

Crime and Microenterprise Growth: Evidence from Mexico

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Abstract: In this paper we investigate one potential explanation for low rates of microenterprise growth: robbery. Robbery limits the incentives of entrepreneurs to invest in productive moveable assets, and is one of the main shocks reported by urban microentrepreneurs in a recent survey in Mexico. We explore the relationship between property crime and growth among microenterprises in Mexico using repeated cross-sectional data on these enterprises and the incidence of crime. We find that higher rates of property crime are associated with a significantly lower probability that an enterprise plans to expand in the next 12 months or experience income growth. These effects are unique to property crimes and are independent of other types of crime, including violent offenses. Finally, our results are not driven by border or drug crime states, and are robust to a number of controls for heterogeneity in the growth potential of firms and for local institutional quality.

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Microenterprises—firms that operate with 10 employees or less—are recognized as large generators of income and employment in the developing world, and there is increased interest among policy-makers and researchers in improving their productivity. The expanding literature on the subject, however, has generated conflicting observations about the barriers to growth faced by the sector. On one hand, several papers that estimate returns to capital for microenterprises using field experiments find that some firms generate very high returns (McKenzie and Woodruff, 2006, 2008). For example, in Mexico, the country of focus of this paper, McKenzie and Woodruff (2008) find estimated monthly returns in the range of 20-33%. These are well above the rates charged by most formal lenders and suggest that some microentrepreneurs have the capacity to grow their way into higher levels of capital, employees, and income. It is argued that what prevents these entrepreneurs from doing so are the high effective costs of expanding their capital (due to credit and savings constraints, e.g., McKenzie and Woodruff 2008) or labor inputs (due to fixed labor costs, e.g., Emran et. al. 2007).

Another potential cause for low rates of microenterprise growth, however, is weak institutions, specifically the potential for weak property rights to limit firm size (De Soto 1989). In the absence of formal and informal institutions which protect property, entrepreneurs have reduced incentives to invest in productive assets. An institutional story can better explain why some firms appear reluctant to increase in size even when given the opportunity. For example, De Mel, McKenzie and Woodruff (2008) find that many microenterprises do not invest in additional assets, even when provided with capital. The fact that some microentrepreneurs choose not to invest in equipment or machinery for their businesses, even when they have access to cheap (or free) capital, suggests that these investments may be riskier than one might believe based on mean returns alone.

In studying the institutional drivers of low microenterprise growth, the focus to date largely has been on the role of the state and corruption (DeSoto 1989). Over the past decade, many studies have examined the role of corruption and other forms of state rent-extraction in limiting the incentives for growth among microenterprises (Safavian et al 2001, Fjelstad et al 2006, Francisco and Pontara 2007, Hallward-Dreimler 2009, Clarke 2011). Almost no attention, however, has been paid to the role of private individuals or groups who can seize others' assets with impunity. Robbery can pose a severe threat to firm owners and might provide a strong incentive for enterprises to limit their investment in productive but vulnerable moveable assets. For example, a 2008 survey of microenterprises in Mexico finds that the incidence of robbery is higher than that of fines and bribes and the average loss three times as high (Table 1). In the face of such risks, entrepreneurs may reasonably limit their plans for investment in new capital or expanded operations. Furthermore, they may face reduced credit access if microfinance institutions are reluctant to accept as collateral assets that have a high probability of being stolen.

To our knowledge, only one other paper has examined the impact of crime on microenterprise behavior. Krkoska and Robeck (2009) find cross-sectional evidence that enterprises in Eastern Europe and Central Asia suffer substantial losses from street crime, and that those enterprises that suffer the largest losses are the least likely to make new investments. We argue that robbery by private agents is an important new dimension of the costs of weak property rights, particularly in developing countries facing high degrees of property and personal violence.

We investigate the link between robbery and microenterprise growth using data from Mexico, a country with a large microenterprise sector and high rates of property-related crimes. We combine repeated cross-sectional surveys of microenterprises with repeated surveys of the general population on crime. By using repeated surveys we can control for time-invariant, state-level

unobserved characteristics as well as control for a host of state-time varying effects that may jointly determine robbery and microenterprise decisions, such as local economic conditions, local institutional quality and demographic changes. Overall we find strong suggestive evidence that higher robbery rates significantly reduce the probability that microenterprises will expand their operations. We also find that these microenterprises are much less likely to experience income growth in the ensuing 12 months. This relationship holds after controlling for other types of crime, including homicides and assaults, which may be related to underlying factors that determine both crime and microenterprise behavior but have little direct impact on microenterprises. The relationship also holds after we control for other types of property crime, such as mugging, that do not reflect expropriation risks for enterprise assets but may constitute income shocks both for an enterprise and its customers. Finally, we find that the effects of robbery of different types of capital vary by industry, with vehicle robbery rates only affecting expansion among enterprises in the transport sector. These results suggest that although Mexican microenterprises operate in an environment with widespread violent crimes, it is the threat of robbery of the specific assets used in their enterprise that limits their growth.

We also perform a large number of robustness checks to address concerns that factors other than expropriation risk drive the link between microenterprise expansion and robbery rates. These factors include: heterogeneity among microenterprises and the potential for low productivity firms to be differentially located in states with high robbery rates; the potential for reverse causation, in which crime rates themselves are affected by the growth experiences of microenterprises; the potential for groups of states that have been more affected by violence to drive the results; and the potential for unobserved institutional changes to simultaneously determine robbery rates and microenterprise behavior. We include numerous controls and find that our results are robust to

their inclusion. Overall we view our results as a strong indication of a causal relationship between property crimes and microenterprise expansion.

The paper proceeds as follows. In Section 2, we describe the datasets that we use to conduct the analysis. Section 3 outlines our empirical strategy, while section 4 presents baseline results. In section 5, we consider alternative explanations for these results, while section 6 provides robustness checks. In Section 7, we offer conclusions.

Section 2: The Data

2A. Microenterprise Data

The data on microenterprises come from the ENAMIN, or National Survey of Microentrepreneurs, a cross-sectional, nationally representative survey conducted by INEGI, the National Statistical Institute. We restrict attention to the two most recent ENAMIN surveys, conducted in 2002 and 2008, as they match most closely to available crime data¹. For comparability we limit the 2008 sample to urban microenterprises, defined as those operating in areas with a population of 100,000 or more. Our geographic area of focus therefore is urban areas of states. This is the finest level of geographic detail we can achieve, as none of the data are representative at the municipal level².

Summary statistics on the sample are provided in Table 2. The sample is largely male (64%), married (73%), and with a high level of education (25% have some tertiary education). In terms of size, as measured by employees, only 21.8% of enterprises in 2001 and 22.8% in 2008 had any

¹ The 2002 ENAMIN survey was conducted from October 2001 to January 2002. The 2008 ENAMIN survey was conducted between October 2008 and February 2009. We take the 4th quarter of 2001 and 2008 as the relevant period. The sample framework for the ENAMIN changed between 2001 and 2008. The earlier sample was drawn from the National Survey of Urban Employment (ENEU), creating an entirely urban sample, while the later sample was drawn from the National Survey of Occupation and Employment (ENOE), creating a combined urban-rural sample.

² We also limit the sample to municipalities that appear in both survey years. This yields a relatively narrow geographic focus, as our sample includes only 120 municipalities out of almost 2500 in total.

employees other than the owner, with the average number falling from 1.9 in 2001 to 1.7 in 2008. Approximately 40% of these employees are unpaid. Average monthly profits were \$415 in 2001 and \$425 in 2008. These statistics confirm the “micro” size of many microenterprises.

Our primary measure of enterprise growth is entrepreneurs’ responses to the question of how they plan to continue the enterprise in the future. We count entrepreneurs who say they plan to increase the number of products as having expansion plans, as this will necessitate an increase in capital, either fixed or working. We view this response as one that is highly correlated with enterprise growth. The majority of the other responses, which include a reduction in the number of products or workers, are most likely correlated with stagnation or shrinkage of the business.³

As shown in Table 2, the overall percentage of enterprises with expansion plans falls across the two periods. In 2001, 14.3% of enterprises had plans to expand products/services or employees. This figure falls to 9.1% in 2008. There also is significant variation in the averages at the state level. In 27 out of 32 states, the average percentage of enterprises with expansion plan falls, while in 5 states it rose. The size of the changes ranges from a 20.7 percentage point decline to a 9.9 percentage point increase. Thus, the trajectory has been far from uniform across states, a fact we exploit in our estimations.

We perform several checks to ensure that the expansion measure captures enterprise growth. First we compare estimated working capital investment, measured as purchases of primary materials, packaging, products and merchandise for sale⁴. Second, we consider measures of enterprise growth from the labor force surveys from which the ENAMIN are drawn. These surveys (ENEU/ENOE)

³ We cannot use enterprise assets to measure enterprise growth, because the survey module changed in 2008, generating a high non-response rate (over 20%) and values with a likely high degree of measurement error.

⁴ The values come from the ENAMIN and are converted to December 2001 pesos and then to US dollars at the year-end exchange rate.

are rotating panels that follow households for five quarters. Approximately twenty percent of the sample rotates out every period, such that we can follow eighty percent of the ENAMIN sample for one quarter, 60% for two quarters, etc. We consider variables that likely are closely related to enterprise growth. These include moving from a non-fixed to a fixed location (Fayzlnber et. al. 2010), changing from an enterprise with zero employees to an enterprise with any employees⁵, whether or not the individual reports exiting self-employment, and percent changes in income.

In Table 3, we compare the changes in the aforementioned variables one, two and three quarters following the ENAMIN survey, as well as the information on working capital. We find that average and median working capital investments are significantly larger for firms that have expansion plans than for those that do not. We also find that entrepreneurs who say they plan to expand have significantly higher income growth two and three quarters after the ENAMIN survey, are significantly more likely to have moved their enterprise to a fixed location one quarter after, significantly more likely to have added at least one employee one or three quarters after, and significantly less likely to exit self-employment two or three quarters after. These comparisons provide some evidence that responses on expansion plans are indeed linked with enterprise growth.

2.B. Crime Data

The data on crime come from the National Survey of Insecurity, or the ENSI. This nationally representative household survey generates dependable estimates of the incidence of common offenses, including vehicle robbery, home robbery, physical assault and sexual assault, as well as reporting rates, economic losses, and perceptions of insecurity. As a household level survey the ENSI produces more reliable estimates of victimization rates than official crime statistics due to the

⁵ We cannot use the total change in employees as the ENEU includes bins for different ranges of employees.

low reporting rates for many of these crimes. For example, according to the ENSI, on average 32% of home robberies, 17% of partial vehicle robberies, 87% of full vehicle robbery and 47% of physical assaults are reported to the authorities. Furthermore, the ENSI provides details on robbery which are absent in official statistics. This allows us to separate crimes that more likely affect microenterprise customers than microenterprises themselves and to consider the implications of robbery of certain assets for firms that are more likely to use them.

There are two drawbacks to the ENSI for the purposes of our study. The first is that the finest geographic level at which it is representative is state-urban. While we can achieve more geographic disaggregation by using reported crimes, we lose a vast amount of detail as there is only one “robbery” category. In addition, as a proxy for true crime incidence, reported crimes likely suffer from high rates of measurement error. This is problematic as reporting rates and the degree of measurement error likely are linked with factors- such as institutional quality- that jointly determine crime rates and microenterprise outcomes, introducing a source of bias (Soares 2004).

The second drawback is that the earliest nationally representative ENSI survey starts in year 2004.⁶ We address the time gap by projecting 2001 crime rates using a linear time trend. For robustness, we consider two alternatives. The first is using 2004 crime rates as a proxy for 2001 crime rates- a strategy that assumes no change in crime incidence across the three year period. The second is projecting 2001 crime rates using an exponential time trend- a strategy that assumes a constant percentage change in crime rates. We do not show the results from the two alternative specifications, but they are similar to those produced by the linear time trend and are available upon request. In the remainder of this section we discuss the 2004 and 2008 crime data.

⁶We use the ENSI-3, which corresponds to the year 2004 and the ENSI-6, which corresponds to year 2008. There are other ENSI surveys, but only these three are representative at the national and state level.

Our interest is in property crime affecting the capital of microenterprises. The most appropriate measure of such crime in the ENSI data is the rate of home robberies. Many microenterprises are operated out of the entrepreneur's home, with all assets stored and trade taking place in the home, while other entrepreneurs who work outside of their home may also store their equipment and other capital at home overnight. In such cases, our measure of home robbery captures the direct threat to these enterprises. In other cases, enterprises may operate out of another fixed location or the entrepreneur may store assets elsewhere. In these instances, robberies at micro-scale commercial locations would be a more appropriate measure. Because the ENSI survey focuses on a household sample, we do not have data on commercial robberies at these locations. However, home robbery rates may be quite correlated with commercial robberies at the state-level, making home robbery rates an accurate measure of the property risks faced by microentrepreneurs.

The ENSI also includes two other types of property crimes: vehicle robberies and muggings. Vehicle robberies capture the risk to much of the asset base of the micro-transportation industry. There are two types of vehicle robbery; "full" robberies in which the entire vehicle is stolen and "partial" robberies in which parts and accessories are stolen. Muggings, on the other hand, typically involve theft of cash or other small valuables rather than primary enterprise assets. As a result, while these incidents may be considered income shocks to the enterprise, they may not reflect risk of expropriation of physical capital. Thus, we differentiate between the effects of home and vehicle robberies from those of muggings.

To control for other types of crime that would not be expected to directly influence the investment decisions of microentrepreneurs but may reflect underlying local factors that affect them, we also consider physical assault and sexual assault rates from the ENSI as well as official statistics on homicide rates, compiled by the Citizens' Institute for the Study of Insecurity (ICESI). To

convert these crime rates into measures of incidence, we take the percentage of individuals age 18 or older in urban areas of the state who report being victims of a particular crime in the past year⁷. It is important to note that two states are not included in the 2008 ENSI - Tamaulipas in the North and Tabasco in the South, Gulf region - restricting the overall sample to 30 out of 32 states.

Summary statistics on the incidence of different crimes and reporting rates are provided in Table 4. In 2004 the average home robbery rate of incidence was 2.8%, which means that, on average, 2.8% of adults age 18 or older in urban areas report being a victim of home robbery at least once in year 2004. This compares to 0.6% for full vehicle robbery, 1.9% for partial vehicle robbery, 0.2% for sexual assault and 1% for assault. In 2008 the home robbery rate falls slightly to 2.3%, while partial vehicle robbery shoots up to 5.2%, more than double the incidence of home robbery and close to five times the incidence of assault. While recent attention on crime in Mexico has focused on drug related violence, these statistics establish that non-drug crimes are also a serious concern for many residents.

To show the distribution of crimes across states, Figures 1A and 1B map average incidence across states for home robbery, partial vehicle robbery, full vehicle robbery and mugging for the years 2004 and 2008. Figure 1C maps changes in the averages over the four year period. The maps show a high degree of dispersion in crime incidence across states, and an absence of geographic concentration of property crime. The maps also show that changes in crime rates have been far from uniform across states, suggesting our results are not simply capturing regional phenomena with state level averages.

3. Empirical Strategy

⁷ Averages are weighted to be representative at the state level

Our starting point is a model in which robbery rates affect expansion:

$$y_{ijst} = \alpha + \beta_1 X_{ist} + \beta_2 Z_{st} + \beta_3 robbery_{st} + \beta_4 othercrime_{st} + \delta_t + \gamma_s + \eta_j + \varepsilon_{ijst} \quad (1)$$

where y_{ijst} is the outcome variable of individual i living in state s working in industry j interviewed at time t , X_{ist} is a vector of individual-level controls, Z_{st} is a vector of state time-varying controls, $robbery_{st}$ is the state and time-specific robbery rate, $othercrime_{st}$ is a vector of non-robbery crimes that vary by state and time, δ_t is a year fixed effect, γ_s is a state-level fixed effect, and η_j is an industry fixed effect. Our main outcome variable is a dummy variable that equals one if the firm plans to expand and zero otherwise. Our theory suggests that higher robbery rates are associated with reduced microenterprise expansion ($\beta_3 < 0$).

The difficulty in identifying the relationship between robbery and microenterprise outcomes arises from the fact that robbery rates and their changes over time are neither random across states nor orthogonal to other factors that impact the investment decisions of firms. This could lead to reverse causality, wherein microenterprise expansion attracts higher crime rates, or to omitted variable bias in our estimates of this relationship. Random assignment of a program that reduces crime rates could, in theory, eliminate these biases, though implementation of such a program on a sufficiently broad scale is challenging and costly. Instrumental variables could also eliminate these biases, but most of the instruments for crime rates used in the literature, such as weather, are likely to affect demand for microenterprise goods and services. Thus they would be directly correlated with microenterprise expansion decisions, making them invalid for our estimation.

Instead, we rely on differences in crime rates over time and across urban areas of states using repeated cross-section data. This allows us to control for state fixed effects as well as observable state and time varying factors which may jointly determine robbery and microenterprise expansion.

We break the latter group into two categories: other crimes and other state-time varying factors. For other crimes we start with non-property related crimes, including homicide, physical assault and mugging. Non-property related crimes allow us to isolate the impact of property crimes from those of other types of crime. This is important as robbery rates may be correlated with demand shocks for goods and services offered by microenterprises. In some of the estimations we therefore include muggings – defined in the ENSI surveys as robbery of pedestrians – as they are likely to have a greater impact on microenterprise customers than microenterprises themselves (with the exception of street vendors). As a result, mugging rates offer a useful test of the degree to which the effects of robberies are primarily coming from reductions in demand rather than heightened expropriation risk. In addition, non-property related crimes help control for unobserved factors which vary across states and across time and may jointly determine crime rates and enterprises' investment decisions. For example, the returns to criminal activity may differ in areas where where enterprises are more visible and growing more rapidly. If criminals do not differentially locate based on crime type, the inclusion of non-property related crimes can help account for this reverse causality.

We next consider other property-related crimes, specifically vehicle robbery, to check if the effects of robbery indeed stem from expropriation risk. If expropriation risk is the primary factor driving our estimates, for example, we should observe that transport enterprises respond differentially to vehicle robberies. Conversely, if demand factors indeed are driving our estimates, transport enterprises should not differentially respond to vehicle robberies. In this case changes in vehicle robberies reflect broader conditions and should have a similar impact on transport and non-transport industries.

We also control for other state-time varying factors (Z_{st}), such as economic conditions, and demographic changes. To capture economic conditions that will jointly impact the returns from

entrepreneurial and criminal activity, we include state-year measures of unemployment and real GDP per capita (from INEGI). To control for demographic changes that may be correlated with the size of the low-skill microentrepreneur and criminal population, we include measures of average years of schooling for adults aged 15 or older and the percentage of the state population that is comprised of men between the ages of 16 and 19. These measures come from the 2000 and 2005 Mexican censuses.

Finally we include controls for the quality of local institutions, an important potential source of omitted variable bias. For example, states with improved judicial institutions may have improved conditions for microenterprises by lowering registration requirements or graft, while simultaneously reducing overall crime rates. We attempt to control for these differences using measures of local police and judicial effectiveness first used by Laeven and Woodruff (2007) in their study of firm size and local institutional quality in Mexico. The measures come from surveys of lawyers on the effectiveness of local courts in enforcing commercial code governing bank debt (for example, seizing collateral). The surveys are conducted every two to three years by the Consejo Coordinador Financiero under the direction of the Center for the Study of Law at the Instituto Tecnológico Autónomo de México (ITAM). The focus on a specific commercial code comes from the fact that while bank debt laws largely are set at the national level, judicial proceedings must take place in courts where the debtor is located and thus the implementation and enforcement of the laws varies at the state level⁸.

We use the 2002 and 2009 surveys to create two measures of local institutional quality. The first is a measure of judicial effectiveness. Following Laeven and Woodruff (2007), it is an average

⁸ In the surveys approximately 500 lawyers who either work for banks or act as outside counsel are asked a series of questions regarding the effectiveness of local legal institutions. Responses are ranked from 5 (best) to 1 (worst) and the averages show a high degree of variation across states.

of the questions relating to: (1) the quality of judges; (2) the impartiality of judges; (3) the adequacy of judicial resources; (4) the efficiency of the execution of sentences; and (5) the adequacy of local legislation related to contract enforcement⁹. The second is a measure of the support of public forces (such as the police) in executing judicial sentences. We recognize concerns regarding the ability to capture institutional changes over a seven year time frame. We argue, however, that these years cover a period of dramatic political change in Mexico, following the end of 71 years of single party rule by the PRI (Institutional Revolutionary Party) in the year 2000. Given the tremendous increase in political competition stemming from the dismantling of single-party rule, we argue that is reasonable to expect institutional change at the local level over the time period considered.

4. Results

We begin by estimating equation (1) using a probit model, using the ENAMIN survey sampling weights and clustering standard errors at the state level. Table 5 presents these results, with average marginal effects reported. We first estimate equation (1) without state-time varying controls (i.e., excluding Z_{it}) to see the correlation between home robbery and expansion plans. Covariates include the entrepreneur's gender, age, age squared, education, and experience, as measured by the number of years working in the enterprise or similar activity, as well as industry, state and year fixed effects. The results, presented in column (1), show a significant, negative correlation between home robbery and microenterprise expansion plans.

We next add homicides and assault rates as measures of non-property crimes, as well as the full set of state-level time-varying controls outlined above. These results are shown in column (2) of Table 5. We find that the average marginal effect of home robbery rates remains negative,

⁹ Laeven and Woodruff (2007) also include responses on the efficiency of the public property registries, but this question was discontinued in 2006 (CCF 2009). To ensure the comparability of the averages, we do not include it.

significant and relatively unchanged in size, showing that the results are robust to the inclusion of other factors that change across states and over time. In column (3), we include sexual assaults and in column (4) we include mugging. In both cases we find that the estimated effect of robberies remains little changed. Notably, we find that the marginal effects of physical and sexual assaults are negative but not significant (possibly because their relative infrequency limits the precision of these estimates), while the marginal effects of mugging are negative and significant. Homicides are not generally significant in these estimations.

We next consider vehicle robbery, both partial and full. As shown in Column (5), we find that home robberies continue to dominate our results. The effects of vehicle robberies are negative but not significant. This is not entirely surprising, as we expect that if expropriation risk is the primary channel through which robberies affect microenterprise growth, the effect of vehicle robberies should be concentrated in a small number of enterprises in the transport industry. We thus estimate the differential effects that vehicle robberies, home robbery and homicides have on firms in the transportation industry. The results of this estimation, which includes crime-industry interaction term, are shown in Column (6). While the home robbery interaction term is negative for both types of firms, it is only significant for non-transport firms. Meanwhile, partial vehicle robbery is only significant for transport firms. Considering that a vehicle represents a large share of the assets of a transport microenterprise these results on full vehicle robberies provide strong evidence that robberies heighten the asset expropriation risk faced by such entrepreneurs.

Overall, the estimated effects of robbery are non-trivial. The coefficient on home robbery in column (2) of Table 5 suggests that a 1 percentage point increase in home robbery incidence (half of the standard deviation) is associated with a 1 percentage point decline in the probability the average microentrepreneur plans to expand his/her business (20% of the standard deviation). The average

marginal effect of partial vehicle robberies among transport enterprises (see column (6)) is dramatically larger, indicating that a one standard deviation decline in vehicle robberies (0.82 percentage points) would increase expansion plans by 1.9 percentage points. Given that the average percentage of entrepreneurs who plan to expand their operations in the next 12 months is only 11.7%, the associated decline in average expansion plans is large and potentially can help explain why many microenterprises do not grow.

Did the higher rates of expansion in states with lower crime rates lead to faster income growth for these enterprises? We test whether robberies had similar effects on income growth using the subsequent labor force surveys (ENEU/ENOE). In order to capture the effects on these enterprises' trajectories we limit our sample to those microenterprises in the 2002 and 2008 ENAMIN samples who we observe in the labor force surveys at least 3 quarters after their ENAMIN interview.¹⁰ In Table 6, we focus on the changes in income among these enterprises over these 3 quarters. In columns (1) and (2), we estimate an OLS model of income changes on home robberies, other crimes, and our full vector of controls and fixed effects. We find that home robberies negatively affect income growth, although this effect is only significant at the 10% confidence level and not significant when vehicle robberies are included.

Because the measure of income growth is likely to be quite noisy for a variety of reasons, we transform it into a dummy variable equaling 1 when this income growth is in the top 50% of enterprises in a given year and 0 when not. Columns (3) and (4) present the results of a probit model estimated using this measure as our dependent variable. We find that the effects of home robbery on the probability of being above the median level are now negative and significant. A one

¹⁰ Due to the rotating nature of the ENEU and ENOE this sample is approximately 40% of the full ENAMIN sample.

percentage point increase in home robbery rates is associated with between a 1.2–1.6 percentage point reduction in the probability that an enterprise will rank above the median in its subsequent income growth (depending on whether vehicle robberies are included as a covariate).

We also test whether home robberies affect fast growing enterprises in the same way as they do slower growing ones. In columns (5)-(7), we estimate these specifications using as our dependent variables a dummy indicating that an enterprise's income growth was in the top 5% for that year. We find that home robberies significantly reduce an enterprise's probability of being in this top 5%, with a marginal effect of 0.49-0.74 (again, depending on whether vehicle robberies are included as covariates). This effect is large, given that a one standard deviation rise in home robbery rates (2%) would lead to a 20-30% drop in the probability of being in the top 5%. Notably, the marginal effect of full vehicle robberies is also negative and significant at the 10% level.

In column (7) of Table 6, we estimate the effects of robberies and homicides on this measure of income growth when these crimes are interacted with dummies for the enterprise being in the transport sector and non-transport sectors. We find that the effect of home robberies is negative and significant among non-transport enterprises but not among transport ones. Conversely, the effect of full vehicle robberies is negative and significant among transport enterprises but not significant among non-transport ones. Homicides and partial vehicle robberies are not significant among either type of enterprise. These results indicate that the effects of these crimes are specific to the types of enterprises whose assets are more likely to be at risk. Entrepreneurs who run their own taxi service are much more likely to be concerned about rising vehicle robbery risks than would entrepreneurs who work in construction or sewing. The latter may also be more likely to store their tools and equipment at home and thus may be more concerned about home robbery rates than would the taxi operator.

5. Alternative Explanations

Because our data involve repeated cross-sections of microenterprises that are affected by potentially non-exogenous crime patterns, our primary results may be due to several alternative explanations, including selection effects and reverse causality. We address each in turn.

5.A. Microentrepreneur Selection

The state-level composition of microenterprises may vary in response to crime, as migration or the decision to enter or exit entrepreneurship may be based on the security of operating in a given location. Thus, rather than a causal impact on any given enterprise's outcomes, we may instead be observing the sorting of enterprises with different levels of growth potential across states. To address these potential selection effects, we compare the effects of robberies on microenterprises with different skill characteristics, duration, and entrepreneur migration histories.

5.A.1 Skill Heterogeneity

Several papers have documented the duality of the microenterprise sector, in which some firms are run by highly skilled entrepreneurs for whom self-employment is an optimal labor force outcome ("high-tier") while others are run by low-skill entrepreneurs for whom informal self-employment is the only option ("low-tier") (Cunningham and Maloney 2001, Maloney 2004, Fajnzylber et. al. 2009, Mandelman and Montes-Rojas 2009). Given the large size of the latter group, our concern is that changes in the spatial distribution of low-skill enterprises may explain our results. For example, we could find a negative relationship between home robbery rates and expansion plans if the share of low-skill entrepreneurs, who are less likely to expand, is increasing more rapidly in states experiencing rising robbery rates.

To determine whether our results are driven by changing proportions of high- and low-skill entrepreneurs, we limit our sample to “high-tier” enterprises- defined as those that are more likely to survive and grow. Since entrepreneurial skill and a firm’s growth potential are difficult to observe, we follow other authors in using the work and education experience of the entrepreneurs. This is based on the assumption that enterprises are more likely to survive and grow if their owners have higher levels of education and experience and entered self-employment voluntarily. We consider several classifications of “high-tier” entrepreneurs. The first are entrepreneurs with a secondary education or above. The second are those who entered self-employment from a salaried position and did so voluntarily (they do not report being laid off or that their previous employer closed). The third are all entrepreneurs with at least a secondary education whose currently monthly income is higher than the average for salaried workers with the same gender, education level, age bracket, industry and state¹¹. The fourth group are entrepreneurs who, when asked why they entered entrepreneurship, said they did so to increase their earnings or due to family tradition (in contrast to entrepreneurs who said they entered due to lack of alternative employment). Finally, we consider enterprises that have any employees, as these are more likely to be established firms with greater survival and growth potential¹². The results of the estimation of equation (1) on the different subsamples of “high-tier” enterprises are shown in Table 7. In all cases, the coefficient on home robbery remains negative and significant, showing that the results are not being driven exclusively by firms with lower growth potential. Even among firms that are more likely to survive and grow, microenterprises are significantly less likely to expand in states where robbery rates have increased.

5.A.2.Migration

¹¹ This information comes from the ENEU and ENOE.

¹² We recognize, however, that the growth potential of established firms depends upon where they are in their life cycle. For example, established firms are more likely to have reached their steady state size, in which case they are less likely to grow than new firms that have yet to reach steady state.

The composition of entrepreneurs also may change across states and time in unobservable dimensions. While we cannot control for all of the changes in unobserved characteristics, we can address at least one potential channel through which these changes happen: migration. If microentrepreneur out-migration from dangerous areas and in-migration into safer areas is correlated with the entrepreneur's skill level, then we may observe a correlation between enterprise expansion or income growth and crime rates that does *not* reflect a reduction in the overall productivity of the microenterprise sector.

In column (6) of Table 7, we thus limit our sample to entrepreneurs who were born in the same city in which they currently reside. The results are remarkably similar to those in the full sample, indicating that selection through migration is not likely to be driving our primary results.

5.B. Reverse Causality

It is possible that growing microenterprises are better able to dedicate resources to theft prevention and suffer lower losses as a result. Thus, the direction of causality may run in the opposite direction, with microenterprise expansion and income growth leading to reductions in robberies. To bias our estimates, this reverse causality would have to be due to microenterprise expansion specifically and not to general changes in economic activity, for which we already control. It also would have to be specific to home and vehicle robbery, and not to other crimes, as we also control for these in our estimates.

While we cannot definitively rule out the possibility of reverse causality, we can examine the correlation between robbery rates and the overall levels of microentrepreneurship in a given state. If a growing presence by microenterprises induces additional theft, we should observe a positive relationship between these phenomena. We regress the state-level home robbery measures on the

share of the labor force employed in a microenterprise, including self-employed owners (aggregated to state-level measures using sampling weights in the LFS data). In Table 8, we display the results of these OLS regressions with state and year fixed effects. The coefficients on the microenterprise share are indeed negative but not significant. This is true whether we use the share of employees and self-employed as our explanatory variable, the share of self-employed owners of single person enterprises, or the share of self-employed owners of any microenterprises. This is also true when we include state-level aggregate measures of the demographic characteristics of microentrepreneurs (age, age squared, gender, education, and experience levels) as well as sector and state-level GDP controls. The results indicate that changes in state-level crime rates are not likely to be driven by the changing presence of microenterprises in these states. While they don't definitively rule out all potential sources of reverse causation, these findings do suggest that our primary results are unlikely to be substantially biased by these factors.

6. Robustness Checks

In this section, we address a variety of potential concerns about our primary outcome measures and about omitted variables that could bias our estimates.

6.A. Sub-samples of Firms

To further explore if robbery effects are concentrated in firms at different stages of their growth cycles, we separately estimate expansion plans on different sub-samples. We start with sub-samples defined by age. A priori there is no clear prediction about whether or not robbery effects will be more concentrated among older or younger firms. On one hand, older firms may be larger in size, more visible, and therefore more obvious targets for criminals. On the other hand, older firms

might be at a more advanced point in their growth cycle, and therefore less likely to expand regardless of the barriers. To examine these differences we divide firms into two categories: (1) “new” firms that have been in operation for less than two years; (2) “established” firms that have been in operation for two or more years. We separately estimate outcomes for each group. Results are shown in Columns (1) and (2) of Table 9. The coefficient on home robbery is slightly lower for established firms than for new ones, in line with the theory that firms with greater longevity have greater potential to have reached their steady state size, and therefore are less impacted by impediments to growth. Nevertheless, for both groups the robbery effect is negative and significant, suggesting that robbery negatively affects both new and established firms.

We next consider the sub-sample of entrepreneurs who say they plan to continue their existing enterprise going forward. We do not remove these 1,925 entrepreneurs who say they do not plan to continue, as it is not clear that all of them leave entrepreneurship (some say they plan to open a new enterprise after closing the existing one). Among this sub-sample we first re-estimate our original outcome variable of expansion plans. As a check we then estimate an alternative outcome variable; having no plans to change the enterprise. These entrepreneurs plan to continue business in the same way, and therefore to neither grow nor shrink their enterprise going forward. This is the largest category of entrepreneurs, comprising 64% of those who plan to continue the existing firm.

The results from these estimations are shown in columns (3) and (4) of Table 9. With respect to expansion plans, we find no change in the coefficient on home robbery among the sub-sample that plans to continue the existing enterprises. Alternatively, we find a positive and significant coefficient for home robbery when “no plans” is the outcome variable. Thus home robbery is also associated with an increased likelihood that firms plan to do nothing, or stagnate.

6.B. Alternative Outcome Measures

To investigate some of the channels through which robbery might lead to stagnation among microenterprise firms, we examine changes in microenterprises over time using data from the labor force surveys. To capture the longest time horizon possible while still maintaining a sufficiently large sample size, we choose outcome measures three quarters after the ENAMIN survey. These measures are the same ones we considered in Table 3 and include: 1) if an enterprise moves to a fixed location; 2) if an enterprise adds any employees; and 3) if the entrepreneur exits self-employment all-together. Regarding the last measure, it is important to note that we do not investigate the extensive margin effects of robbery in more detail due to a lack of panel data on firm-level outcomes.

The results are shown in columns (5)-(8) in Table 10. We find that home robbery is associated with a significantly lower probability that firms have moved to a fixed location. It also is associated with a lower probability that firms have added any employees and a higher probability that an entrepreneur has existed self-employment, although the coefficient is not significant in either of these cases. These results further suggest that the channel through which home robbery limits microenterprise expansion is reduced investment.

6.C. Sensitivity to Dropping States

Our identification strategy relies on state- and time-level variation in crime rates and other observed factors. There may be concerns, however, that our results are driven by other differential trends in particular states, like changes in drug market activity and violence or economic changes along the US-Mexico border. As we discuss below, we consider the robustness of our estimates to these phenomena by sequentially dropping groups of states from our analysis.

6.C.1. Mexico City

We first consider the sensitivity of our results to removing Mexico City from the sample. Mexico City, which is a federal district and exists as a separate entity, is an outlier in terms of size and crime incidence, particularly robbery. To ensure that our results are not driven by a “Mexico City” effect, we re-estimate the model on a sample that excludes Mexico City. Results are shown in Column (1) of Table 10. The results are robust to the exclusion of Mexico City, as the size of the coefficient is relatively unchanged, and remains significant. We also note that we repeat this exercise for all states, removing one at a time from the estimation. In all cases the results are robust, confirming that our finding of a robbery effect is not driven by one particular state. Results are available upon request.

6.C.2. Drug Violence

We next consider the sensitivity of our results to removing states that have been most affected by drug violence. Sensitivity to drug violence is a natural concern given that the time frame of our study coincides with the dramatic rise in drug-related crime in Mexico. This rise could affect our estimates if changes in drug-related crime are differentially correlated with robbery rates (more so than with homicide rates, for example), and if drug-related crimes affect the demand for microenterprise goods and services (rather than their risk of property loss or damage). We attempt to control for these concerns by excluding states most affected by drug-related violence. We consider three specifications of this group. First, we exclude all Northern border states (6 states). Second, we exclude states with the highest degree of drug entry, determined by the Washington Post’s Mexico at War series (7 states). Third, we remove states with the highest number of drug related deaths over the 2006-2008 period (6 states). The data on drug-related deaths come from the

Crime Indicator Database for the Justice in Mexico Project at the Trans-Border Institute¹³. Results are shown in columns (2)-(4) of Table 10. The results are robust to removing border, drug entry states and high drug death states, as the coefficient on home robbery remains negative and significant in all cases. We take this as evidence that our results are not completely driven by changes in drug related violence.

6.D. Alternative Measures of Local Institutional Quality

We consider three alternative measures of institutional quality. The first is average reporting rates for home robbery. This variable comes from the ENSI and is the average percentage of the last home robbery that was reported to the authorities. We expect that in states in which police forces, court proceedings, or other institutions have improved, households may be more likely to report crimes to the authorities (Soares 2004). The second measure is perceptions about insecurity. This measure, also taken from the ENSI, takes the average number of adults in urban areas of the state who responded that they consider living in the state to be “insecure”. Public perceptions of insecurity are likely to reflect risks associated with a broader set of institutions and thus would capture local institutional variation over time. Finally, since the time period between the two ENAMIN surveys include notable reforms of the business registration process, we consider a measure of institutions that comes from these reforms. In 2002 the federal government enacted legislation that reduced the federal requirements for registering some businesses and encouraged the reduction of registration requirements at the municipal level. To inform the public about the reforms and promote similar steps by municipalities, the agency charged with enacting the reforms, COFEMER (Federal Commission for Improving Regulation), began opening business registration

¹³ The dataset contains the unofficial tally of drug-related homicides per state per year as reported by the Mexican newspaper Reforma from 2006 through 2008.

centers, known as SAREs (Rapid Business Opening System), in major municipalities (Bruhn 2011). Any variation in registration requirements, if linked with local institutional quality, and specifically the promotion of microenterprises, could capture underlying institutional factors that jointly impact enterprise expansion and crime rates. We therefore test whether the introduction and timing of the SARE program affect our results. We create two measures of the SARE program. The first is the change in the number of SARE offices by state from year end 2001 to November 2008 (COFEMER). The second is the maximum number of months any SARE office in the state had been open as of November 2008 (COFEMER website).

The results of estimations incorporating these alternative controls are shown in Columns (5)-(8) of Table 10. The coefficients on home robbery reporting rates and perceptions of insecurity are negative, which is consistent with our expectations and suggests that reporting rates do reflect variation in institutional quality. However, neither coefficient is statistically significant, and home robbery rates remain negative and significant. The size and significance of the coefficient on home robbery is unchanged, suggesting that the effect of home robbery is not being driven by SARE related regulatory changes. To the extent that the judicial quality, crime reporting, security perception, and registration reform variables effectively control for local institutional features, these results indicate that the robbery effect we find is not simply a reflection of broader institutional changes underlying crime and microenterprise decisions.

7. Conclusions

This paper highlights a new dimension of the costs of weak property rights. Most of the focus in assessing these costs to firms and households has been on the threats posed by the state itself and on the insecurity of land and real estate. There has been much less focus on the threat of

robbery by private citizens or groups against moveable assets, particularly on the effects of this threat on microenterprises. One reason that this dimension has been largely uninvestigated is the difficulty of identifying credible, disaggregated data on both crime and microenterprises collected over time. We overcome this hurdle by linking datasets on these two distinct issues that jointly provide a rich information set in which to test hypotheses about the nature of the effects of property crime on a variety of microenterprise decisions. Our strategy relies on variation in property crimes across states and over time in Mexico, controlling for state and year fixed effects and a variety of observable time-varying factors. Admittedly, we cannot eliminate the possibility that other unobserved factors which vary across states and time could be correlated with property crimes and microentrepreneur expansion decisions. As such, we view our results as a strong indication, rather than proof of, of a causal relationship between property crimes and microenterprise expansion.

Our findings have a number of implications for policymakers. First, microenterprise growth is dependent on the social context in which these enterprises operate, and entrepreneurs clearly respond to risks in this environment. Growth among these enterprises may thus remain limited in settings with high crime, even when public programs offer these enterprises training on business practices, improved access to credit, or other services aimed at enterprise expansion. In such settings, investing in protections of private property rights—particularly protection for individuals in lower socioeconomic categories—may prove more effective in raising microenterprise growth trajectories than would investment in the aforementioned programs.

Second, our results help explain why enterprise formalization may not generate substantial growth among microenterprises. There are, potentially, two competing links between formalization and robbery risk. On one hand, formalization may improve the protection by and recourse to public authorities for an enterprise. On the other hand, formalization may raise the visibility and

subsequent targeting of an enterprise by criminals. These dual channels make the net effect of formality on robbery risk ambiguous, suggesting that in some cases enterprises may not face substantial incentives to grow even after becoming formally registered. Additional work on this link between robbery and formalization may help policymakers better understand the benefits of formality as perceived by entrepreneurs when the former design programs aimed at raising formalization rates.

Finally, while we identify an important link between property crime rates and microenterprise behavior, linking changing crime rates to explicit features of the local institutional environments remains a useful area for further research. For example, it would be useful to determine which dimensions of the local settings have most directly influenced variations in property crime rates over the past decade, and the degree to which these dimensions are actionable by public entities.

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Table 1: Urban Microentrepreneurs 2008

	All	Above Median Assets	Below Median Assets	P-value
<u>Victim of given crime in past year:</u>				
Fines/ Bribes	8.94%	14.15%	4.42%	0.000***
Robbery	10.22%	13.44%	7.42%	0.000***
Private Extortion	1.38%	2.11%	0.74%	0.000***
Fraud	9.26%	12.22%	6.69%	0.000***
Natural Causes/ Accident	2.89%	4.89%	1.15%	0.000***
<u>Of victims of given crime, Estimated loss/monthly profits</u>				
Fines/ Bribes	0.47 (1.65)	0.46 (1.77)	0.50 (1.23)	0.745
Robbery	1.67 (7.75)	1.19 (4.22)	2.40 (11.16)	0.018**
Private Extortion	0.48 (1.33)	0.42 (1.11)	0.65 (1.81)	0.352
Fraud	0.66 (5.11)	0.66 (6.02)	0.64 (3.19)	0.955
Natural Causes/ Accident	0.94 (2.42)	0.86 (2.51)	1.19 (2.07)	0.318
<u>Of victims of given crime, % who reported to authorities</u>				
Robbery	20.2%	23.6%	15.0%	0.001***
Private Extortion	22.1%	22.6%	20.8%	0.809
Fraud	2.1%	3.2%	0.3%	0.002***
Observations	10,838	5,270	5,568	

Coefficients are weighted averages. Standard deviations are in parentheses
Sample size reduced as many respondents to not answer
the asset question in the 2008 ENAMIN survey.

Table 2: Summary Statistics, ENAMIN

Urban Microentrepreneurs	Total Sample	By Survey Year	
		2001	2008
Entrepreneur a woman	35.9%	31.7%	40.3%
Entrepreneur married	72.8%	73.7%	71.9%
Average Age (in years)	44.0 (12.9)	43.1 (12.7)	45.0 (13.1)
Primary Education or Less	38.5%	41.5%	35.4%
Secondary Education	36.6%	36.2%	37.0%
College Education	24.9%	22.2%	27.5%
Experience (in years)	9.77 (9.18)	9.60 (9.01)	9.96 (9.36)
Monthly Profits (USD) ¹⁴	419.4 (695.8)	414.7 (674.8)	424.9 (719.3)
Has any employees	22.3%	21.8%	22.8%
Employees, total	0.40 (1.02)	0.41 (1.11)	0.39 (0.90)
Employees, paid	0.26 (0.89)	0.28 (0.99)	0.25 (0.78)
Employees, unpaid	0.14 (0.48)	0.14 (0.49)	0.15 (0.48)
Enterprise has a fixed location	34.7%	36.2%	33.2%
Enterprise located in individual's home	18.6%	16.1%	21.1%
Keeps Accounts	43.6%	49.3%	38.2%
Enterprise Informal	65.9%	65.9%	65.9%
Industry:			
Manufacturing/Production	10.9%	11.1%	10.6%
Construction	7.2%	6.4%	7.9%
Commerce	36.3%	34.6%	38.2%
Services	40.2%	42.5%	37.7%
Transportation & Communications	5.4%	5.2%	5.5%
Plan to Expand	11.7%	14.3%	9.1%
Observations	24,834	14,742	10,092

¹⁴ All values converted to December 2001 Mexican pesos using the CPI and converted to US dollars using the December 30, 2001 exchange rate of 9.16 pesos per US\$.

Table 3: Expansion and Other Variables

Population weighted averages	Expansion Plans	No Expansion Plans	Difference
Working Capital Investment ¹			
Average	3,197	2,331	0.866***
Median	546	180	
Moved to a Fixed Location			
One quarter after	23.57%	20.50%	0.031***
Two quarters after	21.58%	23.20%	-0.016
Three quarters after	23.47%	23.20%	0.003
Changed from zero employees to any employees			
One quarter after	7.72%	6.37%	0.013**
Two quarters after	7.40%	7.12%	0.002
Three quarters after	10.45%	6.16%	0.043***
Exits self-employment			
One quarter after	19.86%	18.90%	0.009
Two quarters after	19.18%	21.40%	-0.022**
Three quarters after	15.99%	21.70%	-0.057***
Income growth (%change)			
One quarter after	2.94%	1.38%	0.015
Two quarters after	30.74%	3.64%	0.271***
Three quarters after	22.54%	-5.26%	0.278***
Observations			
One quarter after	2173	19157	
Two quarters after	1634	14107	
Three quarters after	1061	9202	

***, **, *; Difference significant at the 1%, 5%, or 10% level

¹ Working capital investment includes investment in primary materials, packaging, merchandise and products for sale. Values in December 2001 Mexican pesos using the CPI and converted to US dollars using the December 30, 2001 exchange rate of 9.16 pesos per US\$.

Table 4: Crime Rates

Population weighted state level averages, for urban areas	2004	2008			
Home Robbery	2.75%	2.33%			
Min	0.54%	1.06%			
Max	7.63%	4.37%			
Partial Vehicle Robbery	1.89%	5.18%			
Min	0.47%	0.91%			
Max	4.47%	10.54%			
Full Vehicle Robbery	0.57%	0.83%			
Min	0.00%	0.00%			
Max	3.71%	3.38%			
Physical Assault	1.08%	0.41%			
Min	0.04%	0.05%			
Max	2.50%	1.77%			
Sexual Assault	0.25%	0.11%			
Min	0.00%	0.00%			
Max	0.97%	0.33%			
Homicide (per 100,000)	28.5	28.0			
Min	9.0	14.0			
Max	56.0	70.0			
Mugging	3.77%	3.35%			
Min	1.03%	0.59%			
Max	12.1%	9.49%			
Last home robbery reported	30.4%	33.6%			
Min	4.14%	1.02%			
Max	53.93%	68.55%			
<u>Correlations</u>	Home Rob	PartVehRob	Full VehRob	PhyAssault	SexAssault
Home Robbery	1.0000				
Partial Vehicle Robbery	0.1055	1.000			
Full Vehicle Robbery	0.3328	0.3479	1.000		
Physical Assault	0.2022	-0.3339	-0.0676	1.000	
Sexual Assault	0.0465	-0.0987	-0.1367	0.3236	1.000

Population weighted averages by state. Source for home robbery, partial vehicle robbery, full vehicle robbery, physical assault, and sexual assault, ENSI. Values are percent of adults age 18 or older living in urban areas of the state who report were victims of a specific crime at least once last year. Source of homicide data, ICESI.

Table 5: Expansion Plans

EXPANSION	(1)	(2)	(3)	(4)	(5)	(6)
Home Robbery	-1.102*** (0.273)	-1.094*** (0.306)	-1.088*** (0.382)	-1.083*** (0.277)	-1.038*** (0.403)	
Homicide		0.004 (0.004)	0.002 (0.004)	0.007 (0.004)	0.005 (0.005)	
Physical Assault		-0.604 (0.984)				
Sexual Assault			-1.939 (2.119)			
Mugging				-0.844*** (0.281)		
Vehide Robbery (Full)					-1.514 (1.190)	
Vehide Robbery (Partial)					-0.035 (0.300)	
Transport x Home Robbery						-2.403 (1.853)
Non-transport x Home Robbery						-0.931** (0.426)
Transport x Vehide Robbery (Full)						-1.048 (5.440)
Non-transport x VehideRob (Full)						-1.745 (1.232)
Transport x VehideRob(Partial)						-1.921** (0.924)
Non-transport x VehideRob (Partia						-0.093 (0.311)
Transport x Homicide						-0.035** (0.016)
Non-transport x Homicide						0.006 (0.005)
Real GDP per capita		0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Unemployment in Q4 of year		-0.002 (0.009)	-0.003 (0.007)	-0.008 (0.010)	-0.002 (0.010)	0.000 (0.010)
Average years education, adults		0.026 (0.092)	0.040 (0.087)	0.145* (0.086)	-0.032 (0.088)	-0.015 (0.096)
% population, men age 16-19		11.503 (9.711)	10.589 (9.101)	18.219 (11.445)	4.383 (10.838)	4.909 (11.137)
Judicial efficiency		-0.020 (0.028)	-0.015 (0.025)	-0.015 (0.028)	-0.011 (0.026)	-0.010 (0.025)
Support of public forces		-0.004 (0.012)	0.001 (0.016)	-0.021* (0.012)	-0.005 (0.014)	-0.007 (0.014)
Observations	24,801	24,793	24,793	24,793	24,793	24,801

Coefficients are average marginal effects from a probit model.

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

Estimated using survey weights, standard errors dustered by state

Other controls indude gender, age, age squared, education, experience, industry, year and state fixed effects

Linear projection for 2001 crime rates. Homicides rescaled to # per 1million inhabitants

Table 6: Income Growth

Dependent Variable Model	Income growth Q1-Q4		Income growth in top 50% ²		Income growth in top 5% ²		
	OLS		Probit		Probit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Home robbery	-4.019*	-1.414	-1.603**	-1.291*	-0.737***	-0.493**	
	(2.287)	(2.120)	(0.764)	(0.660)	(0.229)	(0.213)	
Homicide	0.000	0.050	-0.000	0.007	0.001	0.002	
	(0.029)	(0.031)	(0.012)	(0.012)	(0.003)	(0.004)	
Assault	15.693***		2.319		0.753		
	(4.991)		(1.776)		(0.464)		
Vehicle Robbery (Full)		-		-0.447		-1.706*	
		(7.336)		(2.821)		(0.920)	
Vehicle Robbery (Partial)		2.356		0.213		0.099	
		(1.695)		(0.608)		(0.123)	
Non-transport x Home robbery							-0.470**
							(0.223)
Transport x Home robbery							0.434
							(0.786)
Non-transport x Vehicle robbery (full)							-1.379
							(0.910)
Transport x Vehicle robbery (full)							-6.969***
							(2.518)
Non-transport x Vehicle robbery (partial)							0.127
							(0.120)
Transport x Vehicle robbery (partial)							0.206
							(0.416)
Non-transport x Homicide							0.003
							(0.003)
Transport x Homicide							0.008
							(0.007)
Observations	6,861	6,861	6,857	6,857	6,827	6,827	6,827
R-squared	0.052	0.051					

Standard errors clustered by state in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. All regressions include individual and state-time controls, as well as state, year, and industry fixed effects.

Table 7: Heterogeneity

Expansion Plans	Secondary Education or Above (1)	Entered Entrepreneurship from Salaried work (2)	Monthly Income higher than mean salaried (3)	Entered entrepreneurship to increase income or family tradition (4)	Enterprise has Any Employees (5)	Born in Same City (Non-migrants) (6)
Home robbery	-1.291*** (0.399)	-0.980*** (0.359)	-0.878*** (0.231)	-0.907** (0.412)	-1.979*** (0.373)	-1.095*** (0.281)
Homicide	0.001 (0.006)	0.010** (0.005)	0.001 (0.003)	0.010** (0.005)	0.014*** (0.005)	0.003 (0.003)
Physical Assault	-1.001 (0.981)	0.010 (1.122)	-1.562* (0.924)	-0.617 (0.965)	-1.693 (1.142)	0.313 (0.870)
State-year effects	X	X	X	X	X	X
Observations	14,866	11,505	9,844	6,565	5,959	10,250

Coefficients are average marginal effects from a probit model.

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

Estimated using survey weights, standard errors clustered by state

Other controls include gender, age, age squared, education, experience, industry, year and state fixed effects

Linear projection for 2001 crime rates. Homicides rescaled to # per 1million inhabitants

Table 8: Home robbery and state-level share of labor force employed in microenterprise sector

	Home robbery rates	Using sole self-employed workers as explanatory variable	Using self-employed as explanatory variable	Adding controls
	(1)	(2)	(3)	(4)
Share of labor force employed in microenterprise	-0.102 (0.074)			-0.105 (0.302)
Share of labor force who are sole worker in their own microenterprise		-0.092 (0.056)		
Share of labor force who are self-employed			-0.122 (0.086)	
State Fixed Effects	X	X	X	X
Year Fixed Effects	X	X	X	X
Observations	62	62	62	62
R-squared	0.828	0.827	0.831	0.883

Table 9: Robustness Checks

EXPANSION	Sub-samples of Firms				Alternative Outcome Measures		
	Duration		Firms that Plan to Continue		Three Quarters Later		
	>=2 yrs (1)	<2 yrs (2)	Expansion Plans (3)	No Plans (4)	Move to Fixed Location (5)	Add Any Employees (6)	Exit Self-Employment (7)
Home robbery	-0.986*** (0.328)	-1.571*** (0.416)	-1.239*** (0.347)	1.590* (0.845)	-1.473** (0.663)	-0.024 (0.226)	0.257 (0.767)
Homicides	0.003 (0.005)	0.013** (0.005)	0.005 (0.005)	0.004 (0.013)	0.003 (0.006)	-0.000 (0.002)	0.026*** (0.009)
Assault	-0.379 (0.978)	-1.781 (1.142)	-0.654 (1.071)	-1.349 (1.797)	2.239** (0.955)	0.286 (0.697)	0.389 (1.284)
Observations	19,183	5,562	22,842	22,842	9,156	9,107	7,894

Coefficients are average marginal effects from a probit model *** p<0.01, ** p<0.05, * p<0.1

Estimated using survey weights, standard errors clustered by state in parentheses

Controls include gender, age, age squared, education, experience, state-year unemployment, real GDP per capita, average adult education, percentage male age 16-19, ITAM local institutions measures, state, year and industry fixed effects.

Linear project for 2001 crime rates. Homicides rescales to # per 1 million inhabitants

Table 10: Robustness Checks

EXPANSION	Removing States				Alternative Measures of Institutions			
	Mexico City (1)	Border (2)	Drug entry (3)	Drug death ¹ (4)	Report (5)	Perception (6)	SARE offices (7)	SAREmonths (8)
Home robbery	-0.929*** (0.240)	-0.983** (0.447)	-1.404*** (0.319)	-0.951*** (0.356)	-1.048*** (0.254)	-1.011*** (0.357)	-1.053*** (0.344)	-1.181*** (0.261)
Homicides	0.002 (0.003)	0.010* (0.006)	0.011** (0.005)	0.015*** (0.005)	0.003 (0.004)	0.004 (0.005)	0.004 (0.005)	0.001 (0.005)
Assault	-0.526 (0.886)	-1.441 (1.333)	-2.076** (0.958)	-1.975** (0.862)	-0.659 (0.958)	-0.612 (1.000)	-0.488 (0.955)	-0.581 (0.911)
Last home robbery reported					-0.039 (0.038)			
Perception state insecure						-0.019 (0.052)		
SARE, # offices							0.001 (0.002)	
SARE, months open								-0.001* (0.000)
Observations	23,900	20,335	19,124	20,490	24,793	24,793	24,793	24,793

Coefficients are average marginal effects from a probit model *** p<0.01, ** p<0.05, * p<0.1

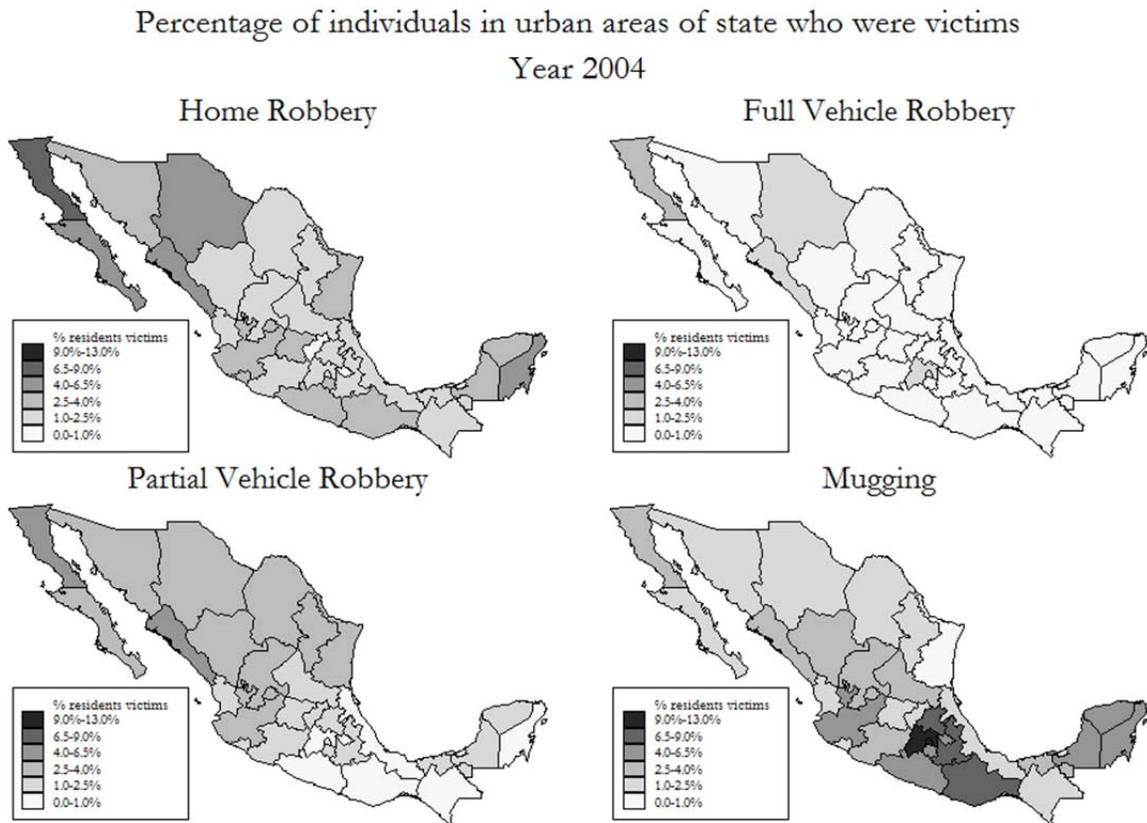
Estimated using survey weights, standard errors clustered by state in parentheses

Controls include gender, age, age squared, education, experience, state-year unemployment, real GDP per capita, average adult education, percentage male age 16-19, ITAM local institutions measures, state, year and industry fixed effects.

Linear project for 2001 crime rates. Homicides rescales to # per 1 million inhabitants

¹ Drug death states are those with highest drug-related deaths in 2009: Baja California, Chihuahua, Durango, Guerrero, Michoacan and Sinaloa, Data from the Crime Indicator Database for the Justice in Mexico Project at the Trans-Border Institute.

Figure 1A: Percentage of individuals in urban areas of state who were victimized, by crime type

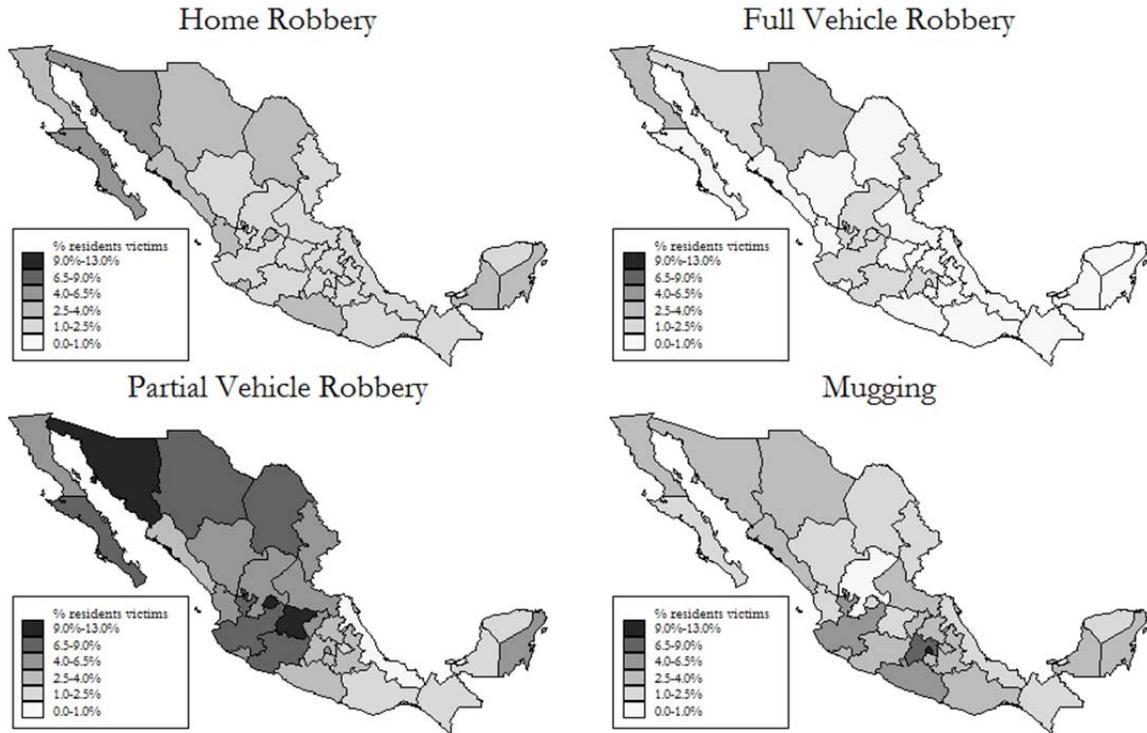


Source: ENSI. National Urban

Figure 1B: Percentage of individuals in urban areas of state who were victimized, by crime type

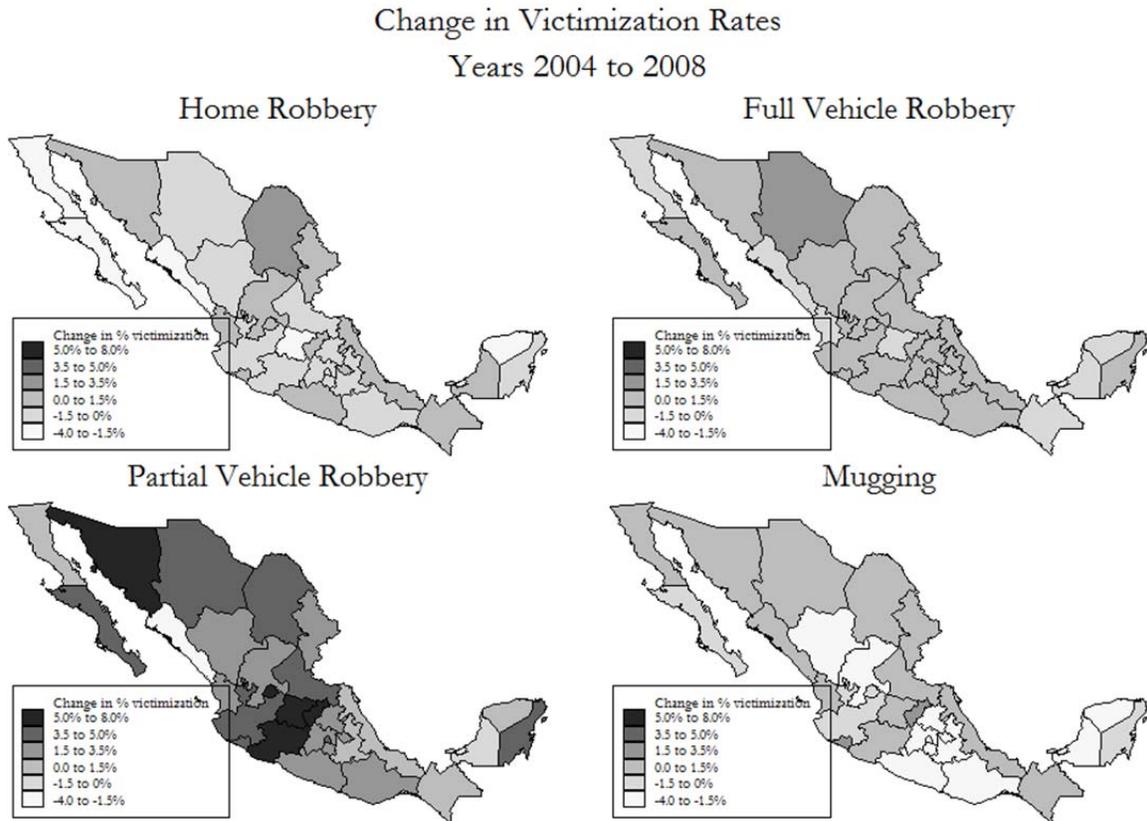
Percentage of individuals in urban areas of state who were victims

Year 2008



Source: ENSI. National Urban

Figure 1C: Changes in Crime Rates



Source: ENSI. National Urban