Perception and Action in a Conflict Zone: a Study of Rural Economy and Rural Life amidst Narcos in Northeastern Mexico

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Abstract

This paper analyzes the effect of drug cartel violence on farmers in Northeastern Mexico. Using tools from the psychology literature on risk perceptions, dual process theory and behavioral economics, we investigate factors correlating with fear among farmers, and how that fear is affecting rural life and production decisions. Farmers' actions in response to risk can be explained under the dual process approach, and the degree of emotional and deliberative response for each action is estimated. We find evidence that drug related violence in Mexico is affecting rural life and production decisions of small holder farmers.

Introduction

The level of violence in Mexico caused by the ongoing war on drugs has escalated dramatically in scale and scope affecting all members of Mexican society in many parts of the country. Based on official data from several government agencies, from December of 2006, when then newly elected president Felipe Calderon declared the war on drugs, to the end of 2012, the number of homicides related to the drug war is estimated at over 60,000 (CNN, March 15, 2014). Although most of these casualties are believed to be members of the drug cartels and government forces, many victims have been civilians unrelated to any side of the conflict.

In many places in Mexico, society faces new risks derived from the war on drugs. These new risks are kidnapping, extortion and carjacking. Kidnapping and extortion, along with homicide, are also called high-impact crimes for the lacerating effect that they have on society. Being exposed to these kinds of traumatic events, create cognitive, emotional and social effects on the victims (Alexander D., Klein S., 2009). Some of these effects range from sleep disturbances to severe ones like psychic numbing and recurring thoughts about the stressor (Markesteyn T., 1992), and Post Traumatic Stress Disorder (PTSD). Analyzing displaced population in Colombia due to drug violence, Moya (2012) finds that violence exposure affects people's risk taking behavior, making them more risk averse, thereby influencing their economic decisions; however, Moya concludes that those preference changes are not permanent and eventually people return to their pre-displacement levels, although this may take several years.

The study presented in this paper is conducted in a conflict area in Mexico where drug related violence, despite being a recent phenomenon, has been devastating. For instance, due to a turf war between two rival cartels, 10 decapitated bodies where left on a road and two days later 13

more bodies appeared again (Proceso, December 31, 2012). In other instances, local police, unable to cope with drug cartel members, or narcos, have been supported by convoyed federal forces. In some cases, local police forces have been investigated on corruption and complicity with the drug cartels; and if enough evidence is found, military forces take over their duty of patrolling and enforcing security. The city of Tampico (near our study area) is a case where the military took charge of the local security (Proceso, April 19, 2012)[1].

As dramatic as these events are, we are unaware of any studies that have investigated how this current narco violence impact the human psyche, the changes in risk perception, or how it affects life in general. More specific to this paper is the effect of narco violence in Mexico on agricultural productivity and rural life.

Accordingly, the purpose of this paper is to analyze the relationship between psychometric measures of risk perception and socioeconomic variables of small farmers living in a drug conflict zone in Mexico. We focus on two related aspects of risk and risk perception. The first follows the psychometric measures of risk developed by Slovic (1964, 1983, 1987), which we use to classify farmers in the conflict zone into four groups, depending on their level of fear, familiarity with the risk of narco violence, and trust to authorities among other factors. These groups were classified by using cluster analysis. The second aspect is the dual process model of cognition formally developed by Loewenstein and O'Donoghue (2004). Dual process explains behavior under risk as the result of two decision making mechanisms: an emotional, irrational, reaction based mechanism known as system 1; and a deliberated, rational, non-emotional

[1] As this paper was in the final edit the seriousness of the drug war in and around the study area was reported in the *Washington Post* June 2, 2014 "In Tampico, Mexico, where the drug war rages, 'the walls have ears'" http://www.washingtonpost.com/world/the_americas/in-tampico-mexico-where-the-drug-war-rages-the-walls-have-ears/2014/06/01/9e955496-f458-4f98-b6cd-dcec64abbebb_story.html. Accessed June 2 2014.

mechanism known as system 2. The dual process approach provides the framework to capture the complex dynamics of decision making that often fails to be modelled by conventional economic models.

The results of this paper are based on surveys given to farmers by the authors in the violence prone areas of Eastern San Luis Potosi in the fall of 2011. Procedurally, we use multivariate regressions techniques focusing on the four cluster groupings based on the Slovic metrics (using demographic, social and economic variables). The deeper part of the story, however, rests with the dual process system. Here we link systems 1 and 2 of the dual process to farmers' actions using, among other variables, the Slovic clusters as endogenous measures of risk perceptions and affect. Using this approach we are able to measure the degree of emotional response and deliberative response to risk according for each action. To our knowledge, this is the first study on small farmers' risk perception and action in real time conflict areas, more specifically, in a drug conflict area in Mexico. While the impact on urban life is well documented (Markowitz et al., 2001; Gray et al., 2011; Jackson and Gray, 2010) , our results show that the current war on drugs in Mexico is also affecting low income farmers. The increase in risk perception due to criminal activity also has an effect on their risk taking behavior and adoption of new production technology. From a disciplinary and academic point of view this paper is important because, to the knowledge of the authors, it is the first that finds evidence of dual process in a non-laboratory setting. From a policy point of view a deeper understanding of the psychological factors affecting farmers in a conflict zone underscores the need to evaluate behavior when that behavior is largely driven by external non-monetary forces for which no market exists to rectify. Understanding non-monetary motives for action can help determine a strategy of risk policy and risk communication to alter risks perception and improve rural life.

Background

It is known that fear of crime affects daily behavior in urban areas even for those who have not been victims of crime. In Mexico, according to a national survey in 2009 (ICESI, 2009), 22% reported that crime has affected their quality of life, up from 14% in 2008. Examples of these changes in behavior are that people stopped wearing jewelry, didn't allow their children to go out of home, didn't go out at night, and stopped carrying cash.

Perception of violence and fear of victimization depend, among others, on individual characteristics and knowledge of the risks (Tseloni, A. and Zarafonitou, C., 2008). For instance, Bennett and Flavin (1994) report that women are more likely to show higher levels of fear than men, due to social and physical factors, even though men have a higher probability of victimization. The relationship between age and crime are mixed. Bennett and Flavin show a positive relationship; while Kanan and Pruitt (2002) show that older people are less fearful than younger ones. Borooah and Carcach (1997) analyze the effect on education and fear level and find that fear is inversely related to education. In a study on fear of crime across different countries, Reese (2009) finds that when the crime rate is high the proportion of fearful people turns out to be low, and vice versa. Feeling of control over risks changes our perception of them. People's response to fear is associated with the level of control they have over the event. Risk taking behavior increases when an event is controllable than when there is no control on the outcome (Slovic, 1987). For instance, driving a car and riding an airplane. Statistically, the former has a higher rate of fatalities but riding an airplane is more likely to cause fear.

Responses to risk perception can take many forms, from physiological reactions such as irritability, anxiety and sleep problems (Kazantzis N., et al. 2010); to behavioral, like avoiding

stressful situations, actions or objects deemed risky. Lerner and Keltner (2001) found that feelings change our risk perception: fearful people tend to exaggerate it, while angry people tend to minimize it. Those effects not only create emotional disturbances, but can lead to economic losses as well.

Our main research interests lie in the effects of violence to changes in economic activities and welfare. Responses to crime and its effect on economic decision have been studied mostly under urban violence (De Mello, J. M., & Zilberman, E. ,2008). Under the context of agricultural production, Rockmore (2011, 2012) studied farmers' behavior in post-conflict areas in northern Uganda. He showed that farmers switch production to less profitable but safer activities; thereby, lowering per capita consumption by up to 6 percent. Rockmore concludes that risk accounts for more economic losses than direct exposure to violence. Arias et al. (2013) studied small farmers hit by violent shocks in Colombia and found that more violent shocks lead farmers to switch perennials to transitory crops, which are less risky but less profitable. Similarly, analyzing Colombian coffee growers, Ibañez et al. (2013) found that risk of violence has a negative effect on land allocation to coffee production. Similar studies on the effect of portfolio choice include Vlassenroot (2008), and Bundervoet (2006). Finnström (2008) concluded that producers switch to crops that require less field work and thus less exposure to potential criminals. In the context of Latin America, Dinar and Keck (1997) concluded that violence affects farming investment decisions in Colombia by creating extra costs to production. Some studies have found different results on people exposed to violence. The costs to society caused by violence can be very large. For example, Pinto, Vergara and La Huerta (2003) measured the costs generated by the armed violence in Colombia in the 90's, concluding that during 1999-2003 those costs were equivalent to 7.4% of GDP. In the case of Mexico, Balmori (2014) analyzed the economic effect of the war

on drugs in Mexico and concluded that the economic costs are about 0.5% of GDP, including a drop of 3.2% of commercial credit.

While the above studies analyze the effects of conflict in the economy, there has been an increasing interest in understanding the factors that contribute to criminal activity and regional conflicts. Examples of those studies include Maystadt and Ecker (2014), Hsiang, Burke and Miguel (2013), Hsiang, Meng, and Cane (2011), which analyze conflicts and civil wars as a result of extreme temperature and droughts.

Risk perception and risk preference of victims of violence and people exposed to violence change depending on the emotions and cognitive assessments caused by the stressor. Studies have found that when the individuals have feelings of anger they tend to be more optimistic about risky outcomes; when the stressor creates fear in the individuals, they are more likely to become risk averse (Lerner and Keltner, 2010). Related to this point, some field studies have found risk aversion to decrease and discount rate to increase with violence exposure (Voors et al., 2010). They believe the subjects of their study have stronger feelings of anger than fear. Changes in risk perception can have deleterious effect in welfare, especially for those in a poverty trap, if they become unwilling to accumulate risky assets (Barret et al., 2008). Similar conclusions are reported by Moya (2012).

Recent studies on narco violence in Mexico have not included the effects on production decisions and rural life. For instance, a study by Dell (2011) looks at violence level in counties on drug smuggling routes and concludes that counties where the political party in power is the same as in the federal power, diverts drug traffic and violence to counties governed by the opposition. Research and surveys related to drug-violence in Mexico include Balmori (2014),

Shirk (2010), Durin (2012), Simser (2011), Widner et al. (2011), and the government sponsored survey, *Encuesta Nacional sobre Inseguridad (National Survey on Insecurity),* which is aimed to measure violence perception in urban areas (INEGI) , but not its effect on agricultural production and rural life. To our knowledge there has not been a study on agricultural production and rural life during real time conflict in Mexico. This study fills this gap in the literature that is so relevant under the Mexican context.

Dual Process Model

Dual process theory provides a model for understanding decision making when the individual is faced by stigma or fear. Unlike the expected utility model, the dual process partitions the utility into two components, an expected utility component, based on rational choices; and an emotional, unconscious component. The expected utility part is based on probabilistic assessments of risk; it is slow and requires deliberation. The emotional component is fast, based on individual experiences and social norms, and requires no deliberation and no probabilistic assessment or risk. Dual process has been studies by many people and it is widely accepted as a model that explains decision making under risk (Loewenstein et al., 2001; Slovic at al., 2004; Loewenstein, G., and O'Donoghue, T., 2004). Under this paradigm, people's decisions are affected by their fear level, or the emotions invoked from an event; and also by their objective assessment of the probability of an event, a rational mechanism. This strand of social psychology and risk perceptions follows Slovic (2001, 2002, 2010); Slovic et al. (2004), Slovic, Fischhoff, and Lichtenstein (1984); Slovic, Lichtenstein, and Fischhoff (1984); Finucane and Holup (2006); Loewenstein, G., and O'Donoghue, T. (2004); Mukherjee K. (2010); Schulze, W., and Wansink, B. (2012). Alós-Ferrer and Strack (2014) provide a review of the dual process theories and its

relevance in economic behavior, while Brocas and Carrillo (2014) surveys various examples of dual process studies.

In this paper we measure degrees of affect, as defined by Slovic et al. (2007), of small scale farmers in a narco conflict zone and combine this with the dual process framework. This is illustrated in Figure 1. The degree of fear, or affect (the feeling of good or bad), of each individual is measured following Slovic's (1987) psychometric approach. Slovic develops an axiomatic system to determine risk perception using a set of questions that measures characteristics of risk. Some of these characteristics are magnitude of risk, control over the event, familiarity and knowledge of the event, and lasting effects of the event. He synthesizes those results into a two-factor space: familiarity with the event, and dread level. Depending on where in that space an event is located, its social consequences can be predicted. A large accident that occurs in a familiar setting has a much smaller social impact than a small accident in an unfamiliar setting. Car accidents for instance, which kills many people per year and is consider by experts to be one of the activities with highest risk, has a much smaller social impact than nuclear reactors even though the number of deaths from the latter are negligible compared to car accidents. This is due from the perceived potential of catastrophe and the unfamiliarity of the event. While we can assess risk objectively as a probability of an event, when we evaluate that probability based on feelings, it tends to be exaggerated if the event being analyzed is frightening (Rottenstreich and Hsee, 2001).

[Figure 1 about here]

The mechanism in which the dual process model works is explained as follows. An individual makes his decision based on a combination of two factors: emotional and rational. The

emotional, or quick response, system of decision is also known as system 1; and the rational or slow response system as system 2 (Kahneman, 2011). This utility function is comprised of a linear combination of utilities of these two components. In the rational component, probabilities are assessed for each state of the world and multiplied by the utility of each state based on some attributes. The sum of these probability-weighted utilities is the total utility from the rational component. In the emotional side, each state is assigned a utility based on the difference of attributes from a reference point, or status quo. That is, the utility derived from the emotional component is based on how different each potential state is in relation to a reference state. There are no probabilities assigned at each state in the emotional component. Once an individual assesses his utilities from the two components, his final utility is a linear combination of the utilities derived from systems 1 and 2. This allows for final utilities to be based on the emotional component, rational component or both.

Schulze and Wansink (2012) provide a dual process utility model derived from Loewenstein and O'Donoghue (2004), and Mukherjee (2010) as follows:

$$(1)\ V = (1-\gamma)\sum_s^n P_s\,(\dots, a_{iks}, \dots)U_s(\dots, a_{iks}, \dots) + \gamma\sum_s^n \tfrac{1}{n} M_s(\dots, a_{iks} - a_i^0, \dots)$$

V is the utility from the dual process model. U_s is the rational component utility at each state of the world, s = 1,…,n; and a_{iks} is the level of attribute i for choice k in state s with probability P_s. M_s the utility from the emotional component, a_i^0 is the reference point for attribute i, $a_{iks} - a_i^0$ is the difference of the attribute a_{iks} from the reference point. γ is the weight of system 1 in the total utility, such that if its value is 1 only system 1 contributes to the total utility of the dual process, and if it is 0 the total utility of the dual process is based on the deliberative system 2. State probabilities are only present in system 2, while for system 1 the difference from the

reference point is the only thing that matters. The effect of the system 1 component on the dual process depends among other factors in social norms, beliefs, principles and own experience with similar events.

Dual Process under Random Utility Model

Our approach rests on the theoretical structure of the Schulze-Wansink model and quantifies both systems' contributions using a variety of demographic and psychographic factors (risk perceptions). Our action space is captured by a dichotomous choice variable for which a respondent indicates that he took an action or did not. Under this random utility model a respondent chooses an action if his utility from making the choice is greater than his utility from not making it, $U^y > U^n$. This is usually represented as a linear function of explanatory variables plus an error term, $X'\beta + \varepsilon$, where X' is a 1 x k vector of explanatory variables, β is a k x 1 vector of estimated coefficients, and ε is the error term under the usual assumptions. The value of this function is also referred to as an index. Whenever the index is greater than a threshold (normalized to zero), an action is chosen ($y = 1$). This is obtained from noting that if $U^y = X'\beta_y + \varepsilon_y$, and $U^n = X'\beta_n + \varepsilon_n$, then, $Prob(y = 1) = Prob(U^y > U^n)$, which becomes $Prob(X'\beta_y + \varepsilon_y > X'\beta_n + \varepsilon_n)$, simplifying to $Prob\big(X'(\beta_y - \beta_n) + (\varepsilon_y - \varepsilon_n) > 0\big)$, $Prob(X'\beta + \varepsilon > 0)$. Under this framework, the Wansink-Schulze model is modified to accommodate dichotomous choices.

Utility is defined in terms of explanatory variables and an error term. The coefficients of these explanatory variables provide a measure of utility. In the case of the utility of system 1, for instance, this is represented as $U^1 = \gamma \sum_s^n \frac{1}{n} M_s(\dots, a_{iks} - a_i^0, \dots) = \gamma\big(\beta_{1,0} + \beta_{1,1}x_1 + \cdots + \beta_{1,k}x_k + \varepsilon_1\big)$, which in matrix form becomes $X'\gamma\beta_1 + \gamma\varepsilon_1$. The estimated coefficients of X' are

$\widehat{\beta_1} = \gamma\beta_1$ and $\widehat{\beta_2} = (1-\gamma)\beta_2$ for systems 1 and 2 respectively. It is not possible to determine the value of γ alone under this framework, the relative weight of each system in total utility; we can estimate $\widehat{\beta_1}$ and $\widehat{\beta_2}$, which similarly measures the effect of each system into making a decision. Because the Wansink-Schulze model is an additively separable homothetic function, the estimated betas have embedded the value of γ. As can be observed, this function is not separable independent. The dependency comes from γ, which makes the two systems inversely related: an increase in γ (system 1 effect) would cause a similar decrease in $1-\gamma$ (system 2) .

In the dual process under a random utility model, an individual's preference of choice *y* (to act) over choice *n* (not to act) becomes a function of the two systems, S_1, S_2; and control variables X.

$$U^y(S_1,S_2,X) = \gamma \sum_s^n \frac{1}{n} M_s\left(\dots, a_{iks} - a_i^0, \dots\right) + (1-\gamma)\sum_s^n P_s\left(\dots, a_{iks}, \dots\right) U_s(\dots, a_{iks}, \dots) + X'\beta_y + \varepsilon_y$$

$$U^n(S_1,S_2,X) = \gamma \sum_s^n \frac{1}{n} M_s\left(\dots, a_{iks} - a_i^0, \dots\right) + (1-\gamma)\sum_s^n P_s\left(\dots, a_{iks}, \dots\right) U_s(\dots, a_{iks}, \dots) + X'\beta_n + \varepsilon_n$$

S_1 and S_2 are the utility from system 1 and 2 respectively. They represent the value of the first and second terms of the above equations. Each system can be characterize by vector of variables $X_1$and X_2. These variables can be psychometric values to questions that engage deliberative and emotional responses. An individual chooses to take an action if $U^y(S_1,S_2,X) > U^n(S_1,S_2,X)$, and the probability of taking an action is

$$Prob(y=1) = Prob(X_1'\widehat{\beta_{1,y}} + X_2'\widehat{\beta_{2,y}} + X'\beta_y + \varepsilon_y > X_1'\widehat{\beta_{1,n}} + X_2'\widehat{\beta_{2,n}} + +X'\beta_n + \varepsilon_n)$$

$$= Prob(X_1'\left(\widehat{\beta_{1,y}} - \widehat{\beta_{1,n}}\right) + X_2'\left(\widehat{\beta_{2,y}} - \widehat{\beta_{2,n}}\right) + X'\left(\beta_y - \beta_n\right) + (\varepsilon_y - \varepsilon_n) > 0)$$

$$(2) \quad = \; Prob(X_1'\widehat{\beta_1} + X_2'\widehat{\beta_2} + X'\beta + \varepsilon > 0)$$

As mentioned earlier, the parameter γ from the Wansink-Shultze model is embedded in the parameters $\widehat{\beta_1}$ and $\widehat{\beta_2}$, representing the effects of each system into the likelihood of taking an action. A positive value of any of these parameters implies that its corresponding system affects the decision to take the action positively, whereas a negative value implies that the system acts against taking the action. Different from equation (1), equation (2) includes variables X_1 and X_2 that elucidate each of the system's effects into each action.

Included in X in equation (2) are variables that categorize each respondent according to their dread level and familiarity to the risk of violence. These variables are obtained through a cluster analysis which is explained next.

Cluster Analysis

Cluster analysis is used to manage the set of questions related to risk perceptions. Under this method we are able to establish discrete identifiers for groups of respondents with similar attitudes towards risk and degrees of affect. The advantage of this approach is in the collection of distinct cluster variables which when assigned to a respondent describes the respondent in relation to other respondents. These cluster identifiers will be used as independent (dummy) variables in the regressions to follow. In doing so we preserve degrees of freedom, given the number of variables that classify clusters; the advantage of this method is in identifying respondents within a cluster that have similar beliefs and perceptions while maximizing the distance between other groups with different and identifiable characteristics.

Cluster analysis is widely used in many disciplines, for instance, image processing, biology, psychology, sociology, and marketing among others (Jain et al., 1999). The goal is to create

homogeneous groups of individuals while decreasing the number of variables required for further analysis[2].

Details on the cluster variables and method uses in this paper are presented in the next section.

Methodology

Between September 13th and 26th of 2011 we interviewed 370 small scale farmers in the eastern part of the state of San Luis Potosi (SLP), about 80 Km southwest of Tampico. The survey was conducted in the municipalities of Ébano and Tamuín. In almost all cases, these farmers live in population centers near their plots, and almost every farmer interviewed belonged to an ejido (98%), or commune. All crop production in the region is a combination of corn, sorghum and soybeans. Some farmers may supplement their household income working outside their farms or by raising cattle. At each population center that we visited, 6 in total, we randomly interview people from different ejidos, as well as few farmers who do not belong to any ejido. With the help of our local partner, a marketing cooperative called Interagro de las Huastecas, we obtained the logistic and sampling support for our research. We hired local college students as enumerators for the survey, and train them in our first day of fieldwork.

Every day we visited at least one population center. We recruited farmers by having the ejidos' leaders announce a study to their members. The ejidos' leaders were informed in advance about

[2] There are several algorithms used in cluster analysis, all of them minimize within group variation while maximizing between group variation (see Kaufman and Rousseeuw, 2009, for a discussion on the subject). The cluster method used in this analysis is part of the hierarchical clustering. Hierarchical clusters begin by having *N* clusters, and grouping those with the closest Euclidean distance, based on some variables' values, until a number of distinctive clusters are reached. The Euclidean distance is defined as, $D_{ij} = \sqrt{\sum_{k=1}^{K}(x_{ki-}x_{kj})^2}$, where D_{ij} is the distance between subjects i, j, over K variables. Each variable can have a value over a given range. The number of final clusters is selected based on statistical tests.

the details of the meetings, but were not informed that the study would specifically query members on narcoviolence. Another method used to inform people of our survey was to broadcast messages a few days in advance using the communities' loudspeakers. In fact, this is the most common method to transmit public information and messages to people in these rural communities. In order to minimize selection bias, we sampled from different areas in the communities and tried to include farmers from all ejidos. The number of farmers interviewed from each ejido depended on the ejido's relative size. We knew, from our local partner, the total number of farmers in the region, size of each ejido, the number of ejidos, and the size of each population center. We estimated the rural population in our area of study to be about 35,000 people (Unidad de Microrregiones), from which we obtained 370 observations, one per household. From our local partner's knowledge of the regional agriculture, the farmers surveyed were very much typical and thus representative of most farmers in the region. However, in field studies of this nature achieving a purely randomized sample is very difficult, especially in conflict zones. Thus, while every indication is that the sample is representative and typical, we cannot rule out selection bias in those that voluntary attended the meetings.

The survey took on average 45 minutes to complete and was divided into two parts: the first one contained demographic and economic questions and the second part contained questions regarding perception on insecurity and fear derived from the drug violence. The questions were read and the answers written by the enumerators. Although participants were told that they do not need to answer any question that they consider inappropriate, all of them answered every question. Because the survey contained questions about violence and insecurity that may be sensitive to some and thus produce biased responses, we made sure that the participants understood that this survey was for academic purposes only and that confidentiality was

guaranteed at all times. This was stressed at the beginning of each interview. We offered 100 pesos (MXP) as compensation for completing the survey, which is equivalent to more than an average day's wage.

Our analysis evaluates the perception of fear given demographic characteristics as well as the resulting actions and intentions in response to risk. Given the multidimensionality of Slovic's psychometric measure of risk, we opt to do a two-step cluster analysis to provide a natural grouping according to multiple factors of risk. For the creation of clusters, we used a set of 18 questions derived from Slovic's work (especially Slovic, Lichtenstein and Fischhoff, 1984), but adapted to the local environment. All 18 questions were answered using a five-point Likert scale (the cluster questions are shown in a short form in table 1 along with the regression results for each cluster). These questions reveal the degree of dread people have given various situations, and measure the degree of familiarity to the risk, control over risk, and magnitude of the disaster.

Cluster Variables

The clusters and their defining variables are shown in Table 1. Our clusters were obtained after running a hierarchical method of clustering using a minimum Euclidean distance algorithm and single linkage clustering. We obtained four natural clusters, which we labeled them as cautious, confident, fearful, and optimistic, according to their attitudes toward fear. Naming the clusters in this way provides a context to understand better the responses to risk perception. Figure 2 shows the clusters under names that best describe them in relation to fear level and familiarity to risks. The main characteristics of each cluster are the following: Group 1 feels drug violence is preventable, is unfamiliar to the risk but doesn't feel personally at risk, and feels the risk is catastrophic but short lived; Group 2 feels it can prevent the risk, doesn't think the risk is

catastrophic, is unfamiliar to the risk, and doesn't feel personally at risk; Group 3 has the highest level of fear, doesn't trust authorities, is unfamiliar to the risk, feels the risk is catastrophic and cannot be controlled; Group 4 feels personally at risk, doesn't feel the risk is catastrophic but feels it can last a long time and cannot be prevented but can be controlled.

Accordingly, we label Group 1 as *cautious*, Group 2 as *confident*, Group 3 as *fearful*, and Group 4 as *optimistic*. The values in Table 1 are the OLS regression coefficients, along with their p-values, of group membership on its defining variables. The *cautious* group for instance, has a significant positive value to the statement "Random shooting can kill many people" meaning that they strongly believe the statement; *Confident*, on the other hand, are unlikely to feel this way. *Optimistic* also feels that a catastrophic event is unlikely. *Fearful* are more likely to respond positive to the statement "If stopped by narcos, I'll die", and to "The risk of getting kidnap / robbed is increasing". Similarly, confident and fearful respond negative to the statement that "risk of getting robbed can be reduced". *Confident* are likely to feel that the risk of getting kidnapped or robbed is decreasing but they also feel that they cannot do anything to reduce that risk.

[Figure 2 about here]

Cautious is the largest of the clusters with 111 members (30%), followed by *optimistic* with 100 (27%), *fearful* with 83 (22%), and finally *confident* with 76 elements (21%) from a total of 370 observations.

Apart from the questions that designate each of the four clusters, we also included questions that elucidate participants' perception about crime in their community and roads, that estimate their likelihood of being victimized, and that elucidate their level of fear of being victimized by

different crimes. These questions differ from those used to establish the clusters (table 1). Cluster questions focus on participants' attitudes toward drug-related violence, while this new set of questions measures participants' violence perception, their fear of being victimized in the next 12 months, and their estimated probability of being victimized in the next 12 months. The resulting variables are named ViolenceLevel, FearLevel, and ProbCrime, respectively. The types of crimes used in these questions are the same six types mentioned earlier. Participants responded these questions using a Linker type scale. To facilitate analysis, we created three groups that measure the values of the answers: 1, 2, and 3 for low, medium, and high value, respectively. Thus, each group of questions has three degrees of values. For instance, the variable FearLevelG1 represents the group that has the lowest fear of being victimized in the next 12 months, and FearLevelG3 has the highest fear. An example of FearLevel questions is: "How much do you dread being a victim of the following crimes in the next twelve months?" An example of a ProbCrime question is the following: "Do you feel that you or your family can be victim of the following crimes in the next twelve months?" Participants answered for each of the six different crimes (carjack, theft, extortion, kidnap, homicide, assault), and their likelihood ranging from 1 to 5: from not likely at all, to extremely likely.

The fear level groups are distributed as follows, FearLevelG1 has 170 members, or 46% of the total; FearLevelG2 and G3 have 109 and 91 respectively, about 29% and 25% of total. Violence level groups have similar distribution than fear level group, The probability of victimization groups, however, has a very large density in the low values. ProbCrimeG1 has 215 members; ProbCrimeG2, 113, and ProbCrimeG3, 42; or 58%, 30% and 11% of the total sample. These numbers show that in general, farmers that are mostly concerned about crimes in their

community represent a rather small fraction. This number is even smaller when estimating probabilities of victimization.

Dual Process Variables

Following the Dual Process Theory we next examine the mechanisms in which objective assessments of risk and emotional responses to risk affect actions. In order to capture the effect of the deliberative system (system 2), after categorizing participants into four groups, we used the variable that measures the probability of being victimized within the next 12 months, and created interaction terms for each of the 4 groups. These interaction variables measure the random effect of the probability assessment of victimization for each group. This is justified because each of the four groups has different fear measures, thus, each group is expected to react differently on actions taken according to their probability of victimization. For instance, we expect that a participant who believes that his probability of being victimized is high would react differently depending if he is in the fearful or confident group. This interaction term provides the deliberative effect on the Dual Process because the response corresponds to a probability assessment of victimization, which engages system 2 of the decision process.

In order to capture the effect of the emotional system (system 1), similar measures of group interaction and fear level are created. In this case, the interaction terms of each of the four groups with fear level measures the effect of emotions on actions. For instance, a participant who shows high fear level would react differently depending on the cluster he belongs. By measuring the fear level of victimization in the next 12 months, which is a purely emotional response, farmers engage the system 1 of the decision process.

Results

Most of the farmers interviewed belong to an ejido and have roughly the same amount of land, 10 Ha. The age ranged from 18 to 87. Married people account for 75% of the sample, and 8% are single. 92% of the sample has children. 86% of the respondents were male and 14% female. Almost every respondent is aware of the government's war on drugs: 85% responded that they were aware of it, 7% were not aware and 8% were not sure about it.

Cluster Regression

Table 2 shows the results of a Logit regression for each of the four clusters with respect to demographic, economic and psychometric variables. These clusters are defined only on the basis of the risk perception-psychometric variables by Slovic. The numbers indicate the likelihood that someone belongs in any group given a value of a variable. A positive coefficient means that the effect of a variable to the likelihood of being in that group is positive.

Looking at the column of *fearful*, we find a positive and significant coefficient for the variable sex (1 for Female, 0 for Male) (b= 1.27, p=0.008), which is consistent with the literature on risk perception and gender (Flynn et al., 1994). Similarly, age is negative and significant (b= -0.035, p= 0.081); the older the respondent, the less likely they belong in the *fearful* group. Its squared term do not show significance and was not included in the results. Education has a similar affect as age (b= -0.303, p= 0.049); the more educated, the less *fearful*. These results are also in accordance to previous research. However, the effect of total assets positive and significant (b= $8.28*10^{-7}$, p= 0.046) for *fearful*. In the other groups this variable is not significant. A possible explanation is that people feel to be a target of crime if they have more wealth. Continuing on the *fearful* group, responding to the question "Are you perceived by the community as being socially active?" has a negative and significant coefficient (b= -1.035, p= 0.001),similar result is found

for *confident* (b= -0.893, p= 0.001). *Optimistic* has a positive value for this variable (b= 1.853, p= 0.000). With a significance level of 12 percent, being perceived as influential also has a negative effect on being *fearful* (b= -0.530, p= 0.121); *confident* has a positive value for this variable (b= 0.693, p=0.008). Trust variables have negative values for *fearful* (b= -0.327, p= 0.102), *cautious* (b= -0.328, p=0.109) but positive for *optimist* (b= 0.350, p= 0.062). This represents trust in the Mexican Army and Navy, but not on the local police.

[Table 1 about here]

Knowing a victim of crime has a positive effect of being *fearful* (b= 0.965, p= 0.009) and a negative effect of being *cautious* (b= -1.204, p= 0.017). This variable measures the closeness to experience a crime. Participants who never experience violent crime, or who do not know a victim of violent crime, are less likely to be afraid.

Religion is negatively correlated with fear. Specifically, a high religious celebration attendance per month has a negative correlation of being *fearful* (b= -0.139, p= 0.110) and a positive correlation of being *optimistic* (b= 0.113, p= 0.055). This result requires further analysis to determine causality.

The variable Risk Taking Production, measures the willingness to adopt new production technologies based on three questions: "Are you willing to accept greater production risks to increase the chance of higher profits?", "Are you willing to take risks with new technologies before you see good results in other farms?", and "Are you willing to take risks with new

management practices before I see good results in other farms?" *Cautious* has a significant negative coefficient on this variable (b= -2.099, p= 0.000), while *optimistic* is more willing to take production risks (b= 1.864, p= 0.000). Income, number of children and farm size had no statistical effect in determining group inclusion.

Actions Taken in Response to Risk

In this section we investigate the effects that narco violence may have on production and rural life in this geographic area following the dual process approach. For this, we evaluate different actions taken and intentions considered by farmers given their perception of violence.

[Table 2 about here]

We asked four questions that indicate actions taken and intention of farmers. These are used as independent variables in our regressions. These questions are: "Have you considered moving to another town because of the risk of being victimized?", "Have you changed your production decisions because of the risk of violence?", "Have you changed your daily activities because of violence?", and "If the current level of violence continues, would you change your production decisions?" We refer to these questions as Actions 1 to 4.

Table 3 shows the result using seemingly unrelated regression of actions and intentions with respect to group membership and other risk and control variables. Seemingly unrelated regression is used when we believe that the error terms across equations are correlated. The results are still unbiased but more efficient (Green, 2003; Gujarati, 2003). Unlike multinomial logit models, the parameters estimated in table 3 represent probabilities instead of odds ratio,

which are less intuitive to interpret. Our system of equations consists of Actions 1 to 4, including inaction, on demographic characteristics and fear perception variables.

Men are marginally more likely to have changed production decisions than women (b= -0.055, p= 0.148). The p-value, although high for conventional standards, provides a hint on this relationship that is worth consider. For the other 3 actions, the coefficients are not significantly different from zero. Age is significant in a quadratic relationship. Depending on the action, when people are about 45 years old they are the least likely to make or consider an action in response to violence. More educated people are more likely to consider changing production practices due to violence (b= 0.0373, p=0.037). Some of these production practices include changing their portfolio of crops and livestock, input use, and renting their land. The size of group of friends (social interactions and networks) has a positive effect in "having considered moving" (b= 0.004, p= 0.077), and in "having changed production practices" (b= 0.0037, p= 0.000). Changes in lifestyle are easier to make the more friends one has.

Farm size has a positive and significant correlation in three out of four actions. In "having considered moving" (b= 0.0211, p= 0.003), in "having changed production decisions" (b= 0.0068, p= 0.011), and in "having changed daily activities" (b= 0.0072, p= 0.04).

Closeness to risk measured as "knowing a victim of violent crime", or "knowing someone who has moved out of town because of violence", are important variables that determine changes in activities and intentions. "Knowing a victim of violent crime" has a positive effect in two actions: "Having changed production" (b= 0.047, p= 0.116), and "changed daily activities" (b= 0.071, p= 0.072). "Knowing someone who has moved out of town because of violence" is significant for three actions: "Considered moving" (b= 0.313, p= 0.001), "changed production

decisions" (b= 0.116, p= 0.002), and "changed daily activities" (b= 0.161, p=0.001). These results suggest that the closer a participant is to a victim of crime, the more likely he will take an action to prevent being a victim themselves.

Group membership alone is significant in predicting some actions and intentions. The results are in relation to *confident*. *Confident* was selected as the baseline since it doesn't have extreme values of fear unlike the other groups, making the comparison easier to interpret. We find that c*autious* and *optimistic* are less likely to "have considered moving out of town" (b= -0.635, p=0.034; and b= -0.704, p= 0.019 respectively) compared to *confident*. Compared to *confident*, *optimistic* is less likely to have changed their daily activities.

Dual Process Model Component Effect

In order to measure the effect of each of the components of the dual process, we included questions that reveal emotional and rational responses to risk of violence. System 1 (emotional) is measured in our survey by the response to the question "how afraid are you that you or your family becomes a victim of violent crime in the next 12 months?" The response to this question measures the degree of fear of victimization, which triggers an emotional response and does not incorporate any probability assessment of risk. System 2 (rational) is measured by the response to "how likely are you that you or your family becomes a victim of violent crime in the next 12 months?" Estimating a likelihood, or probability, of an event is a deliberative process that engages system 2. Although the two questions seem to measure the same concept, they are not perfectly correlated to each other. Some people may fear being victimized but may be aware that that probability is very low. The emotional effect on actions is captured by the variables "Low Fear Level" and "High Fear Level", and their interaction with each group. For instance, for

cautious the variables are "*cautious* Low Fear", and "*cautious* High Fear". Similar names are used for the other groups, while keeping *confident* the reference group. The deliberative effect is captured by the variables PLI and PHI and their corresponding interaction with each group. PLI stands for probability of low impact crime, and PHI for probability of high impact crime.

[Table 3 about here]

Low impact crimes are theft and physical aggression; high impact crimes are kidnapping, extortion and homicide. The marginal effect of the emotional and deliberative response of each group is the sum of that variable and their interaction term. Since a high impact crime is more related to the new wave of drug-related violence than low impact crime, the effects of each dual process component is estimated on the fear and probability of victimization of high impact crimes. The influence of each decision process (emotional and deliberative) on each action is measured by the size of their marginal effect. From these values we can determine which decision component dominates each group. Table 4 summarizes the marginal effects of each system.

The type of action taken also determines what decision process is more important for each group. Consider the action "Change Production if Crime Continues" in table 4, where all groups of people are more dependent on the rational mechanism (system 2) than the emotional (system 1). All coefficients are statistically significant for the system 2. Except for *confident*, all other groups have positive marginal effect. This indicates that a larger expected probability of victimization in the next 12 months will make *cautious, fearful* and *optimistic*, more likely to change their production in any way. On the other hand, a *confident* will be less likely to change production as his expected probability of victimization for the next 12 months increases. The insignificant values for system 1 shows that this action, "Change Production if Crime Continues", relies mostly on the objective assessment of risk and not on fear level. Changing

production is a business decision which depends on calculations of costs and revenues. This decision is likely done by deliberation and not by an emotional impulse.

The action "Have Considered Moving out of Town" resulted in system 1 being more influential than system 2. This can be observed by comparing the marginal effects of the coefficients that measure high fear level and those that measure the probability of high impact crime in table 4. The marginal effects of high fear level for this action are significant for *cautious*, *confident* and *optimistic*, but not for *fearful*. *Cautious* and *optimistic* have negative signs, while *confident* has positive sign. A negative coefficient in system 1 indicates that having a high fear level decreased the likelihood of "having considered moving out of town". *Cautious* and *optimistic* would not move out of town despite their fears. *Confident*, on the other hand, would "have considered moving out of town" due to a high level of fear.

[Table 4 about here]

For the other two actions, "Changed Lifestyle due to Crime" and "Change Production due to Crime", both the emotional and rational systems in general have marginal effects not statistically different from zero. For these two actions it seems that no system dominates.

An important observation is that for almost every group, the emotional system (system 1) has a much larger magnitude than the rational system (system 2) for the significant actions. One possible reason for this is that all subjects, by being exposed to violence, have their emotional part of the decision making process more active than their rational part. In other words the emotional component of their decision making process was overwhelmed by exposure to negative stimuli. This finding is similar to the findings in Schulze and Wansink (2012), who

show that by lowering an individual's cognitive load, their deliberative system has a greater effect on their decisions. In our study, farmers are overwhelmed by the amount of negative stimuli.

The influence of positive emotions on stigma is also observed by our results. In an experimental work on stigma and the offsetting influence of positive emotions, Messer et al. (2011) find that the stigma of mad cow disease (BSE) on willingness to pay for a hamburger can be offset by positive advertising on beef. In their study, participants were shown various advertisements after watching a news clip on BSE. The positive emotional treatment was a generic advertisement for beef. We found similarities in our study to that experiment. In our individual categorizations, each group member shares certain characteristics about their attitudes towards risk (*cautious, confident, fearful,* and *optimistic*) which also represents their optimism and pessimism about their current situation. This is related to the offsetting of stigma by positive emotions; however, in the group case these positive emotions are endogenous within each group. Following the results of Messer et al.(2011), offsetting the negative stigma created by the presence of narcos by means of positive emotions might be a way to reduce anxiety in the community. How these positive emotions are to be conveyed to the farmers is a matter of further discussion.

Conclusion and Further Discussion

This paper analyzed the effect of drug violence in a rural area in Mexico using the framework of the dual process theory. We found various significant factors that correlate with fear among farmers, and how that fear is affecting rural life and production decisions.

In this analysis, using a variety of established psychometric models to determine degree of fear developed by Slovic, we were able to create through cluster analysis four groups that classify

people according to their fear perception and feeling of control of risks. These groups, or typologies, were labeled *optimistic*, *fearful*, *pessimistic* and *confident*. We analyzed the effect of demographic and economic variables in determining group membership, and on actions/intentions in response to fear.

We found that farmers' decisions can be explained by the dual process approach. Dual process explains behavior under risk as the result of two decision making mechanisms: an emotional, irrational, reaction based mechanism; and a deliberated, rational, unemotional mechanism. We were able to measure the degree of emotional response and deliberative response to risk according for each action. Both responses to risk are determined by group membership, among other factors. The measure of emotional response to risk is derived on the fear of victimization in the next 12 months. The measure of deliberate response to risk is related to their probability assessments of victimization in the next 12 months. The variables consisting of the product of group membership and probability of victimization, and group membership and emotional response to risk, gives the elements for decision making under the dual process model for each group. We show that for actions which require more analytical deliberation, like choosing a portfolio of production, the rational system dominates. Similarly, decisions on actions that do not depend on numerical calculations are dominated by the emotional system, like the decision to move out of town.

We analyze variables that determine group membership and actions taken due to crime. Fear level depends on exogenous as well as endogenous characteristics. Like our own experiences with risk factors and trust to authorities, how people feel they are viewed, socially, in the community also affects their degree of fear. Deciding to take actions to reduce the probability of victimization depends also on exogenous factors, most importantly, networking size.

Our results also show that group membership affects risk taking behavior in production and adoption of new technology. We find that being unfamiliar to the sources of risk make people less likely to adopt new production technology. Adoption of new technology can be better implemented if information on risks are disseminated and confidence on authorities built appropriately, or by creating a more cohesive community.

Little is actually known about how fear and perceptions of risks interacts with economic behavior. This paper has provided evidence that economic models may well want to add greater specificity to risk aversion and risk perceptions than conventional models of utility provide. From an actionable perspective, the evidence in this paper suggests that policy makers, including law enforcement, may want to look deeper into how criminal activity and other sources of conflict affect economic choices. Because individuals are not identical in either their perceptions or responses to risk, how risks are communicated by authorities may matter.

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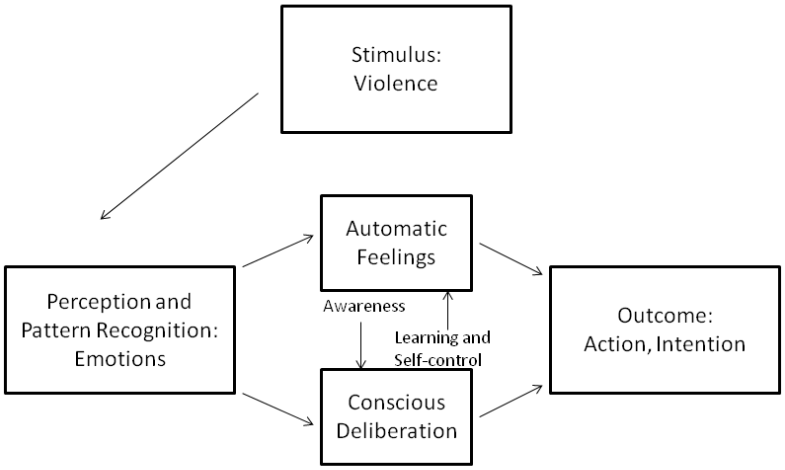

Figure 1. Relationship of Stimulus, Perception and Action under the Dual Process Framework

Figure 2 Four-Quadrant Division of Clusters Based on Fear Level and Familiarity to Risk

Table 1. Regression of Clusters on their Determining Variables

Statement	*Cautious (Group1)*	*p-value*	*Confident (Group2)*	*p-value*	*Fearful (Group3)*	*p-value*	*Optimistic (Group4)*	*p-value*
If stopped by narcos, I'll die	-0.0114	(0.460)	-0.0296***	(0.021)	0.0303***	(0.003)	0.0106	(0.358)
I can prevent being killed by narcos	-0.00122	(0.925)	0.0305***	(0.005)	-0.00754	(0.385)	-0.0217***	(0.028)
If extorted, can sell assets and leave	-0.0301***	(0.017)	0.0163*	(0.117)	-0.0119	(0.153)	0.0257***	(0.007)
Random shooting can kill many people	0.107***	(0.004)	-0.0592**	(0.055)	0.00978	(0.691)	-0.0571***	(0.041)
Living under violence is new to me	-0.0852***	(0.000)	0.0274*	(0.138)	0.0432***	(0.004)	0.0146	(0.381)
The Army knows where narcos are located	-0.0344***	(0.026)	0.00401	(0.753)	0.00791	(0.438)	0.0225**	(0.052)
I know the modus operandi of narcos	-0.0634**	(0.077)	0.0659***	(0.027)	0.000112	(0.996)	-0.00268	(0.920)
Narcos' crimes can be controlled	0.0190	(0.232)	0.00474	(0.720)	-0.0504***	(0.000)	0.0266***	(0.026)
Criminals in my region can put in danger future generations	-0.100***	(0.001)	0.00746	(0.764)	0.0533***	(0.008)	0.0397**	(0.078)
I'm at risk because I work in the field	-0.0485***	(0.019)	0.00885	(0.606)	0.0400***	(0.004)	-0.000388	(0.980)
I'm at risk because I transit on the roads	-0.0493***	(0.047)	-0.0232	(0.259)	0.0122	(0.457)	0.0604***	(0.001)
The presence of narcos can cause a national catastrophe	0.0297*	(0.112)	-0.0143	(0.355)	-0.0109	(0.377)	-0.00445	(0.750)
The Army can react quickly to narcos' crimes	-0.0490***	(0.004)	0.0146	(0.302)	-0.00763	(0.501)	0.0420***	(0.001)
The risk of getting kidnap is increasing	-0.0476**	(0.095)	-0.0422**	(0.075)	0.0520***	(0.006)	0.0378**	(0.078)
The risk of getting kidnap can be reduced	0.0346	(0.180)	-0.0296	(0.167)	-0.0787***	(0.000)	0.0737***	(0.000)
The risk of getting robbed is increasing	0.0767***	(0.008)	-0.104***	(0.000)	0.0313**	(0.100)	-0.00349	(0.871)
The risk of getting robbed can be reduced	0.0171	(0.504)	-0.0398**	(0.062)	-0.0713***	(0.000)	0.0939***	(0.000)
I can minimize the risk of being a victim of crime	0.0313***	(0.014)	-0.0168*	(0.110)	0.00685	(0.414)	-0.0214***	(0.025)
Constant	0.934***	(0.000)	1.146***	(0.000)	-0.232**	(0.094)	-0.848***	(0.000)
Log Like.	-162.8		-93.94		-10.90		-56.46	

Table 2. Logit Regression of Groups on Demographic and Psychometric Variables

	Cautious	*p-value*	*Confident*	*p-value*	*Fearful*	*p-value*	*Optimistic*	*p-value*
Sex	-0.618	(0.216)	0.0639	(0.890)	1.273***	(0.008)	-0.834*	(0.135)
Age	0.0273**	(0.097)	-0.00705	(0.669)	-0.0353**	(0.081)	0.0121	(0.467)
Number of children	-0.0223	(0.709)	-0.00816	(0.893)	0.0292	(0.714)	0.0132	(0.822)
Education	0.200*	(0.123)	-0.0317	(0.795)	-0.303***	(0.049)	-0.0272	(0.828)
Size of group of friends	-0.0121	(0.409)	0.0251***	(0.005)	-0.0122	(0.231)	-0.0113	(0.445)
Farm size	-0.00115	(0.977)	-0.00138	(0.972)	-0.00721	(0.849)	-0.00643	(0.845)
Revenues from farming	1.74e-06	(0.825)	-2.96e-06	(0.630)	7.77e-06	(0.254)	-8.95e-06	(0.321)
Total revenue from all sources	-4.13e-06	(0.612)	3.14e-06	(0.640)	-8.35e-06	(0.299)	1.15e-05	(0.190)
Amount of savings	-3.34e-05*	(0.125)	2.16e-06	(0.877)	1.64e-05	(0.352)	1.85e-05	(0.236)
Total asset value	-4.69e-07	(0.421)	-3.00e-07	(0.527)	8.28e-07***	(0.046)	-3.63e-07	(0.330)
Risk perception of own family wrt others	0.114	(0.682)	0.0362	(0.884)	0.227	(0.477)	-0.183	(0.536)
Believe own family is seen as asset rich	0.152	(0.643)	0.127	(0.694)	0.429	(0.291)	-0.241	(0.472)
Seen as vulnerable	0.352	(0.230)	-0.717***	(0.009)	0.0159	(0.959)	0.0548	(0.854)
Seen as socially active	0.146	(0.627)	-0.893***	(0.001)	-1.035***	(0.001)	1.853***	(0.000)
Seen as cash rich	-0.113	(0.687)	0.499**	(0.074)	-0.0206	(0.959)	-0.200	(0.512)
Seen as influential	0.161	(0.553)	0.693***	(0.008)	-0.530*	(0.121)	-0.327	(0.230)
FearLevelG2	0.204	(0.647)	-0.351	(0.423)	0.665	(0.232)	0.300	(0.501)
FearLevelG3	-1.793***	(0.018)	-0.970	(0.193)	1.529***	(0.045)	1.255***	(0.047)
ViolenceLevelG2	1.682***	(0.000)	-0.0260	(0.949)	-1.266***	(0.011)	-0.680*	(0.137)
ViolenceLevelG3	2.163***	(0.000)	-0.739	(0.176)	-1.260**	(0.058)	-1.392***	(0.018)
ProbCrimeG2	-0.148	(0.756)	-0.179	(0.708)	0.541	(0.299)	0.0399	(0.927)
ProbCrimeG3	-1.702	(0.223)	1.544*	(0.130)	0.645	(0.481)	-0.864	(0.389)
Concerned about crime in your community	0.167	(0.484)	0.185	(0.418)	0.0966	(0.744)	-0.697***	(0.004)
Concerned about crime on roads	-0.319	(0.222)	-0.238	(0.364)	-0.187	(0.613)	0.758***	(0.006)
Feel crime in your community has increased from last year	-0.0672	(0.774)	-0.579***	(0.010)	0.554**	(0.061)	0.401**	(0.076)
Feel road crime has increased from last year	-0.275	(0.254)	0.0862	(0.690)	-0.0445	(0.878)	0.157	(0.491)

	Cautious	*p-value*	*Confident*	*p-value*	*Fearful*	*p-value*	*Optimistic*	*p-value*
Confidence in local police	0.676***	(0.002)	-0.421**	(0.063)	-0.377	(0.159)	0.0275	(0.898)
Confidence in army/navy	-0.328*	(0.109)	0.234	(0.242)	-0.327*	(0.102)	0.350**	(0.062)
Know victim of violent crime	-1.204***	(0.017)	-0.509	(0.267)	0.965***	(0.009)	0.256	(0.463)
Risk Taking Production	-2.099***	(0.000)	-0.206	(0.550)	0.329	(0.437)	1.864***	(0.000)
Know anybody who moved to a safer town	0.647	(0.167)	0.729**	(0.082)	0.0318	(0.949)	-1.122***	(0.017)
Considered religious person	0.0671	(0.637)	-0.252**	(0.056)	0.0187	(0.905)	0.298***	(0.049)
Religious celebrations per month	-0.0528	(0.447)	0.0620	(0.301)	-0.139*	(0.110)	0.113**	(0.055)
Catholic	-0.284	(0.490)	0.675*	(0.136)	0.137	(0.802)	-0.104	(0.818)
Constant	-2.571	(0.187)	2.645	(0.158)	3.022	(0.221)	-10.69***	(0.000)
Log Lik.	-139.8		-151.2		-111.5		-138.7	
Chi-squared	162.1		71.11		168.4		149.3	

* p<0.15, ** p<0.10, *** p<0.05

Table 3. Seemingly Unrelated Regression of Actions on Groups Membership and Farmer Characteristics. Results are in Relation to Group 2(Confident)

	Have Considered Moving Out of Town		**Changed Production due to Crime**		**Change Lifestyle due to Crime**		**Change Production If Crime Continues**	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Female	0.00289	(0.977)	-0.0550*	(0.148)	-0.00703	(0.888)	-0.0297	(0.657)
Age	-0.0373***	(0.027)	-0.0140***	(0.028)	-0.0122*	(0.145)	-0.0163*	(0.146)
Age^2	0.000384***	(0.014)	0.000164***	(0.005)	0.000135**	(0.081)	0.000180**	(0.082)
Number of children	-0.00829	(0.523)	-0.00588	(0.230)	-0.0117**	(0.070)	-0.00528	(0.540)
Education	0.0184	(0.496)	0.00582	(0.568)	-0.00609	(0.650)	0.0373***	(0.037)
Size of group of friends	0.00400**	(0.077)	0.00374***	(0.000)	0.000846	(0.452)	-0.000131	(0.931)
Farm Size	0.0211***	(0.003)	0.00682***	(0.011)	0.00729***	(0.040)	0.00527	(0.266)
Farm Revenue	6.32e-07	(0.653)	5.97e-07	(0.261)	8.99e-07	(0.198)	8.36e-07	(0.370)
Total Revenue	-1.14e-06	(0.468)	-5.44e-08	(0.927)	1.52e-07	(0.845)	-1.25e-06	(0.228)
Total Savings	-2.95e-06	(0.400)	-1.82e-06	(0.170)	-3.90e-06***	(0.025)	-4.37e-07	(0.851)
Asset Value	2.95e-08	(0.736)	2.31e-09	(0.944)	-7.55e-08**	(0.083)	-4.22e-08	(0.467)
Cautious	-0.635***	(0.034)	-0.0446	(0.693)	-0.163	(0.272)	0.0438	(0.825)
Fearful	0.225	(0.498)	0.0864	(0.492)	-0.134	(0.419)	0.211	(0.340)
Optimistic	-0.704***	(0.019)	-0.0470	(0.678)	-0.258**	(0.082)	-0.00536	(0.978)
Pr. Low Impact Crime (PLI)	-0.121	(0.567)	0.102	(0.202)	0.00118	(0.991)	0.287***	(0.040)
Pr. High Impact Crime (PHI)	-0.0407	(0.816)	-0.0753	(0.256)	-0.0284	(0.744)	-0.238***	(0.041)
Cautious PLI	0.289	(0.272)	-0.0904	(0.364)	0.00370	(0.977)	-0.371***	(0.034)
Cautious PHI	0.0931	(0.685)	0.0840	(0.334)	0.0497	(0.663)	0.264**	(0.083)
Fearful PLI	0.0244	(0.920)	-0.166**	(0.072)	-0.0177	(0.884)	-0.376***	(0.020)
Fearful PHI	-0.106	(0.607)	0.0964	(0.218)	0.0492	(0.632)	0.277***	(0.044)
Optimistic PLI	0.164	(0.507)	-0.0890	(0.340)	0.130	(0.290)	-0.430***	(0.009)
Optimistic PHI	0.304*	(0.150)	0.110	(0.166)	0.0244	(0.815)	0.339***	(0.015)
Low Fear Level	0.0343	(0.873)	-0.117	(0.151)	0.148	(0.165)	-0.0233	(0.870)
High Fear Level	0.761**	(0.057)	0.112	(0.458)	0.262	(0.188)	0.363	(0.172)
Cautious Low Fear	-0.196	(0.461)	0.225***	(0.025)	-0.0574	(0.664)	0.125	(0.480)
Cautious High Fear	-1.066***	(0.036)	-0.214	(0.267)	-0.239	(0.345)	0.0326	(0.923)
Fearful Low Fear	-0.00971	(0.975)	0.186*	(0.115)	0.219	(0.158)	0.168	(0.418)
Fearful High Fear	-0.0558	(0.908)	0.0900	(0.623)	-0.0626	(0.795)	-0.161	(0.617)
Optimistic Low Fear	-0.0328	(0.904)	0.0282	(0.785)	-0.235**	(0.083)	0.364***	(0.045)
Optimistic High Fear	-1.048***	(0.022)	0.0486	(0.778)	-0.233	(0.304)	-0.0549	(0.856)

	Have Considered Moving Out of Town		Changed Production due to Crime		Change Lifestyle due to Crime		Change Production If Crime Continues	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Higher risk wrt. others	0.212***	(0.000)	0.0313*	(0.150)	-0.0457*	(0.110)	0.00697	(0.855)
Perc. Family as Asset Rich	-0.163***	(0.017)	0.0286	(0.268)	0.0288	(0.397)	0.0159	(0.726)
Perc. Family as Vulnerable	-0.109***	(0.042)	-0.0409***	(0.044)	-0.00334	(0.900)	-0.0394	(0.269)
Perc. Family as Soc. Active	0.156***	(0.007)	0.0510***	(0.019)	0.0452*	(0.113)	0.169***	(0.000)
Perc. Family as Cash Rich	0.0735	(0.255)	0.00767	(0.754)	-0.0137	(0.669)	0.0681*	(0.112)
Perc. Family as Influential	0.0254	(0.666)	-0.0173	(0.438)	0.0332	(0.258)	0.00616	(0.875)
ViolenceLevel Low	0.0988	(0.332)	0.0391	(0.310)	0.0321	(0.527)	-0.0133	(0.844)
ViolenceLevel High	0.0814	(0.531)	0.0161	(0.744)	-0.0343	(0.595)	-0.121	(0.161)
Concerned Crime in Town	-0.0117	(0.819)	-0.00903	(0.641)	0.00649	(0.799)	-0.00852	(0.802)
Concerned Crime on Roads	0.0116	(0.845)	-0.0142	(0.528)	-0.0144	(0.626)	0.0703**	(0.075)
Feel Crime in Town has Increased from Last Year	-0.0264	(0.604)	-0.00151	(0.938)	0.0195	(0.442)	0.0156	(0.644)
Feel Road Crime has Increased from Last Year	-0.0177	(0.725)	0.000247	(0.990)	-0.0101	(0.685)	-0.00687	(0.837)
Confidence in Police	0.0464	(0.312)	-0.0232	(0.181)	0.0227	(0.319)	-0.0272	(0.372)
Confidence in Army/Navy	0.0221	(0.579)	-0.000200	(0.989)	-0.00728	(0.713)	0.0358	(0.176)
Know Victim of Crime	-0.0636	(0.427)	0.0477*	(0.116)	0.0715**	(0.072)	-0.0198	(0.709)
Know Anybody who moved to a Safer Town	0.313***	(0.001)	0.116***	(0.002)	0.161***	(0.001)	0.0700	(0.276)
Constant	1.391***	(0.018)	0.106	(0.633)	0.221	(0.447)	-0.400	(0.303)
R^2	0.288		0.332		0.266		0.303	
Chi Squared	137		181		132		158	

* p<0.15, ** p<0.10, *** p<0.05

Table 4. Marginal effect of each system on actions. P-values in parenthesis.

Action/ Group	**Have Considered Moving out of Town due to Crime**		**Have Changed Production due to Crime**		**Have Changed Lifestyle due to Crime**		**Will Change Production if Crime Continues**	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
System 1								
High Fear Level								
Cautious	-0.305***	(0.036)	-0.102	(0.267)	0.023	(0.345)	0.3956	(0.923)
Confident	0.761**	(0.057)	0.112	(0.458)	0.262	(0.188)	0.363	(0.172)
Fearful	0.705	(0.908)	0.202	(0.623)	0.1994	0.795)	0.202	(0.617)
Optimistic	-0.287***	(0.022)	0.1606	(0.778)	0.029	(0.304)	0.3081	(0.856)
System 2								
Prob. High Impact Crime								
Cautious	0.0524	(0.685)	0.0087	(0.334)	0.0213	(0.663)	0.026**	(0.083)
Confident	-0.0407	(0.816)	-0.0753	(0.256)	-0.0284	(0.744)	-0.238***	(0.041)
Fearful	-0.1467	(0.607)	0.0211	(0.218)	0.0208	(0.632)	0.039***	(0.044)
Optimistic	0.2633	(0.150)	0.0347	(0.166)	-0.004	(0.815)	0.101***	(0.015)

* p<0.15, ** p<0.10, *** p<0.05