Property Crime and Drug Enforcement in Portugal

Silvia M. Mendes
State University of New York at Binghamton;
and University of Minho, Portugal

The author tests the effect of drug law enforcement on the property crime rate in Portugal, investigating the hypothesis that there exists a property crime and drug crime trade-off. The test is an approximate replication of the Sollars, Benson, and Rasmussen (1994) model using data from 274 Portuguese municipalities in 1996, adjusted for societal differences. Increasing concern over the rise of the drug problem in this country and its seemingly unsuccessful effect on crime has led policy makers to doubt further allocation of scarce resources toward a strict drug policy. Evidence is found that supports the trade-off hypothesis; that is, in Portugal there is a trade-off between efforts to control drug crimes and efforts to control property crimes.

Drug use is commonly believed to be directly related to an increased crime rate, particularly the property crime rate. Drug users may have to resort to theft to maintain their vice. If this is true, it makes sense for government to react to drug use with restrictive laws and vigorous enforcement. These actions by government would satisfy those who find drug use a problem per se, and the actions would find support even among those who, but for the property crime connection, would otherwise see drug use as victimless. This may explain why so many Western governments have waged a war on drugs through restrictive laws, vigorous enforcement, and harsh punishments.

Despite the appeal of this argument, a series of studies on drug and property crimes in the State of Florida raises doubts as to whether a vigorous drug policy will bring about the desired property crime results. Bruce Benson, David Rasmussen, and their colleagues (Benson & Rasmussen, 1991; Benson, Kim, & Rasmussen, 1994; Benson, Kim, Rasmussen, &

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Zuehlke, 1992; Benson, Rasmussen, & Sollars, 1995; Sollars, Benson, & Rasmussen, 1994) wonder whether the subpopulations of drug-related criminals and property criminals coincide to the extent that is commonly assumed. If they do not, law enforcement officials could be facing the prospect of a trade-off between efforts to reduce the two types of crime.

A study by Sollars et al. (1994) models the allocation and crime control issues through a variation of Gary Becker's (1968) deterrence-based general model of crime control. They report that in Florida, when drug arrests were increasing, so too were property crimes. While this could be due to a drug-price effect—more drug arrests lead to higher drug prices and that leads, in turn, to a heightened desire for property crime—they note that this cannot be the case because drug prices in Florida were actually falling during this same time period. Through an analysis of 296 local jurisdictions in Florida, Sollars et al. (1994) show that (a) more drug arrests means fewer property crime arrests, (b) fewer property crime arrests reduce the deterrent sanction for property crime, and (c) the reduced deterrence means that the property crime rate is higher than it would be were drug crimes not so vigorously pursued.

This is not good news for policy makers or the public. It would appear that more police resources and the costs those entail would be needed to combat both types of crimes. However, it is possible that these findings are Florida specific or, at least, specific to a particular condition of law enforcement organization. Florida is well-known as a place of entry for illegal drugs. For that reason, the drug and property criminals may overlap to a lesser extent than is true generally. Furthermore, in Florida, as well as in all U.S. states, law enforcement is a decentralized government activity. One implication of decentralization is that the provision of law enforcement faces a budget constraint that is tied to a local tax base; another implication is that spillover effects from one community to another are not easily coordinated.

To investigate the drug and property crime trade-off further, I have selected Portugal as an alternative test site. Unlike the jurisdictions in Florida, Portugal is a centralized political and administrative system in which the provision and allocation of police is controlled and directed from Lisbon. Its municipalities have no say in police allocation and therefore do not face the same sort of budget constraint as do the jurisdictions in Florida in the sense that poor Florida municipalities might have both high crime rates but limited fiscal capacity to hire more police.[1] Also, the macrolevel evidence in Portugal indicates that drug use and property crimes have been moving in tandem across time (*Gabinete de Estudos e Planeamento*

[*GEPMJ*] statistics, 1993-1996; Pedroso, Santos, & Leitão, 1996). The more drug use there has been in Portugal, the higher the property crime rate, and when drug use declines, so too does property crime. The conjunction of this macroevidence and the centralized Portuguese system make Portugal an interesting and potentially important locale for retesting the Sollars et al. (1994) trade-off hypothesis.

My retesting in the Portuguese setting is an approximate replication of the Sollars et al. (1994) model using data from 274 Portuguese municipalities in 1996, adjusted for societal differences and availability of data.[2] The results show that in Portugal, as in Florida, there is a trade-off between efforts to control drug crimes and efforts to control property crimes.

THEORETICAL FRAMEWORK

Gary Becker's (1968) "Crime and Punishment: An Economic Approach" marked a renewed interest in an economic, policy-oriented approach to crime by reintroducing the notion of rational agents in the study of crime based on the utilitarian school developed in the 18th-century by Beccaria, Feuerbach, Bentham, Paley, and other classicist criminologists.[3] Through the refinement of deterrence theory, he provided the theoretical grounds for empirically testing criminal activity. The basic logic of Becker's argument is that an increase in the efforts of law enforcement and judicial authorities to prevent, detect, and punish should lead to a decrease in the attractiveness of illegal activities. By the same reasoning, increases in crime payoffs raise the attractiveness of committing crime. Rational individuals consider the risk of being caught and punished; depending on the result of their cost-benefit analyses, they may or may not be deterred from committing criminal acts.

In the 1970s, other renowned scholars, such as James Q. Wilson, Ernest Van den Haag, and Edward C. Banfield, made important contributions to the area of research through an eclectic framework that includes rational choice theory approaches to the study of criminal behavior. Since then, various social scientists have investigated the relationship between criminal behavior and changes in the opportunity structure using Becker's model and its extensions (Brown & Reynolds, 1973; Buck, Gross, Hakim, & Weinblatt, 1983; Deutsch, Hakim, & Spiegel, 1990; Ehrlich, 1973, 1975; Eide, 1994, 1995; Friedman, Hakim, & Spiegel, 1989; Kramer, 1990; Sjoquist, 1973). These studies have contributed to the refinement of our understanding of how the rational model can be used to help explain diverse criminal phenomena and behavior.

Extending the Becker Model: Contemplating Drug Enforcement

Benson and Rasmussen (1991), Benson et al. (1992, 1994, 1995), and Sollars et al. (1994) were among the first to extend Becker's (1968) model to include drug control. Their objective was not only to test deterrence theory but also to study the relationship between drugs and property crime. In particular, they examine the effects of law enforcement efforts on the reduction of drug-related activities.

The conventional argument regarding the relationship between drugs and property crime is that drug abuse is substantially responsible for much of the property crime in a given region. This is at least part of the reason behind the politicians' and legislators' crusade in favor of vigorous drug law enforcement policies in most countries worldwide. One of the most relevant motives for this aggressive approach to drug control is the belief that the reduction of these two types of crime is highly correlated. More than this, the two subpopulations of criminals, that is, property criminals and drug criminals, are largely believed to coincide (Benson & Rasmussen, 1991). Therefore, when investing public funds in the capture of drug consumers, authorities believe they are also keeping property crimes from occurring (Agra, 1996; Chaiken & Chaiken, 1990; Fagan, 1994; Luksetich & White, 1982; Lurigio & Davis, 1992; MacKenzie, 1994).

Despite the belief that substance abuse is positively related to property crime, policies aimed at reducing drug consumption may actually cause this type of crime. There are two lines of arguments that question the effectiveness of strict drug policies. The illegality of drug consumption is expected to raise drug prices. An aggressive drug control policy will have a deleterious effect on the property crime rate if the demand for drugs is inelastic. Faced with higher costs, addicts must raise enough to buy their drugs. In the absence of sufficient legitimate resources, they turn to property crimes, thus raising the property crime rate (Becker & Becker, 1997; Benson & Rasmussen, 1991; Currie, 1993; Luksetich & White, 1982).

An alternative explanation for why aggressive drug policies may backfire has been suggested by Benson and Rasmussen (1991), Benson et al. (1992, 1994, 1995), and Sollars et al. (1994). Using data collected in the State of Florida in the 1980s, these authors tested a recursive model of deterrence theory, extended to contemplate drugs and drug enforcement efforts. At this time in Florida, many resources were being invested in an aggressive approach to drug control. Despite these investments, the property crime rate rose. Moreover, drug prices actually fell during this period (Benson &

Rasmussen, 1991). Thus, apparently the price rise hypothesis was not the reason behind the increasing property crime rate. Sollars et al. (1994) argued that it was not so much drug abuse that was causing the property crime rate to increase. Rather, it was the severity of the drug policy that was channeling scarce police resources mostly to drug-related crime control and away from other crime control areas, normally property crime. Basically, these authors were proposing the idea of a trade-off effect among police crime control efforts. This theory suggests that those who are using drugs may not be largely the same individuals who are committing property crimes.

DRUG ENFORCEMENT IN PORTUGAL

Although crime is still fairly low by international comparison, it has become an important and persistent item on the national agenda in Portugal in recent years. In 1994, total reported crime in Portugal was roughly a fifth of the crime figure in the United States and a seventh of the total crime rate in France. There were 1,000 total crimes per 100,000 persons in Portugal, as compared to about 5,400 in the United States and 7,000 in France (Eurostat Anuário, 1997). Still, the Portuguese people have become aware of the growing influence crime has had in their society (Fernandes, 1995). Several mass public surveys conducted in Portugal in the mid-1990s reveal that crime has increasingly found itself up the hierarchical list of societal concerns.

The Portuguese concern surrounding the drug issue is similar to that of crime in general. Drug crimes are not high by international standards, but the Portuguese people are concerned. In 1994, drug crimes[4] were, for example, one third those of France. There were 41 drug crimes per 100,000 persons, as compared to 122 per 100,000 in France (Eurostat Anuário, 1997). In addition to a gradual decline in the prices of hard drugs in the past two decades (Ribeiro, 1996), there have been more drug arrests and also a greater volume of apprehended narcotics.

Since the first anti-drug slogan, *Droga-Loucura-Morte* (i.e., Drugs-Madness-Death), appeared on billboards in the Portuguese city centers and along the major roads in 1973 during Caetano's government, still during the old regime, the Portuguese have become familiar with the dangers of drugs. Many have come in contact with them or someone who has, especially since the mid-1980s. The drug phenomenon figures right at the top of the list of public concern about crime in the Portuguese society. Three fourths of the Portuguese respondents to a 1995 *Público/*

Renascença/TVI/Universidade Católica mass survey claim they know at least one drug addict, and another three fourths of the Portuguese agree that drugs have become a serious social problem. At this time the police also considered drugs the most important cause of crime.

The Portuguese, known wine and coffee lovers, are highly tolerant when it comes to alcohol and caffeine but not when it comes to illegal drugs. The country already figures among the European countries with the worst alcohol problem; and where illegal drugs are concerned, the country has quickly felt the effects of their expansion and infiltration into their society. Except for the drug *bairros* that even the police avoid, drugs are still consumed in isolated places and nightclubs. With no age-drinking laws and no restrictions on the sale of cigarettes, many kids start smoking around the age of 12 and drinking even before that. Although the largest proportion of the population doing drugs is in their 20s, those youngsters who do get involved with illegal drugs do so by the age of 15, according to surveys conducted in the Portuguese schools.

Portugal, like Florida, has a long coastal border that makes it an attractive port of entry and transition of drugs from different parts of the world, especially Morocco, Angola, Thailand, Brazil, and other Latin American countries. Jorge Ribeiro (1996), an established authority on the evolution of the drug problem in Portugal, tells us, in his government-funded report on the evolution of the drug situation in Portugal from 1974 to 1994, that the drugs most often apprehended have increasingly taken the form of heroin and cocaine. He also describes the drug phenomenon as principally a male phenomenon (more than four fifths of users) and tells us that almost half of the drug users and traffickers are in their 20s.

In the late 1970s and early 1980s, hashish and marijuana were the most commonly used drugs; since the mid-1980s, cocaine and especially heroin are the drugs of choice (Ribeiro, 1996). It was not much later that ecstasy made its way into the nightclubs. According to the detox centers and the national pharmacy syringe exchange program begun in 1993, there was an estimated 25,000 to 100,000 drug users in the country in the mid-1990s out of a population of 10 million. Apparently, this is only the tip of the iceberg because many more do not have access to the detox centers or do not rely on the syringe exchange program to consume narcotic substances.

Is the aggressive drug policy paying off? Official government and health reports claim that there has been no success in containing the problem, much less reducing it, despite a greater investment in the attempt to control the supply and demand of narcotics. As in many other countries, Portuguese

legislators are questioning whether to continue allocating so many resources into aggressive drug policies.

On the heels of a government-ordered research project begun in 1991, the Center for the Sciences on Deviant Behavior in the Psychology School at the University of Porto put together a highly trained, multifaceted research group headed by a well-known academic and authority on the matter of drugs, Cândido Agra. This project lasted until 1996, the report of which describes the Portuguese history of the legislation of drug use. Agra (1996) summarizes it according to four periods: 1914 to 1970, 1970 to 1975, 1975 to 1982, and 1983 to the present. In the first period, drugs were viewed from a fiscal perspective. They were considered merchandise, so any illegal act relating to drugs was considered a fiscal transgression. In the early 1970s, however, drug consumption began to be handled in a criminal fashion. This period corresponded to a transition phase to a sole criminal paradigm. However, this paradigm did not last long. In the third period, 1975 to 1982, the approach to drugs became much more interdisciplinary. That is, the perspective on drugs was not strictly criminal but also psychosocial and medical. Finally, beginning in 1983, policy makers began to distinguish between drug consumers and traffickers. The former are seen as ill persons and the latter as delinquents. Thus, consumers saw their sentences suspended. It is interesting to compare these drug legislative periods to the three most relevant phases of the drug phenomenon in Portugal: the 1950s, 1970s, and 1980s. In the 1950s, drug consumption was not considered a social problem; it was seen more of a private pleasure for the elite stratum of society. In the 1970s, the less-favored people and teens began to participate in the drug scene, and only in the 1980s did drugs get out of control. The drug phenomenon exploded just as the penalization for consumption was lessened. Thereafter, all social classes became affected by drugs, and the Portuguese society joined many other societies worldwide as criminality and health problems dramatically increased (Agra, 1996).

Even though the escalation of the drug situation is in itself a concern, it is the connection between drugs and crime, especially property crime, that is the issue under analysis in this study. It is this connection that has forced Portuguese legislators to consider whether to continue investing in a vigorous drug policy or to respond to the critics of an aggressive approach to drug use and advocate alternatives, such as the decriminalization of some hard drugs. Is the drug policy in Portugal actually feeding the property crime rate as Sollars et al. (1994) found in Florida? The macrolevel evidence in Portugal provides sufficient grounds to doubt this. As was the case in Florida,

drug prices have been gradually falling (Ribeiro, 1996), so any increase in property crime was not the result of a price effect. However, contrary to what was occurring in Florida, it appears that the property crime rate and the drug crime rate have been moving in the same direction in Portugal (*GEPMJ* statistics, 1993-1996; Pedroso et al., 1996). In fact, property crimes and drug-related crimes have largely been moving in tandem since drug crimes first became defined as a problem in the mid-1980s. This may indicate that there is no trade-off of law enforcement efforts between property crime–control efforts and drug-control efforts, thus making Portugal an attractive site to test the relationship between drugs and property crimes. Perhaps vigorous drug enforcement policies can be efficacious. For all of these reasons, it should prove useful and important to examine the impact of a harsh drug policy on the property crime rate in a different setting with distinct macroconditions.

EMPIRICAL FRAMEWORK

Data

The data used to conduct this empirical investigation cover 274 municipalities in Portugal in 1996.[5] I compiled the data set from census reports and various Portuguese central government organizations. Table 1, in addition to providing a description of the variables, identifies the sources from which they have been obtained as well as the mean, standard deviation, and range for each variable.

In 1996, there were on average approximately 12 property crimes for every 1,000 persons in a given municipality and one fourth less of all other crimes in the same year. That is, on average, there were only about 9 non-property crimes for every 1,000 persons. In the same year, there were about 91 police officers in each municipality, which is about an average of 3 officers for every 1,000 persons. The average probability of arrest for property crime was 22%, which is 2% higher than the probability of arrest for property crime in the previous year.

As Table 1 also shows, there is considerable variation in the range of property crime, police officers, and the certainty of punishment in the municipalities. Police officers range from .5 to 9 officers per 1,000 persons. The difference in the property crime rate is even greater, varying from less than 1 crime per 1,000 persons in the municipality with the lowest crime rate

Table 1: Variables, Definitions, Sources, and Descriptive Statistics

Variable	*Variable Description*	*Source*	M	SD	*Minimum*	*Maximum*
Criminal						
officers96	Number of sworn police officers per 1,000 persons in 1996	Police authorities[a]	2.47	1.61	0.46	9.18
totofficers96	Number of sworn police officers in 1996	Police authorities	91.41	367.28	10.0	5,553
propoff95	Number of property offenses reported in 1995	GEPMJ	940.41	5,527.30	0	856.52
propoff96	Number of property offenses reported per 1,000 persons in 1996	GEPMJ	12.13	13.62	0.5	112.42
violoff 95	Number of violent offenses reported in 1995	GEPMJ	233.05	550.45	3.0	7,554
drugarr95	Number of drug arrests in 1995	GEPMJ	19.12	57.08	0	740
nonpropoff96	Number of nonproperty crimes per 1,000 persons in 1996	GEPMJ	8.81	4.91	0.10	35.06
%drugarr96	Number of drug arrests as a percentage of total arrests in 1996	GEPMJ	17.64	18.54	0	100
Deterrence						
probarr95	Probability of arrest for property crimes (arrests/offenses) in 1995	GEPMJ	0.06	0.12	0	1.62[b]
probarr96	Probability of arrest for property crimes (arrests/offenses) in 1996	GEPMJ	0.04	0.05	0.01	0.5
probconv95	Probability of conviction given arrest (convictions/offenses) in 1995	GEPMJ	0.056	0.096	0	1.18[b]
Socioeconomic						
pvalue	Property value per 1,000 persons in 1996 (in escudos)	DSCA[c]	8E+08	8.4E+08	8.1E+07	8.5E+09
wage	Average monthly salary in 1995 (in escudos)	MQE[d]	81,938.84	12,441.16	61,037	147,439
unemploy	Unemployment rate	Census 1991	6.47	3.36	1.7	24.4

(continued)

Table 1 Continued

Variable	*Variable Description*	*Source*	M	SD	*Minimum*	*Maximum*
Demographic						
%pop 15-34	Percentage of persons aged 15-34	Census 1991	28.28	3.53	18.587	43.88
pop	Number of persons in a given municipality	Census 1991	34,165.23	59,079.22	2,003	650,676
popden	Population density per square kilometer	Marktest Sales Index, 1994	279.53	852.48	7.0	7,496

a. The police authorities refer to the Judicial Police (PJ), Public Security Police (PSP), and the Republican National Guard (GNR). The GNR incorporates the Fiscal Brigade and the Transit Brigade.
b. There are a few cases in which arrests for property crimes were made in 1996 for property crimes committed in previous years, thus making it possible for arrests for property crimes in 1996 to exceed property offenses reported in 1996. The model was also estimated without these cases, and the results show that keeping them does not adversely affect the author's inferences. The same is true of the convictions made in 1996 for crimes committed in 1996 and in previous years.
c. Section of the Services of Autarchical Contributions of the Department of Taxes and Contributions.
d. Ministry of Labor.

to about 112 crimes per 1,000 in the municipality with the highest crime rate. There are municipalities with a null arrest rate and others with an arrest rate above 100%.[6]

The Model

The model employed in this study is based on the statistical version of the Sollars et al. (1994) model. Theirs is a three-equation, ordinary least squares (OLS) recursive model that estimates, first, the allocation of police resources; next, the probability of arrest for property crime, and third, the commission of property crime itself. The core logic of the overall model is that more police officers lead to a higher probability of arrest for property crime and that a higher probability of arrest for property crime decreases the property crime rate. However, the more effort spent on drug enforcement, the less effort spent on enforcing property crime laws and, thus, a smaller probability of arrest for property crime. The smaller the probability of arrest for property crime the smaller the reduction of the property crime rate.

In detail, the first equation is

Regression 1: The Police Allocation Equation[1]

$$\log(totofficers96) = \alpha_0 + \alpha_1\log(propoff95) + \alpha_2\log(violoff95) + \alpha_3\log(drugarr95) + \alpha_4\log(wage) + \alpha_5\log(pop) + e_1.$$

The dependent variable is police resources, *totofficers96*, which is used to proxy police resources.[7] The allocation of the number of police officers should respond to the need to protect, detect, and deter. It should also take into account the social surroundings in a given locale. Therefore, the demand for police should include two types of variables, crime related and socioeconomic. First, efforts directed at detecting and deterring criminal behavior suggest that the size of the police force should be influenced by the previous year's criminal offenses, especially violent and property crimes. These two crime categories are likely to be those that most often demand police attention. For this purpose, the number of violent offenses recorded in 1995, *violoff95*, and the number of property crimes recorded in 1995, *propoff95*, are used to explain police resource allocation in 1996. Because I expect police efforts to respond to the incidence of crime, these variables should exhibit a positive relationship. The number of drug arrests in the previous year, *drugarr95*, is also included. This measure is intended to reflect police response to the societal demand for drug law enforcement. The

greater this demand the more drug arrests we should expect to find and, consequently, the greater the allocation of officers there should be.[8]

As for socioeconomic controls, I include variables that control for the population and for factors that may pose positive and negative incentives for the criminal. To account for the police protection function, I include the population, *pop*. The Portuguese government, through the Ministry of Home Affairs (personal communication, 1997), has stated that the allocation of police officers is highly influenced by the size of the population, thus making it fitting to use the raw number of officers and include the population as an explanatory variable. However, solely controlling for the population would mean that the allocation of police resources is only based on the idea of equal protection.

The allocation of police officers, through the protection function, should also respond to potential risks in the community. The income, *wage*, can be an indicator of material gain for potential criminals, but it can also be seen as an opportunity cost of committing crime. It is, therefore, ambiguous as to what the expected sign should be. The greater the wage, the more police protection may be needed, but at the same time, the less necessary police protection may be. The logic behind the wage variable is that it is reasonable to argue that individuals with a higher income can acquire more valuable goods that are attractive potential targets for criminals. On the other hand, the positive incentive from individuals having higher legitimate sources of income may offset the need for more police.[9] Property value is used by Sollars et al. (1994) as a measure of attractiveness to the criminal eye as the wage variable may be. However, I do not use both variables in the Portuguese model of police demand due to the fact that the two variables are highly correlated with one another.

Regression 2: The Probability of Arrest for Property Crime Equation

$$\log(probarr96) = \beta_0 + \beta_1 \log(officers96) + \beta_2 \log(nonpropoff96) + \beta_3 \log(\%drugarr96) + \beta_4 \log(popden) + \beta_5 \log(1/propoff) + e_2.$$

In the second equation, the probability of arrest for property crime, *probarr96*,[10] is estimated as a function of police efforts, crime, and demographic factors. As for police efforts, I include police officers per 1,000 persons, *officers96*. Here, I hypothesize that the higher the rate of police officers the more likely it is that there will be a higher arrest rate. The number of nonproperty crimes per 1,000 persons, *nonpropoff96*, is also used to explain

the probability of arrest for property crime. Police time is divided among prevention, detection of crimes, response to calls, and administrative tasks. Spending more time on one task leaves less time for others. Even within tasks, such as the detection of crimes, the more time devoted to controlling one type of crime the less time is available for controlling other crimes. Therefore, if there is an increase in efforts to control crimes other than property crimes, we can expect a decline in the probability of arrest for property crime because it would be harder to detect and solve property crimes. This variable is important to testing the trade-off hypothesis. The more nonproperty crimes there are the fewer resources there should be available to control property crimes.

The same logic suggests the inclusion of drug arrests as a percentage of total arrests, *%drugarr96*. This variable is an indication of police control of drug crimes. In answering the question of a trade-off effect between law enforcement efforts to control drug crimes and property crimes, the coefficient of the *%drugarr96* variable is especially relevant. If we find a negative relationship between drug arrests and the probability of arrest for property crime, then we would have evidence of a trade-off. That is, an inverse relationship would indicate that the two subpopulations, property criminals and drug users, do not coincide as much as one might suppose, and allocating more police resources to an aggressive drug policy would, therefore, hamper the arrest rate for property crime.

Population density, *popden*, is included as a control to capture the demographic effect on the probability of arrest for property crimes.[11] I expect a negative sign for this variable's coefficient, given that a higher population density would mean that it would be harder to detect criminal involvement.[12]

Finally, I add (*1/propoff*) to Equation 2. There has been a century-long debate over the propriety of using ratio dependent variables and, if they are used, the precautions necessary to guard against spurious results (Firebaugh, 1988; Pearson, 1897; Przeworski & Cortes, 1977). In Equation 2, an important question is whether arrests for alleged drug violations involve a trade-off with arrests for property crimes. The trade-off is indicated by a negative coefficient on drug arrests. The use of (*1/propoff*) protects against a negative coefficient as a mere spurious artifact (Hanushek & Jackson, 1977). Total arrests form the denominator of the drug arrest variable, whereas a large number of the total arrests—those for property crimes—are in the numerator of the dependent variable. Therefore, the positions of these elements on each side of the equation could, by themselves, produce a negative coefficient on the *%drugarr96* variable.

Regression 3: The Property Crime Equation[13]

$$\log(propoff96) = g_0 + g_1\log(probarr95) + g_2\log(probconv95) + g_3\log(wage) + g_4\log(pvalue) + g_5\log(unemploy) + g_6\log(\%pop\ 15\text{-}34) + g_7\log(popden) + g_8\log(1/pop) + e_3.$$

In the third equation, the dependent variable is the 1996 property crime rate, *propoff96*. It should be a function of three general categories of explanatory forces: negative incentives, positive socioeconomic incentives, and demographic forces. The probability of arrest for property crime, *probarr95*, and the probability of conviction for property crime, *probconv95*, capture the negative incentives on the commission of crime. If deterrence theory holds in Portugal, these variables should have a negative influence on the crime rate. The *probarr95* is one of two variables in the third equation that is important for the trade-off inference. If the probability of arrest for property crime has a negative effect on the property crime rate in the third equation and the second equation reveals that drug arrests reduce property crime arrests, then drug arrests are contributing to an increased crime rate.

Because the property crime rate should also reflect the opportunity to commit property crime, a set of socioeconomic and demographic control variables is included in this equation. The property value per 1,000 residents, *pvalue*, is used to measure the potential gain from committing property crime. The unemployment rate, *unemploy*, is expected to have a positive influence on the property crime rate (Britt, 1994; Cantor & Land, 1985; Freeman, 1983, 1996). The wage variable, *wage*, as discussed above, may measure legitimate earnings that may represent the opportunity cost of committing property crimes and the attractiveness of a municipality to the criminal eye. The higher the legal income the less attractive crime becomes, or the higher wage the more attractive crime becomes. Therefore, the expected sign may go both ways. The percentage of the population ages 15 through 34, *%pop15-34*, is included to control for the fact that these persons are argued to be the most crime prone (Farrington, 1986; Hirschi & Gottfredson, 1983; Nagin, Farrington, & Moffitt, 1995; Wilson, 1972, 1975). Finally, population density, *popden*, is included to control for demographic effects. It should have a positive influence on the property crime rate, that is, more people make committing illegal activities more difficult.

There is reason to suspect that there may be some endogeneity in the probability of arrest for property crime in Equation 3. Because Sollars et al.

(1994) did not take this into account, it could be argued that they produce dubious estimates (Decker & Kohfeld, 1985; Ehrlich & Brower, 1987; Marvell & Moody, 1996). In addition, there is likely to be a spurious effect between these two variables, as Sollars et al. (1994) measure them, because the numerator of the dependent variable (property crimes) and the denominator of the probability of arrest for property crime are exactly the same. Hence, there is every reason to suspect spuriousness. I include a lag of the probability of arrest for property crime to take into account the possible simultaneity and, at the same time, control for the potential spuriousness.

Finally, I also add (1/*pop*) to Equation 3. As in Equation 2, this control variable guards against the possibility of a spuriously induced negative direction of the effects of the independent variables measured using some fraction of the population. These explanatory variables are the unemployment rate, the population density, and the percentage of the population ages 15 to 34.

DISCUSSION OF THE RESULTS

The results of the estimation of the trade-off model are OLS estimates and are shown in Table 2. Regression 1 is the analysis of police resources; Regression 2 is the analysis of the probability of arrest for property crimes; and Regression 3 is the analysis of the property crime rate.

The estimation of Regression 1 reveals that the demand for police officers is responsive to the demand for drug law enforcement and the level of property crime in the previous year, although this response is not very elastic. A 1% increase of property crimes in a given year will raise the number of police officers by about .23%. More drug arrests also increase the following year's police allocation by about .19% for every 1% increase in arrests. Our best estimates do not provide evidence of a violent crime effect. This may be because violent offenses are substantially less in number than property crimes, thus weighing less on the decision to allocate officers. Also, they are more easily solved than other crimes due to an increased chance of the existence of an eyewitness, making officers less important to the resolution and clearance of the crime. In addition, violent crimes are much less easily deterred because so many involve emotional matters imbedded in domestic and personal relationships. That is why some argue that this type of crime is often irrational.

The size of the Portuguese police force is especially responsive to the potential attractiveness for criminal activity, as seen through the level of

Table 2: **Results of the Estimation of the Property Crime and Drug Enforcement Model for Portugal, 1996**

Variable	*Police Resources* Y = *log totofficers96*		*Probability of Arrest for Property Crime* Y = *log probarr96*		*Property Crime Rate* Y = *log propoff96*	
Intercept	–9.192†	(2.960)	–2.736†	(0.311)	–12.558†	(2.803)
log officers96			0.255†	(0.084)		
log nonpropoff96			–0.123	(0.124)		
log propoff95	0.230†	(0.067)				
log violoff95	–0.089	(0.081)				
log drugarr95	0.194†	(0.034)				
log %drugarr96			–0.107† ‡	(0.064)		
log probarr95					–0.144†	(0.035)
log propconv95					–0.063†	(0.024)
log pvalue					0.644†	(.049)
log wage	.0.763†	(0.251)			0.102	(0.249)
log unemploy					–0.043	(0.062)
log %pop 15-34					–0.599	(0.307)
log pop	0.322†	(0.093)				
log popden			0.013	(0.056)	0.079†	(0.038)
log (1/propoff)			0.089† ‡	(0.052)		
log (1/pop)					–0.162†	(0.045)
N	274		274		274	
R^2	0.780		0.103		0.703	
Adjusted R^2	0.776		0.086		0.694	
S_e	0.486		0.711		0.440	

Note: The values in parentheses are the standard errors of the coefficients.
† Significant at the .05 level or lower for a one-tail test, also significant at these levels with robust standard errors.
‡Significant at the .05 to .08 level for a one-tail test with robust standard error.

income. More income raises the gains to be acquired through property crime, thus calling for more police protection—an increase of officers by about .76% for every 1% increase in income.

Regression 2 allows us to answer a major aspect of my research question regarding the existence of a trade-off between efforts to control for drug crimes and efforts to control for property crimes. The findings clearly support this aspect of the trade-off hypothesis: The greater the percentage of drug arrests as compared to the total number of arrests the lower the probability of officers making an arrest for property crime, about a .11% decline

in the probability of arrest. Also, consistent with our expectations is the finding that municipalities with more police resources have a higher probability of arrest for property crime. There is a .26% rise in the probability of arrest for property crime for a 1% increase in the size of the police force.

Regression 3 shows that the trade-off effect found in the estimation of Equation 2 does have deleterious effect on the property crime rate. Making more drug arrests hurts the probability of arrest for property crimes. Thus, one may infer that drug arrests are associated with a higher property crime rate. Why? This is because we do find evidence of a deterrent effect, however slight, of the probability of arrest for property crimes. For example, a 10% increase in drug arrests lowers the probability of arrest for property crime by about 1%. This, in turn, raises the following year's property crime rate by about .14%. The probability of conviction for property crime also exhibits a deterrent effect, reducing the property crime rate by .06% for every 1% increase in the probability of conviction for property crime.

Finally, the property value per 1,000 persons constitutes a strong positive incentive to commit property crime, as the elasticity of .64 shows. It seems to have the single most potent effect on the property crime rate, possibly allowing us to believe that in Portugal, the potential pay-offs have a stronger say in the decision to commit property crimes than does the risk of being caught.

CONCLUSION

This article addresses the property crime/drug crime relationship and seeks to estimate the effect of drug law enforcement on the property crime rate. Is a vigorous drug enforcement policy effective insofar as it also decreases property crime, or does an aggressive drug control policy produce trade-off effects between law enforcement efforts to control crime, thus producing deleterious, perverse effects on the property crime rate?

Sollars et al. (1994) estimate a recursive model incorporating drug law enforcement in the general model used in econometric studies of crime. Here, I perform an adapted replication of their analysis accounting for potential simultaneity using Portuguese data for 274 municipalities in 1996. Increasing public concerns over the crime rate, greater drug apprehensions despite substantial investment in drug control, and decreasing drug prices in Portugal create a context in which policy analysts should examine the results of a vigorous drug policy. Statistics indicate that the more drug use there has been in Portugal the higher the property crime rate, and when drug use declines, so too does property crime. Moreover, institutional differences

due to Portugal's centralized form of government imply that the local governments are not the locus of decisions for allocating police resources as they are in the United States. This means that law enforcement is not part of the municipalities' budget, as in the case of the State of Florida. Given this macrosetting, it is plausible and interesting to question whether a strict approach to drug control is producing the desired results in Portugal.

The findings show that the previous year's level of property crime and the demand for drug control, reflected in the amount of drug arrests, are important factors in allocating police resources. The results also provide support for the operation of deterrence theory in Portugal. Criminal behavior does seem to respond to negative incentives in the form of the probability of arrest and the probability of conviction for property crime. Criminals also take into account positive incentives in the form of property value.

The main inference to draw is that fighting property crime through the vigorous enforcement of drug laws is ineffective. In other words, the results from Portugal support the Sollars et al. (1994) trade-off hypothesis. They strongly suggest that an aggressive approach to drug control does not lower the property crime rate. Simply put, allocating more police resources to the enforcement of aggressive drug policy and away from other areas of law enforcement hurts the property crime rate. This is an extremely relevant result for understanding governments' crime control efforts and for Portuguese policy makers because a continued investment in the current drug policy may result in perverse policy effects on other crimes.

Overall, this study provides results that are obviously important not only for Portuguese policy makers but for a number of Western governments that continue to battle drugs through restrictive laws. Vigorously combating drug use is a strategy many governments employ not only to control this phenomenon but, arguably, to reduce crime, especially property crime. The problem is that the connection between the two crimes may not exist or may not be as strong as policy makers assume, and this may therefore create trade-off effects among crime categories. Sollars et al. (1994) have shown evidence that does not support a connection between drug enforcement and property crime reduction in Florida, where each local government is responsible for its level of law enforcement. In this study, I also fail to find evidence of this direct relationship in a setting where a centralized government, and not the municipalities, hold the authority in the matters of law enforcement. In both settings, regardless of who has the allocative power, investing too many resources in fighting the drug war would hurt law enforcement efforts to curb other crimes—in this case, property

crimes—creating a trade-off effect. With regard to policy making in general, these findings suggest that, as in the case of the allocation of police resources, trade-offs may exist in various other policy domains. Therefore, exclusively targeting specific policy problems may impose serious and unexpected effects on society.

NOTES

1. The bulk of the Portuguese municipalities' revenue comes from the *Fundo de Equilíbrio Financeiro* (*FEF*), which is based on the value added tax (VAT) and is distributed noncompetitively among the municipalities according to demographic and socioeconomic characteristics (Pereira, 1991). Therefore, these municipalities, having less fiscal capacity, also have greater fiscal stability than the local governments in the United States.

2. These differences pertain to the race variable, the spillover effects variable, and the government revenue variable. In regard to the first case, I drop the percentage of the population that is Black because this population in Portugal is not relevant in size. The spillover effects variable and the government revenue were omitted simply because these data were not available. Data on municipal revenue were available; however, this revenue is only part of a local government's revenue given that there are several deconcentrated central services in the municipalities for which I was not able to obtain data.

3. Until this time, criminal studies were very much influenced by the positive school of criminology. These were the biological, sociological, and psychological approaches to crime. Becker's (1968) contribution marked the revival of the neoclassical school of criminology and is largely centered on deterrence theory.

4. These are crimes rather than crimes as indicated by arrests or just arrests.

5. There are 275 municipalities in continental Portugal. However, 1 municipality, Paredes, was dropped due to questionable drug arrest data. In this municipality, the number of drug arrests exceeds the total number of arrests, which, of course, cannot be.

6. These large arrest rates may be due to arrests for crimes committed in previous years, thus making arrests exceed the number of property offenses in some cases. This may also be the result of multiple arrests for a single offense.

7. Sollars, Benson, and Rasmussen (1994) use sworn officer rates (per 100,000 population) rather than counts in this equation. I introduce some technical adjustments to the model. This involves using the raw number of officers, rather than rate of officers, in the first equation, with a variable controlling for population. This means that the other independent variables, when applicable, are also counts.

8. Aside from using the count of officers, this equation is as true to the original Sollars et al. (1994) police allocation equation as the Portuguese data would permit. The differences reside in their measures of potential material gains. These authors use income rather than wage and the property value. The income measure was not made available to us, and as for the property value, we dropped this variable due to the constant insignificant results generated by the high correlation between this variable and wage. Sollars et al. also included two other explanatory variables that were not available for Portugal: the total local government revenue per capita, and the number of nearby (within five-mile radius) police agencies.

9. The coefficient of correlation between these two variables is .512. It may be that both variables are serving the same purpose in the equation. Therefore, estimating the model with both variables causes one of the two variables to fall to insignificance.

10. Several of the smallest municipalities have zero arrests for property crime in the year of this analysis. These are municipalities that also have small numbers of property crimes. Rather than impose a zero probability of arrest on the potential criminal's reasoning in these municipalities, I find it more plausible to argue that criminal reasoning would consider the overall probability of arrest of the surrounding area rather than the specific probability of each of those particular municipalities based on a small number of property crimes. Therefore, for these cases, I use the probability of arrest of the district in which the municipality is located. In addition to the plausibility, there is the data benefit of preventing these cases from being excluded from the analysis when taking the log of the zero probability of arrest.

11. Besides the inclusion of the control variable, (*1/propoff*), there are two other factors that distinguish my equation from the original model. Sollars et al. (1994) use the population growth rate and the percentage of the population that is Black. This latter variable is not relevant for the Portuguese case because there is no such sizable minority group population in Portugal. Therefore, this equation was never estimated with the percentage of the Black population. As for the population growth rate, I decided to drop it in light of its constant insignificant coefficient, possibly due to its high correlation with the population density in capturing the demographic effects on the probability of arrest for property crime.

12. Some might argue that the expected sign could also be positive because more people per square kilometer could contribute to the detection of criminal activities through increased cooperation with the police.

13. Sollars et al. (1994) use the current probability of arrest for property crimes, whereas I lag this variable so as to avoid any simultaneity.

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