of the entire Mexico-US migration. I thank an anonymous referee for this suggestion.

in program areas received the program certificates: 79.6 percent are fully certified; 88.6 percent are fully or partially certified.[29] The ATE estimates might be recovered by using the program as an instrument for the possession of the program certificates. Following Heckman, Lalonde, and Smith (1999):1904, I divide the coefficient estimate by the share of eligible households in program areas receiving the certificates. A baseline estimate of 0.12 implies an IV estimate ranging from 0.135 to 0.151, depending on whether I consider partially certified households as fully certified (lower bound) or not certified (upper bound). The estimates correspond to the Local Average Treatment Effect (LATE), that is, the ATE of the program certificate for the eligible households that obtained the certificates because they were in program areas, and would not have obtained them had they been in non-program areas (compliers).

In order to interpret this estimate as the ATE of the certificates, I need to make an additional assumption, which is the absence of systematic differences between eligible households who got the certificates and eligible households (in program areas) who did not. In the Online Appendix (Section 8.4.2), I discuss the reasons supporting this assumption and provide additional details on the IV estimate.

5.3 Impact heterogeneity and the inheritance channel

Impact heterogeneity may be used to identify the channel(s) through which the property rights-migration relationship takes place. In Section 3, I suggested the land inheritance mechanism, i.e., uncertain property rights keep landless family members home, as they fear losing their land inheritance in case of departure.

In order to test this mechanism, I divide eligible households depending on whether the household head has written a will, and re-estimate the baseline specification for each sub-sample. The program should have a strong impact on households with no will, as it reduces the relatives' need to stay home to defend their informal property rights over the

[29] See Section 8.4.1 for the exact coding procedure used to determine these certification rates.

land inheritance (since the certificate allowed them to access the Agrarian Tribunal to solve any dispute). Yet, I expect the program to have little or no impact on households with a will, as the identity of the heir is known and there is less room for dispute. Any competing rationale (Section 3) would have difficulty explaining heterogeneity of the impact of land property rights across households with and without a will. Table 5 shows that, in support of the inheritance mechanism, the coefficient of interest is positive, large, and significant among households without a will (Column 3: 0.141), while it is substantially smaller and not precisely estimated among households with a will (Column 2: 0.076).[30]

It is important to recognize that such evidence is not conclusive. I do not know why some households have a will and some do not. Del Rey Poveda (2005:185-186) argues that household heads may avoid writing a will to reduce their children's willingness to migrate. This concern does not seem very problematic, as it may work as an attenuation bias. A more serious concern is whether the program led households to write a will. There is anecdotal evidence suggesting that, while implementing the program, officials suggested that households deposit a will (Del Rey Poveda (2005):179).[31] However, I do not find any substantial difference between the possession of a will[32] for eligible households in program areas (37 percent) relative to those in non-program areas (34 percent). Nonetheless, I know too little about the determinants of the decision to write a will (and my data do not allow for much more than what I do here), and hence I interpret the evidence in Table 5 as an interesting correlation rather than as conclusive evidence. I relegate the evidence on other channels to the Online Appendix (Section 8.5).

[30] It is also consistent with a slightly different rationale (included in the model in Section 3), i.e., rather than attenuating the competition among potential heirs, land property rights attenuate the fear of expropriation by other community members.

[31] If eligible household heads with low propensity to migrate had more opportunities to write a will in program areas than in non-program areas, and if they took advantage of this opportunity, then the coefficient estimate associated with households with a will (Column 2) would be downward biased, while the coefficient estimate associated with households without a will (Column 3) would be upward biased.

[32] The information about households' wills is only available for 1997.

6 Robustness checks

In this section, I present the main robustness checks. Additional results can be found in the Online Appendix (Section 8.7 and 8.8). First, I address potential endogeneity concerns about endogenous selection in the program. Second, I test whether the increase in migration following the program is a mere consequence of eligible households postponing migration in anticipation of the program. Third, I discuss the (absence of any) effect of the program for ineligible households.

6.1 Endogenous selection into the program

A DD identification strategy is biased when there are time-varying determinants that evolved differently for treatment and control areas. In order to test whether this affects the results for eligible households, I take the following steps. First, I control for various pre-program ejido level characteristics and municipality-year fixed effects. Second, I address two specific threats to the identification strategy: the devaluation of the Mexican peso, and the removal of agricultural subsidies associated with the entry of Mexico into the NAFTA agreements. Third, I consider ejido self-selection into the program with respect to boundary issues.

The descriptive statistics at the ejido level (Tables 2) showed that a number of ejido level characteristics differed across program and non-program areas. If these characteristics were correlated with households' migration behavior, then their inclusion as controls should affect my coefficient estimate of interest. Table 6, Column 1, shows the coefficient estimates associated with my baseline specification and eligible households. The coefficient of interest becomes slightly larger when I exclude the few observations with missing community characteristics (Column 2). I re-estimate this specification including a first set of additional controls: ejido area (in logarithms), number of ejidatarios, number of ejido members, whether the road to the ejido is paved, and binary indicators

for electricity, running water, a drainage system, and an assembly hall in the ejido. The impact of the program (Column 3) is virtually unaffected. The coefficient of interest is still about the same once I control for additional characteristics plagued by more missing values, such as whether the ejido has external boundary problems, or, separately, internal boundary problems (Column 4); whether the ejido is affiliated with an ejido union, or, separately, whether it is indigenous (Column 5); or the 1990 Marginality Index (Column 6).[33]

In order to address any residual concerns about endogeneity driven by differences across program and non-program areas in terms of unobserved characteristics, I replace state-year with municipality-year fixed effects. Municipality-year fixed effects may capture more nuanced differences in migration history, heterogeneity in agricultural activities, and soil quality. Column 7 shows that the R-squared increases from 0.228 to 0.418, while the direction and magnitude of the coefficient estimate of interest remain about the same.

The most remarkable events affecting the Mexican economy during the period under investigation are the entry into the NAFTA agreements (1994) and the currency crisis (1994-1995).

Between December 1994 and November 1995, the exchange rate between Mexican peso and US dollar changed from 5.3 to over 10 pesos per dollar. Hence, the value of remittances from the US doubled. In order to take advantage of this opportunity, households had to send a member to the US and the member had to find a job. Households with connections to destinations with better local job market conditions had better opportunities than others (Munshi (2003)).[34] This might be a concern if connections to destinations with promising local market conditions differed across program and non-program areas. The 1994 household survey includes information on the migration des-

[33] The Mexican government routinely computes this index to monitor poverty across the country. It is based on education and dwelling characteristics. See CONAPO (1990) for further information.

[34] See also McKenzie and Rapoport (2010) and references therein for the literature on migration networks.

tination of past and current migrants in the United States. Unsurprisingly, the first destinations are California and Texas, followed by other southern US states. Hence, I control for US state destination fixed effects at the household level (Column 8) and at the ejido level (Column 9).[35] The regression results show that the R-squared increases substantially, that I can always reject the null hypothesis that these controls are jointly insignificant, and that the coefficient of interest is nearly unaffected.

Next, I consider the removal of agricultural subsidies associated with the entry of Mexico into the NAFTA agreements (1994). de Janvry and Sadoulet (2001) and Sadoulet, Janvry, and Davis (2001) argue that the NAFTA agreements led to an increase in out-migration. This might bias my coefficient of interest if program and non-program areas somehow differed in their exposure to this negative shock. I control for proximity to agricultural markets by controlling for distance to the closest urban center and whether the ejido has a government store (called CONASUPO). In addition, households might have been affected differently depending whether they were net sellers (in which case, they were harmed by the removal of subsidies), net buyers (beneficiaries) or subsistence corn producers before the removal of corn subsidies took place (de Janvry, Sadoulet, and Benjamin (1995)). Hence, I control for the household excess corn production (relative to corn consumption) to control for household exposure to the changes in agricultural policies. Column 9 shows that the coefficient associated with the household corn production status is positive and precisely estimated, and that the coefficient of interest is nearly unaffected.

Fearing the potentially devastating effects of the removal of basic crop price supports, the government introduced two programs to support farmers' livelihoods: Procampo (1994) and Alianza para el Campo (1995). Procampo was a conditional cash transfer program to basic crop producers.[36] Alianza para el Campo instead provided support

[35] While household members can rely on both relatives and friends (or other community members), we expect family ties to be stronger than community ones. See also Winters, de Janvry, and Sadoulet (2001).

[36] The transfer was proportional to the area of land devoted to basic crop production (before the

for mechanization and advanced irrigation systems. The 1997 survey asks households whether they received any assistance from each of the two programs. Column 10 shows that controlling for household exposure to the two programs does not affect my coefficient of interest. Column 11 shows that including all NAFTA controls and municipality-year fixed effects (which should absorb even more potential differences in proximity to agricultural markets) leaves the coefficient of interest unaffected.

Finally, I consider the role of boundary issues. I know that the implementation of the program required the substantial resolution of boundary issues within eligible households, and between eligible and non-eligible households. I generate an indicator for ejidos that implemented (or failed to implement) the program because of boundary issues, as reported in Table 1. Table 7 shows that my coefficient of interest remains about the same if I control for this boundary issue indicator (in levels and interacted with the explanatory variable of interest, as shown in Panel A) or if I exclude ejidos with boundary issues (Panel B).

6.2 Do differences in migration behavior reflect anticipatory responses to the program?

One may wonder whether the certification process may have led eligible households to postpone their migration decision rather than having increased the incentive to send one or more household members abroad. For example, it could be that household members feared being left out of the certification process and therefore waited for the certificate to reach the household before deciding to migrate. It could also be that household members abroad returned home just before the program started to ensure that they would not lose future assets, and then went abroad again. If this were the case, I would be confounding a short-term behavioral response to the program with a structural change in

program started). In practice, it reached even farmers who did not produce corn or other basic crops. The program seems to have been effective because it reached more than 80 percent of ejido households (Davis (2000)) and it generated a multiplier effect (Sadoulet, Janvry, and Davis (2001)).

the households' migration strategy. In terms of tenure security, I would mistakenly take short-term tenure insecurity generated by the program itself for a permanent increase in tenure security.

The 1997 community questionnaire identifies non-program areas that have initiated but not completed the program (henceforth called *in-process* areas). Table 8 shows the results: the coefficient estimate associated with eligible households in in-process areas is positive, small, and statistically insignificant; the coefficient estimate associated with eligible households in program areas is generally consistent with the previous findings. Other tests reported in the Online Appendix (Section 8.8) confirm these results.

Overall, anticipation issues do not seem to explain the evidence gathered so far, although I cannot rule out the possibility that they did play a minor role.

6.3 Ineligible households

Table 4, Panel B, showed that the impact of Procede on ineligible households is generally negative, small and always statistically insignificant. This is consistent with their ineligibility status, but it is inconsistent with the high certification rates they report: 60 percent of ineligible households in program areas report Procede certificates on all their plots.[37] Given this certification rate, one might have expected to find a positive effect of Procede on these households, although perhaps not as large as for eligible ones, and not as precisely estimated.

There are some possible reasons for these results. I know that my group of ineligible households is likely composed of *posesionarios*, ejidatarios who failed to receive the pre-program certificates, and *ejidatarios-in-waiting*.[38]

First, I know that posesionarios, even when they received the program certificates,

[37] This certification rate can be explained with the fact that posesionarios receive the program certificates if the ejido Assembly recognizes their status. See Section 8.9.3 for more details on ineligible households' certification rates.

[38] Ejidatarios-in-waiting are ejidatarios entitled to an individual plot who did not receive any because of land scarcity.

were not entitled to the certificate of access to common lands (*certificado de derechos sobre uso de tierra comun*). The common land is important for cattle grazing, which is related to migration through the cattle-migration strategy (de Janvry, Gordillo, and Sadoulet (1997)). Second, I also know that posesionarios, even when they received the program certificates, were not entitled to leave their land in inheritance to the children (Suprema Corte de Justicia de la Nacion (2006)).[39] Even the Procuraduria Agraria suggested that their heirs in these cases could claim rights over the inheritance by positive prescription, i.e., by occupying the land in good faith for five years (or in bad faith for ten years).[40] Third, I know that posesionarios who received the program certificates did so upon formal recognition of their status by the ejido Assembly, and there might have been informal agreements to commit to work the land (rather than migrating) in return.[41] This is likely to apply even to ejidatarios who had failed to receive the pre-program certificates and to ejidatarios-in-waiting who occupied some land while waiting for an official plot. Fourth, posesionarios might have suffered from negative spillovers associated with the certification of eligible households, for example, tenure insecurity or increased involvement in the agricultural wage labor market. Fifth, it could be that ineligible households bought certified land during this period. While this would make them appear certified in 1997, it is not clear whether the acquisition of certified land would activate the same mechanisms as the certification on land already owned.

7 Conclusions

In this paper, I ask whether there is a relationship between land property rights and international migration. I identify the impact of land property rights by making use

[39] This is true even when posesionarios wrote a will.

[40] Conversation with officer of the Procuraduria Agraria.

[41] Indeed, the 1992 Agrarian Law specifies in several articles that ejido Assemblies should prioritize posesionarios who showed commitment to work the land and contributed to group activities aimed at improving the ejido.

of a country-wide certification program in Mexico's ejido sector. Specifically, I exploit the gradual introduction of the program, variation in households' eligibility status, and detailed information on potential misleading factors.

I find that the program increased the eligible households' likelihood of having one or more members abroad by 12 percent. The result is robust to the use of alternative specifications, and holds qualitatively for alternative dependent variables. In terms of number of migrants, my coefficient estimates explain 26 percent of the 1994-1997 increase in Mexican migrants from ejido areas and 13-15 percent of the increase from all of Mexico.

I also find some evidence that the impact of the program occurred through the land inheritance channel, initially suggested by Galiani and Schargrodsky (2010). The land inheritance channel implies that household members refrain from migrating because they worry about losing their land inheritance. Better land property rights attenuate this problem, thus acting as substitutes for a well-defined land inheritance rule. Consistent with this mechanism, the impact on migration is strongest in eligible households where the landowner has not provided a will.

Evidence of a relationship between land property rights and international migration is also interesting for understanding migration in areas other than Mexico and the US. Notwithstanding its recent increase, the level of global migration is rather low (3% of the world population). This is at odds with high cross-country wage differentials and the relatively low cost of illegally crossing the borders of many countries. My analysis suggests that weak land property rights constitute a (typically unobserved) migration cost. This finding may help reconcile the puzzle.

Although the results are specific to Mexico, whose proximity to the US makes it the country with the largest stock of emigrants in the world, it would not be surprising to find similar effects for other countries as well. In 2009, the World Bank allocated about US$1.5 billion to 46 Land Administration Projects all over the world (Deininger and Bell (2010)). Many of the countries receiving these grants have emigrant-to-population

ratios greater than Mexico (Azerbaijan, Bosnia and Herzegovina, the Kyrgyz Republic, Macedonia, Nicaragua, Tajikistan and Ukraine).[42] It would be interesting to investigate whether the studied relationship holds for these countries as well.

[42]See World Bank (2011). All countries mentioned have emigrant-to-population ratios above 10 percent. The Philippines, which is also implementing a Land Administration Project, has a ratio just below 10 percent.

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TABLE 1

PANEL A: REASONS TO IMPLEMENT THE PROGRAM

Sample	Program areas (N=111)	Non-program areas, in process (N=41)
	mean	mean
Tenure security	0.883	0.756
Solve border issues	0.297	0.293
Obey the law	0.153	0.146
Access credit	0.108	0.098
Rent and sell the land	0.108	0.024
Access to Procampo	0.018	0.098
Invest in the land	0.018	0,000
Other	0,000	0.024

PANEL B: REASONS NOT TO IMPLEMENT THE PROGRAM

Sample	Non program areas, program not even started (N=69)
	mean
Lack of information	0.304
Avoid taxes	0.159
Border issues	0.159
Avoid conflicts between ejidatarios and non-ejidatarios	0.087
They did not summon us	0.029
Lack of documents	0.043
Avoid land transactions	0.014
No interest in selling and buying land	0,000
Other	0,000

Note: Data from the 1997 community-level ejido survey. Ejidos that had completed, or started to implement, Procede were asked the reasons for their decision to implement. Ejidos that had not started to implement the program were asked about the reason for this.

TABLE 2
DESCRIPTIVE STATISTICS, COMMUNITY-LEVEL

	1994					1997					
	Obs	Program mean (1)	No Program mean (2)	Diff t-stat (3)		Obs	Program mean (4)	No Program mean (5)	Diff t-stat (6)		Diff-in-Diff t-stat (7)	
Log ejido area (ha)	218	6.85	7.14	(-1.775)	*	221	7.00	7.16	(-1.101)		(1.746)	*
% urban area wrt ejido area (ha)	218	3.53	3.41	(0.143)		221	2.80	2.28	(1.037)		(0.043)	
% parcelled land wrt agr land (ha)	217	70.84	58.21	(2.834)	***	219	73.02	59.80	(2.744)	***	(0.148)	
Number of ejidatarios [1]	218	87.01	112.74	(-2.190)	**	221	104.46	108.65	(-0.320)		(2.423)	**
Number of posesionarios[1]						220	9.67	24.87	(-2.489)	**	N/A	
Number of avecindados[1]	175	73.55	62.91	(0.640)		216	53.92	45.67	(0.620)		N/A	
Ratio avecindados/ejidatario households	175	0.85	0.67	(0.977)		216	0.64	0.50	(0.801)		N/A	
Average parcelled land per ejidatario (ha)	217	13.12	11.90	(0.511)		221	14.69	12.04	(1.012)		(0.583)	
Inequality land[2]	203	6.03	9.85	(-1.969)	*	212	9.33	10.10	(-0.351)		(1.140)	
Common land per ejidatario (ha)	217	9.84	8.64	(0.428)		219	9.43	10.56	(-0.386)		(-1.049)	
Indigenous ejido	214	0.16	0.11	(0.942)		221	0.31	0.25	(1.010)		N/A	
Membership to ejido union	214	0.32	0.41	(-1.420)		221	0.25	0.28	(-0.495)		(0.876)	
Distance from closest urban centre (km)						220	23.93	27.59	(-1.002)		N/A	
Number of urban centres within a hour						221	1.72	1.39	(1.880)	*	N/A	
At least one irrigation facility						221	0.42	0.31	(1.768)	*	N/A	
At least one storing facility						221	0.15	0.19	(-0.741)		N/A	
Access to paved road	218	0.35	0.22	(2.114)	**	215	0.70	0.58	(1.826)	*	(-0.099)	
% dwellings with electricity	218	79.79	71.31	(1.681)	*	221	82.32	80.05	(0.487)		(-1.419)	
% dwellings with drinking water	218	62.21	49.06	(2.155)	**	220	68.13	54.57	(2.288)	**	(-0.010)	
% dwellings with drenage	215	15.19	13.22	(0.444)		221	14.06	9.41	(1.216)		(0.776)	
Public phone	218	0.55	0.49	(0.946)		221	0.61	0.53	(1.280)		(0.270)	
Street lightning	218	0.69	0.63	(0.856)		218	0.73	0.72	(0.166)		(-0.750)	
Auditorium/assembly hall	218	0.61	0.44	(2.606)	***	219	0.64	0.38	(3.967)	***	(1.245)	
External boundary problems[3]	216	0.24	0.59	(-5.588)	***	219	0.12	0.47	(-6.135)	***	N/A	
Internal boundary problem[3]						219	0.14	0.18	(-0.949)		N/A	
Boundary problem in communal land[3]	195	0.14	0.40	(-4.231)	***	218	0.06	0.09	(-0.755)		N/A	
Squatting common land[3]						218	0.12	0.30	(-3.391)	***	N/A	
Kindergarden[3]						220	0.80	0.85	(-0.880)		N/A	
Primary school[3]	218	0.96	0.95	(0.339)		220	0.95	0.96	(-0.339)		N/A	
Secondary school[3]						220	0.44	0.49	(-0.809)		N/A	
At least one social program	218	0.57	0.46	(1.629)		219	0.54	0.54	(0.052)		N/A	
At least one environmental problem						221	0.42	0.50	(-1.140)		N/A	
Observations		111	110				111	110				

* significant at 10%; ** significant at 5%; *** significant at 1%. Column (3) reports the significance of the difference (1)-(2). Column (6) reports the significance level of the difference (4)-(5). Definition of "Program" in the text.

[1] *Ejidatarios* are households with ejido membership and formal right to land; *avecindados* are households with ejido membership but no formal right to land, although part of them own land illegally; *posesionarios* are households with no ejido membership and no formal right to land, although most of them

[2] Land inequality measured as the ratio between the biggest and the smallest plot for entitled individuals.

[3] The definition of some variables differs across the two surveys: indigenous ejido (1997: "Are there people who consider themselves indigenous?"; 1994:"Does the majority belong to an ethnic group?"); external boundary problems (1997: "Are there boundary problems with other ejidos or other bordering private properties?"; 1994: "Are there law problems concerning the ejido borders?"); internal boundary problems (1997:"Are there boundary problems between ejidatarios about the division of parcelled land?"; 1994: none); boundary problems related to communal land (1997: "Are there border problems between ejidatarios about the assignment of communal land?"; 1994:"Are there problems concerning the borders of communal land?"); squatting on communal land (1997: "Is there communal land squatted by families without documentation?"; 1994: none); schools (1997:"Does the community have a kindergarden/ primary/secondary school?"; 1994:"Does the community have a school?"); at least one social program (1997: takes value 1 if there is one DICONSA or LICONSA store, or a support program for dough and tortillas; 1994: takes value 1 if there is a CONASUPO store in the village).

TABLE 3
PRE-PROGRAM DESCRIPTIVE STATISTICS, HOUSEHOLD LEVEL

	1994 All	1997 All	1994 Eligible	1997 Eligible	1994 Eligible			1994 Non-Eligible			
					Program	No Program	Diff	Program	No Program	Diff	Diff-diff
	mean (1)	mean (2)	mean (3)	mean (4)	mean (5)	mean (6)	t-stat (7)	mean (8)	mean (9)	t-stat (10)	t-stat (11)
A: Migration variables											
At least one household member currently living at home has been abroad (last 3 years)	0.04	0.08	0.04	0.09	0.04	0.04	(0.446)	0.02	0.04	(-1.118)	(1.196)
At least one household head's child is currently abroad	0.12	0.23	0.12	0.24	0.10	0.15	(-1.439)	0.09	0.12	(-0.527)	(-0.442)
Migrant household (last 3 years)	0.15	0.29	0.16	0.30	0.14	0.17	(-0.784)	0.11	0.15	(-0.629)	(0.045)
Number of migrants abroad (last 3 years)	0.30	0.72	0.33	0.74	0.27	0.38	(-1.048)	0.20	0.31	(-0.945)	(0.013)
B: Household composition											
Household head's age	49.85	52.88	50.95	53.80	51.06	50.83	(0.156)	48.04	47.59	(0.255)	(-0.111)
Household head's sex	0.97	0.97	0.97	0.97	0.97	0.97	(-0.030)	0.95	0.99	(-1.695) *	(1.397)
Household head's schooling	3.27	3.20	3.23	3.20	3.34	3.12	(0.784)	3.45	3.24	(0.564)	(0.047)
Average schooling of adult members	4.68	4.66	4.73	4.67	4.79	4.67	(0.409)	4.48	4.71	(-0.663)	(0.868)
Number of adult members	5.92	6.71	6.15	6.83	6.14	6.16	(-0.061)	5.31	5.67	(-0.831)	(0.638)
Share females among adult members	0.46	0.37	0.46	0.38	0.47	0.46	(0.464)	0.46	0.43	(0.949)	(-0.614)
Number of household head's siblings abroad	0.14	0.38	0.16	0.38	0.11	0.20	(-1.468)	0.09	0.12	(-0.576)	(-0.891)
C: Household assets											
1992 land assets (owned)	11.89	11.93	12.28	12.32	12.20	12.35	(-0.089)	11.00	11.37	(-0.177)	(0.102)
Hired labor	0.33	0.43	0.35	0.45	0.38	0.32	(0.963)	0.31	0.26	(0.688)	(0.088)
Tractor	0.47	0.46	0.51	0.48	0.56	0.45	(1.750) *	0.49	0.31	(2.092) **	(-0.722)
Pickup	0.32	0.21	0.33	0.21	0.37	0.30	(1.340)	0.27	0.31	(-0.549)	(1.332)
Machinery	0.59	0.59	0.60	0.61	0.66	0.55	(1.931) *	0.61	0.50	(1.419)	(0.023)
Cattle	0.47	0.45	0.49	0.47	0.44	0.54	(-1.835) *	0.39	0.50	(-1.445)	(0.074)
Horses	0.23	0.30	0.24	0.31	0.25	0.24	(0.380)	0.23	0.20	(0.614)	(-0.266)
D: Land transactions											
At least one land rental transaction (last 2 years)	0.10	0.18	0.11	0.21	0.12	0.10	(0.877)	0.12	0.07	(1.458)	(-0.434)
At least one plot rented in (last 2 years)	0.06	0.09	0.06	0.10	0.06	0.06	(0.211)	0.08	0.05	(0.980)	(-0.671)
At least one plot rented out (last 2 years)	0.04	0.09	0.05	0.11	0.06	0.04	(0.928)	0.04	0.02	(1.093)	(0.052)
Observations	926	926	600	600	298	302		169	157		

* significant at 10%; ** significant at 5%; *** significant at 1%. Columns (1,3) and (2,4) report sample means from the 1994 and 1997 surveys respectively. Column (7) reports the t-statistic of the difference (5)-(6). Column (10) reports the t-statistic of the difference (8)-(9). Column (11) reports the t-statistic of the difference [(5)-(6)]-[(8)-(9)]. Standard errors associated with the diff-in-mean tests have been clustered at the ejido level. Definition of "Program," and household in the text. Land assets measured in National Rainfed Equivalent (NRE) hectares. For a description of the procedure, see de Janvry et al. (1997). Hired labor is a binary indicator taking value 1 if the household paid any non-family member for at least one day during any of the two previous harvesting seasons.

TABLE 4
BASELINE RESULTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Migrant household				Number of migrants	Share migrants	Migrant household	Number of migrants	Share migrants
Model	LPM	LPM	LPM	LPM	OLS	OLS	LPM	OLS	OLS
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PANEL A: ELIGIBLE HOUSEHOLDS									
PROGRAM × 1997	0.109**	0.119**	0.124**	0.122***	0.351***	0.059***			
	(0.046)	(0.046)	(0.050)	(0.045)	(0.123)	(0.017)			
TIMING × 1997							0.081***	0.218***	0.037***
							(0.027)	(0.075)	(0.010)
Observations	1,200	1,198	1,198	1,198	1,198	1,198	1,118	1,118	1,118
Number of households	600	600	600	600	600	600	560	560	560
Number of ejidos	187	187	187	187	187	187	176	176	176
R-squared	0.259	0.330	0.514	0.210	0.234	0.180	0.216	0.241	0.187
PANEL B: INELIGIBLE HOUSEHOLDS									
PROGRAM × 1997	-0.022	-0.033	-0.021	-0.024	-0.147	-0.024			
	(0.056)	(0.058)	(0.064)	(0.053)	(0.140)	(0.017)			
TIMING × 1997							-0.029	-0.107	-0.014
							(0.040)	(0.098)	(0.012)
Observations	652	651	651	651	651	651	626	626	626
Number of households	326	326	326	326	326	326	313	313	313
Number of ejidos	141	141	141	141	141	141	135	135	135
R-squared	0.225	0.322	0.600	0.319	0.348	0.305	0.330	0.364	0.320
PANEL C: ALL HOUSEHOLDS									
PROGRAM × 1997	0.072**	0.075**	0.081**	0.079**	0.198**	0.030**			
	(0.035)	(0.036)	(0.038)	(0.035)	(0.091)	(0.012)			
TIMING × 1997							0.051**	0.133**	0.020***
							(0.022)	(0.057)	(0.008)
Observations	1,852	1,849	1,849	1,849	1,849	1,849	1,744	1,744	1,744
Number of households	926	926	926	926	926	926	873	873	873
Number of ejidos	221	221	221	221	221	221	209	209	209
R-squared	0.220	0.291	0.492	0.206	0.226	0.165	0.211	0.236	0.175
PANEL D: ALL HOUSEHOLDS, INCLUDING THOSE WITH MIXED STATUS BUT NO PRIVATELY OWNED PLOTS									
PROGRAM × 1997	0.065*	0.063*	0.072**	0.069**	0.174*	0.026**			
	(0.033)	(0.035)	(0.036)	(0.034)	(0.089)	(0.012)			
TIMING × 1997							0.045**	0.113**	0.018**
							(0.022)	(0.055)	(0.008)
Observations	1,992	1,989	1,989	1,989	1,989	1,989	1,876	1,876	1,876
Number of households	996	996	996	996	996	996	939	939	939
Number of ejidos	221	221	221	221	221	221	209	209	209
R-squared	0.224	0.294	0.483	0.204	0.215	0.155	0.210	0.227	0.168
PANEL E: ALL HOUSEHOLDS, INCLUDING THOSE WITH MIXED STATUS									
PROGRAM × 1997	0.051	0.045	0.056	0.051	0.131	0.018			
	(0.033)	(0.034)	(0.036)	(0.034)	(0.091)	(0.012)			
TIMING × 1997							0.039*	0.092	0.015*
							(0.021)	(0.057)	(0.008)
Observations	2,072	2,069	2,069	2,069	2,069	2,069	1,944	1,944	1,944
Number of households	1,036	1,036	1,036	1,036	1,036	1,036	973	973	973
Number of ejidos	222	222	222	222	222	222	210	210	210
R-squared	0.231	0.298	0.481	0.202	0.212	0.149	0.217	0.227	0.167
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Details of the various specifications at the bottom of the table are valid for all panels. The specifications in Columns (1), (2), and (3) include state fixed effects. The specification in Columns (1) and (2) also include the program indicator. Definitions of "Migrant household," "Program," "Timing," "Eligible," and household in the text. Households with mixed status have both certified and uncertified ejido land and/or privately owned plots. See details in the text (Sections 5.1 and 8.9). Household controls include: average literacy adult household members; average schooling adult household members; household size; land assets; household head's age; number of household head's siblings abroad; share of females among adult members; tractor; machinery; cattle; work animal.

TABLE 5
IMPACT HETEROGENEITY (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)
Sample	All	Will	No will
Model	LPM	LPM	LPM
	coef/se	coef/se	coef/se
PROGRAM × 1997	0.122***	0.076	0.141***
	(0.045)	(0.096)	(0.047)
Observations	1,198	431	761
Number of households	600	216	381
Number of ejidos	187	117	152
R-squared	0.210	0.278	0.239
F-test	37.528	34.875	13.395
Prob > F	0.000	0.000	0.000
State-Year FE	yes	yes	yes
Household controls	yes	yes	yes
Unit FE	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Sample: all households (Column 1); households with a will (Column 2); households without a will (Column 3). Econometric methodology: Linear Probability Model (LPM). Definitions of "Migrant household," "Program," and household in the text. See Table 4 for the list of household controls.

TABLE 6
ROBUSTNESS CHECKS (ELIGIBLE HOUSEHOLDS)

Model	(1) Baseline coef/se	(2) Baseline, restricted coef/se	(3) Ejido controls (1) coef/se	(4) Ejido controls (2) coef/se	(5) Ejido controls (3) coef/se	(6) Margínality Index coef/se	(7) Ejido controls, municipality FE coef/se	(8) US state FE, hh level coef/se	(9) US state FE, ejido level coef/se	(10) Household corn prod status coef/se	(11) Government programs coef/se	(12) NAFTA controls coef/se
PROGRAM × 1997	0.122***	0.129***	0.133***	0.118**	0.117*	0.133***	0.129***	0.144***	0.117**	0.126***	0.135***	0.111**
	(0.045)	(0.045)	(0.049)	(0.057)	(0.062)	(0.049)	(0.042)	(0.049)	(0.051)	(0.048)	(0.050)	(0.047)
Log ejido area (ha)			0.039**	0.051**	0.051*	0.038**	0.078***	0.041**	0.019	0.033*	0.037*	0.071**
			(0.018)	(0.026)	(0.027)	(0.018)	(0.029)	(0.018)	(0.019)	(0.019)	(0.019)	(0.028)
Number of ejidatarios			-0.001**	-0.001***	-0.001**	-0.001**	-0.001	-0.001**	-0.001	-0.001**	-0.001**	-0.001
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of ejido members			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Access to paved road			0.007	0.004	0.008	0.007	-0.078	-0.012	0.007	0.013	0.010	-0.079
			(0.052)	(0.056)	(0.058)	(0.052)	(0.063)	(0.053)	(0.055)	(0.051)	(0.051)	(0.067)
% dwellings with electricity			-0.000	-0.000	-0.000	-0.000	0.002**	-0.000	-0.001	-0.000	-0.001	0.002**
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
% dwellings with drinking water			-0.000	-0.000	-0.000	0.000	0.001	0.000	-0.000	-0.000	-0.000	0.000
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
% dwellings with drainage			0.001	0.001	0.001	0.001	-0.000	0.000	0.001	0.001	0.001	-0.001
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Auditorium/assembly hall			-0.090**	-0.084*	-0.084	-0.090**	-0.048	-0.098**	-0.022	-0.098**	-0.095**	-0.062
			(0.044)	(0.048)	(0.051)	(0.044)	(0.065)	(0.044)	(0.049)	(0.042)	(0.046)	(0.065)
Parcelled land relative to agricultural land (ha)				0.001	0.001							
				(0.001)	(0.001)							
External boundary problems in village				-0.013	-0.020							
				(0.058)	(0.060)							
Internal boundary problems in village				0.033	0.033							
				(0.066)	(0.067)							
Indigenous ejido					0.001							
					(0.069)							
Membership in ejido union					-0.030							
					(0.047)							
Maginality index (1990)						0.005						
						(0.039)						
Distance to closest urban centre										-0.000		-0.001
										(0.001)		(0.001)
CONASUPO store in the village										0.041		0.015
										(0.042)		(0.054)
Household corn production status										0.002**		0.002**
										(0.001)		(0.001)
Procampo											0.030	0.003
											(0.050)	(0.054)
Alianza para el Campo											-0.100*	-0.083
											(0.060)	(0.072)
Observations	1,198	1,176	1,176	1,112	1,090	1,176	1,176	1,176	1,176	1,166	1,168	1,158
Number of households	600	589	589	557	546	589	589	589	589	584	585	580
Number of ejidos	187	183	183	177	172	183	183	183	183	182	183	182
R-squared	0.210	0.214	0.228	0.245	0.246	0.228	0.418	0.271	0.284	0.237	0.234	0.430
F-test								11.156	10.177			
Prob > F								0.000	0.000			
Time FE	state	state	state	state	state	state	municipality	state	state	state	state	municipality
Household controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Restriction	-	yes	-	-	-	-	-	-	-	-	-	-
Unit FE	household	household	household	household	household	household	household	household	household	household	household	household

*** p<0.01, ** p<0.05, * p<0.1. Standard errors (in brackets) clustered at the ejido level. Dependent variable is "Migrant household" in all specifications. The ejido level controls are generated using exclusively 1994 data, then they are interacted with the 1997 indicators. The definition of the ejido indicators are: indigenous ejido ("Does the majority belong to an ethnic group?"); external boundary problems ("Are there legal problems concerning the ejido boundaries?"); boundary problems related to communal land ("Are there problems concerning the boundaries of communal land?"). The F-test reported at the bottom of the table corresponds to the test for the joint significance of the US state destination fixed effects. Definitions of "Migrant household," "Program," and household in the text.

TABLE 7
EXCLUDE EJIDOS WITH BOUNDARY ISSUES (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Migrant household				Number of migrants	Share migrants	Migrant household	Number of migrants	Share migrants
Model	LPM coef/se	LPM coef/se	LPM coef/se	LPM coef/se	OLS coef/se	OLS coef/se	LPM coef/se	OLS coef/se	OLS coef/se
PANEL A: CONTROL FOR EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × 1997	0.074	0.086	0.127**	0.131**	0.410***	0.069***			
	(0.056)	(0.054)	(0.058)	(0.053)	(0.147)	(0.019)			
TIMING × 1997							0.085***	0.246***	0.041***
							(0.030)	(0.084)	(0.011)
BOUNDARY ISSUES ×	0.116	0.132	-0.022	-0.031	-0.208	-0.034	-0.032	-0.188	-0.030
PROGRAM × 1997	(0.096)	(0.089)	(0.092)	(0.084)	(0.248)	(0.032)	(0.079)	(0.239)	(0.030)
BOUNDARY ISSUES ×	-0.169**	-0.156**	-0.041	-0.039	-0.075	-0.005	-0.049	-0.108	-0.010
1997	(0.069)	(0.067)	(0.067)	(0.060)	(0.167)	(0.019)	(0.057)	(0.157)	(0.018)
Observations	1,200	1,198	1,198	1,198	1,198	1,198	1,118	1,118	1,118
Number of households	600	600	600	600	600	600	560	560	560
Number of ejidos	187	187	187	187	187	187	176	176	176
R-squared	0.266	0.343	0.520	0.213	0.239	0.185	0.219	0.247	0.192
PANEL B: EXCLUDE EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × 1997	0.111*	0.134**	0.128**	0.130**	0.473***	0.073***			
	(0.059)	(0.060)	(0.064)	(0.057)	(0.152)	(0.021)			
TIMING × 1997							0.098***	0.311***	0.049***
							(0.034)	(0.085)	(0.012)
Observations	850	849	849	849	849	849	783	783	783
Number of households	425	425	425	425	425	425	392	392	392
Number of ejidos	131	131	131	131	131	131	122	122	122
R-squared	0.285	0.366	0.524	0.258	0.274	0.227	0.276	0.297	0.249
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level.
Econometric model: Linear Probability Model (LPM) or OLS. Sample: all households (Panel A); exclude ejidos which report having implemented the program because of boundary issues (46 ejidos) or having failed to implement the program because of boundary issues and/or disputes between eligible and non-eligible households (16 ejidos; Panel B). Details of the various specifications at the bottom of the table are valid for both panels. The specifications in Columns (1), (2), and (3) also include state fixed effects. The specification in Columns (1) and (2) include also the program indicator. Definitions of "Migrant household," "Program," "Timing," and household in the text. See Table 4 for the list of household controls.

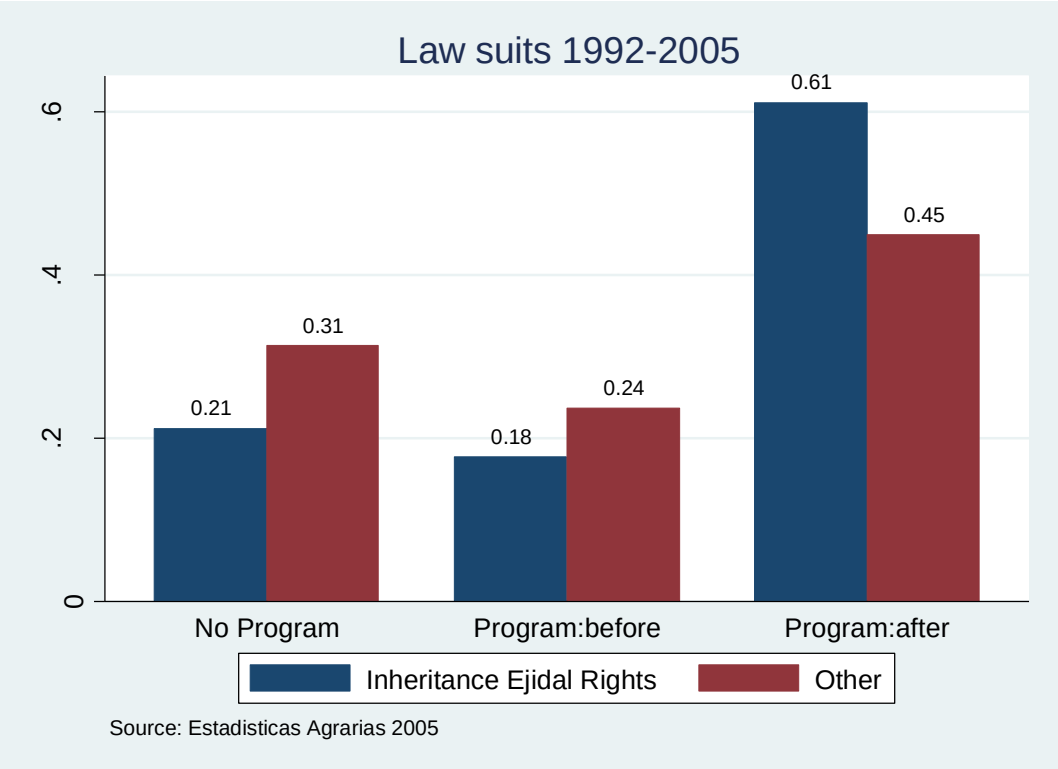
TABLE 8
ANTICIPATION ISSUES (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Migrant household				Number of migrants	Share migrants	Migrant household	Number of migrants	Share migrants
Model	LPM coef/se	LPM coef/se	LPM coef/se	LPM coef/se	OLS coef/se	OLS coef/se	LPM coef/se	OLS coef/se	OLS coef/se
PANEL A									
PROGRAM × 1997	0.124**	0.126**	0.134**	0.134**	0.365**	0.065***			
	(0.055)	(0.057)	(0.060)	(0.055)	(0.153)	(0.020)			
TIMING × 1997							0.085***	0.221**	0.038***
							(0.032)	(0.088)	(0.011)
IN-PROCESS × 1997	0.036	0.016	0.024	0.029	0.036	0.015	0.021	0.014	0.009
	(0.057)	(0.061)	(0.063)	(0.058)	(0.140)	(0.017)	(0.054)	(0.128)	(0.015)
Observations	1,200	1,198	1,198	1,198	1,198	1,198	1,118	1,118	1,118
Number of households	600	600	600	600	600	600	560	560	560
Number of ejidos	187	187	187	187	187	187	176	176	176
R-squared	0.259	0.330	0.514	0.211	0.234	0.181	0.216	0.241	0.187
PANEL B: CONTROL FOR EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × 1997	0.093	0.095	0.141**	0.143**	0.422**	0.074***			
	(0.062)	(0.063)	(0.066)	(0.061)	(0.166)	(0.022)			
TIMING × 1997							0.089***	0.246***	0.042***
							(0.033)	(0.090)	(0.012)
IN-PROCESS × 1997	0.053	0.033	0.027	0.031	0.034	0.014	0.020	-0.001	0.007
	(0.058)	(0.063)	(0.062)	(0.057)	(0.142)	(0.017)	(0.053)	(0.131)	(0.015)
BOUNDARY ISSUES	0.126	0.135	-0.020	-0.026	-0.203	-0.032	-0.027	-0.188	-0.028
× PROGRAM × 1997	(0.097)	(0.091)	(0.093)	(0.084)	(0.253)	(0.032)	(0.080)	(0.246)	(0.031)
BOUNDARY ISSUES	-0.177**	-0.161**	-0.052	-0.042	-0.080	-0.006	-0.052	-0.108	-0.011
× 1997	(0.070)	(0.069)	(0.067)	(0.061)	(0.171)	(0.020)	(0.057)	(0.162)	(0.018)
Observations	1,200	1,198	1,198	1,198	1,198	1,198	1,118	1,118	1,118
Number of households	600	600	600	600	600	600	560	560	560
Number of ejidos	187	187	187	187	187	187	176	176	176
R-squared	0.267	0.336	0.515	0.213	0.239	0.185	0.220	0.247	0.192
PANEL C: EXCLUDE EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × 1997	0.121*	0.141*	0.147*	0.139**	0.509***	0.081***			
	(0.070)	(0.071)	(0.076)	(0.069)	(0.176)	(0.025)			
TIMING × 1997							0.100**	0.328***	0.053***
							(0.041)	(0.094)	(0.014)
IN-PROCESS × 1997	0.027	0.027	0.033	0.023	0.095	0.021	0.010	0.076	0.017
	(0.077)	(0.080)	(0.081)	(0.076)	(0.178)	(0.023)	(0.072)	(0.161)	(0.021)
Observations	850	849	849	849	849	849	783	783	783
Number of households	425	425	425	425	425	425	392	392	392
Number of ejidos	131	131	131	131	131	131	122	122	122
R-squared	0.285	0.356	0.516	0.259	0.275	0.228	0.276	0.298	0.250
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Econometric model: Linear Probability Model (LPM) or OLS. Sample: all households (Panel A and B); exclude ejidos which report having implemented the program because of boundary issues (46 ejidos) or having failed to implement the program because of boundary issues and/or disputes between eligible and non-eligible households (16 ejidos; Panel C). Details of the various specifications at the bottom of the table are valid for all panels. The specifications in Columns (1), (2), and (3) include state fixed effects. The specification in Columns (1) and (2) include also the program indicator. Definitions of "Migrant household," "Program," "Timing," and household in the text. See Table 4 for the list of household controls.

Figure 1

Law cases concerning land inheritance before and after Procede



Note: the figure shows the differential increase of law suits concerning land inheritance (relative to other categories) after the program took place. See Morales Jurado and Colin Salgado (2006) for details.

8 Appendix - For Online Publication only

8.1 Theoretical framework

Thus, certification improves access to courts; potential heirs can now contest land inheritance through outright negotiation in the shadow of the Agrarian Tribunal and no longer have to be present in the ejido. A simple way to capture this mechanism is to consider a two-period extension of the basic agricultural model (Singh, Squire, and Strauss (1986)), where the decision-maker is a single household member rather than the household as a whole. Details and derivations of the model can be found in Valsecchi (2010).

Household member i allocates his/her labor supply ($\bar{T}$) to in-farm (T_{if}) and off-farm (T_{io}) activities.[43] In the first period, all household members pool their on-farm labor and receive an equal share of the agricultural product. In the second period, the member who captured the land can devote labor to on-farm activities and receive the entire agricultural product, while the other members devote their labor to off-farm activities.

Land is subject to dispute among family members. Also, they can influence future land allocation by working on the farm; i.e., working the land strengthens the claims over it.[44] The probability of capturing the land is a function of own on-farm labor-supply (T_{if}), siblings' on-farm labor supply (T_{kf}, with $k \neq i$), other households' labor supply (T_E), and land property rights (θ):

$$p^i = p\left(\frac{f(T_{if})}{f(T_{if}) + \sum_{k \neq i} f(T_{kf}) + f(T_E)}, \theta\right),$$

[43] Off-farm activities include local off-farm activities, domestic migration, and international migration. As long as temporary and return migration are relatively common and the time horizon is medium rather than short, international migration may be considered a continuous choice.

[44] Since we do not model heterogeneity across members of the same household, their payoff is homogeneous across members if they do not contest the land. This could be interpreted either as equal probabilities of inheriting the land or equal division of the land inheritance. The latter could occur either directly by division of the land, or indirectly through assignment of the land to the heir and monetary compensation to the others.

where $f' > 0, f'' < 0, p_1 > 0, p_{11} < 0, p_2 > 0, p_{22} < 0$, and $p_{12} < 0$. The key assumption is that labor supply and property rights are substitutes in land disputes ($p_{12} < 0$). This assumption captures the idea that household members' access to courts increases with the available documentation.

Maximizing income subject to a standard time constraint yields the result that whoever captures land finds it worthwhile to devote some labor to it, which makes competition for the land asset salient in the first period, when the strategic interaction takes place. In equilibrium, all members devote the same (positive) amount of on-farm labor supply; better property rights increase off-farm labor supply:

$$\frac{dT^*_{fi}}{d\theta} < 0 \text{ and } \frac{dT^*_{oi}}{d\theta} > 0.$$

Because this function applies to each household member,[45] it implicitly applies to the household as a whole: $\frac{dT^*_f}{d\theta} < 0$ and $\frac{dT^*_o}{d\theta} > 0$.

8.2 Additional baseline results

Table A3 shows the coefficient estimates associated with the DD specification. Without controlling for any background characteristics (Column 1), the coefficient estimate associated with eligible households in program areas is positive and large (0.065), but not significant at conventional levels. I then control for household characteristics (Column 2), ejido fixed effects (Column 3) and household fixed effects (Column 4): the coefficient is now slightly larger (0.077; 0.074; 0.074) and marginally significant.

Since the program was implemented and coordinated by the state offices of the Procuraduria Agraria (the government agency that implemented the program), differences in state capacity might have affected the supply of the program. In the paper (Section

[45] Because the outcome of the contest is not known in the first period, the increase in migration applies to the future heir, as well as all other members. Baker and Miceli (2005) provide a model where only one relative can inherit land (best-qualified rule), which has a similar prediction: heirs over-invest in land-specific human capital, which can be interpreted as staying home.

4.3), I argue that replacing year with state-year fixed effects would absorb differences in program supply across states. In this section, I provide some evidence supporting this argument. I generate a measure of state capacity based on current state characteristics that has not changed since the establishment of the Procuraduria Agraria. In particular, I use the number of sub-state offices, called *residencias*, which the state delegation used as headquarters for the officers, called *visitadores agrarios*, in charge of monitoring and assisting the ejidos. The number of ejidos relative to the number of headquarters captures state capacity; so does the number of ejidos relative to the number of officers, but the number of headquarters is less likely to have been affected by program implementation.[46]

The number of ejidos per headquarters is rather heterogeneous, because it ranges from 100 to 382 (with mean 251 and median 258). Column 5 shows the results associated with year fixed effects and my measure of state capacity interacted with the year indicator. The regression results show that state capacity was correlated with the program indicator and with migration behavior, because the associated coefficient is positive and statistically significant, and because the impact of the program increases from 0.074 (marginally significant) to 0.091 (significant at conventional levels). This is a substantial increase considering how noisy the measure of state capacity is likely to be.

I then replace year fixed effects with state-year fixed effects (Column 6). The R-squared increases from 0.131 (Column 4) to 0.210, which suggests that state-specific trends explain a non-trivial part of changes in migration behavior. The coefficient estimate is now larger (0.122) and statistically significant at the 1 percent level, suggesting that state unobservables biased downward the estimate of the impact of the program.

[46] Indeed, several state delegations confirmed that they have had the same number of headquarters since the establishment of the Procuraduria Agraria.

8.3 DDD estimates

In the original version of the paper, I made use of a triple difference (DDD) identification strategy, rather than a double difference (DD) strategy, to estimate the impact of the program. The DDD strategy made use of ineligible households as an additional control group. The advantage of this strategy is that it allows us to control not only for all time invariant differences between program and non-program areas, but also for most time-varying differences.[47] This is the panel analog, for example, to the identification strategy in Field (2007) in a cross-sectional framework. More details can be found in Valsecchi (2010).

The DDD strategy has two weaknesses in this context. First, ineligible households in program areas receive the program certificates, i.e., one of the control groups is partially contaminated. This implies that the estimator identifies the mean effect of the program on eligible households relative to ineligible households, which is (only) a downward biased estimator of the mean effect of the program on eligible households. Second, the DDD strategy is ultimately vulnerable to spillover effects of the program from eligible to ineligible households. Specifically, one might wonder whether the increase in tenure security of eligible households in program areas led to a decrease in tenure security of ineligible households located in the same community, or whether it led to a worsening of ineligible households' job market prospects because the certification of eligible households affected the local labor market for wage agricultural workers.

Nonetheless, I re-estimated the models in Tables 4-8 using the DDD specification with state-year (and eligibility-year) fixed effects. Tables A4-A8 show the results.

The baseline results (Table A4) show that the impact of the program on eligible households relative to ineligible households (i.e., the coefficient associated with the triple interaction $PROGRAM \times 1997 \times ELIGIBLE$) is positive, large and statistically sig-

[47] Specifically, it allows us to control for all time-varying differences shared by eligible and ineligible households.

nificant in all but one specification. The magnitude ranges from 0.131 to 0.150. Hence, it is fairly similar to the magnitude obtained with the DD estimates. Results are robust to the use of alternative dependent variables, such as number of migrants and share of migrants (Columns 5-6), and alternative explanatory variables, such as program timing (Columns 7-9). Table A5 shows the heterogeneity of the coefficient estimate with respect to inheritance status: the impact of the program on households with no will (Column 3) is positive, large (0.175) and precisely estimated, while the impact on households with a will (Column 2) is smaller (0.101) and imprecisely estimated. Table A6 shows the main robustness checks: the coefficient estimate is about as large and precisely estimated as in the baseline specification, except when I replace state-year with municipality-year fixed effects (Columns 7 and 12). The lack of precision in the latter might depend on the fact that the coefficient of interest is identified only by households in municipalities with program and non-program areas, as well as eligible and ineligible households, which might be a relatively small subset of the sample. Table A7 shows that the baseline estimates are robust to controlling for (or excluding) ejidos that implemented (or failed to implement) the program because of boundary issues.[48] Table A8 suggests that the baseline coefficients are not driven by anticipation behavior of households in ejidos about to be certified.

Overall, the DDD estimates are remarkably similar to the DD results. To the extent that the two identification strategies rely on different assumptions, I find this similarity reassuring.

8.4 Impact of program certificates on eligible households

In this section, I review the coding procedure I adopted to determine whether a household received the program certificates (Subsection 8.4.1), and I provide a more detailed discussion of the LATE and ATE estimates (Subsection 8.4.2).

[48] When we exclude ejidos with boundary issues (Panel B), the impact of the program becomes statistically insignificant for most of the specifications, but the magnitude remains nearly unaffected.

8.4.1 Identification of certified households in the 1997 survey

In order to identify certified and uncertified households, I make use of 1997 data on possession of a Procede certificate. The 1997 household questionnaire asks the land type for each plot (and for each season) reported by the household. The possible answers are: ejidal without certification (33.12 percent),[49] ejidal with certification (37.06), ejidal with *dominio pleno* (0.23),[50] communal in individual exploitation (25.12), private property (3.74), colony (0.03), national (0.04), and missing (0.66).

The section also includes a question on ownership status for each plot. The possible answers are: owned (58.95 percent), possessed (34.66), rented (1.89), sharecropped (1.44), borrowed (1.93), in partnership (0.35), conceded (0.00), other (0.13), and unspecified (0.66). Hence, 93.61 percent of the plots are either owned or possessed.[51] In order to determine the certification status of each household, there are three approaches that I can follow: i) record whether a plot is ejidal with certification or dominio pleno; ii) record whether a plot is ejidal with certification or dominio pleno conditional on the plot being owned or possessed; iii) record whether the plot is ejidal with certification or dominio pleno conditional on the plot being owned or possessed, and being either certified or uncertified ejidal (that is, not communal in individual exploitation, private property, colony, national, or missing). The advantage of the first approach is that it provides all landed households with a well-defined certification status. This is not necessarily the case for the second and third approach, because conditioning the plot status on ownership status (or excluding particular categories of land type) might (and does)

[49] The certificate is definitely the program (Procede) certificate. In fact, the question on land type appears, separately, in the datasets on land transactions, land rentals, and land in sharecropping, and they all state explicitly "Procede certificate."

[50] Dominio pleno is the certification status associated with full property rights over individual agricultural plots (Section 2).

[51] Note that the distinction between ownership (*en propriedad*) and possession (*en posesion*) in the 1997 questionnaire cannot be used to confirm the distinction between eligible and ineligible households, which is based on the 1994 questionnaire, because Procede changed the perception of ownership relative to possession: 77 percent of plots in program areas are reported as owned (13 as possessed), while only 47 percent of plots in non-program areas are reported as owned (46 as possessed).

lead to failure to assign a certification status to some of the households in the sample.[52]

I collapse these 1997 plot level data to the household level and merge the dataset to the other 1994 and 1997 household and ejido level data. There are 600 eligible households: 298 in program areas and 302 in non-program areas. The percentage of eligible households in program areas who got fully certified is 74.5 according to the first approach (2.0 with missing status); 77.5 according to the second approach (2.7 with missing status); and 85.2 according to the third approach (5.7 with missing status). The percentage of those who got at least partially certified is 86.9 according to all three approaches.[53]

The three approaches show some differences, but they are not huge. The second approach seems the most sensible, because it seems to offer the best compromise between rigorousness (I should not base certification status on plots that are neither owned nor possessed) and completeness (in the sense that only a few households end up having a missing certification status). Hence, this is the approach that I use for the results in the next section and in Section 5.2. In this respect, note that, in order to use Heckman's formula, I need to recalculate the certification rates excluding the households for which I could not determine the 1997 certification status (8 households, which correspond to the 2.7 percent of missing status mentioned above). Hence, the percentage of fully certified households will be 79.6 (i.e., 231/290), while the percentage of fully and partially certified households will be 88.6 (i.e., 257/290).

[52] Unfortunately a small number of households in the final sample reports not to be working on any plot in 1997. Eligible households in program areas with this problematic status are: 14 according to the first approach; 17 according to the second approach; 26 according to the third approach. We know that these households were working some land in 1994. We try to determine the certification status of these households by making use of the information on plots sold, rented out, or left in sharecropping. This refinement reduces the number of households with missing certification status to: 6 according to the first approach; 8 according to the second approach; 17 according to the third approach.

[53] Specifically, there are 298 eligible households in the program areas. Following the second approach, we determine the status of 290 of them: 231 households report only certified ejidal plots; 1 household reports only privately owned plots; 8 households report only communal plots in individual exploitation; 20 households report only uncertified ejidal plots; 15 households report certified ejidal plots and privately owned plots; 8 households report certified ejidal plots and communal land in individual exploitation; 3 households report certified and uncertified ejidal plots; and the remaining 4 households report a mix of the previous categories.

All approaches suffer from certain weaknesses. In particular, land transactions might explain the presence of privately owned plots (located outside the ejido) and the presence of uncertified ejidal plots (located inside the ejido), while the division of the commons might explain the presence of communal land in individual exploitation. I discuss each point separately.

First, it could be the case that the household bought private or uncertified land. In this case, the ejidatario will appear as being partially certified even though it received the certificates on all the eligible plots. Along the same lines, an ejidatario might even appear as uncertified in 1997 if he bought private or uncertified land and sold all his certified land. In principle, I could try to refine the variable indicating the household 1997 certification status by using the information on land transactions (or rentals, or sharecropping). In practice, the data on land transactions (or rentals, or sharecropping) can be merged with the land-used data only at the household-level because of lack of a common plot identifier.[54] Privately owned plots are presumably located outside the ejido, while uncertified ejidal plots are almost certainly located within the same ejido.[55]

Second, Munoz-Pina, De Janvry, and Sadoulet (2003) show that a non-negligible share of ejidos divides the common land during this period.[56] If this is the case, then eligible households in program areas should have received some of this land, which might not have been assigned individual certificates.

Nonetheless, it seems hard to attribute the entire gap in certification in program areas to these potential measurement issues. The available data suggest that eligible (and ineligible) households in program areas owned uncertified land by the time of the

[54] Hence, the survey lacks a common plot identifier not only across surveys, but also across separate datasets within the same survey. This prevents me from refining the household 1997 certification status by taking into account the cases where an eligible household bought some uncertified land (during 1994-1997), or an ineligible household bought some certified land (during the same period). I used only the status of the land sold to determine the certification status of those few households that are not working any plot of land at the time of the survey.

[55] The survey questionnaire asks about the land held in the same municipality without distinguishing between plots located in the same area (ejido) and those located outside of it. Nonetheless, ejidal plots cannot be traded with outsiders, which limits the concern to privately owned plots only.

[56] They also show that the division of the commons is not driven by Procede.

1997 survey. I take this as incomplete certification. In the rest of the section, I will keep the previous caveats in mind and proceed to the estimation of the impact of the program certificates on eligible households.

8.4.2 Estimation of LATE and ATE of program certificates

In this section, I discuss the additional assumptions required to estimate the impact of program certificates on eligible households. The reference Section is 5.2.

As with any IV strategy, the instrument needs to satisfy the inclusion and the exclusion restrictions. The former requires the program to have increased the likelihood of having a Procede certificate. This seems reasonable: only households in program areas obtained a Procede certificate. The exclusion restriction requires the program to have affected household migration behavior only through the Procede certificate, rather than in other ways. It is not easy to think about other ways through which the program may have done so. It is true that the program included some elements of democratic participation, which could have improved social cohesion,[57] but it is not clear how this could have mattered in any relevant way for migration behavior.

In Section 5.2, I reported an IV estimate ranging from 0.135 to 0.151 (depending on how one considers partially certified households). In order to interpret this estimate as the average impact of the certificate (ATE) on all eligible households, I need to make an additional assumption, which is the absence of systematic differences between eligible households in program areas who got the certificates and eligible households in program areas who did not. There are several reasons supporting this assumption. First, the program was free of charge. Credit constraints or similar obstacles cannot have played a role. Second, the certificate is the outcome of a surveying process which took months, so information cannot be an issue. Third, the new certificates included new details on

[57] Our community and household questionnaire includes a question on the effects of the program on social cohesion (only for program areas), reading: "If the ejido implemented the program, how has the program affected social cohesion? (more, same, less)." Social cohesion remained unaffected in 67.77 percent of the cases, increased in 22.51, and decreased in 9.72.

the land without sacrificing any information, so there was no clear advantage in refusing the new certificates to keep the old ones.

Notwithstanding these reasons, one may still doubt the validity of the assumption. In that case, I could still interpret the IV estimates as recovering the Local Average Treatment Effect (LATE), that is, the average impact of the program certificate for the eligible households that obtained the certificates because they were in program areas, and would not have obtained them had they been in non-program areas (compliers).[58]

8.5 Impact heterogeneity and other channels of transmission

As outlined in Section 3, there are several potential channels of transmission: investment motives following increased tenure security, which relates to migration as a self-funding strategy for capital-intensive investments; household labor supply reallocation (out of agriculture) following improved land rental markets.[59]

First, I estimate the impact of the program on remittances. A positive impact on remittances would be consistent with the self-funding strategy for capital-intensive investments. Newly migrated household members might require some time to accumulate earnings for remittances, thus evidence of no impact would not entirely exclude this channel of transmission. In addition, the household questionnaire includes questions on remittances only for 1997. Hence, we can estimate the impact on remittances only using a cross-section specification. Nonetheless, Table A9 shows no evidence of any impact on

[58] In order to interpret a LATE estimate as an ATE, one usually has to assume that there are no defiers and that compliers are similar to always-takers and never-takers. However, in this context, there can be neither defiers nor always-takers because households in non-program areas have no access to the program certificates. Hence, the standard distinction between always-takers, compliers, defiers and never-takers reduces to compliers and never-takers only.

[59] In the working paper version (Valsecchi (2010)), we investigate also the heterogeneity of the impact of the program relative to land assets. The regression results there suggested that the program had a strong impact on medium-sized landowners (3-12 hectares) and large landowners (more than 12 hectares), while it had no impact on small landowners (0-3 hectares). This is consistent with the intensity of treatment increasing in land assets. Nonetheless, small landowners might have also failed to migrate because of credit constraints, or because the capital-labor intensity of future investments is increasing in land size, so that large landowners use migration as a self-funding strategy for heavy machinery, while small landowners plan labor-intensive investments like increases in manure.

remittances, either for those sent by household members currently abroad (Panel A) or for those sent by household members who have been abroad within the previous 5 years (Panel B).

Second, I estimate the impact of the program on land transactions. Table A10 shows the coefficient estimates relative to transactions that increase available land (Panel A), and relative to transactions that decrease available land (Panel B). Procede does not seem to have any impact on land transactions, whether I measure transactions with binary indicators (Columns 1-5, 12-15), number of transactions (Columns 6-7, 16-17), or amount of land (Columns 8-11, 18-21). It also does not seem to matter whether I consider land rentals, land in sharecropping, land acquisitions (Panel A), or land sales (Panel B). Nonetheless, land transactions are measured retrospectively based on the 1997 household survey, which makes the measurement vulnerable to some noise. The information on land used does not suffer from this potential measurement error. Hence, I double check the previous results by estimating the impact on land used. Table A11 shows the estimated impact of the program on the amount of land used: the coefficient estimates are negative across all specifications, but they are not precisely measured. Hence, I find no evidence supporting a "gains from trade" channel in this setting.

Third, I estimate the impact of the program on wage labor. The 1992 Agrarian Law allows households to hire wage labor to work on their plots. I might expect landed households to adjust gradually to this legislative change. The certification program might have boosted the confidence of eligible households to hire wage labor, thus making it easier to send one additional member to the United States. The 1994 household survey asks both the number of workers employed by the household and the number of work days paid by the household for each of the two harvests preceding the survey. Eligible households in program areas in 1994 are slightly more likely to hire at least one worker within the two seasons (37.6 to 33.1 percent), as well as to pay at least one work day (37.6 to 32.4 percent). The difference persists when I consider the number of workers

(7.2 to 5.2), while it disappears when I consider the number of paid days (19.0 to 20.4). The 1997 survey asks only the number of work days. Hence, I will use work days as the dependent variable. Table A12 shows the coefficient estimates. Contrary to my expectations, the program has a negative impact on the likelihood of paying a worker for at least one day (Column 1), on the likelihood of paying for at least one week (Column 2), on the number of weeks worked (Column 3) and days worked (Column 4), and on the number of workers (Column 5).[60] The estimates are statistically insignificant (except in one case), but they are generally quite large, ranging from 27.0 to 44.1 percent of the pre-program average of the dependent variable. These coefficient estimates would not allow me to entirely dismiss the possibility that the program had an effect on wage labor in the opposite direction of what I expected. However, contrary to the impact of the program on migration behavior, the magnitude of the effect on wage labor is not robust to the replacement of the state-year with the municipality-year fixed effects (Columns 6-10).

8.6 Additional outcomes

Note that my theoretical model generates a prediction that may be applied not just to international migration, but also to domestic migration and off-farm labor within the village. So far, my analysis has focused only on the first margin. There are two reasons for this. First, the impact on international migration is arguably the most interesting among the three. Second, the survey was designed with a particular focus on international migration, whereas the emphasis on off-farm labor was not as strong. In regard to domestic migration, I know whether household members migrated to another state. However, if they remained in the same state, it is not possible to tell whether they migrated to an urban area or remained in the same village. Regarding off-farm labor supply, it would be desirable to know the number of on-farm and off-farm labor

[60] On average, workers are hired for 3.02 days. We use this measure to recover the number of workers hired in 1997.

hours (as in Field (2007) and Do and Iyer (2008)). To this end, I will have to rely on information about the primary and secondary occupation of household members living at home. Specifically, I estimate the impact of the program on non-agricultural status, i.e., at least one member currently living at home works outside agriculture. Table A13 shows the results: the coefficient estimate is small and statistically insignificant across all specifications. Thus, I find no evidence of an impact on off-farm labor for members currently living at home. This could be driven by measurement error in the dependent variable or could simply be due to international migration absorbing the entire impact of the program on off-farm labor.

8.7 Endogenous selection into the program

In this section, I provide a more detailed discussion of the potentially misleading effect of the currency devaluation and the NAFTA agreements.

The literature on Mexican migration has singled out the role of historical and recent migration networks in promoting migration. Historical migration networks (Woodruff and Zenteno (2007)) are not a threat because they are time-invariant. Nonetheless, I control for a measure of distance to the United States based on the railways that connected Mexican municipalities to the border in 1920 (Demirguc-Kunt, Córdova, Pería, and Woodruff (2011)).[61] In addition, I make use of the 1990 census (Minnesota Population Center (2013)) and control for the share of population residing in the United States in 1985.[62] Table A14, Columns 4-5, suggests that the coefficient of interest is unaffected by the inclusion of these controls.

Recent migration networks instead might be a concern if program areas were associated with destinations in the United States different from non-program areas, and labor market conditions associated with the former performed differently from those

[61] See their paper for details on the construction of the measure.

[62] Unfortunately, the 1990 census does not include any information on the number of international migrants in 1990. The 1992 ENADID and the 1995 inter-censal surveys include more information, but they cover only about half the municipalities where our ejidos are located.

associated with the latter (Munshi (2003)). In Section 6.1, I showed the robustness of the coefficient of interest to the inclusion of US state of destination fixed effects at the household level and at the ejido level. Here I show that the coefficient of interest is also robust to controlling for the share of migrants in a specific US state at the household level (Column 6), ejido level (Column 7), and municipality level (Column 8-9). I also include municipality-year fixed effects (Columns 10-14). Results are similar to what was previously found.

The other big event is the Mexican entry into the NAFTA agreements (1994). This event was preceded by the removal of price supports for twelve basic crops (1992), and followed by the removal of price supports for corn and beans (1995). The decline in the price of corn might have been strong enough to lead ejido producers to shift away from its production and perhaps send an additional migrant to the United States. Consistent with this hypothesis, Martínez (2007) finds that a measure of municipality-level basic crop shock exposure is negatively correlated with changes in migration rates between 1992 and 1997. However, it is not clear how much the latest changes (1995-1997) played a role in his analysis: Yunez-Naude (2003) reports that the Mexican agency responsible for state interventions in agriculture (CONASUPO)[63] did not cease its activities immediately after 1995, but followed an intermediate price scheme fixation in 1996, and became a buyer of last resort during the winter season 1996-1997.[64] Consistent with the view that corn production might not have dropped as much as people expected at the time, Davis (2000) shows that corn production even increased in the ejido sector.

Nonetheless, to the extent ejido corn producers suffered from the Mexican entry to NAFTA, this might bias my coefficient of interest if program and non-program areas somehow differed in their exposure to this negative shock. In order to capture this

[63] CONASUPO is the acronym for National Company for Popular Subsistence. It used to buy basic crops from small farmers at above market prices. It is spread across the country with a multitude of stores. During the 1990s, it gradually ceased its activities.

[64] In fact, CONASUPO reportedly bought 42 percent of the total domestic production of corn in 1993, 31 in 1994, 7.4 in 1995, 19 in 1996, 13 in 1997, and 12.5 in 1998. In 1995, high international market prices made state intervention unnecessary (Yunez-Naude (2003)).

negative exposure, I control for a basic crop shock exposure indicator (generated using the 1994 data, then interacted with the 1997 year dummy). Columns 15 and 17-18, show that this additional control has little explanatory power and does not affect my results. I also report the estimates obtained including controls for government programs (discussed in Section 6.1) together with municipality-year fixed effects. Columns 16 and 19-21 show results similar to what I previously found.

8.8 Additional tests for anticipatory behavior

In this section, I present an additional test to confirm or rule out anticipatory behavior. The test makes use of the 1994 cross-sectional data, i.e., before any ejido completed the program. If there is anticipatory behavior, then households in early program areas should migrate less than households in all other areas. The test is similar to the one I presented in Section 6.2 making use of *in-process* areas. The difference is that, by using only the 1994 data, I know with certainty which ejidos will complete the certification program before the others. Hence, I generate an indicator for *soon-to-be-certified* areas, which I define as areas certified between August and December 1994, or, alternatively, as areas certified between August 1994 and June 1995. Table A15, Panel A, shows that the coefficient estimates associated with this exercise are insignificant and very close to zero, regardless of which definition I use for *soon-to-be-certified* areas.

For the sake of completeness, I also estimate the impact of the program using my benchmark program indicator and the 1994 and 1997 data separately. The estimation using the 1994 data clearly should not show any effect and essentially should work as a falsification experiment. Most importantly, the two separate estimations should improve my confidence that my baseline results are driven by differences in migration behavior across program and non-program areas in 1997, rather than by some relevant imbalance in the pre-program data. Of course, one should keep in mind the caveat that the cross-sectional identification is much weaker than the panel strategy because

it cannot adequately control for time-invariant differences between program and non-program areas. In order to attenuate this issue, I include ejido level controls.

Table A15, Panel B, shows the results using the 1994 data, while Panel C shows the results using the 1997 data. The impact of the program in 1994 is positive, small and statistically insignificant, while the impact in 1997 is positive, large, statistically significant, and broadly in line with the panel findings.

8.9 Identification of eligible and ineligible households

8.9.1 Identification in the data (coding procedure)

In order to identify eligible and non-eligible households, I make use of pre-program (1994) data on possession of an ejido certificate. The 1994 household questionnaire asks the land type for each plot (and for each season) reported by the household. The possible answers are: ejidal without certification (30.19 percent), ejidal with certification (55.89), communal in individual exploitation (10.05), private property (3.67), colony (0.04), national (0.07), and missing (0.07).[65]

I collapse these 1994 plot level data to the household level, drop three households for which land type is missing on one or more of their plots, and merge the dataset to the other 1994 and 1997 household and ejido level data. As described in Section 4.1, I drop 15 households because they are private landowners (i.e., they report private property for each of their plots) and 110 households because they report "mixed status" (i.e., they report a certificate for some of their plots but no certificate for the others).[66]

The final sample of 926 households includes 600 households reporting a certificate of

[65] Two government officers, who worked on the data collection, confirmed separately that the above mentioned certificate is the certificate of agrarian rights (*certificado de derechos agrarios*).

[66] The 110 households with mixed status can be distinguished as follows: 33 households report certified ejidal plots and privately owned plots; 14 households report certified ejidal plots and communal land in individual exploitation; 51 households report both certified and uncertified ejidal plots; the 12 remaining households report a mix of the previous categories. Privately owned plots might actually be located outside the ejido, because the questionnaire asks about land located within the municipality of the ejido, and not exclusively about land located within the ejido. Instead, uncertified ejidal plots and communal land in individual exploitation most likely belongs to the same ejido.

agrarian rights (*certificado de derechos agrarios*) on all of their plots and 326 households reporting no certificate of agrarian rights on any of their plots.[67]

Households with a certificate of agrarian rights on each of their plots are termed "eligible." They are certainly ejidatarios. Households with no certificate of agrarian rights on any plot are termed "ineligible." They should be posesionarios. However, there is anecdotal evidence that sometimes certificados de derechos agrarios simply did not reach the ejidatarios.[68] It is also possible that some of them might have been ejidatarios-in-waiting (ejidatarios con derechos a salvo), i.e., ejidatarios entitled to an individual plot who did not receive any because of land scarcity. Ejidatarios-in-waiting might have occupied some land while waiting to receive an official plot.

Overall, to the best of my knowledge, the households who do not report any certificate on any plot in 1994 are either posesionarios (thus ineligible) or ejidatarios with relatively weak property rights, because they were supposed to receive their certificado de derechos agrarios and they did not, or ejidatarios-in-waiting. As I show in the next section, there is evidence that posesionarios constitute at least part of the ineligible group.

8.9.2 Inclusion of eligible and ineligible households in the survey

The 1994 ejido survey targeted only ejidatarios, that is, only eligible households. At least, so it seems from reading the papers using these data.[69] Nonetheless, certificates of agrarian rights identified ejidatarios, and I find a substantial number of households *without* these certificates. The researchers who led the survey collection effort suggest a possibility which might reconcile this apparent inconsistency. As in many other surveys, enumerators went to the field and failed to find many of the households they were supposed to interview. This is understandable because the roster was based on old doc-

[67] The 326 ineligible households can be distinguished as follows: 298 households report only uncertified ejidal plots; 15 households report uncertified ejidal plots and privately owned plots; 12 households report uncertified ejidal plots and communal land in individual exploitation; 1 household reports a mix of the previous categories.

[68] This came out in conversations with PA officers belonging to different state offices.

[69] See Section 4.1, footnote 12, for a list of the papers using these data.

uments. In order to overcome this practical hurdle, the enumerators followed simple replacement rules, such as, interviewing the third neighbor on the right. The investigators who led the 1997 data collection effort suggested that it is very possible that, by doing so, enumerators ended up interviewing posesionario households.

In order to shed light on the issue, I asked the central and state offices of the Registro Agrario Nacional (RAN) and Procuraduria Agraria (PA) for the last Investigacion de Usufructo Parcelario (IGUP), which is the document drafted by the SRA officers and the ejido Assembly when the former visited the ejido. This document includes the most updated list of ejidatarios (before the 1992 Agrarian Law). The 32 documents that I obtained allowed me to verify without further doubt the status of 55 ineligible households (located in 8 different Mexican states): 58 percent of them turned out to be posesionarios, and so truly ineligible, whereas the others turned out to be ejidatarios without a certificate. Note that, while I was able to track down only 42 percent of ineligible households in these documents, I found 88 percent of eligible households located in the same ejidos (86 out of 97), i.e., more than double the relative share. Hence, these documents prove that the ejido surveys included at least some ineligible households.

8.9.3 Procede certification of ineligible households

The number of ineligible households is 326: 169 in program areas, 157 in non-program areas. According to the three approaches, the percentage of ineligible households in program areas who were fully certified is: 60.9 according to the first approach (1.8 with missing status), 60.4 according to the second approach (3.5 with missing status), 75.7 according to the third approach (16.0 with missing status). The percentage of those who were at least partially certified is: 78.1 according to the first approach (1.8 with missing status), 77.5 according to the second approach (3.5 with missing status), 77.5 according to the third approach (16.0 with missing status).

8.10 Disaggregation of timing effects

As a robustness check, the baseline results show the effect of program timing on migration behavior (Table 4, Columns 7-9). Program timing takes the value 2 for early program areas and the value 1 for late program areas. Hence, it implicitly imposes the effect of the program to be twice as large in early program areas as it is in late program areas. This is a simplifying assumption consistent, for example, with Field (2007). Alternatives to this timing variable could be: another timing variable with another somewhat arbitrary weight distribution on different periods; (or) several binary indicators, one for each time window (equally arbitrarily defined) in which the program took place. The problem with the first approach is that it would be as arbitrary as the timing variable currently specified in the paper. The problem with the second approach is that it might be too demanding to estimate several coefficients associated with the program. This is because international migration is a relatively rare event, and normally it requires relatively large datasets for its investigation. This issue might be very relevant in this context, because the sample size is not large, and because the explanatory variable of interest is identified by changes in migration behavior across program and non-program areas within Mexican states. If I were to disaggregate further the explanatory variable of interest, then the share of observations identifying the coefficient of interest would decrease, possibly dramatically. For example, the coefficient associated with early program areas would be identified by changes in migration behavior across early program and non-program areas within Mexican states. The subset of observations identifying this effect might be smaller than the subset identifying the baseline coefficients.

Keeping these caveats in mind, I run some alternative estimation using alternative disaggregation choices. Table A16 shows the results for migration status (Columns 1-5), number of migrants (Columns 6-10), and share of migrant members (Columns 11-15). The first specification (Columns 1, 6, 11) is identical to the one included in the baseline estimates. The second specification disaggregates the program timing into early

(1994-95) and late (1996-97) areas. The third specification disaggregates the program timing into three categories: 1994-June 1995; July 1995-June 1996; July 1996 - 1997. The fourth specification disaggregates the program timing into four specifications: 1994; 1995; 1996; 1997. The fifth specification disaggregates the program timing into six categories (essentially six month periods).

Most of the results (but not all: see Columns 5,10,15) suggest that the effect of the program might be small during the first period(s) after the completion of the program, and become sizeable during later period(s). This non-linear effect could be driven by the way the household labor supply adjusts over time; it could be driven by how households' confidence grows over time; it could be driven by some households receiving their certificates later than others located within the same community (the timing variable is based on a question in the community questionnaire; the same question is not included in the household questionnaire); it might be driven by seasonal effects which cannot be fully controlled for in this setting (did the certification take place before, during or after the harvesting season?). However, I think that studying this aspect requires a larger dataset, and probably more variation in the rollout of the program and it is therefore beyond the scope of this project.

TABLE A1
AFTER-PROGRAM DESCRIPTIVE STATISTICS, HOUSEHOLD-LEVEL

	All	Eligible				Non-Eligible				
		Program	No Program	Diff		Program	No Program	Diff	Diff-diff	
	mean	mean	mean	t-stat		mean	mean	t-stat	t-stat	
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	
A: Migration variables										
At least one household member currently living at home has been abroad (last 3 years)	0.08	0.11	0.07	(1.513)		0.07	0.07	(0.031)	(1.044)	
At least one household head's child is currently abroad	0.23	0.23	0.25	(-0.212)		0.18	0.27	(-1.479)	(1.178)	
Migrant household (last 3 years)	0.29	0.32	0.28	(0.610)		0.23	0.31	(-1.224)	(1.498)	
Number of migrants abroad (last 3 years)	0.72	0.77	0.72	(0.272)		0.52	0.83	(-1.511)	(1.538)	
B: Household composition										
Household head's age	52.88	53.71	53.89	(-0.136)		51.23	51.15	(0.048)	(-0.128)	
Household head's sex	0.97	0.96	0.97	(-0.740)		0.96	0.99	(-1.484)	(0.754)	
Household head's schooling	3.20	3.33	3.06	(0.935)		3.47	2.92	(1.507)	(-0.675)	
Average schooling of adult members	4.66	4.67	4.68	(-0.067)		4.78	4.48	(0.910)	(-0.881)	
Number of adult members	6.71	6.65	6.99	(-1.010)		6.40	6.62	(-0.509)	(-0.221)	
Share females among adult members	0.37	0.38	0.38	(0.099)		0.38	0.37	(0.431)	(-0.300)	
Number of household head's siblings abroad	0.38	0.38	0.38	(-0.016)		0.28	0.47	(-1.225)	(1.121)	
C: Household assets										
1992 land assets (owned)	11.93	11.60	13.03	(-0.831)		10.65	11.83	(-0.523)	(-0.099)	
Hired labor	0.43	0.42	0.48	(-1.063)		0.39	0.40	(-0.091)	(-0.595)	
Tractor	0.46	0.56	0.41	(2.511)	**	0.47	0.37	(1.141)	(0.621)	
Pickup	0.21	0.24	0.17	(1.767)	*	0.19	0.25	(-0.878)	(1.724)	*
Machinery	0.59	0.69	0.53	(2.647)	***	0.60	0.50	(1.199)	(0.642)	
Cattle	0.45	0.40	0.53	(-2.430)	**	0.36	0.52	(-2.212)	** (0.417)	
Horses	0.30	0.28	0.34	(-1.364)		0.21	0.34	(-2.121)	** (0.921)	
D: Land transactions										
At least one land rental transaction (1994-1997)	0.18	0.26	0.16	(2.447)	**	0.14	0.13	(0.055)	(1.659)	*
At least one plot rented in (1994-1997)	0.09	0.11	0.08	(1.227)		0.07	0.10	(-1.044)	(1.559)	
At least one plot rented out (1994-1997)	0.09	0.14	0.08	(1.813)	*	0.08	0.03	(1.610)	(0.396)	
Observations										

* significant at 10%; ** significant at 5%; *** significant at 1%. Column (1) reports sample means from the 1997 household survey. Columns (4) reports the t-statistics of the difference (2)-(3). Column (7) reports the t-statistic of the difference (5)-(6). Column (8) reports the t-statistic of the difference [(2)-(3)]-[(5)-(6)]. Standard error associated with the diff-in-mean tests have been clustered at the ejido-level. Definitions of "Migrant household," "Program," "Eligible," and household in the text. All migration indicators (but the number of migrants) are binary variables. Land assets measured in National Rainfed Equivalent (NRE) hectares. For a description of the procedure, see de Janvry et al. (1997). The number of adult members is computed relative to the biological household, i.e., household members currently living at home and children of the household head living outside home.

TABLE A2
PRE-PROGRAM DESCRIPTIVE STATISTICS, EARLY VS LATE PROGRAM AREAS

	All	Eligible				Non-Eligible				
		Early	Late	Diff		Early	Late	Diff		Diff-diff
	mean	mean	mean	t-stat		mean	mean	t-stat		t-stat
	(1)	(2)	(3)	(4)		(5)	(6)	(7)		(8)
A: Migration variables										
At least one household member currently living at home has been abroad (last 3 years)	0.04	0.07	0.02	(2.250)	**	0.03	0.01	(0.707)		(1.639)
At least one household head's child is currently abroad	0.09	0.07	0.09	(-0.534)		0.11	0.08	(0.393)		(-0.652)
Migrant household (last 3 years)	0.12	0.14	0.11	(0.542)		0.14	0.10	(0.591)		(0.029)
Number of migrants abroad (last 3 years)	0.23	0.28	0.21	(0.637)		0.19	0.21	(-0.131)		(0.668)
B: Household composition										
Household head's age	49.36	49.85	51.13	(-0.520)		47.69	47.49	(0.075)		(0.841)
Household head's sex	0.96	0.97	0.96	(0.606)		0.90	0.99	(-2.097)	**	(1.688) *
Household head's schooling	3.49	3.11	3.91	(-1.868)	*	3.45	3.59	(-0.255)		(-0.794)
Average schooling of adult members	4.71	4.72	4.91	(-0.447)		4.26	4.80	(-1.159)		(1.369)
Number of adult members	5.73	5.94	5.98	(-0.086)		4.94	5.70	(-1.309)		(2.023) **
Share females among adult members	0.47	0.45	0.48	(-1.098)		0.46	0.48	(-0.528)		(-0.298)
Number of household head's siblings abroad	0.10	0.15	0.04	(1.845)	*	0.14	0.07	(0.963)		(0.240)
C: Household assets										
1992 land assets (owned)	12.14	11.24	14.19	(-1.164)		9.39	13.23	(-1.430)		(1.165)
Hired labor	0.35	0.44	0.31	(1.499)		0.38	0.24	(1.608)		(0.820)
Tractor	0.53	0.59	0.47	(1.191)		0.56	0.46	(0.721)		(0.409)
Pickup	0.34	0.36	0.40	(-0.426)		0.31	0.26	(0.481)		(0.664)
Machinery	0.64	0.68	0.62	(0.667)		0.67	0.60	(0.642)		(0.211)
Cattle	0.43	0.40	0.50	(-1.118)		0.38	0.42	(-0.439)		(0.342)
Horses	0.25	0.25	0.28	(-0.549)		0.32	0.14	(2.558)	**	(-1.073)
D: Land transactions										
At least one land rental transaction (last 3 years)	0.12	0.13	0.09	(0.809)		0.15	0.10	(1.007)		(-0.349)
At least one plot rented in (last 3 years)	0.07	0.08	0.03	(2.001)	**	0.08	0.07	(0.284)		(0.032)
At least one plot rented out (last 3 years)	0.05	0.05	0.07	(-0.488)		0.07	0.02	(1.190)		(-0.552)
Observations	414	142	116			72	84			

* significant at 10%; ** significant at 5%; *** significant at 1%. Column (1) reports sample means from the 1994 household survey. Columns (4) reports the t-statistics of the difference (2)-(3). Column (7) reports the t-statistic of the difference (5)-(6). Column (8) reports the t-statistic of the difference [(2)-(3)]-[(5)-(6)]. Standard errors associated with the diff-in-mean tests have been clustered at the ejido level. Definitions of "Migrant household," "Early," "Late," "Eligible,"and household in the text. Land assets measured in National Rainfed Equivalent (NRE) hectares. For a description of the procedure, see de Janvry et al. (1997). The information on program timing is missing for 40 eligible households and 13 ineligible households.

TABLE A3
FROM YEAR TO STATE-YEAR FIXED EFFECTS (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Migrant household					
Model	LPM	LPM	LPM	LPM	LPM	LPM
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PROGRAM × 1997	0.065	0.077*	0.074*	0.074*	0.091**	0.122***
	(0.041)	(0.041)	(0.044)	(0.040)	(0.041)	(0.045)
1997	0.109***	0.075***	0.083***	0.085***	-0.084	
	(0.026)	(0.025)	(0.027)	(0.025)	(0.085)	
Number of ejidos per *residencia*					0.001**	
					(0.000)	
Observations	1,200	1,198	1,198	1,198	1,198	1,198
Number of households	600	600	600	600	600	600
Number of ejidos	187	187	187	187	187	187
R-squared	0.030	0.179	0.494	0.131	0.138	0.210
F-test						37.528
Prob > F						0.000
Time FE	year	year	year	year	year	state-year
Household controls	-	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household

*** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the ejido level. The specifications in Columns (1) and (2) include also the program indicator. Definitions of "Migrant household," "Program," and household in the text. A *residencia* is a sub-state office of the Procuraduria Agraria (the government agency that implemented the program). The F-test reported at the bottom of the table corresponds to the test for the joint equivalence of the state-year fixed effects.

TABLE A4
DDD ESTIMATES: BASELINE RESULTS (ALL HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Migrant household				Number of migrants	Share migrants	Migrant household	Number of migrants	Share migrants
Model	LPM	LPM	LPM	LPM	OLS	OLS	LPM	OLS	OLS
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PROGRAM × ELIGIBLE × 1997	0.131*	0.150**	0.149**	0.146**	0.484***	0.086***			
	(0.073)	(0.071)	(0.075)	(0.068)	(0.175)	(0.023)			
PROGRAM × 1997	-0.022	-0.029	-0.029	-0.026	-0.139	-0.026			
	(0.055)	(0.055)	(0.058)	(0.054)	(0.128)	(0.017)			
TIMING × ELIGIBLE × 1997							0.110**	0.315***	0.052***
							(0.049)	(0.120)	(0.016)
TIMING × 1997							-0.029	-0.098	-0.016
							(0.040)	(0.090)	(0.012)
Observations	1,852	1,849	1,849	1,849	1,849	1,849	1,744	1,744	1,744
Number of households	926	926	926	926	926	926	873	873	873
Number of ejidos	221	221	221	221	221	221	209	209	209
R-squared	0.248	0.327	0.514	0.228	0.255	0.194	0.239	0.269	0.207
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household	household	household	household

*** p<0.01, ** p<0.05, * p<0.1. Standard errors (in brackets) clustered at the ejido level. All specifications include eligibility-state-year fixed effects. The specifications in Columns (1), (2), and (3) include also state and eligibility-state fixed effects, the interaction program × eligible, and the eligibility indicator. The specifications in Columns (1) and (2) also include the program indicator. Definitions of "Migrant household," "Program," "Timing," "Eligible," and household in the text. See the text also for the list of household controls.

TABLE A5
DDD ESTIMATES: IMPACT HETEROGENEITY (ALL HOUSEHOLDS)

	(1)	(2)	(3)
Sample	ALL	WILL	NO WILL
	coef/se	coef/se	coef/se
PROGRAM × ELIGIBLE × 1997	0.146**	0.101	0.175**
	(0.068)	(0.134)	(0.075)
PROGRAM × 1997	-0.026	0.004	-0.042
	(0.054)	(0.091)	(0.064)
Observations	1,849	661	1,178
Number of households	926	331	590
Number of ejidos	221	149	195
R-squared	0.228	0.291	0.270
State-Year FE	yes	yes	yes
Household controls	yes	yes	yes
Unit FE	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Sample: all households (Column 1); households with a will (Column 2); households without a will (Column 3). Econometric methodology: Linear Probability Model (LPM). The dependent variable is "Migrant household" in all specifications. All specifications include eligibility-state-year fixed effects. Definitions of "Migrant household," "Program," "Eligible," and household in the text. See also the text also for the list of household controls.

TABLE A6
DDD ESTIMATES: ROBUSTNESS CHECKS (ALL HOUSEHOLDS)

	(1) Baseline	(2) Baseline, restricted	(3) Ejido controls (1)	(4) Ejido controls (2)	(5) Ejido controls (3)	(6) Margínality Index	(7) Ejido controls, municipality FE	(8) US state FE, hh level	(9) US state FE, ejido level	(10) Household corn prod status	(11) Government programs	(12) NAFTA controls
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PROGRAM × ELIGIBLE × 1997	0.146**	0.155**	0.161**	0.146**	0.141*	0.168**	0.142	0.177***	0.205***	0.148**	0.159**	0.135
	(0.068)	(0.070)	(0.071)	(0.072)	(0.074)	(0.070)	(0.092)	(0.068)	(0.075)	(0.071)	(0.071)	(0.090)
PROGRAM × 1997	-0.026	-0.028	-0.026	-0.021	-0.012	-0.033	-0.018	-0.032	-0.070	-0.021	-0.022	-0.026
	(0.054)	(0.057)	(0.055)	(0.058)	(0.058)	(0.054)	(0.082)	(0.051)	(0.056)	(0.055)	(0.056)	(0.080)
Observations	1,849	1,805	1,805	1,741	1,677	1,805	1,805	1,805	1,805	1,795	1,795	1,785
Number of households	926	904	904	872	840	904	904	904	904	899	899	894
Number of ejidos	221	215	215	209	202	215	215	215	215	214	215	214
R-squared	0.228	0.229	0.234	0.247	0.251	0.235	0.415	0.276	0.260	0.241	0.236	0.424
F-test								18.703	5.074			
Prob > F								0.000	0.000			
Time FE	state	state	state	state	state	state	municipality	state	state	state	state	municipality
Household controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ejido controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	household	household	household	household	household	household	household	household	household	household	household	household
Restriction	-	yes	-	-	-	-	-	-	-	-	-	-

*** p<0.01, ** p<0.05, * p<0.1. Standard errors (in brackets) clustered at the ejido level. The dependent variable is "Migrant household" in all specifications. All specifications include eligibility-state-year fixed effects. Definitions of "Migrant household," "Program," "Timing," "Eligible," and household are in the text. See also the text also for the list of household controls. The list of ejido level controls is the same as in Table 6.

TABLE A7

DDD ESTIMATES: EJIDOS WITH BOUNDARY ISSUES (ALL HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Migrant household				Number of migrants	Share migrants	Migrant household	Number of migrants	Share migrants
Model	LPM	LPM	LPM	LPM	OLS	OLS	LPM	OLS	OLS
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PANEL A: CONTROL FOR EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × ELIGIBLE × 1997	0.115	0.134*	0.146*	0.144**	0.466***	0.083***			
	(0.074)	(0.072)	(0.075)	(0.069)	(0.175)	(0.023)			
PROGRAM × 1997	-0.024	-0.030	-0.021	-0.015	-0.106	-0.022			
	(0.063)	(0.062)	(0.062)	(0.058)	(0.138)	(0.018)			
TIMING × ELIGIBLE × 1997							0.110**	0.311**	0.052***
							(0.049)	(0.121)	(0.016)
TIMING × 1997							-0.025	-0.091	-0.015
							(0.041)	(0.094)	(0.012)
PROGRAM × BOUNDARY × 1997	0.056	0.057	-0.018	-0.029	-0.056	-0.008	-0.030	-0.034	-0.007
	(0.085)	(0.078)	(0.074)	(0.068)	(0.199)	(0.025)	(0.065)	(0.189)	(0.024)
BOUNDARY × 1997	-0.147**	-0.134**	-0.027	-0.023	-0.162	-0.022	-0.032	-0.188	-0.025
	(0.062)	(0.058)	(0.056)	(0.051)	(0.148)	(0.017)	(0.049)	(0.140)	(0.016)
Observations	1,852	1,849	1,849	1,849	1,849	1,849	1,744	1,744	1,744
Number of households	926	926	926	926	926	926	873	873	873
Number of ejidos	221	221	221	221	221	221	209	209	209
R-squared	0.255	0.332	0.514	0.229	0.259	0.197	0.241	0.274	0.212
PANEL B: EXCLUDE EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × ELIGIBLE × 1997	0.120	0.138	0.135	0.129	0.587***	0.100***			
	(0.093)	(0.088)	(0.093)	(0.083)	(0.223)	(0.029)			
PROGRAM × 1997	-0.010	-0.011	-0.012	-0.004	-0.139	-0.027			
	(0.071)	(0.066)	(0.070)	(0.064)	(0.161)	(0.021)			
TIMING × ELIGIBLE × 1997							0.111*	0.400***	0.067***
							(0.058)	(0.149)	(0.019)
TIMING × 1997							-0.015	-0.101	-0.017
							(0.046)	(0.113)	(0.014)
Observations	1,328	1,326	1,326	1,326	1,326	1,326	1,245	1,245	1,245
Number of households	664	664	664	664	664	664	623	623	623
Number of ejidos	159	159	159	159	159	159	150	150	150
R-squared	0.288	0.373	0.534	0.270	0.291	0.235	0.285	0.311	0.258
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Econometric model: Linear Probability Model (LPM) or OLS. Sample: all households (Panel A); exclude ejidos which report having implemented the program because of boundary issues (46 ejidos), or having failed to implement the program because of boundary issues and/or disputes between eligible and non-eligible households (16 ejidos; Panel B). Details of the various specifications at the bottom of the table are valid for both panels. All specifications include eligibility-state-year fixed effects. The specifications in Columns (1), (2), and (3) also include state and eligibility-state fixed effects, the interaction program × eligible, and the eligibility indicator. The specifications in Columns (1) and (2) include also the program indicator. Definitions of "Migrant household," "Program," "Timing," "Eligible," and household in the text. See the text for the list of household controls.

TABLE A8
DDD ESTIMATES: ANTICIPATION ISSUES (ALL HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Migrant household				Number of migrants	Share migrants	Migrant household	Number of migrants	Share migrants
Model	LPM coef/se	LPM coef/se	LPM coef/se	LPM coef/se	OLS coef/se	OLS coef/se	LPM coef/se	OLS coef/se	OLS coef/se
PANEL A									
PROGRAM × ELIGIBLE × 1997	0.163*	0.183**	0.152*	0.163**	0.543***	0.104***			
	(0.086)	(0.081)	(0.084)	(0.080)	(0.204)	(0.027)			
PROGRAM × 1997	-0.035	-0.048	-0.024	-0.029	-0.182	-0.038*			
	(0.066)	(0.064)	(0.067)	(0.064)	(0.152)	(0.020)			
TIMING × ELIGIBLE × 1997							0.121**	0.348**	0.061***
							(0.056)	(0.138)	(0.017)
TIMING × 1997							-0.035	-0.128	-0.022
							(0.046)	(0.107)	(0.013)
IN-PROCESS × ELIGIBLE × 1997	0.076	0.079	0.008	0.041	0.142	0.045	0.052	0.142	0.037
	(0.103)	(0.097)	(0.072)	(0.073)	(0.214)	(0.031)	(0.071)	(0.214)	(0.029)
IN-PROCESS × 1997	-0.031	-0.048	0.011	-0.010	-0.103	-0.029	-0.028	-0.127	-0.026
	(0.087)	(0.080)	(0.064)	(0.062)	(0.191)	(0.028)	(0.061)	(0.192)	(0.027)
Observations	1,852	1,849	1,849	1,849	1,849	1,849	1,744	1,744	1,744
Number of households	926	926	926	926	926	926	873	873	873
Number of ejidos	221	221	221	221	221	221	209	209	209
R-squared	0.249	0.328	0.514	0.228	0.255	0.195	0.239	0.270	0.208
PANEL B: CONTROL FOR EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × ELIGIBLE × 1997	0.144*	0.166**	0.149*	0.161**	0.526**	0.102***			
	(0.086)	(0.082)	(0.085)	(0.080)	(0.204)	(0.027)			
PROGRAM × 1997	-0.031	-0.043	-0.016	-0.020	-0.145	-0.033			
	(0.071)	(0.068)	(0.070)	(0.066)	(0.159)	(0.021)			
TIMING × ELIGIBLE × 1997							0.122**	0.347**	0.061***
							(0.056)	(0.138)	(0.017)
TIMING × 1997							-0.033	-0.121	-0.021
							(0.047)	(0.108)	(0.014)
IN-PROCESS × ELIGIBLE × 1997	0.072	0.077	0.009	0.043	0.146	0.046	0.055	0.150	0.038
	(0.099)	(0.092)	(0.072)	(0.072)	(0.213)	(0.030)	(0.071)	(0.213)	(0.029)
IN-PROCESS × 1997	-0.014	-0.033	0.012	-0.010	-0.097	-0.028	-0.033	-0.134	-0.028
	(0.085)	(0.078)	(0.064)	(0.062)	(0.190)	(0.027)	(0.062)	(0.193)	(0.026)
PROGRAM × BOUNDARY × 1997	0.061	0.058	-0.014	-0.026	-0.059	-0.009	-0.030	-0.049	-0.009
	(0.085)	(0.079)	(0.075)	(0.068)	(0.202)	(0.025)	(0.065)	(0.195)	(0.024)
BOUNDARY × 1997	-0.151**	-0.136**	-0.030	-0.025	-0.160	-0.021	-0.032	-0.180	-0.025
	(0.062)	(0.059)	(0.056)	(0.051)	(0.151)	(0.017)	(0.049)	(0.145)	(0.016)
Observations	1,852	1,849	1,849	1,849	1,849	1,849	1,744	1,744	1,744
Number of households	926	926	926	926	926	926	873	873	873
Number of ejidos	221	221	221	221	221	221	209	209	209
R-squared	0.256	0.333	0.514	0.230	0.259	0.199	0.241	0.274	0.213
PANEL C: EXCLUDE EJIDOS WITH BOUNDARY ISSUES									
PROGRAM × ELIGIBLE × 1997	0.123	0.170*	0.137	0.143	0.599**	0.110***			
	(0.104)	(0.098)	(0.104)	(0.095)	(0.272)	(0.034)			
PROGRAM × 1997	0.008	-0.023	-0.008	-0.009	-0.115	-0.028			
	(0.080)	(0.074)	(0.080)	(0.076)	(0.216)	(0.027)			
TIMING × ELIGIBLE × 1997							0.121*	0.406**	0.071***
							(0.065)	(0.177)	(0.022)
TIMING × 1997							-0.022	-0.092	-0.018
							(0.053)	(0.142)	(0.017)
IN-PROCESS × ELIGIBLE × 1997	0.009	0.081	0.005	0.038	0.035	0.027	0.046	0.032	0.021
	(0.118)	(0.112)	(0.085)	(0.093)	(0.338)	(0.043)	(0.092)	(0.333)	(0.041)
IN-PROCESS × 1997	0.045	-0.030	0.009	-0.012	0.061	-0.003	-0.032	0.036	-0.002
	(0.094)	(0.090)	(0.077)	(0.081)	(0.312)	(0.039)	(0.081)	(0.304)	(0.038)
Observations	1,328	1,326	1,326	1,326	1,326	1,326	1,245	1,245	1,245
Number of households	664	664	664	664	664	664	623	623	623
Number of ejidos	159	159	159	159	159	159	150	150	150
R-squared	0.289	0.373	0.534	0.271	0.291	0.236	0.285	0.311	0.258
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Econometric model: Linear Probability Model (LPM) or OLS. Sample: all households (Panel A and B); exclude ejidos which report having implemented the program because of boundary issues (46 ejidos), or having failed to implement the program because of boundary issues and/or disputes between eligible and non-eligible households (16 ejidos; Panel C). Details of the various specifications at the bottom of the table are valid for all panels. All specifications include eligibility-state-year fixed effects. The specifications in Columns (1), (2), and (3) also include state and eligibility-state fixed effects, the interaction program × eligible, and the eligibility indicator. The specifications in Columns (1) and (2) include also the program indicator. Definitions of "Migrant household," "Program," "Timing," and household in the text. See the text for the list of household controls.

TABLE A9
REMITTANCES (1997 CROSS-SECTION ONLY, ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(6)
Dependent variable	Household receives remittances		Amount remittances	Household receives remittances	Amount remittances
Model	LPM coef/se	LPM coef/se	LPM coef/se	LPM coef/se	OLS coef/se
PANEL A: FROM MEMBERS CURRENTLY ABROAD					
PROGRAM × 1997	0.021	0.065*	76.893		
	(0.038)	(0.038)	(66.943)		
TIMING × 1997				0.033	47.528
				(0.020)	(43.113)
Observations	600	573	572	538	537
Number of ejidos	187	178	178	168	168
Mean dep variable	0.183	0.186	161.294	0.180	164.940
R-squared	0.173	0.307	0.146	0.314	0.147
PANEL B: FROM MEMBERS WHO HAVE BEEN ABROAD WITHIN PAST 5 YEARS					
PROGRAM × 1997	0.007	0.047	72.008		
	(0.039)	(0.038)	(67.024)		
TIMING × 1997				0.026	45.726
				(0.021)	(43.106)
Observations	600	573	572	538	537
Number of ejidos	187	178	178	168	168
Mean dep variable	0.200	0.204	164.003	0.197	167.684
R-squared	0.181	0.321	0.148	0.335	0.149
State-Year FE	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes
Ejido controls	-	yes	yes	yes	yes

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Details of the various specifications at the bottom of the table are valid for all panels. The specifications in Columns (1), (2), and (3) include state fixed effects. The specification in Columns (1) and (2) include also the program indicator. Definitions of "Migrant household," "Program," "Timing," and household in the text. See Table 4 for the list of household controls. Ejido level controls include: log ejido area, share of communal land relative to all agricultural land, number of ejidatarios, binary indicators for indigenous ejido, affiliation with an ejido union, access to paved road.

TABLE A10
LAND SALES, RENTALS AND SHARECROPPING AGREEMENTS (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	Ejidal plot rented	Any plot rented	Any plot rented or sharecropped	Any plot rented, sharecropped, or bought	Any plot bought/sold	Number of ejidal plots rented	Number of plots rented	Hectares of land rented	Hectares of land rented or sharecropped	Hectares of land rented, sharecropped, bought/sold	Hectares of land bought/sold	Any plot rented	Any plot rented or sharecropped	Any plot rented, sharecropped, or bought/sold	Any plot bought/sold	Number of ejidal plots rented	Number of plots rented	Hectares of land rented	Hectares of land rented or sharecropped	Hectares of land rented, sharecropped, or bought/sold	Hectares of land bought/sold
Model	LPM	LPM	LPM	LPM	LPM	OLS	OLS	OLS	OLS	OLS	OLS	LPM	LPM	LPM	LPM	OLS	OLS	OLS	OLS	OLS	OLS
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PANEL A: TRANSACTIONS INCREASING AVAILABLE LAND																					
PROGRAM × 1997	0.006	0.003	-0.005	0.017	0.025	0.040	-0.002	-0.106	-0.078	0.071	0.150										
	(0.017)	(0.018)	(0.022)	(0.031)	(0.023)	(0.035)	(0.031)	(0.133)	(0.219)	(0.234)	(0.103)										
TIMING × 1997												-0.004	-0.008	0.005	0.011	0.014	-0.007	-0.062*	0.003	0.090	0.088
												(0.011)	(0.014)	(0.018)	(0.013)	(0.021)	(0.019)	(0.036)	(0.108)	(0.110)	(0.062)
Observations	1,194	1,198	1,198	1,198	1,198	1,194	1,194	1,194	1,194	1,194	1,198	1,118	1,118	1,118	1,118	1,114	1,114	1,114	1,114	1,114	1,118
Number of households	598	600	600	600	600	598	598	598	598	598	600	560	560	560	560	558	558	558	558	558	560
Number of ejidos	187	187	187	187	187	187	187	187	187	187	187	176	176	176	176	176	176	176	176	176	176
R-squared	0.019	0.041	0.038	0.091	0.057	0.068	0.053	0.020	0.037	0.039	0.050	0.054	0.043	0.089	0.056	0.072	0.058	0.077	0.048	0.058	0.051
F-test	0.386	0.514	0.559	6.598	0.897	1.191	0.671	0.519	0.456	0.982	0.736	0.517	0.596	6.967	0.899	1.375	0.816	0.505	0.533	0.961	0.747
Prob > F	0.999	0.983	0.970	0	0.625	0.240	0.902	0.982	0.994	0.499	0.839	0.983	0.953	0	0.621	0.107	0.740	0.985	0.978	0.530	0.826
PANEL B: TRANSACTIONS DECREASING AVAILABLE LAND																					
PROGRAM × 1997	0.002	0.012	0.016	0.024	0.009	-0.038	-0.038	-0.211	-0.162	-0.007	0.155										
	(0.020)	(0.016)	(0.021)	(0.032)	(0.022)	(0.039)	(0.039)	(0.304)	(0.334)	(0.392)	(0.196)										
TIMING × 1997												0.019	0.025	0.012	-0.005	0.007	0.007	0.041	0.111	0.056	-0.056
												(0.012)	(0.015)	(0.022)	(0.013)	(0.017)	(0.017)	(0.197)	(0.212)	(0.234)	(0.089)
Observations	1,194	1,198	1,198	1,198	1,198	1,194	1,194	1,198	1,198	1,198	1,198	1,118	1,118	1,118	1,118	1,114	1,114	1,118	1,118	1,118	1,118
Number of households	598	600	600	600	600	598	598	600	600	600	600	560	560	560	560	558	558	560	560	560	560
Number of ejidos	187	187	187	187	187	187	187	187	187	187	187	176	176	176	176	176	176	176	176	176	176
R-squared	0.088	0.089	0.059	0.160	0.069	0.168	0.168	0.127	0.080	0.117	0.079	0.096	0.067	0.162	0.073	0.176	0.176	0.128	0.081	0.120	0.087
F-test	0.982	0.914	0.748	3.917	1.315	1.324	1.324	0.782	0.547	1.034	3.811	1.011	0.800	4.353	1.260	1.247	1.247	0.708	0.528	1.230	0.884
Prob > F	0.499	0.599	0.826	4.49e-09	0.140	0.134	0.134	0.784	0.974	0.425	9.49e-09	0.458	0.761	3.10e-10	0.181	0.191	0.191	0.867	0.980	0.205	0.644
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household

*** p<0.01, ** p<0.05, * p<0.1. Standard errors (in brackets) clustered at the ejido level. Definitions of "Program," "Timing," and household are in the text. Also see the text also for the list of household controls.

TABLE A11
IMPACT ON LAND USED (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Hectares of land used					
Model	OLS	OLS	OLS	OLS	OLS	OLS
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PROGRAM × 1997	-0.747	-0.918	-1.017	-1.019	-1.019	
	(0.765)	(0.803)	(0.876)	(0.793)	(0.793)	
TIMING × 1997						-0.297
						(0.405)
Observations	1,198	1,196	1,196	1,196	1,196	1,116
Number of households	600	600	600	600	600	560
Number of ejidos	187	187	187	187	187	176
R-squared	0.191	0.512	0.711	0.082	0.082	0.088
State-Year FE	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household

*** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the ejido level. The specifications in Columns (1), (2), and (3) include state fixed effects. The specifications in Columns (1) and (2) include also the program indicator. Definitions of "Program" and household in the text.

TABLE A12
WAGE (NON-FAMILY) LABOR (ALL HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	At least one work day	At least one work week	Number of work weeks	Number of work days	Number of workers	At least one work day	At least one work week	Number of work weeks	Number of work days	Number of workers
Model	LPM	LPM	OLS	OLS	OLS	LPM	LPM	OLS	OLS	OLS
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PANEL A: ELIGIBLE HOUSEHOLDS										
PROGRAM × 1997	-0.120**	-0.083	-1.172	-8.671	-2.492	-0.029	-0.072	-0.196	-1.388	-0.425
	(0.056)	(0.059)	(0.972)	(6.913)	(2.025)	(0.066)	(0.069)	(1.200)	(8.594)	(2.519)
Observations	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170
Number of households	586	586	586	586	586	586	586	586	586	586
Number of ejidos	187	187	187	187	187	187	187	187	187	187
R-squared	0.119	0.100	0.095	0.094	0.096	0.295	0.267	0.324	0.322	0.323
Mean dep variable	0.351	0.307	2.678	19.781	5.651	0.351	0.307	2.678	19.781	5.651
F-test	2.061	1.837	2.893	2.524	2.696	1229.681	4002.927	750.475	638.850	847.735
Prob > F	0.002	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PANEL B: INELIGIBLE HOUSEHOLDS										
PROGRAM × 1997	0.046	-0.008	0.184	1.347	0.420	0.343**	0.083	0.933	7.893	2.173
	(0.099)	(0.087)	(0.900)	(6.488)	(1.880)	(0.147)	(0.126)	(1.173)	(8.508)	(2.427)
Observations	639	639	639	639	639	639	639	639	639	639
Number of households	320	320	320	320	320	320	320	320	320	320
Number of ejidos	139.000	139.000	139.000	139.000	139.000	139.000	139.000	139.000	139.000	139.000
R-squared	0.204	0.171	0.066	0.068	0.064	0.409	0.364	0.211	0.212	0.210
Mean dep variable	0.288	0.251	1.859	13.787	3.922	0.288	0.251	1.859	13.787	3.922
F-test	15.557	15.198	75.736	80.242	68.534	247.260	163.351	31.568	1516.415	38.011
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Time FE	state	state	state	state	state	municipality	municipality	municipality	municipality	municipality
Household controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	household	household	household	household	household	household	household	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Econometric model: Linear Probability Model (LPM) or OLS. Sample: eligible households (Panel A); ineligible households (Panel B). Details of the various specifications at the bottom of the table are valid for both panels. Definitions of "Migrant household," "Program," "Eligible," and household are in the text. See Table 4 for the list of household controls.

TABLE A13
NON-AGRICULTURAL LABOR (MEMBERS CURRENTLY AT HOME, ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	At least one member working outside agriculture					
Model	LPM	LPM	LPM	LPM	LPM	LPM
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PROGRAM × 1997	0.013	0.015	0.014	0.012	0.012	
	(0.044)	(0.043)	(0.046)	(0.043)	(0.043)	
TIMING × 1997						-0.000
						(0.024)
Observations	1,200	1,198	1,198	1,198	1,198	1,118
Number of households	600	600	600	600	600	560
Number of ejidos	187	187	187	187	187	176
R-squared	0.101	0.210	0.385	0.192	0.192	0.186
F-test	2302.996	93.179	26.376	28.439	28.439	50.326
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Mean dep variable	0.148	0.148		0.148	0.148	0.148
State-Year FE	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes
Unit FE	-	-	ejido	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Econometric model: Linear Probability Model (LPM). Definition of non-agricultural status: binary indicator taking value 1 if at least one member reports working outside agriculture as primary occupation. The mean of the dependent variable refers to the 1994 survey. The specificatons in Columns (1), (2), and (3) include state fixed effects. The specifications in Columns (1) and (2) include also the program indicator. Definitions of "Program," "Timing," and household are in the text. See Table 4 for the list of household controls.

TABLE A14
ADDITIONAL ROBUSTNESS CHECKS (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	Baseline	Restricted sample	Ejido controls	Distance to the US (1920s)	Municipality migration rates (1990)	US state shares, hh level	US state shares, ejido level	US state shares, muni level	US state FE, muni level	Municipality year FE	US state shares, hh level	US state shares, ejido level	US state FE, hh level	US state FE, ejido level	Basic crop shock exposure	Corn seller, buyer, self sufficient	Basic crop exposure and hh status (1)	Basic crop exposure and hh status (2)	Procampo and Pronasol	Procampo (1)	Procampo (2)
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PROGRAM × 1997	0.122***	0.129***	0.133***	0.133***	0.127***	0.141***	0.132***	0.123**	0.125***	0.129***	0.137***	0.140***	0.154***	0.136***	0.139***	0.133***	0.148***	0.139***	0.127***	0.131***	0.130***
	(0.045)	(0.045)	(0.049)	(0.049)	(0.048)	(0.050)	(0.049)	(0.048)	(0.046)	(0.042)	(0.043)	(0.040)	(0.042)	(0.041)	(0.042)	(0.044)	(0.043)	(0.044)	(0.043)	(0.043)	(0.043)
Distance to the US (1920s)				-0.000																	
				(0.000)																	
Municipality migration rates (1990 census)					6.183																
					(4.061)																
Basic crop shock exposure															0.017		0.015				
															(0.059)		(0.059)				
Net corn buyer (1994)																0.032	0.045				
																(0.047)	(0.049)				
Net corn seller (1994)																0.020	0.035	-0.001			
																(0.054)	(0.057)	(0.093)			
Basic crop shock exposure × net corn seller																		0.016			
																		(0.113)			
Procampo																			0.002	-0.036	-0.083
																			(0.054)	(0.049)	(0.071)
Pronasol																			-0.039		
																			(0.154)		
Procampo × Pronasol																			0.012		
																			(0.158)		
Procampo magnitude (absolute level)																				0.000	
																				(0.000)	
Procampo magnitude (log level)																					0.012
																					(0.010)
Observations	1,198	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,120	1,176	1,120	1,120	1,172	1,166	1,166
Number of households	600	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	587	584	584
Number of ejidos	187	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	182	182
R-squared	0.210	0.214	0.228	0.228	0.232	0.265	0.286	0.298	0.289	0.418	0.459	0.448	0.444	0.461	0.433	0.418	0.434	0.433	0.422	0.425	0.423
F-test						6.899	12.119	14.162	7.176		11.506	16.127	18.287	14.921							
Prob > F						0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000							
Time FE	state	state	state	state	state	state	state	state	state	municipality	municipality	municipality	municipality	municipality	municipality	municipality	municipality	municipality	municipality	municipality	municipality
Household controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ejido controls	-	-	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sample restriction	-	yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit FE	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household

The econometric model is a Linear Probability Model for all specificatons. The Dependent variable is household migration for all specifications. The F-tests at the bottom of the table correspond to the test for the joint significance of the US state destination indicators.

TABLE A15
ANTICIPATION BEHAVIOR: CROSS-SECTIONAL RESULTS (ELIGIBLE HOUSEHOLDS)

Dependent variable	(1) Migrant household	(2) Migrant household	(3) Number of migrants	(4) Share migrants	(5) Migrant household	(6) Number of migrants	(7) Share migrants
Model	LPM	LPM	OLS	OLS	LPM	OLS	OLS
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
PANEL A: IMPACT OF FUTURE PROGRAM USING 1994 CROSS-SECTIONAL DATA ONLY							
SOON TO BE CERTIFIED (AUG - DEC 1994)	0.038	0.032	0.046	0.017			
	(0.051)	(0.045)	(0.088)	(0.013)			
SOON TO BE CERTIFIED (AUG 1994 - JUNE 1995)					0.006	0.032	0.002
					(0.032)	(0.067)	(0.009)
Observations	590	560	560	560	560	560	560
Number of ejidos	185	176	176	176	176	176	176
R-squared	0.245	0.307	0.312	0.248	0.307	0.312	0.247
F-test	8.472	26.411	40.930	30.275	19.698	36.765	25.312
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PANEL B: BASELINE ESTIMATES USING 1994 CROSS-SECTIONAL DATA ONLY							
PROGRAM	0.024	0.040	0.133	0.012			
	(0.031)	(0.035)	(0.083)	(0.012)			
TIMING					0.021	0.089*	0.010
					(0.018)	(0.047)	(0.007)
Observations	600	570	570	570	536	536	536
Number of ejidos	187	178	178	178	168	168	168
R-squared	0.241	0.302	0.310	0.226	0.317	0.319	0.234
F-test	7.180	24.277	35.864	23.988	32.588	43.922	25.289
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PANEL C: BASELINE ESTIMATES USING 1997 CROSS-SECTIONAL DATA ONLY							
PROGRAM	0.133***	0.144***	0.382***	0.059***			
	(0.051)	(0.046)	(0.146)	(0.017)			
TIMING					0.096***	0.258***	0.040***
					(0.029)	(0.091)	(0.011)
Observations	600	584	584	584	544	544	544
Number of ejidos	187	181	181	181	170	170	170
R-squared	0.235	0.352	0.351	0.257	0.355	0.362	0.270
F-test	30.344	10.610	12.288	10.953	17.255	18.440	16.092
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
State FE	yes	yes	yes	yes	yes	yes	yes
Household controls	-	yes	yes	yes	yes	yes	yes
Ejido controls	-	yes	yes	yes	yes	yes	yes

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Details of the various specifications at the bottom of the table are valid for all panels. Definitions of "Migrant household," "Program," "Timing," "Eligible," and household are in the text. See Table 4 for the list of household controls. Ejido level controls include: log ejido area, share of communal land relative to all agricultural land, number of ejidatarios, binary indicators for indigenous ejido, affiliation with an ejido union, access to paved road.

TABLE A16
DISAGGREGATION OF PROGRAM EFFECTS BY TIMING OF THE PROGRAM (ELIGIBLE HOUSEHOLDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dependent variable	Migrant household					Number of migrants					Share migrants				
Model	LPM					OLS					OLS				
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
TIMING × 1997	0.081***					0.218***					0.037***				
	(0.027)					(0.075)					(0.010)				
PROGRAM (1994-95) × 1997		0.169***					0.456***					0.075***			
		(0.054)					(0.152)					(0.020)			
PROGRAM (1996-97) × 1997		0.019					0.048					0.020			
		(0.049)					(0.136)					(0.019)			
PROGRAM (1994 - june 1995) × 1997			0.164***					0.341**					0.072***		
			(0.060)					(0.152)					(0.025)		
PROGRAM (july 1995 - june 96) × 1997			0.067					0.176					0.037*		
			(0.065)					(0.161)					(0.022)		
PROGRAM (july 1996 - 97) × 1997			0.003					-0.130					-0.004		
			(0.062)					(0.122)					(0.021)		
PROGRAM (1994) × 1997				0.151*					0.447**					0.066**	
				(0.088)					(0.224)					(0.033)	
PROGRAM (1995) × 1997				0.180***					0.467**					0.081***	
				(0.058)					(0.196)					(0.024)	
PROGRAM (1996) × 1997				0.042					0.146					0.034	
				(0.052)					(0.158)					(0.021)	
PROGRAM (1997) × 1997				-0.027					-0.138					-0.008	
				(0.063)					(0.136)					(0.022)	
PROGRAM (1994) × 1997					0.158*					0.495**					0.071**
					(0.088)					(0.222)					(0.033)
PROGRAM (early 1995) × 1997					0.159**					0.159					0.072**
					(0.068)					(0.155)					(0.033)
PROGRAM (late 1995) × 1997					0.169					0.356					0.053
					(0.145)					(0.333)					(0.046)
PROGRAM (early 1996) × 1997					0.018					0.096					0.029
					(0.057)					(0.178)					(0.024)
PROGRAM (late 1996) × 1997					0.097					0.076					0.031
					(0.080)					(0.134)					(0.022)
PROGRAM (1997) × 1997					-0.021					-0.184					-0.012
					(0.063)					(0.130)					(0.022)
Observations	1,118	1,118	1,078	1,118	1,078	1,118	1,118	1,078	1,118	1,078	1,118	1,118	1,078	1,118	1,078
Number of individuals	560	560	540	560	540	560	560	540	560	540	560	560	540	560	540
Number of ejidos	176	176	171	176	171	176	176	171	176	171	176	176	171	176	171
R-squared	0.216	0.218	0.218	0.219	0.221	0.241	0.244	0.248	0.246	0.253	0.187	0.188	0.194	0.191	0.195
F-test	43.374	22.919	28.296	12.555	11.519	9.726	7.668	5.990	10.705	15.698	4.742	4.354	4.239	10.497	8.082
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
State-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
hh-controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Unit FE	household	household	household	household	household	household	household	household	household	household	household	household	household	household	household

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors (in brackets) clustered at the ejido level. Definitions of "Migrant household," "Timing," "Eligible," and household are in the text. All explanatory variables reported in table, other than "Timing," are binary indicators taking value 1 if the household lives in an ejido certified at a specific time (in brackets). See Table 4 for the list of household controls. Ejido level controls include: log ejido area, share of communal land relative to all agricultural land, number of ejidatarios, binary indicators for indigenous ejido, affiliation with an ejido union, access to paved road. The information on the month of certification is missing for 18 eligible households living in ejidos certified in 1995 and 2 eligible households living in ejidos certified in 1996.