The Political Economy of the Environmental Criminal Justice System: A Panel Data Analysis

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Abstract

The criminal justice system combines at least three distinct institutions, police, prosecution service, and courts, in order to enforce key regulations. This proliferation of agencies for a single public task has sound constitutional reasons. At the same time, it raises questions about the scale of agency problems in criminal enforcement. Focussing on criminal environmental law contained in the German Penal Code, this paper studies the determinants of enforcement decisions at the levels of the police, prosecutors, and judges. It assess the role of political factors in enforcement decisions and compares their relative weight at different levels. The results of the panel data analysis show evidence for the presence of both opportunity cost considerations and political factors at all levels. In relative terms, the role of the political factors does not align with the degree of constitutional independence.

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1   Introduction

Every legislature interested in effective, coherent, and consistent policy implementation has to confront the agency problem of how to organize its regulatory activities. Key dimensions of the solution to the agency problem are the extent of delegation from the legislature to the regulatory institutions and the degree of independence of the institutions from the legislature (Horn 1995). One important area in which the agency problem is particularly palpable is in the case of the criminal justice system (Becker and Stigler 1974). The criminal justice system ensures compliance with key regulations and is therefore arguably as important for determining policy outcomes as the regulations themselves (Polinsky and Shavell 2006).

Agency problems in the criminal justice system have attracted attention since the system typically consists not of a single agency, but of several regulatory institutions arranged sequentially. At the base, there is a police force that monitors and investigates, followed by a prosecution service that decides on the basis of police reports and own investigations on the merits of an offence, and, finally, courts that decide on cases brought before their judges by prosecutors. The combined activities of all of these institutions together jointly determine the effectiveness of the enforcement regime.

Despite their joint objective and their procedural inter-connectedness, the institutions of the criminal justice system vary considerably in terms of their independence. Some, such as the police force, are - as part of the executive branch of government - relatively dependent. Others, such as courts, are deliberately set up to operate at arm's length from other branches of government. This institutional heterogeneity can be understood to mirror two countervailing arguments about the merits of independence within the criminal justice system: One the one hand, there are the well rehearsed arguments of constitu-

tional checks-and-balances and of interest group theory for granting some of the decision-makers in the system a relatively high degree of independence (Landes and Posner 1975). On the other, the independence of decision-makers in the criminal justice system from the legislature should be limited in order to resolve the agency problem that has decision-makers deviate systematically from the intentions of the legislature (Becker and Stigler 1974). This would suggest employing various incentive mechanisms in the form of budgets or personal rewards in order to align the interests of police officers, prosecutors, and judges with that of the public.

Conceptually, therefore, the trade-off between the arguments of checks-and-balances and agency problems seems clear. Empirically, however, there is a lack of evidence on whether and how this trade-off works in practice. Given the institutional structure, observed enforcement outcomes should reflect the different degrees of independence and therefore different incentives that agents face at different stages of the sequential enforcement process, taking into account the different resource constraints at each level. The empirical question is whether this conjecture is borne out by reality. This leads to three sub-questions. The first is what determines enforcement decisions by the police force, prosecutors, and judges within the criminal justice system. The second is whether and if yes, to what degree, decision-makers are responsive to the preferences of voters and politicians. The third is how the influence differs between agents at different stages. Is the conjecture correct that those institutions of enforcement that enjoy greater independence by design are indeed less responsive to the political factors that drive the legislature and executive?

The core of the present paper consists of an empirical approach to answering these questions in a particular context. This context is the enforcement of environmental criminal law. This highly specific area of criminal law lends itself for

an empirical investigation of this type for two reasons. One is that it is an area of criminal law that - because of the complexity of its nature - requires non-trivial amounts of resources to be spent at every level in order to push cases through the enforcement process (Hoch and Lutter 1996, Cohen 1999). This offers an opportunity to recover from empirical data the economic determinants of enforcement decisions at the level of the police force, prosecution service, and courts because pursuing environmental crimes imposes non-negligible opportunity costs. The other reason is that the public and politicians have preferences regarding the public good to be protected that are easily observable. Resource and political economy factors should therefore be empirically salient.

How does this paper add to the literature? The political economy of regulatory enforcement has attracted a good deal of scholarly attention, resulting in an impressive body of empirical evidence on what determines regulatory action. The typical case considered in the literature studies the behavior of one particular regulator enforcing one regulation. Examples are studies on the enforcement by a regulatory agency such as the Food and Drugs Administration (FDA, Shipan 2004), the Internal Revenue Service (IRS, Mete 2002) and the Environmental Protection Agency (EPA, Nadeau 1997; Deily and Gray 1991) as well as monitoring under the Occupational Safety and Health Act (OSHA, Headrick et al. 2002). Other studies examine the behavior of prosecutors (Ramseyer et al. 2008; Boylan 2005) or of judges (Salzberger and Fenn 1999, Ashenfelter et al. 1995). Across the studies, there is evidence that the political economy factors are allocatively relevant. Our enforcement context also focuses on a single regulation, i.e. the German Penal Code, but differs in that it studies the behavior not of a single regulator but several different institutions at once. This multitude of institutions offers the opportunity of comparing the determinants of enforcement decisions of different institutions along a single enforcement chain

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with each other and against widely held assumptions about how this system works. Methodologically, we add to the literature by demonstrating the usefulness of approaches to dynamic production function estimation (Blundell and Bond 2000) and to cross country studies (Kiviet 1995, Bruno 2005) to bear on the problem of the political economy of regulatory enforcement.

Our key results are threefold. The first is that economic factors matter at all stages of the enforcement process. This implies that - very much in line with the economic theory of enforcement - institutions deliberately direct resources away from the enforcement of environmental law as its opportunity cost increases. This responsiveness with respect to costs is evident at all levels, including criminal courts, which enjoy the greatest degree of independence. It also lends credibility to using a production function approach as a methodological starting point. The second result is that political economy factors influence enforcement decisions at a statistically significant level at all stages of the process. This demonstrates that even in the ostensibly most independent parts of the criminal justice system, there is evidence of political reach-through. The third result is that the relative weight of political economy factors is not fully in line with the declared degree of independence: Prosecutors' and judges' decisions seem to be as responsive to political economy variables as the police force.

The paper proceeds as follows: In the following section, we summarize the main features of environmental crime and its prosecution in Germany, emphasizing the three institutions of police, prosecution service, and courts involved in criminal enforcement. We then develop a set of testable hypotheses on the determinants of enforcement decisions at each of the institutions in section 3. Section 4 explains the data sources, followed by a presentation of the empirical strategy and key results. Section 6 discusses the results and concludes.

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2 Environmental crime and its prosecution in Germany

The German Penal Code (*Strafgesetzbuch*) was extended in 1980 to include environmental offences. The intention behind this move was (i) to raise the level of general deterrence on account of harsher sanctions being available through the criminal justice system, (ii) to harness the additional police, prosecutorial, and judicial resources available in the criminal justice system, and (iii) to improve general awareness of the need for greater environmental protection (Hoch 1994, Schall 2006). Stiffer sanctions were introduced into the German Penal Code in 1994, following the inclusion of environmental protection in the German Constitution as a distinct constitutional objective.

Harnessing the enforcement capabilities of the Penal Code implies the involvement of three distinct institutions in the handling of cases that enter into the criminal enforcement system: These are - in sequence - the police force, the public prosecution service, and the courts. The police forces in the German states, situated at the start of the enforcement sequence, are directly controlled by the executive, being part of the Ministry of the Interior. Operating budgets and personnel resources are therefore determined largely externally. The police force main activity is to respond to the report of an environmental criminal act by dedicating resources to identifying the probable offender(s). The share of environmental crimes in Germany for which the identity of the probable offender(s) is established, also referred to as the 'clearance rate' of reported environmental crime, is an average of 60 percent. The contribution of the police force within the enforcement system is therefore primarily the production of so-called 'cleared' cases through identifying probable offenders that are fed into the following prosecutorial stage of enforcement. However, the police force

also has to dedicate resources to assist the prosecution service in those cases in which the prosecution service decides to bring a case to trial, raising the cost of investigating new crimes.

At the subsequent stage, the enforcement system involves the public prosecution service. There, prosecutors examine cases with identified suspects and decide on whether to accuse a suspect or not. The prosecution services in the German Lander are part of the respective Ministries of Justice. Prosecutors are appointed, not elected. In common with judges, prosecutors enjoy considerable discretionary power, but are dependent to a significantly greater extent on an executive unit (the Ministry) that determines budget and resources. A decision in favor of bringing a case to trial implies that resources need to be dedicated to preparing a case at a level of detail for guilt or innocence to be ascertained at the standard required for a criminal conviction. Rational prosecutors will incur the opportunity cost of these resources only if the resultant expected benefits dominate those of other prosecutions foregone. Owing to the technical nature of the subject matter, environmental cases are on average of a relatively high complexity and thus resource-intensive. On average, 25 percent of identified offenders are passed on by prosecutors to be tried in court, with the remainder of cases either dismissed for lack of evidence or insufficient severity of the offence or the offender punished using lighter administrative fines that establish no criminal record.

Courts are the third and final distinct institution involved in the criminal enforcement system. The courts consist of judges that enjoy - within the law - full discretionary power on how to sanction. Judges hear cases brought to trial by public prosecutors and decide on whether to convict a defendant, and if yes, what tariff to set as a sanction. Out of those ending up in court, over three quarters (76%) are sentenced, of which 6.4 percent sentenced to a severe

fine and 3.5 percent sentenced to a prison sentence. The rest faces a standard pecuniary tariff.

At each one of the three stages of the enforcement process, institutions involved face opportunity costs in terms of resources and trade-offs in terms of priorities when deciding to what extent to enforce environmental crimes. The subsequent focus in this paper is on the determinants of these enforcement decisions, among them political economy factors that capture policy-specific interests among the population and the ideological orientation of the executive. Given the specific nature of environmental criminal law, observed environmental preferences of the population will be considered as candidate explanatory variables. Likewise, political parties in Germany have a clear profile as to the priority they place on environmental matters (Budge et al. 2007). The identity of governing parties will therefore be used to capture these ideological factors within the executive.

The empirical strategy in this paper is to exploit the devolved nature of enforcement under the German Penal Code. While federal law, its implementation, i.e. detection, prosecution, and sanctioning by courts, is delegated comprehensively to the level of the 16 States (Länder) within the Federal Republic. Unlike in the U.S., there is no federal shadow system of federal prosecutors or EPA officers that monitor, assist, remedy, and possibly preempt state-level enforcement. This comprehensive delegation from the federal to the state level generates - against a uniform legal background - the natural variation in enforcement choices at the level of police forces, prosecution services, and courts that this paper exploits.

3 Hypotheses on the determinants of enforcement decisions

In this section we develop the arguments that give rise to four testable hypotheses regarding the extent to which political economy factors help explain enforcement decisions of different institutions involved in the compliance assurance process.

3.1 Police

As the first of three institutions involved in enforcing the German Penal Code against environmental offenders, decisions of police force determine the influx of cases into the system by passing 'cleared 'cases, that is cases for which suspects are identified, on to the prosecution office. The 'production' of cleared cases is determined by the number of cases on the one hand and the effort dedicated to linking individuals to an illegality on the other. We proceed in two steps, first focusing on the economic determinants of the production of cleared cases by the police, then discussing the role of political economy factors.

From an economic point of view, the production of cleared cases depends on inputs and opportunity costs of effort dedicated to environmental crimes. Growth in cleared cases of environmental crime will depend positively on the growth in cases to be investigated. This scale effect leads us to predict a positive coefficient. Higher opportunity costs of investigation, on the other hand, shift resource away from investigating environmental crime (Helland 1998). Such opportunity costs are an increased number of overall cases to be investigated and - finally - a higher number of cases of environmental crime proceeding to trial and therefore requiring additional police resources dedicated to preparing evidence to a higher standard of proof. The opposite effect, driven by decreases in

opportunity cost, is known to be generated by changes in enforcement priorities towards environmental crime as a result of a growing environmental crime rate. Benson et al. (1995) and Cloninger and Sartorius (1979) identify increases in crime levels as a key driver of inputs available for crime detection and reporting, leading us to predict a positive coefficient. In addition to the scale and opportunity cost effects, the final economic consideration in the production of cleared cases is the question of economies of scope in efforts dedicated to clearing up environmental crime. Two countervailing effects exist: A higher production of cleared cases in other areas will take resources away from environmental crime, leading to a negative scope effect. On the other hand, offenders booked for environmental crime will - at the same time - have typically committed other punishable offences (Hoch 1994). The possibility of both negative and positive spillovers is therefore present, with the net effect an empirical matter.

Turning to political economy considerations, political factors also impacts on the opportunity costs of effort. Pro-environmental parties in the administration would be predicted to give higher priority to enforcement resources being shifted towards environmental offences while pro-industry parties would be predicted to have a lower priority. Likewise, the executive administration may want to respond to a higher 'green' sentiment among the population by directing the police force to prioritize environmental offences relative to other areas of crime. Stronger 'green' preferences in the population would therefore be predicted to be associated with a higher volume of cleared cases produced by the police.

The predictions on how the volume of cleared cases responds to exogenous variables are summarized in the following hypothesis.

Conjecture 1 *For reasons of economic constraints, the output of cleared cases of environmental crime by police will (a) increase in the amount of cases to be investigated, (b) increase in the growth rate of environmental crime, and (c)*

decrease in the number of environmental crime cases tried and in the number of general crime case to be investigated. The effects of (d) the total volume of cleared cases is ambiguous. For reasons of political economy, the effect of (e) variables capturing 'green' preferences and the effect of a pro-envionmental party in government is predicted to be positive, that of (f) a pro-industry party in government to be negative.

3.2 Prosecutors

There is a small, but rich literature on prosecutor behavior, starting with Forst and Brosi (1977). Most of these studies focus on the case-specific determinants of prosecutorial activity and productivity within the model of a self-interested prosecutor (e.g. Myers and Hagan 1979, Albonetti 1986, Boylan 2005). The empirical results bear out the concept of the prosecutor as a rational decision-maker, balancing expected benefits in the form of successful convictions against opportunity costs of time and resources.

In terms of economic determinants, prosecutors are predicted to respond to more prosecution opportunities in environmental crimes (that is cleared cases forwarded by the police) with raising the volume of associated suspects accused on account of higher expected benefits and to an increase in the number of overall identified suspects in the Penal Code by bringing fewer environmental offenders to trial on account of higher opportunity cost of prosecuting environmental offences. Since prosecutors cannot be expected to care about deterrence to the same extent as politicians (Miceli 1996), an increase in the growth rate of environmental crime would be predicted to have a smaller effect on the decision on whether to bring case to trial at the margin.

Political economy considerations have only recently been studied in the context of prosecutor behavior. An approach close to ours in spirit is by Ramseyer

et al. (2008). There, two models of prosecutor behavior are developed, a functionalist variety in which the prosecutor is an extended hand of the social planner and a political variety in which the prosecutor's payoff is modeled as dependent on achieving a mix of objectives, in part set by the public and in part set by the prosecutor themselves. The functionalist version is rejected by the empirical evidence while the evidence support the political model. The empirical analysis by Ramseyer et al. (2008) builds on the specifics of the US context that do not carry over easily to the German setting on account of important institutional differences. However, like Ramseyer et al., we include political economy factors as explanatory variables in the empirical model, predicting that the dependence of prosecutors on the Ministry in terms of resources will make their prosecution decisions responsive to political circumstances such as the identity of the political party in power and the strength of 'green' preferences among the population.

Together, these factors give rise to the following predictions on how the number of cases brought to trial will respond to different variables.

Conjecture 2 *The number of offenders of environmental crime brought to trial by public prosecutors will (a) increase in the amount of identified suspects, (b) weakly increase in a growth in environmental crime, and (c) decrease in the number of general suspects to be investigated on account of an opportunity cost effect. The effects of (d) a higher number of overall tried suspects is ambiguous. The effect of (e) political economy variables capturing 'green' preferences and the effect of a pro-envionmental party in government is predicted to be positive, that of (f) a pro-industry party in government to be negative.*

3.3 Courts

The output of courts in context of environmental enforcement is the production of convicts out of an input of defendants, with the balance constituting the released. There is a strong expectation that the decisions of courts should - in the words of Landes and Posner (1975) - be independent of "the sorts of political factors [...] that would influence and in most cases control the decision were it to be made by a legislative body". Empirical tests of the resulting prediction of judicial independence demonstrate that the empirical record does not unequivocally support the prediction of judicial independence. While some studies find that variables capturing the political environment of current court cases and the judge's own political background do not explain court decisions (Ashenfelter et al. 1995), the balance of the literature tends to emphasize the importance of political economy variables in explaining court behavior (Cohen 1989, Anderson et al. 1989, Salzberger and Fenn 1999). In other words, the interests of voting public and politicians as well as the ideological convictions of the judges themselves are - more often than not - found to influence judicial decisions at the margin.

The economic factors that are candidates for explaining the behavior of courts in our sample center - again - on inputs and opportunity costs. We predict - on account of a scale effect - that a greater volume of suspects being brought to trial by prosecutors will lead to an increase in the volume of convicts. However, an increase in overall trials will raise the cost of time and effort to argue environmental cases to the required standard of proof. As a result, we predict a negative relationship between the aggregate volume of trials and convictions for environmental crimes. The impact of a growing rate of environmental crime on convictions should be weak, as argued before in the case of prosecutors (Miceli 1996), and if not zero, then positive. As at the level of prosecution, the presence

of economies of scope between convictions for environmental and other crimes is an empirical question with little prior evidence as guidance.

In the light of the preceding empirical literature on courts, we predict factors of political economy to have the same effect as at the previous two levels: A 'greener' population should - at the margin - lead to more convictions. So should the presence of a green party in government. The presence of a pro-industry party in government, on the other hand, should lead to a decrease in the conviction rate.

Hypothesis 3 summarizes these prediction regarding the decision of judges thus:

Conjecture 3 *The number of offenders of environmental crimes ending in a conviction by a judge will (a) increase in the amount of tried suspects (b) be unaffected by a growth in environmental crime, and (c) decrease in the number of general crime suspects to be tried on account of an opportunity cost effect. The effects of (d) a higher number of convictions for other crimes is ambiguous. The effect of (e) political economy variables capturing 'green' preferences and the effect of a pro-envionmental party in government is predicted to be positive, that of (f) a pro-industry party in government to be negative.*

3.4   Synopsis of economic and political variable predictions

Before turning to our last testable hypothesis, table 1 summarizes the predictions on the determinants of enforcement decisions. The left-hand column lists explanatory variables for the enforcement outputs of the police force (cleared cases), prosecutors (tried offenders) and courts (convicted offenders). Different symbols summarize the predicted effects of a change in the explanatory variable on the enforcement output, with a plus sign signaling a predicted positive relationship and a minus sign a predicted negative relationship. The sign '∅'

implies a prediction of no influence of the variable and a question mark denoting an ambiguous influence.

For police success in clearing environmental crimes, we predict a positive relationship vis-a-vis reported cases. In addition, theoretical considerations suggest police to be negatively affected by the amount of tried environmental offenders and the amount of aggregate crime cases through a opportunity cost argument. The influence of an increase in the amount of aggregate cleared cases is unclear ex ante.

The decision of prosecutors whether to bring an environmental suspect to court is predicted to positively depend on the number of identified suspects. In contrast, an increase in the amount of aggregate suspects is expected to raise opportunity costs and thus reduce the number of environmental offenders brought to court. There is again no clear-cut prediction for the scope effect of the number of aggregate tried suspects.

For the last stage of enforcement, theory suggests that an increase in the number of tried environmental offenders will increase, and an increase in the number of overall offenders brought to court will decrease the number of convicted environmental offenders. The effect on overall convictions is ambiguous.

With respect to political factors the literature leads us to predict that the effect of a pro-industry party in state government is negative throughout. In contrast, green preferences and the German greens in state government will have a negative effect on all stages of enforcement.

Taken together, theory and previous empirical evidence provide a basis for predicting the coefficient sign of most of the variables. One exception are economic variables whose effect depends on the presence or absence of economies of scope at each level: Dedicating effort to cases in other areas of crime competes with resources for environmental crime. On the other hand, environmental

Table 1: Summary of Predictions

	Police force	Prosecution	Courts
Explanatory variables	Cleared cases	Tried offenders	Convicted offenders
No. of EC cases	+		
EC suspects		+	
EC offenders tried	-		+
Change in EC rate	+	$\varnothing$	$\varnothing$
Aggr. crime vol.	-		
Aggr. cleared cases	?		
Aggr. suspects		-	
Aggr. offenders tried		?	-
Aggr. offenders convicted			?
Pro-industry party in gvmt.	-	-	-
Greens in gvmt.	+	+	+
Green preferences	+	+	+

crime is frequently connected with other offences such that economies of scope are a plausible outcome at every stage of the enforcement chain.

The final testable hypothesis concerns the relative strengths of coefficients for variables capturing political economy factors. Different institutions ostensibly enjoy different degrees of independence from the legislature, from the police force with the lowest degree to the courts with the highest degree of autonomy in decision-making. We would therefore expect that the relative responsiveness of these three institutions vis-à-vis the identity of the governing party and the preferences of voters should reflect this. The police force would therefore be predicted to be most responsive, courts the least, and prosecutors somewhere in between. This idea is captured in hypothesis 4.

Conjecture 4 *The absolute value of coefficients for political economy variables capturing 'green' preferences and the identity of the party in government should be highest at the level of the police, lowest at the level of courts, and between police and courts at the level of the prosecution service.*

With our set of three testable hypotheses complete, we now turn to the data used in the econometric specifications.

4   Data

Data on crime in Germany is collected at the level of 16 individual states to which enforcement is devolved and at various stages in the state-level enforcement process. Since one state has not released the relevant data, our sample comprises 15 of the 16 states and the years 1995 (1994 in case of reported cases) to 2005 with a small subset of states having incomplete reporting,[1] leading to an unbalanced panel. Data on reported and cleared cases of environmental and aggregate crime are taken from the official police crime statistics (PKS) published by the German Federal Criminal Police Office (BKA). Further necessary data of the sanctioning regime applied to crime, such as the number of trials, convictions and imprisonment, is available from the official prosecution statistics (StVSt) of the Research Data Centre (FDZ) provided by the Federal Statistical Office and its state level counterparts. Data concerning juvenile offenders is included in cleared cases but excluded from the remaining analysis due to the distinct sanctioning regime applicable to this subgroup. However, on average 93 percent of all identified suspects for environmental crimes are adults. Data on structural variables that characterize individual states, such as population, size, political, and several socioeconomic variables, are taken from publications of the Federal Statistical Office.

Voting shares and information on the support for the German Green Party at the state level are available from the Central Archive for Empirical Social Research (ZA). Specifically, voting shares track the share of people surveyed

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[1] No data is available for the state of Saxony-Anhalt. Saarland's date cover 1996-2005, Brandenburg 1995-2005 with the exception of 2002, Hamburg's data 1997-2005. Thuringia's data cover 1998-2005 and Mecklenburg-Vorpommern 2001-2005.

who would vote for the German green party if there had been elections at the time of the interview. The supporters of the German Green Party indicate the share of respondents that identify themselves as strong supporters for the German Greens (1 on a scale of 1-5).

As an indicator of having a pro-industry government in power, we use the presence of the conservative party (CDU/CSU) as a proxy. The CDU (CSU in Bavaria) is the German party that is consistently most closely aligned with business and industry interests and least aligned with environmental policy preferences among the parties in German state parliaments (Budge et al. 2007). We also included a dummy for the presence of the German greens in state governments to validate their impact on prosecution.

Another important factor determining the success of institutions in enforcing environmental criminal law is the endowment of police, prosecution, and courts with manpower and equipment. We therefore included information for budgets and number of employees in our analysis. However, we will explain in preceding sections why we did not include information for this in our core estimations.

Tables 2 and 3 provide variable definitions and summary statistics for all variables included in the core econometric estimation.

5 Econometrics

In this section we analyze the 3 successive stages of the enforcement process in Germany empirically. Thereby we assume that the enforcement production of police, prosecution and courts depend on economic and political economy factors. As there are different institutions responsible for different stages of the enforcement process we split our analysis according to these responsibilities. Going with the natural way first of all a crime has to be detected and recorded

Table 2: Variable Definitions

Variable	Definition
cleared env. crimes (cleared)	number of cases for which suspects are identified
tried suspects (tried)	number of identified suspects that are accused
convicted offenders (convicted)	number of accused suspects that are convicted
environmental crime (cases)	reported cases of environmental crime
identified suspects (suspects)	number of identified environmental offenders
Environmental Crime Rate (CR)	Number of reported cases divided by population
aggr. crime cases (agg.cases)	total amount of reported crimes
aggr. cleared cases (agg.cleared)	number of cases cleared overall
aggr. identified suspects (agg.suspects)	number of identified overall offenders
aggr. tried offender (agg.tried)	total number of accused offender
aggr. convicted offender (agg.conv)	total number of convicted offender
dummy conservatives (cons)	indicating whether cdu/CSU is in state government
dummy greens (greens)	indicating whether green party is in state government
green voters (green.pref1)	share of people intending to vote for greens
green supporters (green.pref2)	share of people with strong support for greens

Table 3: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
cleared	176	1.192.114	9.377.375	24	4258
tried	152	3.265.461	3.031.189	6	1497
convicted	152	2.493.487	2.366.307	4	1156
cases	176	1.986.028	1.452.868	58	5848
suspects	274	1261.825	939.9252	31	4211
CR	176	5.196.115	3.715.087	8.733.851	1.796.139
agg.cases	176	405652.2	317165	60651	1531647
agg.cleared	176	210833.5	163082.7	30861	741607
agg.suspects	274	137536.8	104779.7	21368	485859
agg.tried	154	76661.32	65145.82	10784	254178
agg.conv	155	62018.07	52157.22	8006	195050
cons	176	.5568182	.4981785	0	1
greens	176	.1818182	.386795	0	1
green.pref1	176	.0986038	.0520535	0	.3037975
green.pref2	176	.0440468	.026972	0	.1736111

to police. Police then has to identify suspects. This is the first step of the enforcement process and the only stage police is involved directly.[2] After the police having identified a probable offender prosecution decides whether there is enough evidence to accuse the suspect and thus bring the incidence to court. When brought to court the judge has to decide whether a potential offender is guilty and thus will be convicted to a fine or even sent to prison. One important issue is whether these different punishment rates are persistent - leading to a dynamic production function (Blundell & Bond 2000) - or not. As we will show in the next few paragraphs there is evidence for persistency for most punishment rates but not for all. Another important task is to deal with the small sample size in an appropriate manner. As the number of observations is limited and the amount of potential explanatory factors is rather large we followed two different strategies. We first estimated a core equation and added in a second step subsequently further variables figuring out whether they have an influence or whether they change results. The second approach was to include all potential explanatory variables and then subsequently skip those which do not seem to influence the dependent variable. In this context we also included variables indicating the number of employees and the expenditures for police, prosecution and courts as obvious input to the enforcement process. However, none of these variables turned out to be significant (see table 7 provided in the appendix). This is not very surprising considering the fact that overall employment or overall budget probably does not reveal the resources dedicated to the prosecution of environmental offenses. We therefore think that the opportunity costs faced by everyone enforcing environmental offenses may be a far better indicator of the available resources.

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[2]However, the quality of evidence the police secures will be important for all following stages.

5.1 Police

The basis for all later enforcement activities for the major fraction of all reported environmental crimes in Germany[3] is the initial work of police.

The equation we are going to estimate for the production of cleared cases is the following:

$$\log cleared_{it} \quad = \quad \alpha + \beta_1 \log cleared_{it-1} + \beta_2 \log cases_{it-1} + \beta_3 \Delta CR_{it} + \quad (1)$$

$$+\beta_4 \log tried_{it} + \beta_5 \log agg.cases_{it} + \beta_6 \log agg.cleared_{it} +$$

$$\beta_7 cons_{it} + \beta_8 greens_{it} + \beta_9 green.pref_{it}$$

$$+f_i + t_t + \epsilon_{it}$$

where α, β_{1-9} are the parameters to be estimated, f_i and t_t are state and time dummies. Furthermore, i and t being the subscripts for states and time periods, respectively, and ϵ is the error term.

Table 4 displays the results. As suggested by Blundell & Bond (2000) for dynamic production function estimation we used system GMM (BB) rather than Arellano & Bond (1991) difference GMM to estimate dynamic production functions.[4] However, simulations show (Bond 2002) that GMM is vulnerable in case of very small samples and may perform badly in case of persistency for the dependent variable. There is evidence (Bruno 2005a/b) that bias correction as proposed by Bruno (2005a/b)[5] or similarly by Kiviet (1995), Bun and Kiviet (2003) and Bun and Carree (2005) outperforms GMM in terms of biases espe-

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[3] In 2004, 76% of all cases handled by prosecution were forwarded by police, 20% were initiated by the prosecution itself and 3.2% were reported by environmental agencies.

[4] All GMM estimations have been carried out with the user written xtabond2 command in Stata, see Roodman (2006). To keep the number of instruments for the lagged dependent variable tractable we only used lags 1 to 4.

[5] All bias-corrected estimations have been carried out with the user written xtlsdvc command in Stata, see Bruno (2006). Another feature of xtlsdvc is that it has been tailored for unbalanced panels.

cially in case of persistency of the dependent variable and small sample size. In addition, the Sargan statistic of overidentifying restrictions points against the validity of the instruments. We would therefore in principle prefer the BC estimates. Unfortunately, bias correction is only valid for strictly exogenous variables. One has therefore to make sure that there exist no further endogeneity problem besides the Nickell (1981) bias. The only suspected variables for potential endogeneity or simultaneity issues are the growth in environmental crime and number of tried offenders. As the amount of identified offenders are the key input to the amount of tried offender there is obviously an effect in this direction as well. However, we applied different strategies[6] to control for this and results remained fairly constant. On the other hand a rising amount of cleared cases increases expected punishment and my therefore reduce that growth in environmental crime. Again, we applied various tests[7] and did not find evidence for the growth of the environmental crime rate to distort results.

Besides this the Arellano and Bond test for first and second order autocorrelation works as suggested. There is evidence for first order autocorrelation (ar1) and no evidence for second order autocorrelation (ar2). To capture the environmental preferences of state populations we included the share of green voters (green.pref1) or the share of strong supporters for the German green party (green.pref2).

Comparing the different specifications does not reveal significantly differences for most of our variables. There is huge evidence that the number of cleared cases (cleared) occupy some time dependency as the lagged variable is highly significant in all specifications with values between .57 and .75. Our

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[6] A difference-in-Sargan test was not able to reject the Null of exogeneity (p-value: 0.647). Furthermore, we treated the number of tried as being endogenous in BB and results remained unchanged. Another strategy was to use the lag or to skip the variable from the estimation equation. However, none of the applied methods revealed further problems.

[7] The difference-in-Sargan test was again not able to reject the Null of exogeneity (p-value: 0.310). Furthermore, we treated the number of tried as being endogenous in BB and results remained unchanged. However, none of the applied methods revealed further problems.

Table 4: Estimation Results: Police Production of Cleared Cases

Exp. variables	BB 1	BC 2	BB 3	BC 4	BB 5	BC 6
cleared, lag	.7545	.5868	.7466	.5739	.7110	.5766
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
cases	.1740	.3754	.1718	.3873	.2034	.3902
	(0.2132	(0.0021	(0.1872	(0.0013	(0.1438	(0.0012
CR growth	.8551	.6388	.8605	.6247	.8256	.6250
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
agg.cases	-.3727	-.5312	-.3208	-.5403	-.3809	-.5324
	(0.0321	(0.1331	(0.0517	(0.1248	(0.0294	(0.1330
agg.cleared	.3735	.4777	.3265	.4903	.3840	.4822
	(0.0318	(0.0550	(0.0471	(0.0477	(0.0268	(0.0517
tried	.0378	.0458	.0439	.0503	.0498	.0453
	(0.3263)	(0.2095)	(0.2579)	(0.1620)	(0.2634)	(0.2118)
cons	-.0447	-.1399	-.0438	-.1349	-.0438	-.1371
	(0.3028)	(0.0002)	(0.3202)	(0.0004)	(0.3339)	(0.0003)
greens	.0315	-.0541	.0322	-.0494	.0302	-.0499
	(0.3110)	(0.2678)	(0.2890)	(0.3072)	(0.3213)	(0.3002)
green.pref1			-.2649	.1792		
			(0.3072)	(0.5862)		
green.pref2					-.2136	.1991
					(0.6784)	(0.7815)
N	152	152	152	152	152	152
instruments	69		70		70	
F	1808.8973		2480.3867		4046.8116	
Sargan	70.1179		69.6997		73.9341	
	(.0316)		(.0341)		(.0155)	
ar1	-2.5958		-2.6591		-2.6566	
	(.0094)		(.0078)		(.0078)	
ar2	.7591		.5501		.6391	
	(.4477)		(.5822)		(.5227)	

Note: time dummies and a constant have been included but omitted here. P-values in parenthesis. All GMM specifications have been estimated with robust standard errors and BC standard errors via bootstrapping with 50 repetitions.

input variable for the production process of cleared cases, the number of environmetal crimes (cases), has a positive and with elasticities of around .4 for BC significant influence on the production of cleared cases by police. Overall crime cases (agg.cases) indicate the opportunity costs and overall cases cleared (agg.cleared) point towards a general scope effect. In our case, parameter estimates for aggregate cases and aggregate cleared cases show up to be highly significant for BB and slighlty fail significance at the 10% level for BC. Aggregate cases show with estimates of around -.3 for BB a negative and significant relationship to cleared environmental crimes. There is thus strong support for the opportunity cost hypothesis. The estimates for the aggregate cleared cases, however, are positive and give with a value of .53 support for our scope effect hypothesis.

The estimates for the growth rate for environmental crime (ΔCR) are highly significant and positive and reveal elasticities ranging from .62 to .86. We therefore find clear evidence for the police reacting on criminal behavior. Another possible determinant of cleared cases is the amount of suspects brought to court as this may imply further investigations. However, our estimates for the number of tried suspects (tried) do not seem to have a negative impact on the amount of cleared cases.

The remaining explanatory variables represent our political hypothesis. The share of green voters (green.votes), the share of supporters of the greens (green. supp) and the greens dummy (greens) do not seem to influence police behavior in clearing environmental crimes. However, our dummy for the conservatives (cons) reveals a negative and for BC significant connection to cleared cases. The parameter estimate is throughout negative with a semi-elasticity of -.13 for BC.

The next section analyzes the behavior of prosecution as this is the next institution involved in the enforcement of environmental crimes.

5.2 Prosecution

It is probably not possible to underrate the role of prosecutors in the context of enforcement of crimes. Prosecutors decide on behalf of society whether a suspect will be brought to trial - or not. This decision being very important as if a prosecutor decides not to acusse a potential offender there will be no further opportunity for a criminal sanction.[8]

Having our theoretical predictions in mind we are going to estimate the following equation:

$$\log tried_{it} = \alpha + \beta_1 \log tried_{it-1} + \beta_2 \log suspects_{it} + \beta_3 \Delta CR_{it-1} + \quad (2)$$
$$\beta_4 \log agg.suspects_{it} + \beta_5 \log agg.tried_{it} + \beta_6 cons_{it} +$$
$$\beta_7 greens_{it} + \beta_8 green.pref_{it} + f_i + t_t + \epsilon_{it}$$

where again the greek letters represent the parameters to be estimated, f and t indicate state and time effects and in case of ϵ the error term. In contrast to the specification for police production of cleared cases we included the growth rate for environmnetal crime with one lag. The reason for this is that we belief prosecutors and also judges not to have immediate information on the crime rate as it is the case for police. We think that prosecution and judges may get the information out of official statistics published at the end of each year. Table 4 presents the estimation results.

Similarly to cleared cases there is evidence that the amount of tried suspects exhibits some degree of persistency. Problems arise when looking at the Sargan test statistics. Whereas the Arellano and Bond tests for autocorrelation behave

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[8] There will be exceptions only if the prosecutor made a serious mistake.

as requested the Sargan test needs some further attention. The Sargan test is for both AB and BB significant rejecting the Null of validity of the instruments even at the 1% level for BB. We therefore again prefer bias correction as the most reliable estimator.

The results reveal a throughout positve and highly significant relationship for the lagged number of tried suspects. The magnitude of the effect is with estimates of .56 to .73 in the same range as for the number of cleared cases. Again, the production input in form of the amount of identified suspects reveals with elasticities ranging from .26 to .36 a highly significant influence on the amount of tried offender. Contrary to our initial suggestions the growth of environmental crime shows up to be a significant and positive driver of the amount of tried suspects (.34 to .45). Our variables indicating the aggregate amount of identified and tried suspects have the expected signs but seem to have no influence on the amount of tried environmnetal offenders. A bit curious are the findings for public environmnetal preferences. The share of green voters (green.pref1) seem to have a negative and in case of BC significant effect on the amount of tried environmental offenders. On the other hand, the parameter estimate for share of strong supporters for the German green party (green.pref2) has in case of BB a positive and significant influence on the amount of tried offenders. It is therefore not quite clear if one can rely on one of these outcomes. The dummy for the greens in state parliament is not significant in any specification. Our dummy for the conservatives, however, reveals a throughout negative parameter estimate which is significant once[9] and gives thus cautious support for the pro-industry assumption.

In the next subsection we now analyze the behavior of courts. After a prosecutor deciding whether to accuse a potenital offender the lawsuit comes to court and judges have to decide whether to convict the offender.

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[9] Ans slightly fails significance at the 10% level for the other BC estimates.

Table 5: Estimation Results: Production of Suspects Prosecuted

Exp. variables	BB 1	BC 2	BB 3	BC 4	BB 5	BC 6
tried, lag	.6879	.5651	.7338	.5760	.6606	.5619
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
offender	.3273	.2688	.2647	.2652	.3640	.2612
	(0.0110)	(0.0690)	(0.0286)	(0.0706)	(0.0013)	(0.0748)
CR growth, lag	.4395	.3857	.4564	.3439	.4338	.3865
	(0.0095)	(0.0119)	(0.0129)	(0.0250)	(0.0126)	(0.0101)
agg.offender	-.3589	-.1883	-.2809	-.0631	-.4083	-.1817
	(0.2479)	(0.7470)	(0.3036)	(0.9123)	(0.1638)	(0.7561)
agg.tried	.3435	.3210	.2763	.2369	.3806	.3900
	(0.1842)	(0.5594)	(0.2176)	(0.6613)	(0.1230)	(0.4822)
cons	-.0520	-.1614	-.0455	-.1913	-.0656	-.1664
	(0.3041)	(0.1496)	(0.3755)	(0.0887)	(0.1818)	(0.1284)
greens	-.0334	-.0643	-.0246	-.0941	-.0522	-.0512
	(0.4016)	(0.6515)	(0.6289)	(0.5056)	(0.2645)	(0.7128)
green.pref1			-.4710	-3.553		
			(0.7347)	(0.0006)		
green.pref2					2.6105	2.4377
					(0.0323)	(0.2010)
N	136	136	136	136	136	136
instruments	55		56		56	
F	91.5133		42.2263		1126.0095	
Sargan	63.863.609		62.572.573		64.039.004	
	(.0053)		(.0072)		(.0051)	
ar1	-2.4597		-2.4052		-2.4304	
	(.0139)		(.0161)		(.0150)	
ar2	.4177		.7968		.2855	
	(.6761)		(.4255)		(.7752)	

Note: time dummies and a constant have been included but omitted here. P-values in parenthesis. All GMM specifications have been estimated with robust standard errors and BC standard errors via bootstrapping with 50 repetitions.

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5.3 Courts

As already stated in our theoretical part we assume that the political influence is reduced significantly for this last stage of enforcement. However, as this is just a hypothesis in a first stage we estimated the following estimation equation:

$$\log convicted_{it} = \alpha + \beta_1 \log convicted_{it-1} + \beta_2 \log tried_{it} + \beta_3 \Delta CR_{it-1} \quad (3)$$
$$\beta_4 \log agg.tried_{it} + \beta_5 \log agg.convicted_{it} +$$
$$\beta_6 cons_{it} + \beta_7 greens_{it} + \beta_8 green.pref_{it} + f_i + t_t + \epsilon_{it}$$

In line with the productionfunction for prosecutors we assume that judges take their information about the environmnetal crime rate out of official statistics published at the end of the previous year. The growth rate of environmnetal crime appears therefore with one lag. Table 6 reveals that the series of convicted environmental offenders does not exhibit persistency as found in earlier stages of the enforcement process. We therefore stick to static Fixed Effects (FE) as the most appropriate estimator. Moreover, further investigations revealed that there is serial correlation[10] in the errors such that we estimated the model with AR(1) disturbances.[11]

It is interesting to see that the persistency of judges behavior is relatively small in comparison to previous results.

Besides this, the input measure for the production of convicted environmental offenders, the amount of tried suspects has the intended effect. The amount

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[10] We applied a test suggested by Wooldridge (2000) and implemented in Stata through the user written command xtserial by David M. Drukker (2003).

[11] Implemented with xtregar in Stata.

Table 6: Estimation Results: Judges Production of Convicts

Exp. variables	BB 1	BC 2	FE 3	FE 4	FE 5
convicted, lag	-.0155	-.0071			
	(0.7500)	(0.8504)			
tried	1.0173	.9757	.9710	1.0276	.9702
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
CR growth	-.1325	-.1443	-.1090	-.1153	-.1082
	(0.3168)	(0.0328)	(0.0656)	(0.0402)	(0.0687)
agg.tried	-1.3584	-1.8491	-2.4771	-2.2343	-2.4698
	(0.0400)	(0.0219)	(0.0049)	(0.0070)	(0.0052)
agg.conv	1.3396	1.7964	2.3021	2.0703	2.3078
	(0.0474)	(0.0144)	(0.0019)	(0.0030)	(0.0020)
cons	-.0255	.0329	.0365	.0656	.0341
	(0.4938)	(0.4711)	(0.4996)	(0.2025)	(0.5329)
greens	-.0354	.0389	.0511	.0581	.0506
	(0.4758)	(0.5631)	(0.4601)	(0.3726)	(0.4668)
green.pref1				1.6152	
				(0.0004)	
green.pref2					.2697
					(0.7372)
N	136	136	135	135	135
j	55				
F	3890.9901		59.4512	64.0705	55.4288
Sargan	112.9140				
	(0.0000)				
ar1	-1.5625				
	(.1181)				
ar2	1.0813				
	(.2795)				

Note: time dummies and a constant have been included but omitted here. P-values in parenthesis. All GMM specifications have been estimated with robust standard errors and BC standard errors via bootstrapping with 50 repetitions.

of tried suspects (tried) shows up to be highly significant with an elasticity of around 1. The estimates for the growth in environmental crimes do provide some evidence for influencing the amount of convicted offender negatievly with an elasticity of roughly -.1 for static FE. This is not in line with our initial expectations and difficult to interpret.

The variables reflecting the amount of overall tried and convicted offender follow our previous suggestions. The number of tried (agg.tried) have negative elasticities ranging from -1.3 to -2.4 and the number of convicted (agg.conv) a positive one with values of 1.3 to 2.6. Both elasticities are highly significant throughout all specifications.

The political variables included in our regressions show in most cases no effects on the amount of convicted environmental offenders. The share of green voters (green.pref1) being the only exception indicating a significant and positive influence with an elasticity of around 1.6. The estimates for strong green support are positive but not significant. The dummy for the greens is negative but insignificant in case of static FE and the dummy for the conservatives has also no definite effect on convicted offenders.

6 Discussion

In this section we contrast previously stated conjectures with our empirical findings. The first conjecture stressed the possible determinants of police clearing behavior regarding environmental crime.

Result 1 *We find evidence for (a) the amount of reported cases of environmental crime to increase with the amount of cleared cases. Moreover, there is also evidence that (b) the growth rate of environmental crime has the intended shift effects as parameter estimates are positive, significant and robust. There is no support for the hypothesis that the amount of tried environmental offenders*

decreases the amount of cleared cases (c) through a opportunity cost effect. The effects of our aggregate crime variables (d), however, are very definite. The amount of aggregate crime points towards a significantly negative effect on the clearing of environmental offenses through a opportunity cost effect. In contrast, the aggregate amount of cleared cases is a positive driver of the amount of cleared environmental crimes. For our political variables there is only evidence for the conservative dummy to negatively affect police success in clearing environmental crimes. The remaining variables do not show up to have a significant influence on police behavior.

Our results for the opportunity cost arguments confirm the findings of Helland (1998) in the context of EPA enforcement of pollution control laws. Moreover, we also find evidence for the argument that police may react to changing crime rates as proposed by Miceli (1996). With respect to the political factors, estimates support findings in the existing literature that politicians may have a significant impact on enforcement decisions (Mete 2002, Shipan 2004, etc.).

The behavior of prosecution is the next key institution when stepping up the enforcement process. Their key input in the production of tried suspects is identified suspects resulting trough the clearing of a crime cases. We summarize our empirical findings in the following paragraph.

Result 2 *There is clear-cut evidence that the amount of suspects brought to court increases with the number of identified suspects (a). Surprisingly, the growth in environmental crime (b) again has a highly significant and positive effect on the amount of prosecuted suspects. We also find support for our next hypothesis (c) that a higher amount of aggregate suspects decreases the amount of tried environmental offenders through a opportunity cost effect. There is also evidence for the scope effect. The amount of aggregate suspects tried increases the amount of tried environmental offenders. A bit surprising and counterin-*

tuitive are the negative and in some cases significant estimates for the share of green votes. In contrast, the share of green supporters point towards a positive and significant effect on tried offender. It is therefore not possible to draw clear-cut conclusions with respect to environmental preferences. Being in line with this, the dummy variable for the greens does not show up to have any effect. However, there is again some evidence that the conservatives have a negative influence on enforcement of environmental crimes.

In contrast to the theoretical considerations by Miceli (1996), we find evidence that prosecutors react to changing criminal threat in the context of environmental crimes. A higher growth in environmental crimes leads to a significantly higher amount of tried environmental offenders. In contrast to Ramseyer et al. (2008), we find evidence for both political and production-based factors to influence the behavior of prosecutors.

The final institution involved in the enforcement of crimes are courts represented by judges. Judges finally decide whether to convict a suspect and which kind of sanction to impose.

Result 3 *The input of tried offenders has the suggested effect (a) of increasing the number of convicted suspects. Contrary to initial suggestions and results for previous enforcement stages there is evidence that the growth in environmental crime affects the amount of convicted offender in a negative fashion (b). Similar to previous stages, however, the overall amount of tried suspects has a negative and the overall amount of convicted criminals a positive effect on convicted environmental offender (c) and thus supporting our opportunity cost and scope effect hypothesis. Contrary to our initial expectations we find cautious support for public environmental preferences to positively influence judges decisions to convict offender (d). Both the share of green supporters and the share of green voters show positive estimates which are in case of the share of*

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green voters also significant. The dummies do not show up to be significant in any specification.

Estimates for variables that are part of the production function approach are robust and in line with the findings for police behavior. The growth of environmental crimes seem to negatively affect the amount of convicted offenders. There is again evidence for political considerations to influence judges decisions as the variables indicating public environmental preferences seem to have a positive influence. Although our approach is rather novel, there is support in the literature that political factors have an influence on courts (Cohen 1987, Anderson et al. 1989, Salzberger and Fenn 1999) or bureaucrats enforcement decisions (Headrick et al. 2002).

Our last hypothesis focuses on the degree of political influence at different stages of the enforcement process. Although our empirical findings do show evidence for political economy factors being important determinants of agency behavior, the degree of political influence contradicts initial predictions.

Result 4 *Except for the dummy for the German Green Party being in state government, all political economy variables seem to influence enforcement of environmental crimes. Especially the dummy for the conservatives meant to reflect a pro-industry policy has a negative and significant impact on police and prosecution in enforcing the German Environmental Penal Code. Moreover, there seems to be at least slight evidence for the share of green voters to positively influencing the amount of convicted environmental offenders. However, as the degree of control does not decrease but remains fairly constant while stepping up the enforcement process, we do not find support for our fourth hypothesis.*

7 Conclusion

The starting point of this paper was that the criminal justice system combines at least three distinct institutions, police, prosecution service, and courts, in order to enforce key regulations. This proliferation of agencies for a single public task - while grounded in sound constitutional arguments - raises questions about the scale of agency problems in criminal enforcement. These questions have not been adequately examined from an empirical perspective and we believe that this paper is one first step in this direction.

The findings of this paper add in a significant way to existing literature. Firstly, we reaffirm the usefulness of the production function approach as a powerful tool for analyzing behavior of law enforcement institutions as pioneered by (Becker and Stigler 1974). On its basis, the paper provides new evidence on the role of economic and political factors for explaining the behavior of the criminal justice system. Secondly, it is the first paper to our knowledge to provide this evidence not only at the level of one institution involved in criminal enforcement, but at all three key stages of police, prosecution, and courts. This allows us to compare the empirical record with institutional design choices. These choices would suggest that while the police and - to a lesser extent - the prosecution service can be expected to be responsive to public preferences, the decisions of courts should be independent of political factors. The empirical analysis, on the other hand, finds evidence that both economic and political factors are present at all levels. This means that - faced with scarce resources - police, prosecutors and judges are forced to consider opportunity cost arguments when deciding how much effort to put into enforcement and that political factors influence this decision at the margin. It also means that political economy factors influence agency decision making in significant ways. In line with previous results (Ramseyer et al. 2008), there is evidence that

pro-industry parties tend to decrease the enforcement of environmental crimes while public environmental preferences have a positive effect. In addition, there is evidence that police and prosecutors respond to a growth of environmental crime with increased effort in order to provide further deterrence, an empirical finding that contrasts with Miceli (1996).

Finally, on a geographical note, this is to our knowledge the first paper to do so for the context of Germany, thus demonstrating the applicability of the methods in new legal contexts.

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A   Appendix

Table 7: BC Estimates for Different Covariates

Exp. variables	BC(cleared) 1	Exp. variables	BC(tried) 2	Exp. variables	FE(convicted) 3
cleared, lag	.5527	tried, lag	.5416		
	(0.0000)		(0.0000)		
cases	.4279	offenders	.3809	tried	1.0354
	(0.0000)		(0.0160)		(0.0000)
CR growth	.6257	CR growth	.3029	CR growth	-.1325
	(0.0000)		(0.0404)		(0.0256)
agg.cases	-.7469	agg.offenders	-.5793	agg.tried	-2.7638
	(0.1379)		(0.3998)		(0.0066)
agg.cleared	.5845	agg.tried	-.0091	agg.conv	2.8395
	(0.0732)		(0.9887)		(0.0017)
tried	.0489				
	(0.2972)				
cons	-.1110	cons	-.1520	cons	.0172
	(0.0181)		(0.2125)		(0.7728)
greens	-.0240	greens	-.0240	greens	.0054
	(0.6569)		(0.8689)		(0.9398)
green.pref1	.0581	green.pref1	-3.4383	green.pref1	1.7102
	(0.8933)		(0.0068)		(0.0006)
exp.police	.1221	exp.enf	-1.0494	exp.enf	.1454
	(0.7571)		(0.1410)		(0.7056)
GDP	-.6967	GDP	-.6254	GDP	.8631
	(0.3050)		(0.6319)		(0.2182)
unemp	-.0031	unemp	-.0377	unemp	-.0122
	(0.8830)		(0.2899)		(0.5133)
N	137	N	121	N	120

Note: Estimates in columns 1 (cleared) and 2 (tried) are produced with Bias-correction and estimates in column 3 (convicted) applying Fixed- Effects (FE) estimation with ar(1) disturbances. P-values in parenthesis. Time dummies have been included but omitted here. 'exp.police' and 'exp.enf' indicate the log of real expenditures for police, and for prosecution and courts, respectively. 'GDP' and 'unemp' stand for real GDP per capita and the unemployment rate in either state and year.