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THE COMPARATIVE LAW AND ECONOMICS OF PLEA BARGAINING: THEORY AND EVIDENCE

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The Comparative Law and Economics of Plea Bargaining: Theory and Evidence

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Abstract

Why is plea bargaining commonly employed in some countries, while its use is heavily restricted in others? I develop a formal model in which a social planner, who minimizes the social harms from punishing the innocent and not punishing the guilty, considers the effect of different plea bargaining regimes on law enforcement agencies and individuals, and decides on the optimal scope of plea bargaining. The model shows that higher levels of crime and a greater social emphasis on ensuring that guilty individuals are punished lead to a greater use of plea bargaining, while lower levels of crime and a greater social emphasis on ensuring that innocent individuals are not punished leads to less use of plea bargaining. Using new cross-country data on social preferences for punishing the innocent versus not punishing the guilty together with crime data, and a new coding of plea bargaining regimes across countries, I obtain results that are consistent with the model's predictions.

JEL Classification: K14, K41, K42

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1 Introduction

A plea bargain is an agreement between the prosecution and the defense whereby the defendant pleads guilty in exchange for a more lenient sentence, and a full trial is avoided. Although plea bargaining is commonly employed in some countries, its use is heavily restricted in others. What explains this national divergence with regard to plea bargaining?

To illustrate the different policies with regard to plea bargaining, while the United States does not restrict the use of plea bargaining, France, until recently, had not permitted defendants to plead guilty to indictments (Kritzer 2002, p. 383). In a reform of March 9, 2004 France introduced a version of guilty pleas and bargaining, but this new procedure is limited to crimes punishable with no more than five years in prison, and allows the prosecutor to propose a sentence not exceeding one year in prison (Bradley 2007, p. 227). Reflecting the different restrictions on the use of plea bargaining, in 2005 only 4% of French decisions by correctional courts were made using the new guilty plea procedure (French Ministry of Justice 2006). In contrast, in the same year in the United States 86% of all criminal cases were closed as a result of a guilty plea (Federal Justice Statistics Resource Center).

The division has traditionally been viewed by legal scholars along common law/ civil law lines; common law countries employ plea bargaining, while civil law countries do not. Merryman (1985, p. 130-131) explains the legal doctrines that restrict the use of plea bargaining in certain countries:

> Civil lawyers criticize the common American practice of plea bargaining. . . Their law and their prosecutorial traditions both sharply limit prosecutorial discretion. . . Most significant of all is the different effect of the guilty plea, which is an essential component of the plea bargaining system. With us, the defendant who pleads guilty forgoes a trial. In the civil law world a trial cannot be averted by a guilty plea. The accused's confession can be admitted as evidence, but the trial must go on. The court determines guilt, it is said, not the defendant or the prosecutor.

In this paper I argue that the varying plea bargaining policies across countries can be explained by exploring the underlying preferences and circumstances of different countries. That legal institutions are determined endogenously is in the spirit of Aghion, Alesina and Trebbi (2004), who analyze

the endogenous choice of political institutions. Along the same lines Aghion, Algan, Cahuc and Shleifer (2010) analyze the feedback between regulation and distrust.

Section 2 presents a model in which a law enforcement agency detects a group of individuals as violators of the law. However, the agency may be mistaken, and for every individual there is a certain probability that he did not, in fact, violate the law. If the individual is brought before the court there is a certain probability that the court would not find the truth (that is, the court may find an innocent individuals guilty or a guilty individual innocent).

In the model society cares about two types of social harm: The social harm from punishing an innocent individual, and the social harm from not punishing a guilty individual. Two additional assumptions in the model are that individuals vary in their degree of risk aversion, and that the law enforcement agency has limited resources.

To explain the basic intuition of the model let us ignore the social harm from mistakes the court makes when cases are brought before it. This harm complicates the analysis, and is fully considered in the formal model.

If plea bargaining is permitted the agency offers a plea bargain to all individuals who it detected as violators of the law. Many guilty individuals take the offer, since they know there is only a small probability the court will find them innocent, and a plea bargain allows them to receive a more lenient sentence. A few innocent individuals who are sufficiently risk averse also take the offer, because of the risk of being convicted erroneously by the court. Therefore when plea bargaining is used some innocent individuals are punished.

If plea bargaining is prohibited then the law enforcement agency has to take part in a full trial in order for a sanction to be imposed. However, because the agency has limited resources it will not be able to bring to court all the individuals it detected as violators of the law. Therefore, some guilty individuals will not be brought to court. Thus, when plea bargaining is prohibited some guilty individuals are not punished.

Section 2 shows that a greater social emphasis on ensuring that innocent individuals are not punished leads to less use of plea bargaining. Intuitively, if the social harm from punishing the innocent increases relative to the social harm from not punishing the guilty, then the fact that some innocent individuals choose to take the plea bargain when plea bargaining is permitted is socially more costly, while the fact that some guilty individuals are not

brought to court when plea bargaining is prohibited is socially less costly. Therefore, such a change leads to less use of plea bargaining.

Section 2 also shows that an increase in the level of crime leads to a greater use of plea bargaining. Intuitively, with more criminals more guilty individuals will be left out of court when plea bargaining is prohibited. Therefore prohibiting plea bargaining becomes socially more costly, which means that such a change leads to a greater use of plea bargaining.

To see whether the model's predictions are supported by the data I use several different sets of data, described in detail in section 3. To look at the degree to which countries put an emphasis on ensuring that innocent individuals are not punished I used data from the International Social Survey Program (ISSP) on the role of government, where the following question was asked: "All systems of justice make mistakes, but which do you think is worse? Convict an innocent person / Let a guilty person go free." This data set, which reflects the preferences in different countries for type 1 and type 2 mistakes, has not be previously used in the academic literature, to the best of my knowledge. To measure the overall level of crime in different countries I used standardized comparative data on one-year prevalence rate of victimization by common property and contact crimes from the International Crime Victims Survey (ICVS). As an alternative measure of crime I use the homicide rate from the World Health Organization (WHO) data on death classifications by medical practitioners. To measure the scope of plea bargaining in different countries I coded the legal situation with respect to plea bargaining in different countries and years that correspond to the ISSP and the ICVS data, and created an index of plea bargaining.

As noted, the United States has no restriction on the use of plea bargaining, while France's new plea bargaining procedure is quite restricted. What explains this difference? The model predicts that a lower concern for punishing the innocent and a higher level of crime result in a greater use of plea bargaining. Thus, if the model is correct one would expect to find that relative to France the United States has a lower concern for punishing the innocent and a higher level of crime. Table 1 shows the data for France and the United States for the years 2004-2006. Consistent with the model in France 82.6% of the population thinks that punishing an innocent individual is the worse type of judicial mistake, while only 70.6% of the population in the United States shares a similar view. Furthermore, the level of crime in France is 60% of the level of crime in the United States.

Section 4 presents the empirical evidence in a systematic way. Using the

Table 1: Data for the U.S. and France, 2004-2006

	France	U.S.
Crime Prevalence	9.0	14.8
Punish Innocent Worse	82.6%	70.6%

plea bargaining index I show that lower levels of concern about punishing the innocent and higher levels of crime are associated with greater use of plea bargaining, while controlling for other parameters.

Section 5 addresses the possibility of reverse causation, that is the possibility that it is not the preferences that determine the scope of plea bargaining in each country, but it is plea bargaining regime that affects peoples' preferences. To address this concern I look at the United States General Social Survey (GSS) for 2006, where American respondents were asked the same question as in the ISSP data, about the worse type of judicial mistake, and were also asked about their country of ancestral origin. Since in the United States plea bargaining is commonly employed, if it is the plea bargaining policy that determines social preferences one would not expect to see that the preferences of people in the United States are associated with the preferences in their respective countries of ancestral origin. However, I show that Americans' preferences are correlated with the preferences of people in their country of ancestral origin. The possibility that the plea bargaining regime affects crime levels is also addressed in this section.

Section 6 makes some concluding remarks, noting the implications of the paper for future analysis of other legal institutions.

The legal literature on plea bargaining has been dominated by the debate over the desirability of plea bargaining, with some scholars fiercely opposing the use of plea bargaining (Alschuler 1983, Langbein 1978, Schulhofer 1992) and others defending it (Church 1979, Easterbrook 1983, Scott and Stuntz 1992).[1] Although it is widely acknowledged that different countries adopt varying plea bargaining policies, each side of the debate assumes that there is only one correct policy, and does not probe the underlying reasons behind this national divergence. The economics literature on plea bargaining, which originated with Landes (1971) and Grossman and Katz (1983), takes the existence of plea bargaining as a given, and focuses on analyzing its effect or discussing adjustments that would improve it (Baker and Mezzetti 2001,

[1] See also Bar-Gill and Ben-Shahar (2009).

Bar-Gill and Gazal-Ayal 2006, Miceli 1996, Mongraina and Roberts 2009, Reinganum 1988, Reinganum 2000). The national divergence with regard to plea bargaining is not considered, with the exception of Adelstein and Miceli (2001), which, as will be discussed later, includes an opposite prediction to the one derived in this paper regarding the effect of social preferences for error types on the use of plea bargaining.

2 The Model

2.1 Setup

Consider a model with a law enforcement agency, a court and measure N of individuals that the agency detected as violators of the law. For every individual there is a probability $\alpha \in [0,1]$ that the agency made a mistake, and the individual did not, in fact, violate the law. The individual knows whether he violated the law.

If an innocent individual is brought before the court then with probability $\beta_1 \in (0,1)$ the court will make a mistake and find the individual guilty. If a guilty individuals is brought before the court then with probability $\beta_2 \in (0,1)$ the court will make a mistake and find the individual innocent. Think of β_1 and β_2 as being relatively small, and specifically assume that $\beta_1, \beta_2 < \frac{1}{2}$.

The sanction for violating the law is s. The individual's disutility from a sanctions s is captured by the following constant relative risk aversion (CRRA) function:

$$u(s,\theta) = -\frac{s^{1+\theta}}{1+\theta} \tag{1}$$

where $\theta \in (-1,\infty)$, the coefficient of relative risk aversion, is assumed to be distributed in the population based on a distribution function $F(\cdot)$. The higher θ the more risk averse the individual is. Specifically, for $\theta < 0$ the individual is risk preferring, for $\theta = 0$ the individual is risk neutral, and for $\theta > 0$ the individual is risk averse.[2]

In a plea bargain the law enforcement agency offers an individual a lower sanction $(1-\gamma)s$ in return for a confession, where $\gamma \in (0,1)$ is the discount in the sanction. If a plea bargain is reached the agency's cost is normalized

[2] On individuals' possible attitudes toward a risk of a sanction see Polinsky and Shavell (1999).

to zero, while if a case is brought before the court for a trial the agency bears the cost of litigation. The agency has limited resources and therefore the maximum number of full trials it can take part in is a measure $n < N$.

Define two types of social harms: h_1 – the social harm from punishing an individual who did not violate the law (type 1 error, false positive); and h_2 – the social harm from not punishing an individual who did violate the law (type 2 error, false negative). For later use let us define the social harms ratio as $\frac{h_1}{h_2}$.

It is worth noting that the law and economics literature has traditionally focused on deterrence, and in that context, as emphasized in Png (1986), one can show that both types of error reduce deterrence (Kaplow and Shavell 2002, p. 1753). The two types of error are treated differently here since this paper does no focus on deterrence but rather on enforcement, and as section 3 shows we have a direct measure of the social preferences for the two error types that can be used.

2.2 Analysis

Consider two policies: allowing plea bargaining or prohibiting it. If plea bargaining is permitted and the agency offers a plea bargain to all individuals it detected as violators of the law, innocent individuals will accept the offer only if their utility from the plea bargain is higher than their expected utility from going to court. That is only if:

$$u((1-\gamma)s, \theta) \geq \beta_1 u(s, \theta) + (1-\beta_1)u(0, \theta) \tag{2}$$

where the left hand side of expression 2 is the individual's utility from the plea bargain with a sanction $(1-\gamma)s$, and the right hand side of expression 2 is the individual's expected utility from going to court, given a probability β_1 of the court making an error and finding him guilty. Using the utility function from expression 1 we can define θ_1, the coefficient of relative risk aversion for which expression 2 holds with equality, as:

$$\theta_1 = \frac{\ln \beta_1}{\ln(1-\gamma)} - 1 \tag{3}$$

Innocent individuals with $\theta \geq \theta_1$ will choose to settle, while innocent individuals with $\theta < \theta_1$ will not settle but will go to court. In other words, innocent individuals who are relatively risk averse will take the plea bargain,

while innocent individuals who are relatively risk preferring will not. Note that $\frac{\partial \theta_1}{\partial \beta_1} < 0$ and $\frac{\partial \theta_1}{\partial \gamma} < 0$.[3] Intuitively, the higher the probability of the court making a mistake and finding an innocent individual guilty, or the higher the discount in the sanction for pleading guilty, the more the innocent individuals are willing to take the plea bargain.

Similarly, for guilty individuals we can define:

$$\theta_2 = \frac{\ln(1-\beta_2)}{\ln(1-\gamma)} - 1 \tag{4}$$

Guilty individuals with $\theta \geq \theta_2$ will choose to settle, while innocent individuals with $\theta < \theta_2$ will not settle but will go to court. Note now that $\frac{\partial \theta_2}{\partial \beta_2} > 0$ and $\frac{\partial \theta_2}{\partial \gamma} < 0$.[4] Intuitively, the higher the probability of the court making a mistake and finding the guilty individual innocent the less the guilty individuals are willing to take the plea bargain, while the higher the discount in the sanction for pleading guilty the more the guilty individuals are willing to take the plea bargain. Note also that since $\beta_1, \beta_2 < \frac{1}{2}$ we get $\theta_1 > \theta_2$, which means that innocent individuals have to be more risk averse than guilty individuals to take the plea bargain.

To summarize, If plea bargaining is permitted and the agency offers a plea bargain to all individuals it detected as violators of the law, of the innocent individuals a fraction $1 - F(\theta_1)$ will take the offer and fraction $F(\theta_1)$ will go to court. Of the guilty individuals a fraction $1 - F(\theta_2)$ will take the offer and fraction $F(\theta_2)$ will go to court. Since $\theta_1 > \theta_2$, $F(\theta_1) \geq F(\theta_2)$, which means that a greater fraction of innocent individuals than guilty individuals rejects the plea bargain and goes to court. This partial screening effect of plea bargaining is along the lines of Grossman and Katz (1983).

What are the social costs of allowing or prohibiting plea bargaining? Let us use as a benchmark the case where, out of the population of individuals who were detected as violators of the law, only the guilty individuals are punished. The social cost of allowing or prohibiting plea bargaining can then be analyzed in comparison to this first best benchmark case. The focus here is on the social harm from the two types of mistakes – punishing the innocent and not punishing the guilty.

When plea bargaining is permitted the agency offers a plea bargain to all

[3] $\frac{\partial \theta_1}{\partial \beta_1} = \frac{1}{\beta_1 \ln(1-\gamma)} < 0$ and $\frac{\partial \theta_1}{\partial \gamma} = \frac{\ln \beta_1}{(1-\gamma)[\ln(1-\gamma)]^2} < 0$ (recall that $\beta_1, \gamma \in (0,1)$).

[4] $\frac{\partial \theta_2}{\partial \beta_2} = \frac{-1}{(1-\beta_2)\ln(1-\gamma)} > 0$ and $\frac{\partial \theta_1}{\partial \gamma} = \frac{\ln(1-\beta_2)}{(1-\gamma)[\ln(1-\gamma)]^2} < 0$ (recall that $\beta_2, \gamma \in (0,1)$).

individuals it detected as violators of the law. Individuals who are sufficiently risk averse will take the offer. Specifically, a fraction $1-F(\theta_1)$ of the innocent individuals and a fraction $1-F(\theta_2)$ of the guilty individuals will take the offer. Therefore, the social cost of permitting plea bargaining is:

$$H_{PB} = \alpha[(1-F(\theta_1)) + F(\theta_1)\beta_1]h_1 + (1-\alpha)F(\theta_2)\beta_2 h_2 \tag{5}$$

The first term in expression 5 is the share of individuals who are innocent (α), who either choose to accept the plea bargain and not go to trial ($1-F(\theta_1)$) or go to trial but are found guilty by the court ($F(\theta_1)\beta_1$), multiplied by the social harm from punishing the innocent (h_1). The second term in expression 5 is the share of individuals who are guilty ($1-\alpha$), who choose to go to trial and are found innocent by the court ($F(\theta_2)\beta_2$), multiplied by the social harm from not punishing the guilty (h_2).[5]

When plea bargaining is prohibited the agency knows that in order to impose a sanction it has to go to trial. As noted, the agency will bring a lawsuit only in a fraction $\frac{n}{N}$ of the cases. Thus, the social cost of prohibiting plea bargaining is:

$$H_{NPB} = \alpha\frac{n}{N}\beta_1 h_1 + (1-\alpha)[1-\frac{n}{N}+\frac{n}{N}\beta_2]h_2 \tag{6}$$

The first term in expression 6 is the share of individuals who are innocent (α), who the agency sues ($\frac{n}{N}$), but are found guilty by the court (β_1), multiplied by the social harm from punishing the innocent (h_1). The second term in expression 6 is the share of individual who are guilty ($1-\alpha$), who are either not sued ($1-\frac{n}{N}$) or are sued but are found innocent by the court ($\frac{n}{N}\beta_2$), multiplied by the social harm from not punishing the guilty (h_2).

The optimal plea bargaining regime is determined by comparing the social costs of allowing and prohibiting plea bargaining. Note that $H_{NPB} > H_{PB}$ when $\alpha = 0$, and that $H_{PB} > H_{NPB}$ when $\alpha = 1$.[6] Since both H_{PB} and H_{NPB} are monotonic in α ($\frac{\partial H_{PB}}{\partial \alpha}$ and $\frac{\partial H_{NPB}}{\partial \alpha}$ do not depend on α), the probability of a mistake by the agency, we can define α^*, the unique probability of mistake

[5] I am assuming here that the number of trials, $\alpha F(\theta_1)+(1-\alpha)F(\theta_2)$, is relatively small, so the agency's resource constraint is not binding. As will be seen later, in equilibrium the relevant condition is that $\frac{n}{N} \geq \alpha^* F(\theta_1) + (1-\alpha^*)F(\theta_2)$, since $\alpha^* F(\theta_1) + (1-\alpha^*)F(\theta_2)$ is the maximum number of cases that are not settled when plea bargaining is used.

[6] The former statement is true because $1-\frac{n}{N} > \beta_2[F(\theta_2)-\frac{n}{N}]$. The latter statement is true because $1-F(\theta_1) > \beta_1[\frac{n}{N}-F(\theta_1)]$.

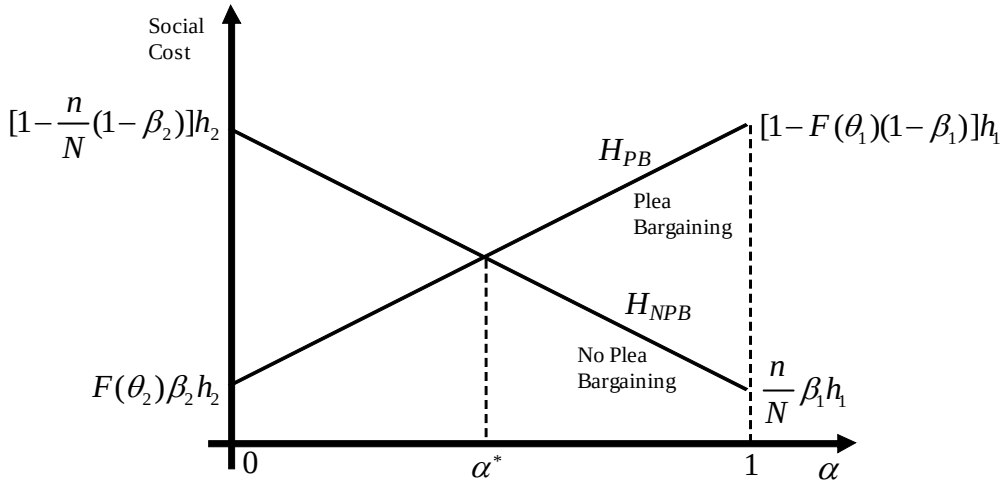

Figure 1: The Social Cost of Permitting and Prohibiting Plea Bargaining

by the agency for which the social cost of allowing plea bargaining is equal to the social cost of prohibiting plea bargaining ($H_{PB} = H_{NPB}$):

$$\alpha^* = \frac{[1 - \frac{n}{N}(1-\beta_2) - F(\theta_2)\beta_2]h_2}{[1 - \frac{n}{N}(1-\beta_2) - F(\theta_2)\beta_2]h_2 + [1 - F(\theta_1)(1-\beta_1) - \frac{n}{N}\beta_1]h_1} \qquad (7)$$

Figure 1 depicts H_{PB}, H_{NPB} and α^*.

If $\alpha < \alpha^*$, that is if the probability of the agency making a mistake in detecting violators of the law is relatively low, plea bargaining should be permitted. If $\alpha > \alpha^*$, that is if the probability of the agency making a mistake in detecting violators of the law is relatively high, plea bargaining should be prohibited.

Intuitively, if plea bargaining is permitted some innocent individual will choose to accept the plea bargain, because of their risk aversion. If plea bargaining is prohibited some guilty individuals will not be punished, since the agency will no sue all the individuals it detected as violators of the law because of its limited resources. When the probability of the agency making a mistake in detecting violators of the law is relatively low only few innocent individuals will be punished if plea bargaining is permitted, since most of the individuals who will choose to settle will be guilty, but many

guilty individuals will not be punished if plea bargaining is prohibited, since most of the individuals who the agency will not sue in court will be guilty. Therefore in such a case it is optimal to allow plea bargaining. By contrast, when the probability of the agency making a mistake in detecting violators of the law is relatively high many innocent individuals will be punished if plea bargaining is permitted, since most of the individuals who will choose to settle will actually be innocent, but only few guilty individuals will not be punished if plea bargaining is prohibited, since most of the individuals who the agency will not sue will be innocent. Therefore in such a case it is optimal to prohibit plea bargaining.

Note that when $h_1 = 0$, that is when there is no social harm from punishing the innocent, we get $\alpha^* = 1$, which means that plea bargaining will always be used. When $h_2 = 0$, that is when there is no social harm from not punishing the guilty, we get $\alpha^* = 0$, which means that plea bargaining will never be used.

2.3 Comparative Statics

How do changes in the parameters of the model affect the decision whether to allow plea bargaining? We can address this question by analyzing the change in α^*, the threshold probability of a mistake by the agency under which allowing plea bargaining is optimal and over which prohibiting plea bargaining is optimal, as a result of a change in a parameter. If α^* decreases as result of a change in a parameter, it means that plea bargaining will be prohibited in more cases. If α^* increases as result of a change in a parameter, it means that plea bargaining will be permitted in more cases.

Recall that the social harms ratio is $\frac{h_1}{h_2}$, reflecting the relative social harms from punishing innocent individuals (h_1) and not punishing guilty individuals (h_2). An increase in the social harms ratio reflects a greater social emphasis on ensuring that innocent individuals are not punished, while a decrease in the social harms ratio reflects a greater social emphasis on ensuring that guilty individuals are punished.

How does a change in the social harms ratio affect the decision whether to allow plea bargaining? We can write α^* from expression 7 as:

$$\alpha^* = \frac{1}{1 + \frac{1-F(\theta_1)(1-\beta_1)-\frac{n}{N}\beta_1}{1-\frac{n}{N}(1-\beta_2)-F(\theta_2)\beta_2}\frac{h_1}{h_2}} \tag{8}$$

Since the term multiplying $\frac{h_1}{h_2}$ in expression 8 is positive,[7] it is straightforward to show using expression 8 that $\frac{\partial \alpha^*}{\partial h_1/h_2} < 0$. This results is summarized in the following proposition.

Proposition 1 *A greater social emphasis on ensuring that innocent individuals are not punished leads to less use of plea bargaining. A greater social emphasis on ensuring that guilty individuals are punished leads to a greater use of plea bargaining.*

Proposition 1 can be understood intuitively. If there is a greater social emphasis on ensuring that innocent individuals are not punished and a lower social emphasis on ensuring that guilty individuals are punished, then the fact that some innocent individuals choose to take the plea bargain when plea bargaining is permitted is socially more costly, while the fact that some guilty individuals are not brought to court because of limited resources when plea bargaining is prohibited is socially less costly. Therefore, such a change leads to less use of plea bargaining.

It is worth noting that Adelstein and Miceli (2001) have an opposite prediction to this one, that is that plea bargaining becomes more desirable as the social harm from punishing the innocent increases. The reason is that their model assumes unlimited prosecutorial resources, and therefore in their model the main effect of prohibiting plea bargaining is simply to increase the sentences that are imposed, both on guilty and innocent individuals. This effect become less desirable as the social harm from punishing the innocent increases relative to the social harm from not punishing the guilty.

How does an increase in crime affect the decision whether to allow plea bargains? An increase is crime is reflected in the model by an increase in N, the measure of individuals that the agency detected as violators of the law. One can show using expression 8 that, for β_2 sufficiently small, $\frac{\partial \alpha^*}{\partial N} > 0$.[8] We therefore get the following proposition:

Proposition 2 *An increase in crime leads to a greater use of plea bargaining.*

[7] Note that in the term $\frac{1-F(\theta_1)(1-\beta_1)-\frac{n}{N}\beta_1}{1-\frac{n}{N}(1-\beta_2)-F(\theta_2)\beta_2}$ the numerator and the denominator are positive both for $\frac{n}{N}=0$ and $\frac{n}{N}=1$, and their derivative with respect to $\frac{n}{N}$ is monotonic in $\frac{n}{N}$ (does not depend on $\frac{n}{N}$).

[8] Formally, sign$\{\frac{\partial \alpha^*}{\partial N}\}$ =sign$\{(1-\beta_1-\beta_2)(1-F(\theta_1))-\beta_1\beta_2(F(\theta_1)-F(\theta_2)\}$. For β_2 sufficiently small this term is positive.

Proposition 2 can be understood intuitively. When plea bargaining is prohibited and there is an increase in crime then the agency is able to sue a smaller fraction of the individuals it detected as violators of the law, since its resource constraint is binding. Thus, when plea bargaining is prohibited more guilty individuals will go unpunished. This makes prohibiting plea bargaining relatively less appealing, and therefore there will be a greater use of plea bargaining.

3 Data

To look at the degree to which countries put an emphasis on ensuring that innocent individuals are not punished or that guilty individuals are punished I use data from the 1996 and 2006 surveys of the International Social Survey Program (ISSP) on the role of government. In particular, I look at the answers to the following question: "All systems of justice make mistakes, but which do you think is worse? Convict an innocent person / Let a guilty person go free." For every country I use the percentage of people who thought that convicting an innocent person is worse than letting a guilty person go free. I have the data for 23 countries in 1996, and 34 countries in 2006.[9] For most countries I have repeat observations, but for some I do not.

Figure 2 shows the ISSP data for OECD countries in 2006, that is the percentage of people in every country who thought that convicting an innocent person (rather than letting a guilty person go free) is the worse type of judicial mistake. The legal system of every country, whether civil law or common law, is also indicated in the figure (taken from La Porta, Lopez-de-Silanes, and Shleifer 2008). One can see that common law countries are concentrated on the right hand side of the figure, with a relatively low level of concern for punishing the innocent.

Comparative measures of crime levels across countries are notoriously imprecise, since much crime is not reported. One reliable measure of the overall level of crime in different countries is the International Crime Victims Survey (ICVS), which has standardized comparative data on ten common property and contact crimes (van Dijk, van Kesteren, and Smit 2007; Alvazzi del Frate 1998; Hatalak, Alvazzi del Frate and Zvekic 1998). I use the

[9] The 2006 Slovakia data was not integrated into the 2006 ISSP survey, since the survey has been fielded in Slovakia only in october 2008. I obtained the data directly from the ISSP Slovakian representative.

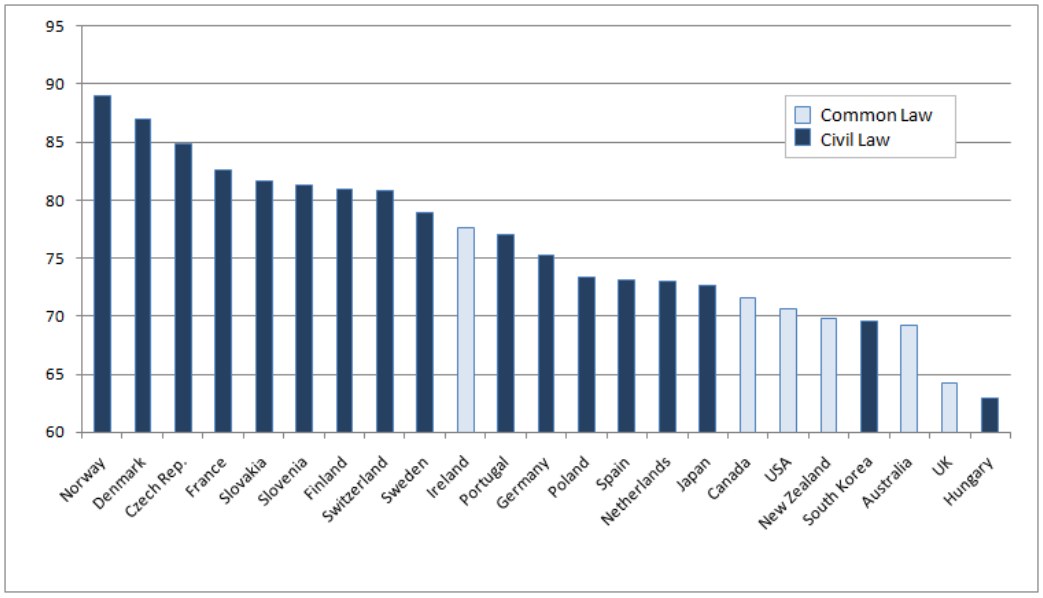

Figure 2: Percentage of people who think that convicting an innocent person is the worse type of judicial mistake, OECD Countries, 2006

one-year prevalence rate of victimization by any of five common crimes (burglary, attempted burglary, personal theft, robbery and assault), that is the probability of being the victim of any of these five crimes at least once in the year before the survey.[10] I use the data for the same years as the ISSP data, 31 countries in 1996 and and 27 countries in 2004-2005. For most countries I have repeat observations, but for some I do not.

Figure 3 shows the ICVS data for OECD countries in 2005, that is the level of crime in every country. Again, the legal system of every country is indicated. One can see that common law countries are concentrated on the left hand side of the figure, with relatively high levels of crime.

[10]I did not include in my measure the crime of sexual offense, since what constitutes a sexual offense can vary among countries. I also did not include crimes that are related to means of transport (theft of a car, theft from a car, car vandalism, theft of a bicycle, theft of a motorcycle), since data for some of these crimes for many countries was missing, and also because these crimes could reflect the prevelance of that means of transport (for example, in the Netherlands bicycle theft is relatively common, and in certain developing countries with otherwise high crime prevelance car theft is relatively uncommon). However, the results of the paper all hold when the means of transport crimes are included.

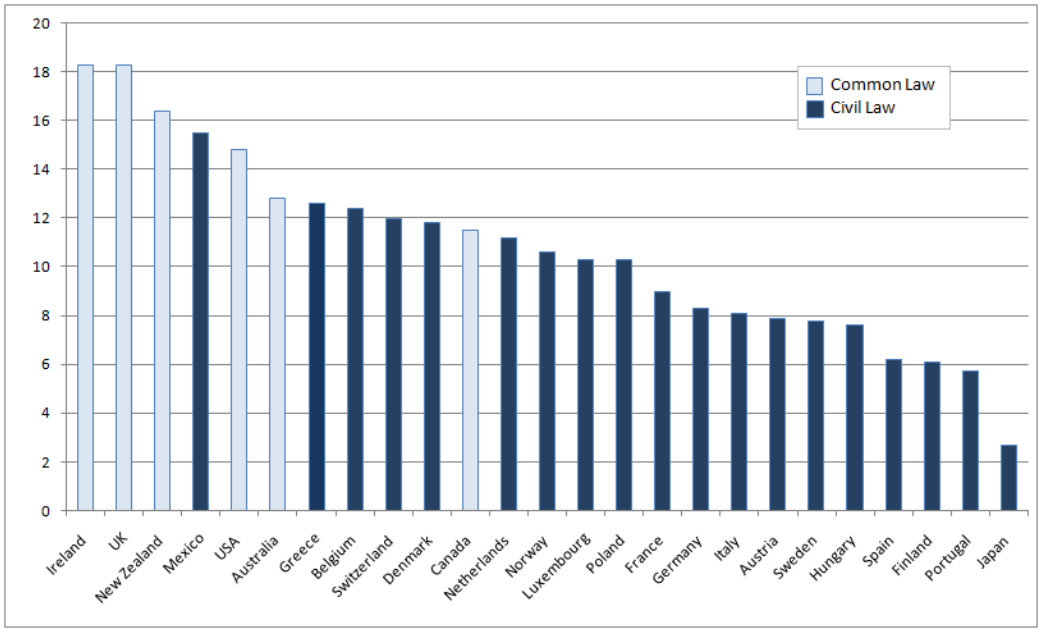

Figure 3: Crime Prevalence, OECD Countries, 2005

As an alternative measure of crime I use the homicide rate from the World Health Organization (WHO) data on death classifications by medical practitioners (World Health Organization, Mortality Database). This measure has greater coverage, but since it captures only one type of crime it can be relied on as a proxy for the overall level of crime in a country only to the extent that the overall level of crime is highly correlated with the homicide rate. I use the data for the same years as the ISSP and ICVS data.

To measure the scope of plea bargaining in different countries I created a plea bargaining index by coding the legal situation with respect to plea bargaining in different countries. Several sources were relied upon: The World Factbook of Criminal Justice Systems (Bureau of Justice Statistics 1993, 2002), Euro Justice (European Commision 2004) for European Union members and Bradley (2007). Where I couldn't find the legal situation in these sources I used other country specific sources detailed in the data appendix. Countries that do not have plea bargaining (or a similar procedure) or that have plea bargaining that is restricted to minor crimes where a prison sentence may not be imposed, were coded with 0. Countries that use plea

Table 2: Descriptive Statistics

	Obs.	Mean	St. Dev.	Min	Max
Crime Prevalence	58	17.98	11.89	2.7 (JAP)	51.8 (ZWE)
Punish Innocent Worse	57	73.27	9.45	44.3 (TWN)	92.0 (NOR)
Plea Bargaining Level	72	1.84	0.833	0	2

bargaining or a similar procedure but do not allow its use for severe crimes with a prison sentence over a certain length were coded with 1. Countries that place no restrictions on the use of plea bargaining (except for death penalty) were coded with 2. The data appendix details the plea bargaining coding for different countries.

Table 2 shows summary statistics of three mail variables I use.

Two controls I use are real GDP per capita in constant prices, and government share of real GDP per capita, taken from the Penn World Table.

4 Evidence

Recall that according to proposition 1 a lower social concern for punishing the innocent and a higher concern for not letting the guilty go free lead to a greater use of plea bargaining. According to proposition 2 higher levels of crime lead to a greater use of plea bargaining. Using the plea bargaining index in different countries one can analyze directly whether a lower concern for punishing the innocent and a higher level of crime are associated with a greater use of plea bargaining.

In table 5 the dependent variable is the index of the use of plea bargaining that was described in section 3. Higher levels of this index mean a greater use of plea bargaining. The table present results of an OLS regression, with robust standard errors that are clustered by country.[11]

In specification (1) the independent variable is the percentage of the population that says that punishing the innocent is the worse type of judicial mistake (as in all other specifications, I control for real GDP per capita). Since the coefficient is negative and statistically significant we can say that a lower concern for punishing the innocent and higher concern for not letting

[11] The results also hold with standard significance levels using an ordered logit regression.

Table 3: Scope of Plea Bargaining

Dependent Variable:	Plea Bargaining Index				
	(1)	(2)	(3)	(4)	(5)
Punish Innocent Worse	-0.041^{***} (0.011)		-0.054^{***} (0.016)	-0.043^{**} (0.019)	-0.048^{***} (0.010)
Crime Prevalence		0.082^{***} (0.019)	0.091^{***} (0.018)	0.099^{***} (0.017)	
Gov. Share of GDP				$-.067^{*}$ (0.033)	$-.028$ (0.028)
Homocide Rate					0.034^{**} (0.015)
GDP Per Capita	✓	✓	✓	✓	✓
Obs.	56	52	36	36	54
R^2	0.20	0.25	0.49	0.57	0.32

$^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$

Standard errors are robust and clustered at the country level

the guilty go free are associated with a greater use of plea bargaining.

In specification (2) the independent variable is the measure of crime prevalence that was described in section 3. Since the coefficient is positive and statistically significant we can say that higher levels of crime are associated with a greater use of plea bargaining.

Specification (3) includes as independent variables both the percentage of the population that says that punishing the innocent is the worse type of judicial mistake and the measure of crime prevalence. Both coefficients are statistically significant in this specification.

Specification (4) controls for government share of real GDP per capita. Under this specification both the coefficient for the percentage of people who think that punishing the innocent is worse and the coefficient for crime prevalence are statistically significant. Furthermore, an increase in government share of real GDP per capita is associated with less use of plea bargaining (statistically significant with a p-value of 0.053). This makes intuitive sense and is supported by the model, according to which $\frac{\partial \alpha^*}{\partial n} > 0$. With more resources for the government prohibiting plea bargaining is less socially costly, since with more governmental resources it would be possible to bring more

criminals to court when plea bargaining is prohibited, so relatively few guilty individuals will go unpunished.

Specification (5) uses WHO homicide rate instead of ICVS data as a measure of crime. Both the coefficient for the percentage of people who think that punishing the innocent is worse and the coefficient for homicide rate are statistically significant under this specification.

The results shown in table 3 are consistent with the model, that is with the predictions of propositions 1 and 2. A lower concern for punishing the innocent and a higher prevalence of crime are associated with a greater use of plea bargaining.

5 Reverse Causation

Section 4 shows that a lower concern for punishing the innocent and a higher prevalence of crime are associated with a greater use of plea bargaining. In this section I try to address the concern that this correlation is driven by reverse causation.

5.1 Plea Bargaining and Preferences for Error Types

The evidence in section 4 shows that a lower concern for punishing the innocent is associated with a greater use of plea bargaining. However, one could make a reverse causation argument. That is, one could argue that it is not the preferences that determine the scope of plea bargaining in each country, but it is the scope of plea bargaining that affects citizens' preferences. If a country decides to permit the use of plea bargaining it causes the population to care less about punishing the innocent, while if a country prohibits the use of plea bargaining it causes the population to care more about punishing the innocent.

To address this concern I look at the United States General Social Survey (GSS) for 2006. The survey includes the same question that was analyzed before: "All systems of justice make mistakes, but which do you think is worse? Convict an innocent person / Let a guilty person go free." The survey also asks people the following question: "From what countries or part of the world did your ancestors come?"

Since in the United States plea bargaining is commonly employed, if it is the plea bargaining policy that determines social preferences one would

Table 4: Punishing the Innocent is Worse - U.S. GSS 2006

Dependent Variable:	Punish Innocent Worse			
	(1)	(2)	(3)	(4)
Punish Innocent Worse in	0.0101^{***}	0.0095^{**}	0.009^{**}	0.0084^{**}
Country of Ancestral Origin	(0.0039)	(0.004)	(0.004)	(0.004)
Age		0.0007	0.001	0.0005
		(0.0012)	(0.0012)	(0.0012)
Female		−0.0364	−0.0345	−0.0274
		(0.0394)	(0.0392)	(0.04)
Education			0.0242^{***}	0.024^{***}
			(0.0077)	(0.0077)
Conservative				0.0052
				(0.0133)
Obs.	521	515	515	503

$^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$
Standard errors are robust

not expect to see that the preferences of people in the United States are associated with the preferences in their respective countries of family origin. For example, a person living in the United States whose ancestors came from France should not be more likely than others to think that punishing the innocent is the worse type of mistake, even though this view is more common in France than in other countries. The use of immigrants and their descendants to address concerns of reverse causality is standard in the cultural economics literature (Alesina and Giuliano 2010, Algan and Cahuc 2010, Fernández and Fogli 2009, Giuliano 2007, Luttme and Singhal 2011).

In table 4 the dependent variable is a binary variable representing the person's answer to the question on punishing the innocent versus not punishing the guilty. The variable takes the value 1 if the person answered that punishing the innocent is the worse type of mistakes. Table 4 presents the marginal effects of a logit regression with robust standard errors.

In specification (1) the independent variable is the percentage of the population in the person's country of ancestral origin that says that punishing the innocent is the worse type of judicial mistake, taken from the 2006 ISSP survey. For example, if a person's said that his ancestors came from France, then the value of the independent variable is the percentage of the population

in France that said in 2006 that punishing the innocent is the worse type of judicial mistake. Since the coefficient is positive and statistically significant we can say that a higher concern for punishing the innocent in one's country of ancestral origin increases the likelihood of that person thinking that punishing the innocent is the worse type of judicial mistake. Specifically, an increase of 1% in the number of people in a country who think that punishing the innocent is the worse type of judicial mistake increases the likelihood of a person whose ancestors originated from that country holding a similar position by 1%.

In specification (2) I control for age and gender. Older people seem to care more about not punishing the innocent, while women seem to care less. However, these effects are not statistically significant.

Specification (3) adds years of education as an independent variable. More years of education are associated with more concern about punishing the innocent, and the effect is statistically significant. An increase in one years of schooling increases the probability that a person thinks that punishing the innocent is the worse type of judicial mistake by 2.4%. However, the effect of preferences in one's country of ancestral origin remains statistically significant.

Specification (4) adds a measure of how conservative a person is.[12] Surprisingly, there is no correlation between a person's ideology and his opinion about the worse type of judicial mistake. Even when controlling for ideology the effect of preferences in one's country of ancestral origin remains statistically significant.

Under all specifications Americans' preferences are correlated with the preferences in their country of ancestral origin. This result seems inconsistent with a reverse causation argument, that the plea bargaining policy affects people's preferences, since plea bargaining is widely employed in the United States.

5.2 Plea Bargaining and Crime

The evidence in section 4 shows that more crime is associated with a greater use of plea bargaining. However, one could make a reverse causation argument, that a greater use of plea bargaining leads to more crime because of reduced deterrence due to shorter sentences.

[12] A 1-7 scale, where 1 is extremely conservative and 7 is extremely liberal.

In theory plea bargaining has two effects on deterrence. On the one hand, when plea bargaining is used shorter sentences are imposed on those who plead guilty, which reduces deterrence. On the other hand, when plea bargaining is used there is no need to hold a full trial to convict a defendant, so with the same resources more convictions can be obtained, or in other words the probability of conviction increases, which increases deterrence. Which of these effects dominates?

In the vast literature on plea bargaining the argument that plea bargaining will increase crime is not raised, which seems to imply that most scholars do no think that the effect of reduced sentences could dominate the effect of increased probability of conviction. Furthermore, in unreported regression using number of prisoners in each country I do not find that a greater scope of more plea bargaining is associated with less prisoners, when controlling for the level of crime, as one would expect if the effect of reduced sentences dominated the effect of increased probability of conviction. If the reduction in sentences does not dominate the increase in the probability of conviction, deterrence cannot be lower when more plea bargaining is used, and therefore the problem of reverse causality does not arise.

6 Concluding Remarks

Why do different countries have different policies regarding plea bargaining? Using a formal model I argue that different policies reflect different social preferences for the two types of mistakes: punishing the innocent and not punishing the guilty. Lower concern for punishing the innocent leads to greater use of plea bargaining. Furthermore, the model also shows that higher levels of crime lead to a greater use of plea bargaining. Using cross country data on crime prevalence and on social preferences for the different types of judicial mistakes, and a new index of the legal situation with respect to plea bargaining in different countries, I find results that are consistent with the model's prediction.

If indeed plea bargaining policies across countries are explained by the degree to which countries put an emphasis on ensuring that innocent individuals are not punished, then a similar analysis of other legal institutions may be in order. Like plea bargaining, many legal institutions balance competing values. Since different countries may weigh values differently, one should consider how these differences filter into the design of legal institutions across

countries.

A Data Appendix

Table 5 details the plea bargaining index for different countries and years. Countries that do not have plea bargaining (or a similar procedure), or that have plea bargaining that is restricted to minor crimes where a prison sentence may not be imposed, were coded with 0. Countries that use plea bargaining but do not allow its use for severe crimes with a prison sentence over a certain length were coded with 1. Countries that place no restrictions on the use of plea bargaining (except for death penalty in certain countries) were coded with 2.

Table 5: Plea Bargaining Level

	1995	2005		1995	2005		1995	2005
Australia	2	2	France	0	1	Norway	1	1
Austria	0	0	Germany	1	1	Philippines	2	2
Belgium	0	0	Greece		0	Poland	0	1
Bulgaria	1	1	Hungary	0	1	Portugal	0	0
Canada	2	2	Irealnd	2	2	Russia	0	1
Chile		1	Israel	2	2	Slovakia		0
Taiwan		1	Italy	1	1	Slovenia	0	0
Croatia		0	Japan	0	0	S. Africa		2
Cyprus	2		S. Korea		0	Spain	1	1
Czech Rep.	0	0	Latvia	1	1	Sweden	0	0
Denmark		0	Luxembourg		0	Switzerland	0	0
Domin.Rep.		1	Mexico		0	U.K.	2	2
Estonia	0	0	Netherlands	0	0	U.S.A.	2	2
Finland	0	0	N. Zealand	2	2	Venezuela		2

The three main sources I used to code the legal situation with respect to plea bargaining in different countries were The World Factbook of Criminal Justice Systems (Bureau of Justice Statistics 1993, 2002), Euro Justice (European Commission 2004) for European Union members and Bradley (2007). Where I could not find the legal situation in these sources I used other country specific sources including the legal codes of the countries. For

the Philippines I used Bautista (2003, pp. 88-91) for Taiwan Lo (2006, pp. 233-234), for South Africa Skeen (2004, pp. 524-525), and for Switzerland Trechse and Killias (2004, pp. 276-277, 283). For Bulgaria, Croatia, the Dominican Republic and Chile I consulted their criminal procedure code, but there is no change in the reults if these observations are dropped. For South Korea I consulted a South Korean Judge. I also relied on Bárd (2007, pp. 230-232) for Hungary, Dean (2002, p. 37) for Japan, and Kyprianou (2009, p. 170) for Cyprus.

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