

# Vengeance

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Although laboratory experiments suggest that vengeance is an emotion that can potentially help explain some puzzling economic behaviors, the existence of vengeance has not been analyzed using data outside the lab. This paper investigates the extent of vengeful feelings and their determinants using data on more than 116,000 individuals from 66 countries. Country characteristics as well as personal attributes of the individuals influence vengeful feelings. The magnitude of vengeful feelings is greater for people in countries with low levels of education, in low-income countries and interrupted democracies. Personal education impacts vengeful feelings in lower-income countries. The results suggest that some puzzles about individual choice can best be explained by considering the interplay of personal and economic factors.

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## Vengeance

“Thou shalt give life for life, eye for eye, tooth for tooth, hand for hand, foot for foot.”  
Exodus 21:23-24

“An eye for an eye makes the whole world blind”  
Attributed to Mahatma Gandhi.

### I. Introduction

The desire to punish others produces high levels of cooperation and enhances collective action (Fehr and Gächter 2002; Gürerk, Irlenbush, and Rockenbach 2006), and there is evidence suggesting that people derive satisfaction from punishing norm violators (de Quervain et al. 2004.) Retaliation could also be a contract enforcement device in markets with incomplete contracts (Fehr, Gächter and Kirchsteiger 1997, Fehr and Falk 1999). Along the same lines, it has been argued that revenge serves a number of other objectives, ranging from righting perceived injustice to restoring self-worth of the vengeful individual (Cota-McKinley et al. 2001). The idea that vengeful behavior can stop potential offenders from committing similar crimes or from even considering similar crimes (Cota-McKinley et al. 2001, Wilson 1983) also suggests a deterrence effect of vengeance.

Given that social norms play a significant part in human behavior, understanding the extent of retaliatory feelings and their interplay with the economic and cultural characteristics of the society is important. However, as Fehr and Gächter (2000) indicate, very little is known about the social, economic and personal factors that contribute to the desire to punish others who have behaved in a manner that is considered unfair, harmful, or against the norms.

Specifically, although vengeance is assumed to be an integral part of human behavior, no evidence on vengeance exists based on field data. <sup>1</sup>

This paper develops a measure of vengeance and documents that the degree to which people want retaliation depends on both personal attributes and a number of country characteristics. The dictionary definition of vengeance is “Punishment inflicted or retribution exacted for an injury or wrong.” Consider a situation where having been subjected to a “wrong” means having been a victim of burglary in recent past and consider two individuals who are identical in all respects. If one of these individuals was then burglarized, vengeful feelings can be identified by the difference in the severity of punishment these individuals wish to inflict on a convicted burglar. This paper operationalizes this concept and provides evidence on the extent of vengeance using data on more than 116,000 individuals from 66 countries. It also investigates the extent to which personal attributes of individuals, and cultural and country characteristics explain the degree of their vengeful feelings.

People are likely to differ in their notions of fairness and in their beliefs about the level of appropriate punishment. Furthermore, victimization may prompt enhanced demand for protection, which may be mistaken for vengeance. To address these issues, empirical analyses in the paper control for a host of personal characteristics that may be correlated with potential victimization and the demand for punishment. Examples of these variables include, among others, age, gender, and education of the person, the rank of family income in the income

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<sup>1</sup> One obvious reason for the dearth is the difficulty of measurement. A common procedure to measure an individual’s extent of vengeful feelings is to employ a Vengeance Scale (Stuckless and Goranson 1992). This is a 7-point scale index based subjects’ responses to such hypothetical statements as “I am not a vengeful person”, “I try to even the score with anyone who hurts me,” and “It is always better not to seek vengeance.” Researchers have investigated the relationship between a vengeance index created this way and various behaviors, such as aggressive driving (Wiesenthal, Hennessy, and Gibson 2000).

distribution of the country and the burglary rate in the city/state of the residence of the person. Furthermore, I present evidence indicating that having been victimized by burglary triggers vengeful feelings against a burglar, but having been victimized by *other crimes* such as robbery and theft *does not* trigger demand for harsher punishment for a burglar. Victims who live in high crime cities/states may have enhanced demand for punishment for a burglar not because of a desire for retribution but because of a demand for deterrence. However, estimating the models by excluding people who live in high crime cities/states does not alter the results. Thus, the results are not likely the result of a general desire to punish or due to a pre-existing demand for protection.

As mentioned earlier, having been burglarized could trigger enhanced demand for protection. For example, becoming a victim of burglary may impact the victim's beliefs about the likelihood of burglary. Thus, victimization may generate demand for enhanced desire for self-protection in the form of burglar alarms, window grills, a high fence, a watch dog etc., as well as stiffer prison sentences for burglars. To control more directly for the demand for punishment that emerges for deterrence purposes, I include a variable that measures whether the respondent has taken precautionary measures that involve financial outlays to protect his or her home/residence.

Section II describes the data. Section III presents information on the vengeful feelings at the country level. Section IV describes the analyses conducted at the individual level and Section V presents the results of these analyses. Section VI investigates the determinants of vengeance. A discussion of the results and their implications are provided in Section VII, and Section VII offers a conclusion.

## II. Data and the Measurement of the Desire to inflict Punishment

The data are obtained from the International Crime Victim Survey compiled by the United Nations Inter-regional Crime and Justice Research Institute.<sup>4</sup> Table 1 presents the list of countries included in the analysis. The countries were surveyed either in various years between 1989 and 2002. Some countries were surveyed in more than one year. The key variable for this paper is based on the answer to the following two questions: *“People have different ideas about the sentences which should be given to offenders. Take for instance the case of a man of 20 years old who is found guilty of burglary for the second time. This time, he has stolen a colour TV. Which of the following sentences do you consider the most appropriate for such a case?”* The alternatives given are: fine, prison, community service, suspended sentence, any other sentence (to specify), and don’t know. For those respondents who declared that a prison sentence is appropriate, the following question is asked: *“For how long do you think he should go to prison?”* Fifteen alternatives are given to this question, which are: one month or less, 2-6 months, 6 months-1 year, 1 year, 2 years, 3 years, 4 years, 5 years, 6-10 years, 11-15 years, 16-19 years, 20-24 years, more than 24 years, life sentence, and don’t know.

Table 1 displays the percentage of individuals in each country who declared the appropriateness (according to them) of various sentence lengths. There are a total of 197,634 people behind Table 1. The first column displays the proportion of individuals in each country who indicated that a prison sentence of two years or longer would be appropriate punishment for a burglar who is convicted for stealing a color TV as his second offense. The second column displays the proportion of respondents who would like to impose a sentence of 4 or more years;

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<sup>4</sup> is [http://www.unicri.it/documentation\\_centre/publications/icvs/data.php](http://www.unicri.it/documentation_centre/publications/icvs/data.php)

and the third column reports the proportion who suggests a prison sentence of at least 6 years. These percentages include every respondent regardless of whether they were a victim of a crime themselves. As expected, the proportion of individuals who prefer longer prison terms declines in each country. There is substantial variation between countries in terms of the proportion of the respondents who suggested a particular prison sentence. For example, while less than two percent of the respondents in Switzerland, Austria, Finland, France and Denmark declare that a prison sentence of two years or longer would be appropriate for a burglar, the rate is 8 percent in Australia, 18 percent in Russia, 27 percent in the U.S., 38 percent in Argentina, 47 percent in Romania, 59 percent in Zimbabwe and 71 percent in China.

### III. Country Level Analysis

The information displayed in Table 1 is not a reflection of vengeful feelings. It merely pertains to the *level of the desired stiffness* of punishment. There are at least three reasons why the preference for harsh punishment might differ across countries. First, the question pertains to stealing a color TV. This action carries different monetary values in different countries. A color TV constitutes a larger fraction of personal income in a developing country than a developed one. Thus, the desired penalty for the theft of a color TV is expected to differ between countries. Second, criminal penalties and the culture of illegality differ between countries. Imagine two otherwise similar countries. If the first country has developed a more strict penal code with harsher penalties than the second country, the citizens of the first country may be expected to propose more strict penalties for burglary in comparison to those of the second country.<sup>5</sup> Third, the desired punishment level of each person may, in part, be determined by the level of

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<sup>5</sup> On the other hand, it should be noted that if a country has a very harsh penalty for burglary (e.g. losing a limb), then, suggesting a 6 year prison term for burglary in that country may be considered a lenient treatment.

prevailing criminal activity. Put differently, an individual's response to the desired punishment for burglary may contain his/her reactions to the extent of the crime rate in the city/state that he/she resides.

Because of these reasons, I will analyze the data by focusing on the variation of the responses to the revealed desired punishment *within a country*. Nevertheless, it is still interesting to investigate the cross-country determinants of desired punishment for burglary. To this end, the proportion of individuals who desire two or more years of punishment in each country, listed in Table 1, are regressed on a number of country attributes, including per capita real income, the share of government in per capita gross domestic product, the average level of education in the country, the size of the population and the proportion of young people in the population, and the proportion of Catholics and Muslims in the country. I also control for whether the country's legal system is based on British common law, French civil law, German civil law, or Socialist legal origin. Additional country attributes include variables that measure the existence of uninterrupted democracy during the period of 1950 and 1995, whether the country experienced a war or armed conflict between 1975 and 2000, the burglary rate in the country, and the proportion of women in the parliament. Measures of the extent of ethno-linguistic fragmentation in the country, the extent of the rule-of-law, and the degree of individualism in the culture are also included. More detailed definitions of these variables and their sources are provided in Section IV and in Table 4. Also included are time dummies for the year of the survey, as well as geographic location dummies.

Table 2 reports the result of the county-level regression, where the stiffness of desired punishment, as measured by the proportion of people who want to impose a sentence of at least two years on a burglar, is explained by country attributes described above. This variable is a

measure of the average desired sentence in the country, regardless of people's victimization status. Table 2 shows that the proportion of people who would like to impose a prison sentence of at least two years is lower in countries with British, French or German legal origin in comparison to those that have a Socialist or Scandinavian origin (the left-out category). An increase in the proportion of Catholics in the country is associated with a larger proportion of people who desire stiffer sentences. As the burglary rate goes up, so does the country-level desire to impose stiff punishment for burglary. More populous countries have stronger demands for punishment, but the demand is weaker in countries that have a larger proportion of young people. The proportion of women in the parliament, uninterrupted democracy, per capita income of the country and the extent of individualistic culture in the country are negatively related to the proportion of people that demand stiff punishment.

If being burglarized does not trigger vengeful feelings towards a burglar, then the proportion of individuals who desire a certain level of punishment should be the same among groups of victimized and non-victimized people. Figure 1 displays, for each country, the proportion of individuals who desire at least a 2-years prison term for a burglar who stole a color TV as his second offense. The horizontal axis displays the rate among people who were not victimized, and the vertical axis measures the rate among those who were victimized. The solid line is the 45-degree line. As Figure 1 demonstrates, most countries lie above the 45-degree line, indicating that the tendency to demand a stiffer penalty is higher among those who are victimized.

Table 3 presents the results from a country-level regression, where the dependent variable is the difference between the two rates (the distances from the 45-degree line in Figure 1). This can be thought of as a county-level measure of the extent of vengeful feelings. The proportion of

women in the parliament and the existence of uninterrupted democracy are negatively correlated with the strength of vengeful feelings at the country-level. The same is true for counties that have French or German legal origins and that have experienced a war in recent history. Countries that are ethno-linguistically more fragmented are more vengeful. Although some of the explanatory variables in Tables 2 and 3 are plausible exogenous in this context (e.g. the legal origin of the country), the same cannot be said easily for all variables. Therefore, the results in tables 2 and 3 should not be necessarily interpreted as causal relationships.<sup>6</sup>

#### IV. Individual-level Analysis

I hypothesize that vengeful feelings can be measured by the discrepancy in desired punishment between victims and non-victims. On the other hand, the discrepancy, or part of the discrepancy, may pre-exist. Individuals who live in high crime cities/states (where the risk of victimization is higher) may have higher demands for punishment. That is, these individuals may prefer stiffer penalties for a deterrent effect to reduce their risk of victimization. Similarly, individuals who have lower risks of victimization may prefer lesser punishments. If the risk of victimization is highly correlated with actual victimization revealed in the data, then the revealed differences in desired punishment may be due to pre-existing preferences about optimal punishment, and not necessarily because of the vengeful feelings that emerge after victimization.

The risk of victimization is related to personal characteristics of the person, such as age, education, income, labor market activity, marital status and the local crime rate. (Bureau of

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<sup>6</sup> For example, if desired prison sentences revealed in the data and actual prison sentences imposed by the legal system in the country are correlated, the burglary rate of the country will be endogenous. Dropping the burglary rate did not influence other coefficients or their statistical significance.

Justice Statistics 2006). Thus, I estimate individual-level regressions depicted by Equation (1) below.

$$(1) P_{ij} = \delta_0 + \delta_1 V_{ij} + \delta_2 D_{ij} + X_{ij}'\beta_2 + K_j'\beta_2 + u_{ij},$$

where  $P_{ij}$  stands for desired punishment for burglary as revealed by individual  $i$  who lives in country  $j$ .  $V_{ij}$  is a dichotomous variable to indicate if the individual has been a victim of burglary in the recent past. The coefficient  $\delta_1$  is expected to be positive if, all else the same, being a victim of a burglary prompts a desire to inflict harsher punishment.  $X$  is a vector of personal characteristics, including age, gender, marital status, gun ownership, the level of education, labor market status of the individual and whether the individual's family income is located in the upper 50 percent of the income distribution in that country. These attributes are known to be correlated with the risk of victimization and therefore they may influence the desire to impose stiffer punishment. Other variables that potentially impact the risk of victimization are the size of the city the person resides in, and the burglary rate in the city or state in which the individual lives.<sup>8</sup>

In Equation (1),  $D$  stands for an indicator for the demand for self-protection against burglary. If  $D$  depends on  $V$  (victimized people having higher demand for protection), and if  $\delta_2$  is positive (those who want more self-protection demand stiffer prison sentences), omission of  $D$  from equation (1) would inflate the estimated value of  $\delta_1$ . The survey includes a question that identifies the measures taken by the respondent against burglary that involve financial outlays. Specifically, the respondents were asked the following question. *“In order to help us understand why some homes are more at risk of crime than others, could I ask you a few*

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<sup>8</sup> For example in France, the city/state groups include Paris, Champagne-Ardenne and Alsace, Normandy and Brittany, Burgundy and Auvergne, Centre, Rhone-Alpes, Midi-Pyrenees and Aquitaine, Provence-Alpes-Cote d'Azur, and Picardi and Nord-Pas-de-Calais. In Canada they are: Quebec, Ontario, British Columbia, Prairies (Alberta, Manitoba and Saskatchewan) and Atlantic (New Brunswick, Prince Edward Islands, Nova Scotia, Newfoundland and Labrador)

*questions about the security of your home/residence? Is your own home/residence protected by the following:”* D takes the value of one if the respondent indicated that the house/residence was protected by a burglar alarm, special door or locks, window or door grills, a dog that would detect a burglar, a high fence or a caretaker or a security guard.

The variables in vector K pertain to country characteristics. In addition to acting as control variables, these country attributes will allow for an investigation as to whether the extent of vengeful feelings are influenced by these attributes. Most of these country variables, which are also employed in country-level regressions reported in Tables 2 and 3, are self-explanatory, with the potential exception of the Ethno-linguistic fragmentation of the country, the extent of individualistic culture prevailing in the country, and prevalence of the rule-of-law in the country. The Rule-of-Law index, which is obtained from the World Bank,<sup>9</sup> measures “the extent of which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.” (Kaufmann, Kraay and Mastruzzi 2007). The range of the index is from -2.5 indicating the weakest rule-of-law environment, to 2.5 representing the strongest. In our sample, the lowest score of rule-of-law is -1.53 and it belongs to Zimbabwe. Nigeria and Cambodia have second and third lowest scores of -1.35 and -1.08. Denmark and Finland have the highest scores of the rule-of-law, with 1.88 and 1.89 respectively. Tunisia and India are around the sample median of 0.13.

Another measure of cultural differences is the index of individualism as employed by Herrmann, Thöni and Gächter (2008). The index is developed by Hofstede (2001) and Hofstede and Hofstede (2005).<sup>10</sup> Lower values indicate the extent of collectivism of the society, which

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<sup>9</sup> : <http://info.worldbank.org/governance/wgi/index.asp>

<sup>10</sup> The data are downloaded from [http://www.geert-hofstede.com/hofstede\\_dimensions.php](http://www.geert-hofstede.com/hofstede_dimensions.php).

stands for the extent to which individuals are integrated into groups. Higher values of the index represent individualistic societies where the ties between individuals are loose, and where people are expected to look after themselves and their immediate family. In collectivist societies, people from birth onwards are integrated into strong, cohesive in-groups, often extended families (with uncles, aunts and grandparents) which continue protecting them in exchange for unquestioning loyalty.<sup>11</sup> In our sample, the United States is the most individualistic country with a score of 91, followed by Australia with a score of 90 and the U.K. with 89. The most collectivist societies in the data are Panama with score of 11, Colombia with a score of 13, Indonesia with a score of 14 and Costa Rica with a score of 15. Slovakia, Czech Republic and Austria are around the median score of 55.

The ethno-linguistic fragmentation index measures the probability that two randomly selected people in a given country in 1985 will not belong to the same ethno-linguistics group. This index, which is obtained from (Roeder 2001), has been used in research in both economics and political science (Smith 2004, Easterly and Levine 1997). In the data, the most ethno-linguistically homogenous country is the Republic of Korea with the value of the index being 0.003, followed by Portugal with 0.007, and Hungary with 0.01. The two most heterogeneous countries are Uganda and South Africa with score of 0.922 and 0.886, respectively. Belarus is at the mean with score of 0.374, and the U.S. has a score of 0.575.

Table 4 displays the definitions and the descriptive statistics of the variables employed in empirical analyses. The first column of numbers provides the descriptive statistics of the observations with non-missing personal and country characteristics. The second column displays the descriptive statistics of the sample which with non-missing personal characteristics. The third column provides the same information with the omission of the two variables that gauge the

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<sup>11</sup> The description is obtained from ([http://www.geert-hofstede.com/geert\\_hofstede\\_resources.shtml](http://www.geert-hofstede.com/geert_hofstede_resources.shtml)).

size of the city. Exclusion of these city size variables from the regressions did not alter either the magnitude or the statistical significance of the other coefficients, but allowed an increase in the sample size.

## V. Results

Table 5 displays the results of the ordered probit models, where the dependent variable consists of three categories, measuring the severity of desired punishment. These are: 1) if the person declared that the appropriate punishment is something other than a prison sentence (such as fine, community service, suspended sentence), 2) if the person declared that the appropriate punishment is a prison sentence up to one year, and 3) if the desired prison sentence is two years or longer. The proportion of responses in each category are: 60%, 21%, and 19%, respectively.

Three specifications are displayed in Table 5. All specifications include time dummies to control for the year in which the survey was registered in that country and the standard errors are adjusted for clustering at the country level. In the interest of space, only the coefficients of selected variables are reported. The first column reports the results obtained from the entire sample with non-missing personal and country attributes. Because the variables which measure the size of the city the person lives in were never significant, because in a few countries this information was not collected, and because dropping these variables did not alter the remaining coefficients, I dropped these two variables and re-estimated the model. The results that are reported in column II are almost identical to the ones displayed in column I. Finally, results of column III are based on the specification that includes country fixed effects, instead of the

country characteristics. Again, the magnitudes and the statistical significance of the estimated coefficients do not change.

The existence of vengeful feelings is identified by comparing the reactions of individuals who have identical observable personal characteristics but who differ in their victimization experience. The victimization coefficients reported at the top of Table 5 demonstrate evidence of *vengeful behavior*. Specifically, individuals who were victims of burglary this year or last year, prefer stiffer penalties for burglars in comparison to those who were not victimized. In addition, being a victim of burglary two years ago or earlier has an additional positive effect on the desire to impose stiffer penalties in the model with country fixed effects.

Other coefficients listed in Table 5 demonstrate the impact of a particular personal or country attribute on the level of desired punishment. For example, individuals who have taken protective measures against burglary are more likely to demand stiffer penalties. If the individual or anyone else in that household owns a gun, the intensity of the desire for stiffer punishment is stronger, suggesting that characteristics of the individuals that make them more likely to own a gun induce them to impose harsher penalties. Males prefer stronger punishment in comparison to females. Singles and widows are also more lenient than married people. The proportion of women in the parliament is negatively associated with the intensity of the desire to impose harsh punishment.

The middle panel of Table 5 displays the marginal effects of the victimization variables in the ordered-probit specification. Having been a victim of burglary this year or last year lowers the willingness to impose a punishment other than a prison sentence (a fine, community service, etc.) by about 2 percentage points, while it increases the probability of assigning a prison sentence up to a year by one percentage point, and it increases the probability of declaring that a

sentence of two years or longer is appropriate by about one percentage point. The impact of having being burglarized before last year is smaller in magnitude.

The bottom panel of Table 5 displays the results obtained from probit specifications, where the dependent variable is a dichotomous indicator of whether the individual declared that the desired punishment is a prison sentence of two years or longer. This is a simpler alternative specification to ordered probit. The results from this specification are consistent with the ones obtained from ordered probit. They indicate that, all else the same, having been a victim of burglary this year or last year increases the probability of the willingness to impose a prison sentence of two years or longer by 1.5 to 2 percentage points. Having been a victim in more distant past increases the same probability by about 1 percentage point.

Table 6 displays the estimated ordered probit coefficients and the associated marginal effects of having been burglarized that are obtained from models which are similar to those reported in Table 5, but the models reported in Table 6 also include city/state fixed effects. Thus, in addition to personal and country attributes and year fixed-effects, the models in Table 6 contain city/state fixed effects as well. The model in column (2) omits the city size variable; thus it is the counterpart of the regression reported in columns (2) of Table 5. The model in column (3) controls for personal attributes and includes country fixed effects as well as city/state fixed effects and the standard errors are clustered at the city/state level. As in table 5, the bottom panel of the table displays the marginal effects obtained from the probit specifications. The specifications displayed in Table 6 produce results that are very similar to those reported in Table 5.

Glaeser and Sacerdote (2003) find that victim characteristics affect sentence lengths in vehicular homicide trials in the U.S. To justify this result, an argument can be made that juries

and judges implicitly calculate the social welfare loss associated with each victim's death, and they assign differential values for each victim type, which is then translated to the severity of the sentence. In our case, however, such a justification is not valid. This is because the individuals who are analyzed here were asked to provide information about a *hypothetical 20 year old male burglar*. This does not imply that the respondent in our data set would not be more or less vengeful against females, older criminals, or towards certain race or ethnicity classes, but the results in Tables 5 and 6 demonstrate that there is an overall vengeful attitude, which stems from the person's own past victimization experience.

Note that the results of Tables 5 and 6 indicate that vengeful feelings dissipate slowly over time. Individuals who were victims of burglary this year or last year would like to impose stiffer penalties on a burglar. If victimization took place before last year, this event still has an impact on the demand for retribution, but the magnitude of the impact is smaller. This suggests that people forgive and forget slowly.

#### Are the Results due to the Demand for Protection?

Victimization could increase the demand for protection. The models reported in Tables 5 and 6 include *Protection Against Burglary*, which controls for the demand for self-protection. The coefficient of this variable is always positive and highly significant in each specification. However, in this section I address the issue of demand for self-protection in alternative ways as well. For example, a crime victim may demand stiffer punishment for criminals in comparison to non-victims for the purpose of deterrence of future crime. If this is the case, *victims of other crimes, such as robbery or theft*, would demand stiffer punishment *for any potential criminal*, including *burglars* in comparison to non-victims. Put differently, if the results reported in Table

5 are not due to vengeance but due to the manifestation of an enhanced demand for protection as a result of victimization, one would expect that a victim of any crime would demand stiffer punishment for any potential criminal.

To investigate this hypothesis I re-estimated the models displayed in Table 5 by replacing burglary victimization variable with an indicator variable to represent if the person was a victim of *robbery* this year or last year. I also ran the models with the following indicator variables: if the person was *a victim of personal theft, victim of bicycle theft, or if he/she was physically assaulted*. The results are reported in Table 7.<sup>12</sup> In column (1) we observe that having been robbed this year or last year *does not* increase the demand for punishment for a burglar. Similarly columns (2) and (3) demonstrate that having been a victim of theft, or bicycle theft this year or last year has no additional impact on the desired punishment for a burglar. This is important, because being a victim of robbery, theft or bicycle theft is associated with a monetary loss; and the same is true for burglary. Thus, if the results reported in the Table 5 are merely due to enhanced demand for protection, we would expect a similar relationship to hold between the desired punishment for a burglar, and having been victimized by robbery, theft, or bicycle theft. As Table 7 reveals, this is not the case.

These results indicate that vengeful feelings are event-specific. They are targeted to the person who is believed to have generated the harm in the first place. People who were victimized by burglary have vengeful feelings about burglars; but having been victims of robbery, theft or bicycle theft *do not* evoke vengeful feelings about *burglars*. This suggests that the identified vengeance effect is not likely to be driven by a general attitude about crime, or by a demand for protection that would be correlated with all types of victimization. The exception is physical assault, displayed in column (4). Having been physically assaulted increases people's

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<sup>12</sup> In the interest of space, I only report the coefficients of victimization variables.

desire to impose heavier punishment for burglary, indicating that physical victimization triggers stronger feelings than being victims of other crimes. This may suggest that having been targeted for violence may augment more general retaliatory feelings.

The first four columns of Table 8 report the results of the specifications of Table 7 that also include burglary victimization indicators. The point estimates of other victimization indicators do not change but burglary victimization remains significant in each case, suggesting that having been a victim of burglary generates vengeful feelings towards a burglar. Columns (5) to (8) of Table 8 present the results obtained from further specifications. Column (5) reports the results of the specification where all types of victimization experience are included jointly. The model in column (6) includes a dichotomous variable to indicate whether the person was a victim of any other crime (other than burglary). This variable is replaced by another dummy variable in column (7) to indicate if the person was a victimized at all for any crime. The model in column (8) uses the sample of individuals who were victims of at least one type of crime. Regardless how other victimization experience is measured, the coefficient of burglary victimization does not change in magnitude and it remains statistically significant.<sup>13</sup>

If the results presented so far are an artifact of enhanced demand for protection due to high levels of local crime, the estimated effect should disappear when the models are estimated for samples of individuals who live in low crime areas. I excluded from the analysis the top 20 percent of the sample who live highest crime cities/states in their country. Neither the point estimates nor their statistical significance were impacted. Similarly, dropping the people who

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<sup>13</sup> The marginal effects are not reported in the interest of the space. The marginal effect of Victim of Burglary This/Last year is negative for the “no prison term” category, and it is significant for “1 to 2 years in prison” and “2 years or more in prison” categories. In every case and in each models, there are highly statistically significant. The marginal effects from the probit specification were about 0.015 for the impact of victimization this year or last year, and they were highly significant. The marginal effects for victimization before last year were about 0.01, and were significant at the ten-percent level.

live in the top 40 percent of high crime cities/states did not change the results, suggesting that exposure to high level of local crime and the presumed higher demand for protection for the purpose of crime deterrence is not the driver of the results.

## VI. What Determines Vengeance?

The identification of the extent of vengeful feelings is obtained from the responses of individuals who differ in their victimization experience. As shown in the previous section, controlling for personal characteristics and a host of country attributes (or country fixed effects), having been a victim of burglary increases one's desire to impose harsher punishment on a hypothetical burglar. In this section I investigate the extent to which these vengeful feelings are influenced by personal characteristics of the individuals or the attributes of the countries they live in. For example, I will ask questions such as: are more educated people in a country more vengeful than less educated people in the same country? Are people who live in poorer countries more vengeful than people who live in richer countries? What are the impacts on the strength of vengeful feelings of the level of education or the extent of ethno-linguistic fragmentation in the country?

To identify the impact of personal and country characteristics on vengeful feelings, I estimate a sequence of probit regressions where the world population in the data set is divided into various groups and regressions are estimated separately for each group. The next sub-section discusses the impact of country attributes; the following sub-section reports the impact of personal attributes on vengeful feelings.

### *The Impact of Country Characteristics*

To investigate the impact of country income on vengeful feelings, I classify people by their country's per capita GDP. Specifically, I divide the countries in the sample into five quintiles by per capita GDP and estimate specifications identical to the one reported in column (3) of Table 5. The estimated marginal effects of having been burglarized this year or last year represent the incremental desire to impose a prison sentence of two years or longer on a hypothetical burglar between those who have been victimized and those who have not been victimized.

These estimates are reported in Figure 2 along with their 95% confidence intervals. Being a victim of burglary generates enhanced desire to impose a prison sentence for those who live in countries that are at the bottom three quintiles of the world income distribution. If per capita GDP of the country is in the fourth quintile of the world income distribution (category 4 on the horizontal axis), the estimated effect is not significantly different from zero at the five percent level. Similarly, for residents of the richest countries (those who are in the fifth quintile) having been a victim of burglary does not increase the desire to impose a prison sentence in comparison to those who are not victimized. Thus, Figure 2 indicates that the incidence of victimization generates stronger reactions if the victimized individual resides in a low or middle-income country.<sup>14</sup>

A similar result is obtained when I divide the world population into quintiles by country education. Figure 3 shows that people who live in countries with low levels of education are more vengeful. Figure 4 presents the results that are obtained by classifying the world

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<sup>14</sup> The cut-off for the fourth quintile in Figure 2 is \$11,400, while the World Bank cutoff for high-income countries is about \$12,200.

population by the extent of the ethno-linguistic fragmentation of the country they live in. The results indicate that people who live in the most ethno-linguistically fragmented countries (categories 4 and 5) are more vengeful; but the same is true for people who live in very homogeneous countries.<sup>15</sup> Figure 5 displays the extent of vengeful feelings of individuals when they are classified by their country's income level *and* the measure of democracy in the country. In category 1 are people who live in low or middle-income countries with uninterrupted democracies. Having been victimized does not trigger stronger reactions in this group in comparison to those who are not victimized but who live in the same country environment. Category 2 consist of people who live in low or middle-income countries with interrupted democracies. Victimization produces stronger desires to punish in this group. In countries where per capita income is greater than \$12,000 and democracy is uninterrupted (category 3) the extent of vengeful feelings is zero. Exposure to interrupted democracy among people who live in high-income countries (category 4) pulls them towards stronger vengeful feelings, although the coefficient is only significant at the 7-percent level.<sup>16</sup>

In summary, the results of this section indicate that country attributes, ranging from per capita income to average country education, from ethno-linguistics fragmentation to the existence of uninterrupted democracy, impact the extent of vengeful feelings and that betterment of these country attributes is correlated with the reduction of the extent of vengeful feelings.<sup>17</sup>

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<sup>15</sup> This latter group consists of Italy, Hungary, Poland, Denmark, Malta, Portugal, Japan, Czech Republic, Republic of Korea, Egypt, Tunisia and Albania.

<sup>16</sup> In this group are Spain, Portugal, Czech Republic, Hungary, Belarus, Japan, Argentina and the Republic of Korea. Because Japan gained full sovereignty in April 1952 following World War II, and because the "uninterrupted democracy" variable covers the years 1950 to 1995, Japan is classified as having been experienced interrupted democracy. Dropping Japan from the sample or re-coding Japan as continuous democracy did not alter the results. Note that the inference is not obtained from a change in country attributes over time but from a comparison of country attributes between countries holding constant all covariates listed in Table 3.

### *The Impact of Personal Attributes*

The difference in vengeful feelings between the richer and the poorer people in the same country is analyzed by classifying individuals into two groups in their *own country*. Poorer (richer) people in a given country are located in the bottom (top) 50% of their country's income distribution. Figure 6 presents the results pertaining to the impact of country income and the rank of the individual's income in that country. Category 1 consists of people who live in poorer countries, where per capita income is less than or equal to \$12,000 and whose incomes are at the bottom 50% of their country's income distribution. Victimization triggers vengeful feelings among this group. Category 2 includes relatively poor people (those who are at the bottom of 50% of their country's income distribution) but who live in richer countries. Victimization does not trigger vengeance in this group. Figure 6 also shows that relatively richer people (who are at the top 50% of their country's income distribution) are not vengeful if they live in high-income countries, but they are vengeful if they live in low- and middle-income countries.

Figure 7A presents the results obtained from people who live in low- or middle-income countries. The results pertaining to people who live in countries where per capita income is greater than \$12,000 are displayed in Figure 7B. In low or middle-income countries, individuals who have less than or equal to 6 years of education are vengeful. Perhaps surprisingly, in these countries individuals who have 12 or more years of education are also vengeful. In countries where per capita income is greater than \$12,000 (Figure 7B) there is no difference in vengeful feelings between individuals by their level of education, with the exception of those who have 12-14 years of education.

The upshot of these results is the following. Although a number of personal and country attributes have significant impacts on vengeful feelings, a more complete picture of vengeful behavior involves a combination of these attributes. An improvement in country characteristics, such as an increase in per capita income, or country education mitigate the extent of vengeful feelings. Furthermore, some of the personal and country factors counter-balance each other (such as living in a poor country, but having been exposed to uninterrupted democracy), therefore it may be misleading to attribute vengeful feelings to a particular characteristic.

## VII. Conclusion

Although it has been argued that revenge is an integral part of human psyche, and vengeful behavior is common, there has been very limited research to quantify its extent. Theoretical models in economics that incorporate other-regarding preferences, or emotions such as fairness, predict behaviors of retribution and punishment (Rabin 1993, Fehr and Gächter 2000). Although these predictions are supported in laboratory experiments, no evidence is available based on real data. Furthermore, the investigation of the existence of vengeance, its extent and its determinants may be important for theoretical and practical aspects of criminal justice system, and it may shed light into extremely violent behavior such as suicide bombings and other terrorist attacks.

This paper employs data on more than 166,000 individuals from 66 countries to directly investigate the presence and the extent of vengeful feelings. Since the definition of vengeance is “infliction of punishment in return for a wrong committed,” the extent of vengeance is measured by the difference in the propensity to assign a particular punishment for the burglary of a color TV between two people: one, who has been burglarized himself/herself during this year or last

year, and the other, who has not been burglarized. Empirical analyses control for potential differences in victimization propensities and other factors that may be correlated with both the demand for punishment and likelihood of victimization.

Descriptive statistics reveal that there are substantial differences between countries regarding the extent to which people are willing to impose harsh punishment. For example, while 1% of the population in Denmark believes that a prison term of two years or more is appropriate for a 20 year old man who is found guilty of stealing a color TV as a second offense, the rate is 19 percent in Brazil, 27 percent in the U.S., 33 percent in Paraguay, 48 percent in South Africa and 71 percent in China. These cross-country differences are interesting, but they can be reflections of a number of country characteristics, ranging from the effectiveness of the legal system to economic conditions and culture. Country-level regressions show that the legal origin of the country, population size, the proportion of young people in the country, the religious composition of the country, the existence of uninterrupted democracy, per capita income, country education, the proportion of women in the parliament and the extent of individualism in the country are related to the desired punishment at the country level.

Individual-level analyses compare the reactions of observationally equivalent individuals, who differ in terms of their victimization experience. Models control for a large set of personal characteristics ranging from education to the rank of the family income in the income distribution of the country, from the crime rate of the city/state of the respondent to whether the person took measures for protection against burglary, as well as a host of country attributes. The results show that people's desire to impose stiffer punishment is positively related to their own victimization experience. Having been a victim of burglary increases one's willingness to impose harsh prison sentences on a hypothetical 20 year old burglar. These results are not

likely due to an enhanced demand for punishment due to victimization . This is because vengeful feelings towards a burglar are not influenced by having been a victim of robbery, theft or bicycle theft, suggesting that the identified vengeance effect is not a reflection of a general demand for law and order or the demand for protection. Similarly, the results are not driven by victims who live in high crime cities/states, who are expected to have higher demand for protection.

The strength of vengeful feelings are influenced by country characteristics, such as per-capita income, average education, the extent of ethno-linguistics fragmentation in the country as well as uninterrupted democracy. The findings, which are summarized in Figures 2-7, indicate that the magnitude of vengeful feelings is greater for people in low-income countries, in countries with low levels of education, and in countries that experienced interrupted democracy in recent history.

These results reinforce the idea that some puzzles about individual choice can best be explained by considering the interplay of personal and cultural factors. For example, it is well-known that the proportion of rejected offers in ultimatum games differs substantially between experiments conducted in different countries (Oosterbeek, Sloof and Van de Kuilen 2004, Heinrich et al. 2001, Fehr and Gächter 2000). Although the average offers made by the first player in an ultimatum game is around 40% of the endowment in experiments conducted around the world, the rejection rates differ substantially between countries, ranging from no rejected offers to one-third of the offers being rejected (Oosterbeek, Sloof and Van de Kulien 2004). Similarly, there is significant variation in the rates antisocial punishment in experiments conducted in various countries (Herrmann, Thoni and Gaechter, 2008). Even though researchers recognize the complicated nature of behavioral responses in these environments, culture turns

out to be a primary suspect as a determinant of behavior around the notions of fairness, individualism vs. collectivism, and retaliation. The results of this paper suggest that the variation in these behaviors can be best explained by taking into account both the personal and the cultural factors as well as the interplay between them.

The results have implications on at least two fronts. First, they suggest that a complete understanding of economic behavior should incorporate the context and the environment in which the decision is taking place, including measures of culture. But also, they highlight the dangers of attributing too much of the impact to culture as the economic conditions pertaining to the individual (independent of culture) are important determinants of behavior.

**Table 1**  
**The Proportion of People in Each Country**  
**Who Would Like to Impose the Following Punishment for Burglary**

Country Name	Two Years or More	Four Years or More	Six Years or More	Number of Observations
<b>European Countries</b>				
United Kingdom	0.22	0.12	0.08	17,700
Netherlands	0.14	0.11	0.09	7,311
Germany West	0.07	0.06	0.05	5,000
Switzerland	0.70	0.70	0.70	1,881
Belgium	0.12	0.10	0.09	5,559
Finland	0.05	0.04	0.03	8,016
Norway	0.12	0.10	0.10	902
Sweden	0.08	0.06	0.06	4,464
Austria	0.06	0.05	0.05	1,416
Denmark	0.07	0.06	0.06	2,810
<b>Mediterranean Countries</b>				
France	0.07	0.07	0.07	3,279
Spain	0.21	0.19	0.19	5,276
Italy	0.22	0.19	0.18	1,704
Malta	0.14	0.06	0.03	984
Portugal	0.15	0.09	0.07	1,893
<b>North American and Australian Countries</b>				
United States	0.51	0.42	0.36	3,705
Canada	0.23	0.17	0.15	7,976
Australia	0.14	0.09	0.07	5,639
New Zealand	0.11	0.08	0.06	1,930
<b>Eastern European Countries</b>				
Estonia	0.22	0.12	0.08	3,658
Poland	0.16	0.10	0.07	10,040
Czech	0.19	0.11	0.07	4,293
Slovakia	0.32	0.17	0.11	1,489
Russia	0.36	0.26	0.23	2,763
Georgia	0.34	0.24	0.15	3,190
Slovenia	0.16	0.11	0.08	6,486
Latvia	0.34	0.17	0.08	2,494
Romania	0.52	0.39	0.26	2,330
Hungary	0.21	0.12	0.09	2,113
Yugoslavia	0.27	0.18	0.11	1,007
Albania	0.31	0.20	0.15	2,498
Macedonia	0.20	0.15	0.12	628
Croatia	0.13	0.11	0.09	2,329
Ukraine	0.37	0.27	0.19	2,209

(Table 1 concluded)

Belarus	0.34	0.24	0.19	850
Bulgaria	0.30	0.18	0.12	2,393
Lithuania	0.25	0.15	0.11	2,470
<b>Asian Countries</b>				
Japan	0.30	0.26	0.25	3,486
Indonesia	0.42	0.26	0.20	4,394
Philippines	0.33	0.16	0.11	4,222
India	0.29	0.18	0.13	2,111
China	0.72	0.40	0.23	1,904
Mongolia	0.47	0.34	0.27	1,641
Kyrgyzstan	0.19	0.11	0.04	1,731
Azerbaijan	0.17	0.11	0.07	882
Cambodia	0.49	0.35	0.28	2,888
Republic of Korea	0.08	0.05	0.04	1,974
<b>African Countries</b>				
Uganda	0.48	0.30	0.16	3,069
Egypt	0.43	0.24	0.13	951
South Africa	0.50	0.31	0.17	3,219
Tunisia	0.27	0.13	0.08	1,071
Zimbabwe	0.62	0.38	0.22	934
Botswana	0.47	0.33	0.24	1,725
Namibia	0.39	0.21	0.11	1,013
Swaziland	0.48	0.30	0.17	934
Lesotho	0.53	0.40	0.27	972
Nigeria	0.47	0.27	0.20	892
Zambia	0.56	0.37	0.25	941
Mozambique	0.19	0.15	0.11	940
<b>Latin American Countries</b>				
Costa Rica	0.47	0.41	0.37	1,607
Brazil	0.22	0.13	0.08	1,947
Argentina	0.50	0.40	0.33	8,817
Bolivia	0.37	0.25	0.16	859
Paraguay	0.40	0.27	0.18	520
Colombia	0.26	0.13	0.07	1,940
Panama	0.38	0.22	0.11	861

The values in columns represent the proportion of individuals in each country who consider the sentence length displayed in column headings (e.g. two years or longer) as the appropriate punishment for a burglar. The information pertains to individuals in each country who have non-missing values for all personal characteristics. The tabulations that used all individuals generated very similar outcomes.

**Table 2**  
**County-level Determinants of Desired Punishment**

<b>Dependent Variable: The Proportion of the Population that Wants to Impose a Prison Sentence of Two Years or Longer</b>		
<b>Explanatory Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>
Individualism	-0.003*	(0.002)
Rule of Law	0.031	(0.067)
Ethno-linguistic Fragment	0.080	(0.077)
British Legal Origin	-0.214***	(0.072)
French Legal Origin	-0.178*	(0.097)
German Legal Origin	-0.393***	(0.102)
Percent Catholic	0.002**	(0.001)
Percent Muslim	0.004	(0.004)
Democratic	-0.134**	(0.058)
Per-capita income	-0.007*	(0.004)
Government Share	0.004	(0.004)
Population	0.0001***	(0.000)
Percent Younger than 25	-0.017***	(0.005)
Average Country Education	0.030	(0.019)
Women in parliament	-0.014***	(0.003)
War	0.040	(0.059)
Burglary rate	0.080*	(0.042)
N		83
R-squared		0.84

The regression includes time dummies for the year of the survey, as well as geographic location dummies. Robust standard errors are in parentheses. Statistical significance of the coefficients at the 10%, 5% and 1% level are indicated by \*, \*\*, and \*\*\*.

**Table 3**  
**Country-level Determinants of Vengeance**

<b>Dependent Variable: The Difference in Average Desired Punishment (Prison Sentence of Two Years or Longer) between Victims and Non-victims</b>		
<b>Explanatory Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>
Individualism	-0.0001	(0.001)
Rule of Law	0.007	(0.026)
Ethno-linguistic Fragmentation	0.076***	(0.026)
British Legal Origin	-0.052	(0.033)
French Legal Origin	-0.076**	(0.037)
German Legal Origin	-0.107**	(0.041)
Percent Catholic	0.000	(0.000)
Percent Muslim	0.001	(0.002)
Democratic	-0.042*	(0.022)
Per-capita income	0.003	(0.002)
Government Share	0.001	(0.001)
Population	0.000	(0.000)
Percent Younger than 25	-0.0003	(0.002)
Average Country Education	0.005	(0.007)
Women in parliament	-0.003***	(0.001)
War	-0.045**	(0.021)
Burglary Rate	0.040	(0.034)
N		83
R-squared		0.45

The regression includes time dummies for the year of the survey, as well as geographic location dummies. Robust standard errors are in parentheses. Statistical significance of the coefficients at the 10%, 5% and 1% level are indicated by \*, \*\*, and \*\*\*.

**Table 4**  
**Descriptive Statistics**

Variable	Description (source)	Mean (Std. Dev.) N=74,725	Mean (Std. Dev.) N=111,606	Mean (Std. Dev.) N=116,508
Victim of Burglary- This/Last Year	Dummy Variable (=1) if the individual was victim of burglary this year or last year, 0 otherwise (A)	0.065 (0.247)	0.088 (0.283)	0.087 (0.281)
Victim of Burglary- Before Last Year	Dummy Variable (=1) if the individual was victim of burglary before last year, 0 otherwise (A)	0.082 (0.274)	0.093 (0.290)	0.093 (0.290)
Protection Against Burglary	=1 if the individual has at least one of the following to protect his/her home: burglar alarm, special door locks, special window/door grilles, a dog that would detect a burglar, a high fence, a caretaker or security guard. (A)	0.654 (0.476)	0.627 (0.483)	0.629 (0.483)
Gun Ownership	Dummy Variable (=1) if the individual Owns a gun other than an air rifle due to purposes other than collection (A)	0.092 (0.289)	0.091 (0.288)	0.091 (0.287)
Male	Dummy Variable (=1) if the individual is male (A)	0.472 (0.499)	0.468 (0.499)	0.462 (0.499)
Upper Income	Dummy Variable (=1) if individual's income is in the upper half of the country's income distribution, 0 otherwise (A)	0.519 (0.500)	0.506 (0.500)	0.505 (0.500)
Education	Completed years of education (A)	12.180 (3.556)	12.205 (3.616)	12.170 (3.614)
Burglary rate	The burglary rate in the city/state of the respondent (A)	0.064 (0.051)	0.087 (0.072)	0.085 (0.072)
Small City	Dummy Variable (=1) if the population of the city is less than 50,000 (A)	0.414 (0.493)	0.315 (0.465)	
Middle Size City	Dummy Variable (=1) if the population of the city is between 50,000 and 1 million (A)	0.335 (0.472)	0.374 (0.484)	
Age20to24	Dummy Variable (=1) if individual's age is between 20 and 24, 0 otherwise (A)	0.080 (0.272)	0.093 (0.290)	0.091 (0.288)
Age25to29	Dummy Variable (=1) if individual's age is between 25 and 29, 0 otherwise (A)	0.104 (0.306)	0.112 (0.316)	0.112 (0.315)
Age30to34	Dummy Variable (=1) if individual's age is between 30 and 34, 0 otherwise (A)	0.119 (0.323)	0.121 (0.326)	0.121 (0.326)
Age35to39	Dummy Variable (=1) if individual's age is between 35 and 39, 0 otherwise (A)	0.121 (0.326)	0.119 (0.324)	0.119 (0.324)
Age40to44	Dummy Variable (=1) if individual's age is between 40 and 44, 0 otherwise (A)	0.112 (0.315)	0.108 (0.310)	0.108 (0.310)
Age45to49	Dummy Variable (=1) if individual's age is between 45 and 49, 0 otherwise (A)	0.094 (0.292)	0.091 (0.288)	0.091 (0.288)
Age50to54	Dummy Variable (=1) if individual's age is between 50 and 54, 0 otherwise (A)	0.083 (0.276)	0.079 (0.270)	0.079 (0.269)

(Table 4 continued)

Age55to59	Dummy Variable (=1) if individual's age is between 55 and 59, 0 otherwise (A)	0.067 (0.251)	0.062 (0.242)	0.063 (0.242)
Age60to64	Dummy Variable (=1) if individual's age is between 60 and 64, 0 otherwise (A)	0.058 (0.234)	0.055 (0.229)	0.056 (0.230)
Age65to69	Dummy Variable (=1) if individual's age is between 65 and 69, 0 otherwise (A)	0.050 (0.218)	0.047 (0.211)	0.047 (0.212)
Age70+	Dummy Variable (=1) if individual's age is 70 or more, 0 otherwise (A)	0.082 (0.275)	0.074 (0.261)	0.075 (0.264)
Single	Dummy Variable (=1) if the individual is single, 0 otherwise (A)	0.212 (0.409)	0.228 (0.419)	0.227 (0.419)
Widowed	Dummy Variable (=1) if the individual is a widow, 0 otherwise (A)	0.070 (0.256)	0.068 (0.252)	0.070 (0.255)
Living together	Dummy Variable (=1) if the individual is living together with a partner, but not married, 0 otherwise (A)	0.063 (0.242)	0.056 (0.231)	0.056 (0.230)
Divorced	Dummy Variable (=1) if the individual is divorced, 0 otherwise (A)	0.064 (0.245)	0.060 (0.237)	0.061 (0.239)
Working	Dummy Variable (=1) if individual is working, 0 otherwise (A)	0.588 (0.492)	0.567 (0.495)	0.567 (0.496)
Looking for job	Dummy Variable (=1) if individual is looking for a job, 0 otherwise (A)	0.066 (0.248)	0.077 (0.266)	0.075 (0.264)
Home keeper	Dummy Variable (=1) if individual is a home keeper, 0 otherwise (A)	0.103 (0.303)	0.103 (0.303)	0.105 (0.307)
Retired/disabled	Dummy Variable (=1) if individual is retired/disabled, 0 otherwise (A)	0.190 (0.392)	0.177 (0.381)	0.178 (0.382)
Individualism	Index of the degree to which individuals are integrated into groups (B)	61.037 (22.422)		
Rule of Law	Index of the extent to which agents have confidence and abide by the rules of society (C)	0.933 (0.882)		
Ethnolingu. Fragment	The index of the extent of ethno-linguistic fragmentation in the country (D, E)	0.335 (0.268)		
British Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is English, 0 otherwise (F, E)	0.292 (0.455)		
French Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is French, 0 otherwise. (F, E)	0.228 (0.419)		
German Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is German, 0 otherwise (F,E)	0.066 (0.248)		
Percent Catholic	Percent of Catholics in the country (F, E)	39.163 (34.419)		
Percent Muslim	Percent of Muslims in the country (F, E)	1.640 (4.497)		
Democratic	Dummy Variable (=1) if the country was democratic in all 46 years between 1950 and 1995, 0 otherwise (H)	0.510 (0.500)		
Per-capita income	PPP adjusted Real per-capita income of the country in 2005 dollars (I)	17.849 (9.537)		

(Table 4 concluded)

Government Share	Government share of real GDP per capita (I)	17.615 (4.642)
Population	Population of the country in millions in the survey year (I)	81.121 (196.975)
% Younger than 25	Percentage of population less than 25 years of age (J)	38.266 (8.509)
Average Country Education	Average education of individuals aged 25 and over in the country (K)	9.047 (1.946)
Women in parliament	Percentage of parliamentary seats in a single or lower chamber held by women (L)	16.230 (9.587)
War	Dummy Variable (=1) if an armed conflict occurred between 1975 and 2000, 0 otherwise (M)	0.398 (0.489)
Europe	Dummy Variable (=1) if the country is in Europe, 0 otherwise (A)	0.318 (0.466)
Central Europe	Dummy Variable (=1) if the country is in Central Europe, 0 otherwise (A)	0.269 (0.444)
Mediterranean	Dummy Variable (=1) if the country is in Mediterranean region, 0 otherwise (A)	0.052 (0.222)
Asia	Dummy Variable (=1) if the country is in Asia, 0 otherwise (A)	0.128 (0.335)
Africa	Dummy Variable (=1) if the country is in Africa, 0 otherwise (A)	0.027 (0.163)
Latin America	Dummy Variable (=1) if the country is in Latin America, 0 otherwise (A)	0.076 (0.265)

A: UNICRI International Crime Victim Survey version ICVS2000\_2

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<http://www.prio.no/CSCW/Datasets/Armed-Conflict/UCDP-PRIO/Armed-Conflicts-Version-X-2009/>> Accessed on January 13, 2011.

**Table 5**  
**Ordered Probit Estimates**  
**Dependent Variable: Severity of Desired Punishment for Burglary**

Variables	(1)	(2)	(3)
Coefficients of Ordered Probit			
Victim of Burglary This/Last Year	0.057*** (0.016)	0.058*** (0.015)	0.071*** (0.014)
Victim of Burglary Before Last Year	0.014 (0.020)	0.016 (0.020)	0.037** (0.017)
Protection Against Burglary	0.072*** (0.016)	0.079*** (0.017)	0.060*** (0.014)
Gun Ownership	0.076** (0.030)	0.060** (0.026)	0.059*** (0.016)
Male	0.159*** (0.021)	0.157*** (0.020)	0.133*** (0.017)
Upper Income	-0.022 (0.023)	-0.023 (0.025)	-0.019 (0.020)
Education	-0.028*** (0.004)	-0.027*** (0.004)	-0.025*** (0.003)
Individualism	-0.013* (0.008)	-0.013 (0.008)	
Rule of Law	-0.102 (0.205)	-0.127 (0.202)	
Ethnolingu. Fragment	0.531 (0.349)	0.505 (0.350)	
Percent Catholic	0.005 (0.004)	0.004 (0.004)	
Percent Muslim	-0.006 (0.013)	-0.007 (0.014)	
Democratic	-0.264 (0.271)	-0.266 (0.297)	
Per-capita income	0.011 (0.016)	0.010 (0.015)	
Government Share	0.019 (0.014)	0.020 (0.015)	
Population	0.001** (0.000)	0.001** (0.000)	
% Younger than 25	-0.060*** (0.019)	-0.060*** (0.019)	
Average Country Education	0.144** (0.060)	0.138** (0.063)	
Women in parliament	-0.038*** (0.013)	-0.036*** (0.014)	
War	0.089 (0.180)	0.090 (0.190)	
N	74,725	78,164	116,508
Year FE	Yes	Yes	Yes
Country FE	No	No	Yes
Log Likelihood	-62,151	-65,275	-99,876

(Table 5 concluded)

<b>Marginal effects from Ordered Probit</b>			
<b>Victim of Burglary This/Last Year</b>			
<i>Punishment Other than Prison</i>	-0.022*** (0.006)	-0.022*** (0.006)	-0.027*** (0.006)
<i>Up to One Year in Prison</i>	0.009*** (0.003)	0.010*** (0.003)	0.010*** (0.002)
<i>Two or More Years in Prison</i>	0.012*** (0.003)	0.013*** (0.003)	0.018*** (0.004)
<b>Victim of Burglary Before Last Year</b>			
<i>Punishment Other than Prison</i>	-0.005 (0.008)	-0.006 (0.008)	-0.014** (0.007)
<i>Up to One Year in Prison</i>	0.002 (0.003)	0.003 (0.003)	0.005** (0.002)
<i>Two or More Years in Prison</i>	0.003 (0.004)	0.003 (0.003)	0.009** (0.004)

**Probit Regressions****Dependent variable: Two or More Years in prison**

<b>Marginal Effects of</b>			
Victim of Burglary This/Last Year	0.015*** (0.005)	0.015*** (0.006)	0.020*** (0.005)
Victim of Burglary Before Last Year	0.010 (0.007)	0.010* (0.006)	0.017*** (0.005)
N	74,725	78,164	116,508
Year FE	Yes	Yes	Yes
Country FE	No	No	No
Log Likelihood	-28,113	-29,540	-48,559

The dependent variable for the ordered-probit models consists of three categories. 1) If the person declared that the appropriate punishment is something other than a prison sentence (such as fine, community service, suspended sentence), 2) If the person declared that the appropriate punishment is a prison sentence up to one year, and 3) If the desired prison sentence is two years or longer.

Robust standard errors, clustered at the country-level, are in parentheses. Statistical significance of the coefficients at the 10%, 5% and 1% level are indicated by \*, \*\*, and \*\*\*.

**Table 6**  
**Ordered Probit Estimates**  
**Dependent Variable: Severity of Desired Punishment for Burglary**

Variables	(1)	(2)	(3)
<b>Coefficients of Ordered Probit</b>			
Victim of Burglary This/Last Year	0.057*** (0.017)	0.059*** (0.017)	0.076*** (0.015)
Victim of Burglary Before Last Year	0.028 (0.021)	0.029 (0.020)	0.047*** (0.018)
N	72,659	75,983	109,537
Year FE	Yes	Yes	Yes
Country Attributes	Yes	Yes	No
City/State FE	Yes	Yes	Yes
Log Likelihood	-59,409	-62,336	-93,257

<b>Marginal effects from Ordered Probit</b>			
<hr/>			
Victim of Burglary This/Last Year			
<i>Punishment Other than Prison</i>	-0.022*** (0.007)	-0.022*** (0.007)	-0.029*** (0.006)
<i>Up to One Year in Prison</i>	0.010*** (0.003)	0.010*** (0.003)	0.010*** (0.002)
<i>Two or More Years in Prison</i>	0.012*** (0.004)	0.013*** (0.004)	0.019*** (0.004)
Victim of Burglary Before Last Year			
<i>Punishment Other than Prison</i>	-0.011 (0.008)	-0.011 (0.008)	-0.018*** (0.007)
<i>Up to One Year in Prison</i>	0.005 (0.004)	0.005 (0.003)	0.006** (0.002)
<i>Two or More Years in Prison</i>	0.006 (0.004)	0.006 (0.004)	0.012*** (0.004)

**Probit Regressions**  
**Dependent variable: Two or More Years in prison**

Marginal Effects of			
Victim of Burglary This/Last Year	0.017*** (0.006)	0.017*** (0.006)	0.022*** (0.005)
Victim of Burglary Before Last Year	0.013** (0.007)	0.012** (0.006)	0.020*** (0.005)
N	71,341	74,613	108,121
Country Attributes	Yes	Yes	No
City/State FE	Yes	Yes	Yes
Log Likelihood	-26,889	-28,210	-45,680

The dependent variable for the ordered-probit models consists of three categories. 1) If the person declared that the appropriate punishment is something other than a prison sentence (such as fine, community service, suspended sentence), 2) If the person declared that the appropriate punishment is a prison sentence up to one year, and 3) If the desired prison sentence is two years or longer.

Robust standard errors, clustered at the country-level, are in parentheses. Statistical significance of the coefficients at the 10%, 5% and 1% level are indicated by \*, \*\*, and \*\*\*.

**Table 7**  
**Ordered Probit Estimates**  
**The Impact of Victimization by Other Crimes**  
**on the Severity of Desired Punishment for Burglary**

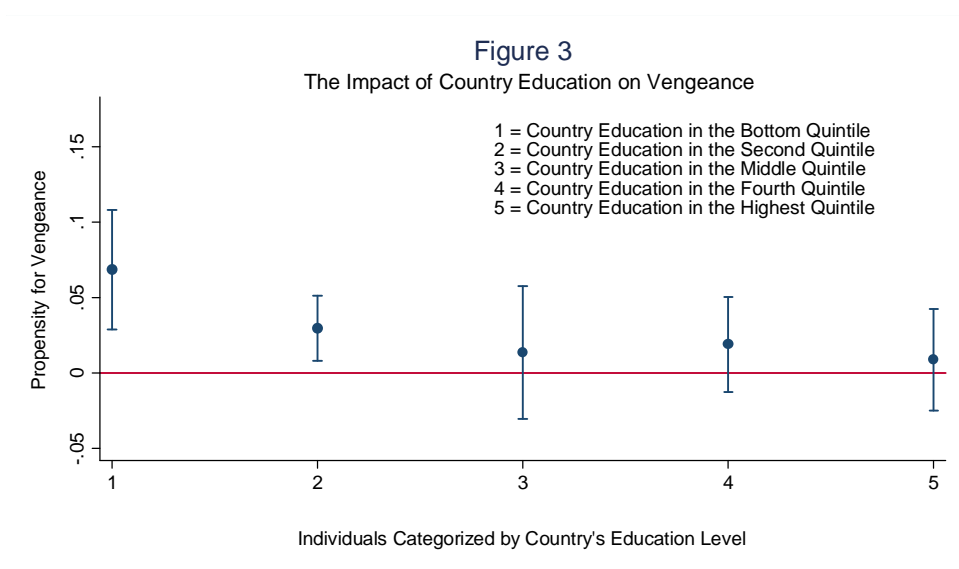
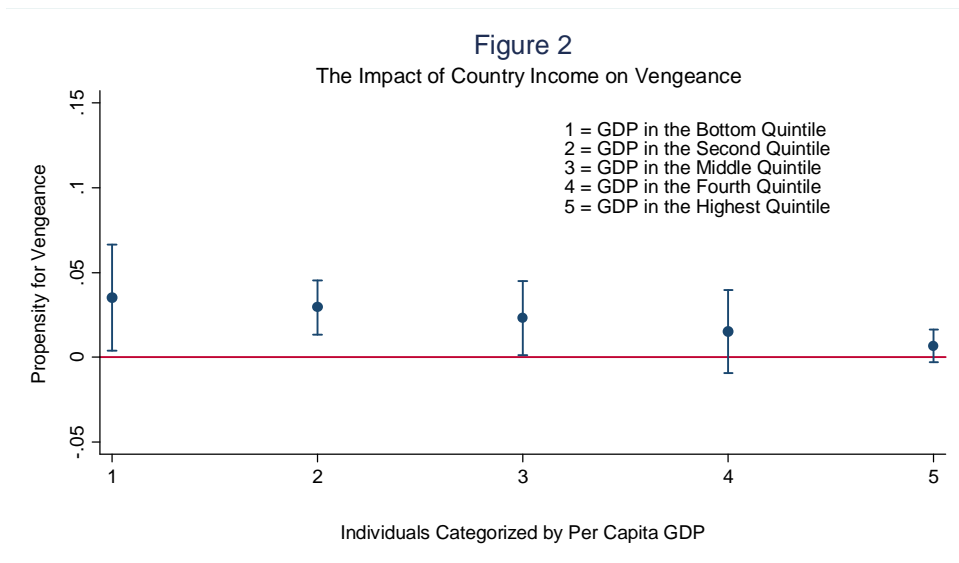
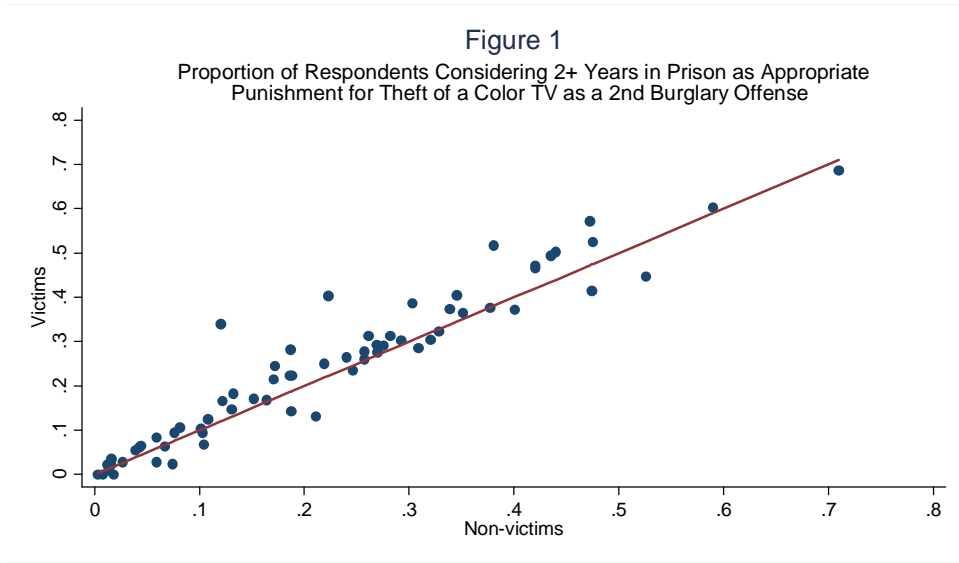
<b>Variables</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
Victim of <b>Robbery</b> This/Last Year	0.040 (0.041)			
Victim of <b>Personal Theft</b> This/Last Year		0.011 (0.021)		
Victim of <b>Bicycle Theft</b> This/Last Year			-0.027 (0.035)	
Victim of <b>Assault</b> This/Last Year				0.032* (0.018)
N	78,106	77,902	77,849	77,952
Year FE	Yes	Yes	Yes	Yes
Log-likelihood	-65,190	-64,982	-64,933	-65,043

All models control for personal attributes and country characteristics; i.e., they are the same specifications reported in column II of Table 5. Robust standard, clustered at the country-level are in parentheses. Statistical significance of the coefficients at the 10%, 5% and 1% level are indicated by \*, \*\*, and \*\*\*.

**Table 8**  
**Ordered Probit Estimates**  
**The Impact of Victimization by Burglary and by Other Crimes**  
**on Severity of Desired Punishment for Burglary**

<b>Variables</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>
Victim of Burglary This/Last Year	0.052*** (0.016)	0.054*** (0.016)	0.054*** (0.016)	0.050*** (0.016)	0.048*** (0.016)	0.052*** (0.016)	0.040** (0.018)	0.046** (0.020)
Victim of Burglary Before Last Year	0.010 (0.019)	0.011 (0.019)	0.008 (0.019)	0.008 (0.018)	0.010 (0.018)	0.008 (0.019)	0.008 (0.019)	-0.013 (0.028)
Victim of Robbery This/Last Year	0.037 (0.049)				0.041 (0.043)			
Victim of Personal Theft This/Last		0.010 (0.021)			0.010 (0.022)			
Victim of Bicycle Theft This/Last			-0.031 (0.035)		-0.035 (0.036)			
Victim of Assault This/Last Year				0.030 (0.018)	0.024 (0.020)			
Not A Victim Other than Burglary						-0.022 (0.015)		
Not A Victim of Any Crime							-0.019 (0.016)	
N	78,064	77,860	77,805	77,910	77,201	78,164	78,164	17,873
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-likelihood	-65,142	-64,937	-64,884	-64,998	-64,306	-65,236	-65,237	-15,889

All models control for personal attributes and country characteristics; i.e., they are the same specifications reported in column II of Table 5. Robust standard, clustered at the country-level are in parentheses. Statistical significance of the coefficients at the 10%, 5% and 1% level are indicated by \*, \*\*, and \*\*\*. The specification in column (8) is run using individuals who were victims of at least one type of crime.



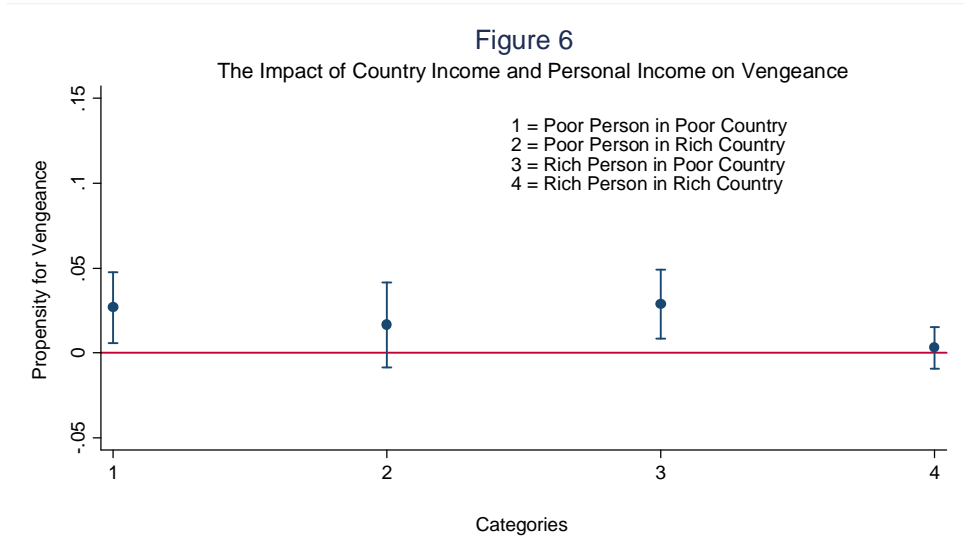
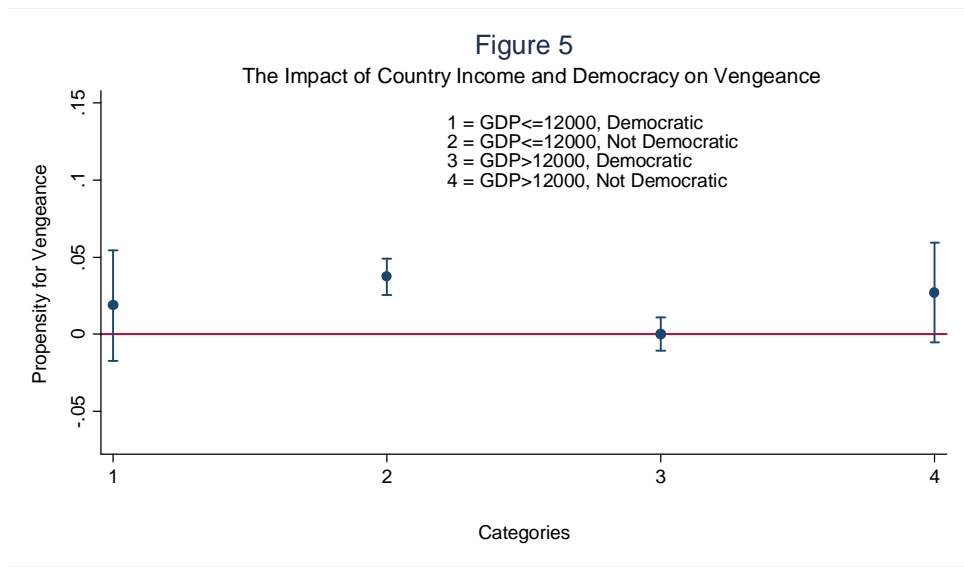
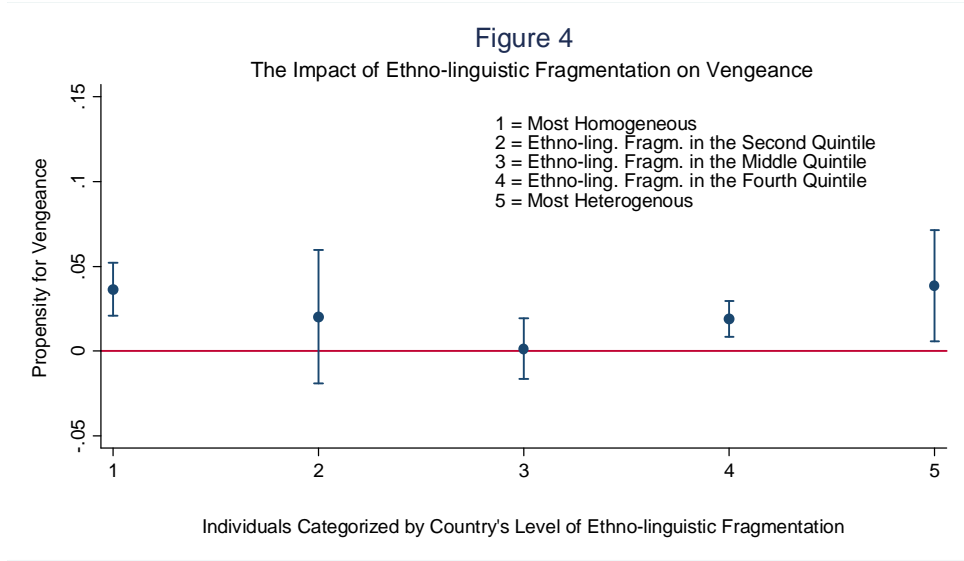


Figure 7A

The Impact of Personal Education on Vengeance  
GDP per capita  $\leq$  \$12,000

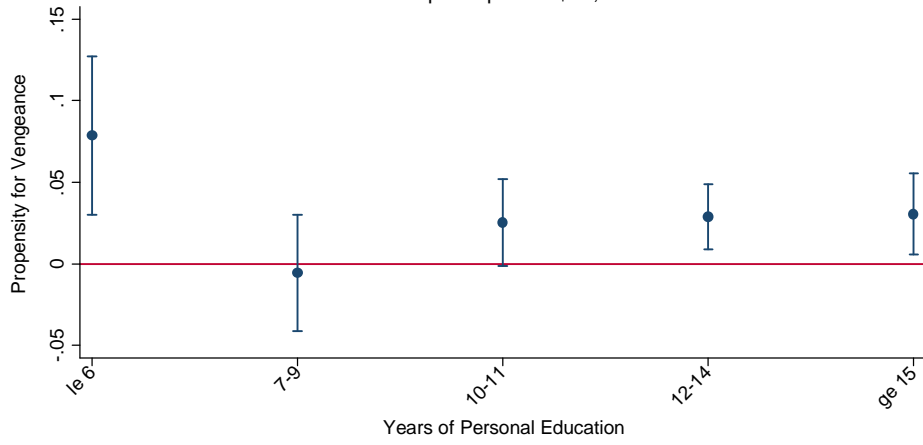
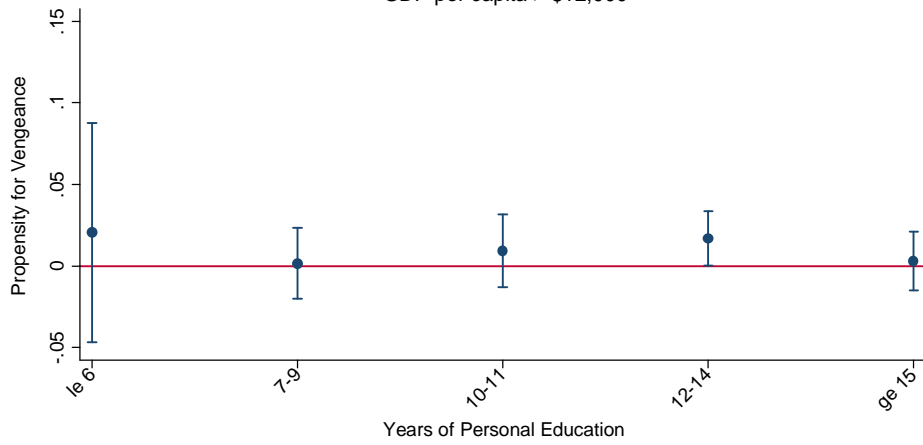


Figure 7B

The Impact of Personal Education on Vengeance  
GDP per capita  $>$  \$12,000



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