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*Article*

# Deterrence Theory in Paraguay: An Exploratory Study

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**Abstract:** This research paper contributes to the literature of deterrence theory in general, and in particular with respect to white-collar crime, offering valuable inside by using a unique data set of fraud and violation of trust incidents for Paraguay. Descriptive evidence show a clear and continuous misallocation of funds and human capital, and therefore providing less efficient services for the public. Regression analysis suggests that clearance rate exerts a highly significant effect in deterring fraud but results are not clear for violation of trust incidents. Despite the limitations of available data, results confirm deterrence theory in Paraguay. However, to more than two-thirds of victims, not even the attempt was made to seek justice. As a side-result, it seems that a soft on crime strategy, induced from the former German penal code, has led to an increasing share of pre-trial diversion and therefore enhancing white-collar crimes like fraud and violation of trust due to impunity.

**Keywords:** Deterrence, Paraguay, Fraud, Crime, soft on crime

## 1. Introduction

Deterrence, in his essence, is the use or the threat of punishment with the intention to avoid that people break the law that governs the coexistence of a society. These rule breakers, however, are almost on a daily basis the main headlines in the newspapers being accused of fraud, violation of trust, embezzlement of public funds, money laundering among others. What it makes so sensitive to society is the fact that these deviants are often politicians, prosecutors, judges or other high ranking public servants, who should be the first in line when it comes to maintain law and order. This behavior directly and indirectly reduces quality of life of all citizens who must cope with the lack of resources for social, health or educational programs (Fajnzylber et al. 2002; Oliver 2002). It offends and hurts collective feelings (Durkheim 1982) and thereby generate public anger and social unrest. High shares of pre-trial diversion (e.g. dismissals) and archiving cases have both reached more than 30 percent on average, and are enhancing typical white-collar crime incidents as fraud and violation of trust. More diversion by dismissals and archiving cases, or even ignoring charges made by victims, means that more time will be devoted to illegal activities (Entorf and Spengler 2008).

There is an increasing demand by Paraguayan's civil society, non-government organizations and multilateral lenders in promoting judicial and administrative reforms. It has been widely recognized that economic and social development requires democratic consolidation, respect for basic human rights, and a well-functioning judicial system (Dakolias 1999; World Bank 1998). While judiciary is getting more and more unpredictable, solving cases in an unreasonable time frame with an increasing backlog of cases, they are not just affecting the efficiency of the judicial system, they are also affecting fairness, access to justice, and even violating human rights (Dakolias 1999). However, to maximize the effect of deterrence, certainty, severity and celerity are necessary, and no one alone is sufficient (Mendes and McDonald 2001).

The aim of this paper is twofold: First, I shade some light on the efficiency and resources spent to the judicial system compared to other European countries. Second, the paper contributes to the

literature of deterrence theory offering valuable insight by using exploratory regression analysis with data for fraud and violation of trust incidents within the jurisdiction of Paraguay.

After this introduction a literature review analysis different aspects and components of deterrence, followed by a short word about the Paraguayan Penal Code. In the next section descriptive evidence of the efficiency of the judicial system is offered. Next, results of the exploratory regression analysis for fraud and violation of trust are presented before ending with a conclusion and recommendations.

## 2. Literature Review

Deterrence is grounded on the idea that offenders' decisions are based on a rational choice taking into account expected payoffs of the criminal activity compared to legal income, personal tastes and preferences, and the perceived likelihood of apprehension, conviction, and punishment (Becker 1968, 1993). There is a common consensus in literature that deterrence is necessary for the maintenance of the legal system and the preservation of society. Its effectiveness depends upon a particular society in question (Ball 1955).

The effect of deterrence has been studied for a while from different perspectives and a variety of subfields in numerous countries around the globe to assist in informing policymakers. Deterrence requires the combination of three elements to work properly and generate an expected cost of punishment: certainty, severity, and celerity (Mendes and McDonald 2001, Mendes 2004). Potential criminals combine these three elements before committing a crime, regardless of being risk neutral, averse or acceptant (Mendes 2004). Nevertheless, a weak criminal justice system may increase risky attitudes due to impunity and push perception of risk downward (Paternoster 2010). However, it seems that there is still no consensus about the weights of each element in the equation. Grogger (1991) and Witte (1980), for instance, argue that increasing certainty of punishment has a larger deterrent effect than increasing severity and point also to the criminogenic effect of imprisonment.

Ball (1955: 351) argues that, in the first place, a law to have a deterrent effect depends upon the knowledge of a would-be offender of that law and possible punishments, otherwise the law would have no deterrent effect at all. This communication process, or lack thereof, might result in different perceptions of certainty and severity of punishment. "People are more influenced by their perceptions of the certainty of arrest if they believe the penalty if arrested would be sever […]" (Grasmick and Bryjak 1980: 486). The same conclude Bailey and Lott (1976: 105). They argue that the higher the level of perceived certainty the higher the deterrent effect of severity. Hence, the perceived severity of punishment may have a deterrent effect, because crime becomes more expensive. The reason that severity may be less effective could be in the fact that criminals and 'inspectors' may have inverse incentives, and therefore increasing severity would lead to less inspection, and less inspection to higher crime rates. This is especially true for less attractive crimes (Rauhut 2009).

Mastrobuoni and Rivers (2016) analyzed data of Italian prisoners after a large collective pardon. They conclude "that low future time preference is a driver of criminal behavior" (:31). The same conclude Akerlund et al. (2016) after studying data of a Stockholm birth cohort at age 13. They aggregate that the link is much stronger for males with low intelligence. Time discounting is rarely taken into account in economic models. The fact that some criminals do not care much about the probability of incarceration may explain the weight of severity in the deterrence puzzle. Therefore, increasing severity may have a deterrent effect for low initial sentence length (Mastrobuoni and Rivers 2016). Increasing punishment certainty has direct effects on deterrence and incapacitation, on the other hand, increasing punishment severity has long run effects on deterrence and incapacitation. In consequence, crime will decrease gradually to a new steady state, indicating that criminals respond to severity as well as certainty (Kessler and Levitt 1999). A slow justice system, however, runs in favor of offenders and potential offenders which discount time heavily. For them possible future costs of committing a crime are insufficient to deter in favor of an immediate benefit, because they do not feel the "pain of payment" at the moment of a deviant behavior (Prelec and Loewenstein 1998). "The criminal law, as a long-distance danger, does not affect them" (von Hentig 1938). Increasing delay by

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one year, for example, would increase fraud cases by 11 percent in first instance courts (Dalla Pellegrina 2007).

The ignorance of future consequences in favor of immediate benefits is one of six elements making up one's self-control in Gottfredson and Hirschi's (1990) *A General Theory of Crime*. They argue that low self-control is a driver to be more prone to criminal or deviant behavior, a behavior "of force or fraud taken in the pursuit of self-interest" (: 15).

Personality traits seem to be particularly important indicators in the context of white-collar crime such as fraud and violation of trust. Low behavioral self-control paired with high hedonism, low integrity, and high narcissism are important variables to discriminate between white-collar offenders and non-offenders (Blickle et al. 2006).

Money, financial gain, and greed are the most common motives for white-collar offenders according to Bucy et al. (2008) who interviewed prosecutors, defense counsels, and white-collar offenders. Offenders, as a group, who participate in illegitimate activities respond to incentives in much the same way as non-offenders who are engaged in legitimate activities (Ehrlich 1973). Wrong or even perverse incentives, like low penalties for abuse, poor accounting, and lax regulations will help to create environments for white-collar crime (Akerlof and Romer 1993; Black 2010). Ehrlich (1996) and Black (2010) go even further and argue that only prison sentences or sentencing guidelines shift the tax for crime and can deter the willful violations.

But the consequences are not only of economic nature. Despite of the individual economic losses directly caused by the fraud itself and indirectly caused by contracting a law firm, and opportunity costs, there are also social consequences. Distrust or cynicism against the justice system or public institutions in general, or emotional consequences like anxiety disorder, major depressive episodes or even suicidal tendencies are mentioned in literature. White-collar crime can sometimes even involve physical harm from polluting the environment with toxic waste, unsafe working conditions or from marketing unsafe products (Brody and Kiehl 2010; Friedrichs 2010; Ganzini et al. 1990; Malone 2010; Payne 2016; Pridmore and Reddy 2012; Seligson 2006). Sutherland (1940: 5) argues that "white-collar crimes violate trust and therefore create distrust, which produces social disorganization on a large scale."

### *2.1. A short word about the Paraguayan panel code*

Rising crime rates of the 1970's were faced differently in Germany and most other European countries and the US. While latter followed a 'tough on crime strategy', Germany followed a softer path bearing in mind future consequences for perpetrators – especially young deviants. The main aspect of the 'Grand reform' of 1969 was a restricting use of imprisonment in favor of non-custodial sentences like monetary fines. Another aspect was to strengthen the role of the public prosecutor in the context of pre-trial diversion (Cherry 2001; Entorf and Spengler 2008).

Paraguay started his reform of the previous penal code in 1992 after 35 years of dictatorship which ended in 1989. The new penal code became effective in 1997 (law no. 1160/97). It has been recognized that the new Paraguayan penal code is heavily based on the German penal code of 1969, still effective when Paraguay started his reform, and even "an almost textual and certainly quite unfortunate version of the Criminal Code in force in the Federal Republic of Germany" (Guzman 2008).[1]

German legislators were already working on a 'reform of the Grand Reform' with more server maximum and minimum penalties for many violent crimes. The new law became effective in 1998. This was the result of preceding discussions where apparently lenient sentences for violent crimes were criticized with respect to property crimes (Entorf and Spengler 2008). However, it seems that this historical fact combined with descriptive evidence presented in the following section may

[1] Wolfgang Schoene, a German specialist in penal law, has been mentioned by Guzman and in local newspapers (e.g. Ultima Hora, "La idea de una sumatoria de penas es absolutamente inconstitucional", 21.03.2010) as one of the designers and heavily involved in the preparation of the new penal code.

indicate the implementation of the German soft strategy into the Paraguayan penal code, without taking into account historical, cultural, and socio-economic differences. As a consequence, high and prevailing crime rates in general, and white-collar crime in particular might be the result of a soft on crime strategy and an increasing share of pre-trial diversion, in particular dismissals and archived cases, resulting in impunity.

Particularly Latin American countries were a major concern for implementing human rights and re-democratizing the judicial system after decades of dictatorial control and abuses (Hammergren 2008). However, ideological ideas and psychological consequences are still present in some countries. While most European and even Latin American countries have already implemented new legal and administrative reforms, adjusting for new tendencies in crime, thereby fulfill their commitment to society and the social contract, Paraguay is still *thinking about it*.

## 3. Data and Methods

### *3.1. Descriptive evidence*

Due to a lack of previous research regarding the jurisdiction of Paraguay, some descriptive statistics are offered and put in an international context to shade some light on resources allocated and efficiency of the judicial system. Usual standard measures for efficiency are length of proceedings, the clearance rate, and case backlogs (European Union 2018: 10).

The following table (table1) shows different professional groups involved in the judicial system compared to the European median and three European countries, chosen due to their similarities in population size. It can be observed that figures of those who can clear a case, like judges and prosecutors, are below European median, while lawyers, non-judge staff, and non-prosecutor staff exceed by far the figures reported for Denmark, Bulgaria, Serbia, and the European median.[2] In particular the high density of lawyers per 100.000 inhabitants and administrative staff should rise special attention to public policymakers. This points to a misallocation of human capital and probably indicates a low infrastructure regarding information technology.

Table 1: Professionals p. 100.000 inhabitants.

| | **Professionals p. 100.000 inhabitants** | | | | |
|---|---|---|---|---|---|
| | Paraguay | Denmark | Bulgaria | Serbia | European median |
| Judges | 13.99 | 6.00 | 30.80 | 38.00 | 18.06 |
| Prosecutors | 5.11 (5.78) | 12.20 | 20.40 | 9.20 | 10.27 |
| Lawyers | 609.89 (688.12) | 108.40 | 178.30 | 118.10 | 110.17 |
| Non-judge staff | 191.55× | 31.00 | 83.50 | 140.30 | 54.92 |
| Non-prosecutor staff | 64.49 (64.80) | 8.10 | 40.50 | 16.80 | 14.13 |

Notes: All data for European countries from the European Commission for the Efficiency of Justice (CEPEJ) with 2014 as reference year; Judges' Data for Paraguay from Supreme court's official website with figures for 2017; Prosecutor data from the office of the Public Prosecutor (April 12 and May 24, 2018) with data for 2014 (2017); × indicates estimation (2018).

Table 2 shows the budget spent to the judicial system. Paraguay outperforms Bulgaria, Serbia, and in most cases the European median regarding the allocation of funds.[3] Paraguayan's annual judiciary budget for 2012 was 1.81 percent of the GDP per capita and about three times higher than

[2] Regular working hours in the judicial system are from 07.00 a.m. to 13.00 p.m. from Mondays to Fridays.

[3] The Paraguayan judicial budget includes also the budget of the Superior Court of Electoral Justice, which has in most cases the same budget - or even more - as the Public Ministry.

the budget of Bulgaria (0.54 percent) or even European average with 0.33 percent (World Bank 2015: 6). The budget available to the judicial system increased 12.47 percent, on average, between 2005 and 2017. The budget for the Court increased 11.78 percent and for the Public Ministry 11.31 percent in the same period. Table 2 indicates a clear misallocation of funds with respect to quality offered to society.

Table 2: Budget per inhabitant.

| | **Budget, EURO (€) per inhabitant** | | | | |
|---|---|---|---|---|---|
| | Paraguay | Denmark | Bulgaria | Serbia | European median |
| Judicial System | 57.47 (62.47) | NA | 32.55 | NA | 46.40 |
| Court | 25.50 (28.98) | 42.57 | 18.94 | 21.90 | 31.37 |
| Prosecution Services | 13.42 (14.34) | 17.16 | 13.01 | 5.00 | 9.21 |
| Legal Aid | 4.97 (6.13) | NA | 0.60 | NA | 2.46 |

Notes: All data for European countries from CEPEJ with 2014 as reference year; Data for Paraguay from the Ministry of Finance with reference year 2014 and recent data for 2017 in parentheses; Local currency Guaranies (Gs); 1 EUR = 6348 Gs on average for 2017 and 1 EUR = 5924 Gs on average for 2014; NA = Not available.

Despite high and increasing budget allocations Paraguayan's judiciary performance lags far behind European countries as shown in table 3. Overall clearance rate reached 52 percent in 2014, which is far below European median.

Table 3: Efficiency of the judicial systems.

| | **Efficiency of the judicial systems p. 100 inhabitants** | | | | |
|---|---|---|---|---|---|
| | Paraguay | Denmark | Bulgaria | Serbia | European median |
| Incoming cases | 2.77 | 2.35 | 1.92 | 10.60 | 1.22 |
| Resolved cases | 1.44 | 2.31 | 1.93 | 10.22 | 1.34 |
| Clearance rate % | 52.0 | 98.5 | 100.5 | 96.5 | 99.9 |
| Pending cases | NA | 0.30 | 0.39 | 7.14 | 0.30 |
| Disposition time (days) | NA | 47.00 | 74.00 | 255.00 | 112.00 |

Notes: All figures for 2014 and based on total criminal cases; Data for European countries from European Commission for the Efficiency of Justice (CEPEJ) indicating 1st instance for criminal cases; Data for Paraguay from the office of the Public Prosecutor's anual statistics report (online); NA = Not available.

The situation worsens when considering just fraud cases, subject of this paper. Table 4 shows a clear and sharp decrease in clearance rate between 2001 and 2015, while backlog is consequently increasing during the same period.[4] At the end of 2015 clearance rate was merely 12.73 percent, while it takes more than six years for a pending case to be solved in the light of the current pace of work. However, increasing spending in personnel does not necessarily lead in reducing disposition time (Buscaglia and Dakolias 1996). Of particular interest is the fact that, on average, more than two thirds (75.2%) of incoming cases between 2001 and 2015 do not have any procedural status. Expressed differently: to two thirds of victims not even the attempt was made to seek justice.

[4] Recent data for the last eight years (2008-2015) are shown to illustrate the evolution of efficiency, however, data from 2001-2015 are available, and calculations are based on the entire series.

Table 4: Efficiency of judicial system (fraud cases) - Part 2.

**Efficiency of the Paraguayan judicial system (Fraud cases) - Part 2**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Incoming cases | 3884 | 4328 | 4315 | 5626 | 6145 | 5943 | 6749 | 6811 |
| Controlled cases | 940 | 1020 | 1345 | 1582 | 1500 | 1632 | 1663 | 1436 |
| Archived cases | 345 | 282 | 334 | 431 | 500 | 604 | 644 | 564 |
| Dismissals | 323 | 384 | 488 | 522 | 503 | 575 | 580 | 503 |
| Resolved cases | 593 | 741 | 1018 | 1156 | 1000 | 1024 | 1014 | 867 |
| Clearance rate % | 15.27 | 17.13 | 23.60 | 20.54 | 16.27 | 17.23 | 15.02 | 12.73 |
| Backlog | 18383 | 21970 | 25266 | 29737 | 34882 | 39801 | 45536 | 51480 |
| Turnover ratio | 0.18 | 0.21 | 0.31 | 0.26 | 0.19 | 0.21 | 0.18 | 0.15 |
| Disposition time (days) | 2025.54 | 1766.05 | 1181.92 | 1411.68 | 1877.97 | 1752.97 | 2065.34 | 2502.87 |

Notes: All figures correspond to fraud cases; Backlog is calculated since 2001; a controlled case is a case with an asigned procedural status (e.g. investigation, accused, desestimated etc.); Turnover ratio measures the relationship between resolved cases and unresolved cases at the end of a period; Disposition time (in days) measures the theoretical time necessary for a pending case to be solved in court in the light of the current pace of work.

Paraguayan's Police officer rate of 331.5 (2006) seems to be on a high level compared to some selected countries during the same year: Ecuador 292.6, Spain 313, US 223.6, Japan 199.8, Germany 303.8, Canada 191.4, Denmark 197.8 (Harrendorf and Smit 2010: 135-136).

Descriptive evidence shown above point to a clear misallocation of human capital and financial funds which in turn lead to a less efficient system. Technical inefficiency (lag of best practice) and size inefficiency (courts are to big) account for more than 50 percent of total inefficiency in the justice sector (Peyrache and Zago 2016). This is a fertile ground for other serious crimes (i.e. corruption), or hamper democratic and economic development while one of society's core institution is not effective (Busso et al. 2012; Casterlar 1996; Restuccia and Rogerson 2017).

*3.1. Data set*

This study uses yearly fraud and violation of trust incidents for a time span between 2001 and 2015, which accounts for more than 90 percent of crimes against property in the Paraguayan judicial system, and increased dramatically between 2000 and 2016 (XXX XX). This approach is preferred to avoid aggregation bias of the (aggregated) crimes against property series, which can result in a loss of information due to considerable variation of different crime types, each with different deterrent effects (Cherry and List 2002; Lee et al. 1990). No further distinctions are made regarding geography, age, gender or race. These two dependent variables are subsequently related to clearance rate and further covariates mentioned in literature in a stepwise exploratory process due to sample size. Severity and celerity, as other deterrent components, are not included in the different regression specifications due to a lack of available data.

Certainty, expressed by the clearance rate (Clear.rate), is measured in percent and calculated as a ratio between resolved cases to incoming cases at the end of a given period. Archived cases (ln(Archived)) is a count variable at the end of a given period. Data were collected from the Public Ministry. Court budget (ln(CourtBudg)) and prosecution budget (ln(ProsBudg)) are measured in budget spending per inhabitant (in local currency) and calculated with data from the Ministry of Finance and World Bank. Prosecutors (ln(Pros.)) is a count variable and counts the absolute number of prosecutors in a given period. Unemployment rate (Unemploy.rate) indicates the official unemployment rate in percent (not accounting for sub employment) in a given period. GDP per capita growth rate (GDPpcgrate) as a measure of strength of a country's local income (within its borders) and GNI per capita growth rate (GNIpcgrate) as a measure of economic strength of the citizens of a country (including from local citizens living abroad) are included as regressors, and

representing legal income opportunities. Descriptive statistics of offence specific and socio-economic variables are offered in the appendix (table A1 and A2).

*3.1. Exploratory analysis*

Paraguay experienced an epidemic increase regarding white-collar crime incidents, particularly fraud and violation of trust, between 2000 and 2016 and will remain on a high level (XXX XX). In the following analysis I will present mainly fraud data, however, graphs and tables for violation of trust data are offered in the appendix for reasons of space and convenience.

When a variable with a unit root is regressed on another variable with a unit root this can lead to spurious regressions (Entorf 1997). Non-stationary data, as a rule, are unpredictable and therefore most techniques require a stationary series to perform forecasts of relative or absolute nature. Different techniques were applied to transform the data and to smooth the different series, such as first and second order differences, as well as log normal function. Subsequently, an Augmented Dickey Fuller Test (ADF, Dickey and Fuller 1979, 1981) and a KPSS Test (Kwiatkowski et al. 1992) are performed with the aim to observe a more stationary data set. As expected, stationarity can be assumed for the majority of the variables in first differences, except for GDP per capita growth rate and unemployment rate, which are stationary at level. Prosecutors count, court budget, and prosecution budget are stationary in second differences (table A3). Furthermore, it can be assumed that crime market participants, in other words, criminal prosecution system and offenders, will need time to assimilate new information and therefore will create a time lag regarding their decision making. "[…] humans are quite hesitant to adapt strategically to their social environment" (Rauhut 2009: 387). Likewise, recidivist offenders, motivated by low clearance rates and diversion, will contribute to crime rates in subsequent years. To account for this effect in the data generating process (DGP) a lagged dependent variable (LDV) $y_{t-1}$ is incorporated as an additional regressor. "However, in a dynamic equation where lagged values of the dependent variable appear as regressors, least squares estimates are biased and generally inconsistent" (Breusch 1978: 334). As suggested by Keele and Kelly (2005) a Lagrange Multiplier test was applied to test for white noise of the residuals after introducing lagged dependent variables. Wilkins (2018) argues in a more recent research that more LDVs and lagged independent variables should be included to account for autocorrelation and provide more accurate coefficient estimates. Lagged dependent variables also control for omitted variable bias (Mustard 2003), which in contrast would seriously bias ordinary least squares regression coefficients.

Figures for fraud and violation of trust might be flawed by measurement errors due to the fact that not all victims present charges. Coefficients for the clearance rate might be biased (ratio bias) for two reasons: a) due to measurement errors of fraud and violation of trust incidents (cleared cases / registered cases) and b) due to a high level of charges without any procedural status which effects clearance rate. Furthermore, it depends on the offender to choose which type of crime to commit, which, in turn, influence the likelihood of being arrested and punished (Cook 1979). Coefficients for the clearance rate, however, might be understated due to omitted variables of conviction rates and sentence length due to a lack of data (Mustard 2003).

3.1.1. Fraud

The following graph (figure 1) describes the evolution and persistence of fraud incidents reported to the Public Ministry between 2001 and 2015, indicating possible multiple breaks in the structure of the series.[5] Chow tests applied to the series did not reveal statistically significant breaks for fraud (table A4).

[5] The expected sentence length for fraud is up to five years of prison or fine (Art. 187, Law No. 1160/97; Penal Code of Paraguay).

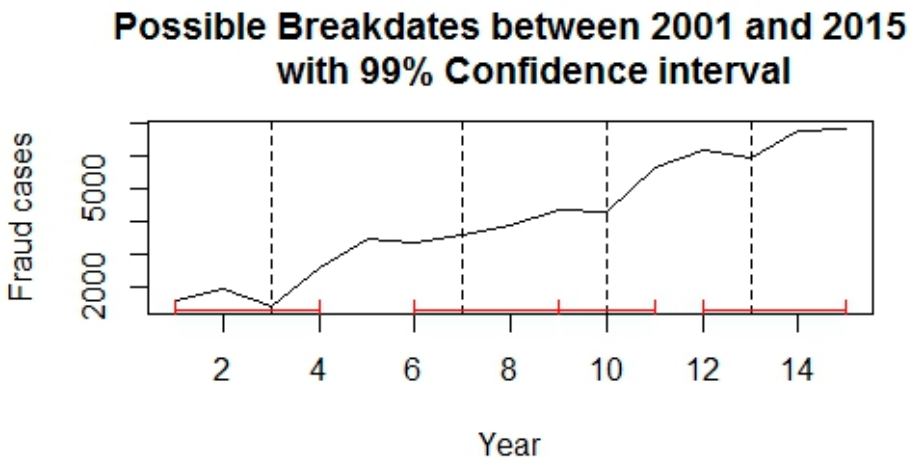


Figure 1: Possible breakdates for fraud series. Data: Public Ministry

In a stepwise exploratory procedure additional regressors are added along with clearance rate, as shown in table 5. The incorporation of a lagged dependent variable (LDV) has benefited the intention to explore lasting effects and are in line with previous research (e.g. Buonanno and Montolio 2008; Caudill et al. 2013; Corman and Mocan 2000; Entorf and Spengler 2008; Imai and Krishna 2004; Mustard 2003; Oliver '02 2002). The lagged variable in the first regression specification is statistically significant. The negative sign indicates a reversion to an equilibrium ($y_t = y_{t-1}$). Expressed differently: Offenders might change their behavior now if they know that they would receive a punishment in the future. However, half-life or the degree of mean reversion of a one unit impulse is just eight month (0.809) (Kilian and Zha 1999). The high speed to mean reversion – or business as usual - seems to confirm that humans are quite hesitant to adapt to changes. Clearance rate is highly significant and remarkably consistent at all different specifications, and reveals a negative sign as expected according to theory. As expected, unemployment and archiving cases without the intention to prosecute and punish offenders will increase fraud in the future. Unexpectedly, for GNI per capita growth rate, prosecution budget, and court budget the sign is reversed. This phenomena has already been reported by Achen (2001) who analyzed governmental budgets. He argues that incorporating lagged dependent variable coefficients dominate the regression, may induce autocorrelation, and diminish the effect of other covariates in the form of biased coefficients. Comparing regression one (1) and eight (8) might confirm this. Introducing a lagged dependent variable in a static process would be clearly a misspecification. However, the limit of the residual error due to stationarity should limit or reduce remaining autocorrelation and any significant amount of bias. Furthermore, both exogenous budget variables are heavily trending and are influenced by an unmeasured observation (probably internally driven by increasing funds for human resources) which might have caused the anomalous revers of the expected sign (Achen 2001: 21). Therefore, if the DGP is dynamic, LDV models will provide better estimates (Keele and Kelly 2005). In this particular case of fraud incidents the Breusch-Godfrey test does not reveal evidence for heteroskedasticity. It might be obvious that reversed signs and biased coefficients suffer from sample size, and with that a degree of freedom problem in the regression analysis, also due to transformation which reduces the number of observations.

The direct impulse effects in model 8 are immediately evident from table 5. Increasing clearance rate by one percent would lead to a decrease of 4.3 percent, on average, in fraud incidents with a long-run effect of a 2.9 percent decline after a one-time impulse. On the other hand, archiving cases that do not serve to prosecute and clear a crime would lead to a direct increase of 30 percent with a long-run effect of 31 percent in fraud incidents. Increasing the number of prosecutors should have a negative effect on fraud, however, not significantly. The coefficient for unemployment is also not significant, but indicates that a decrease in the unemployment rate might change the perception of

people's future and therefore public policies regarding employment could reduce criminal behavior significantly (Imai and Krishna 2004). However, there is no evidence that economic variables do have a significant deterrent effect. In general, comparing additions in adjusted $R^2$, it does not seem that adding further control variables result in a significant better prediction of fraud incidents.

Table 5: Regression table for fraud incidents.

Regression table for fraud incidents

| dependent = ln(Fraud) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Intercept | 0.1378 ** | 0.1292 * | -0.0090 | 0.1247 . | 0.1178 * | 0.1206 * | 0.1229 * | 0.0893 * |
| | (0.037) | (0.047) | (0.206) | (0.060) | (0.045) | (0.046) | (0.048) | (0.039) |
| Lag. dep. Var. | -0.4245 * | -0.3432 | -0.2656 | -0.2871 | -0.2304 | -0.2831 | -0.3020 | -- |
| | (0.167) | (0.211) | (0.201) | (0.210) | (0.199) | (0.199) | (0.211) | |
| Clearance rate | -0.0414 *** | -0.0359 ** | -0.0382 ** | -0.0360 * | -0.0394 ** | -0.0348 * | -0.0353 * | -0.0425 ** |
| | (0.008) | (0.010) | (0.011) | (0.012) | (0.010) | (0.011) | (0.011) | (0.010) |
| ln(Archived) | 0.4543 * | | | | | | | 0.2967 |
| | (0.180) | | | | | | | (0.211) |
| ln(Pros.) | | -0.3017 | | | | | | |
| | | (0.363) | | | | | | |
| Unemploy.rate | | | 0.0229 | | | | | |
| | | | (0.036) | | | | | |
| GDPpcgrate | | | | -0.0013 | | | | |
| | | | | (0.010) | | | | |
| GNIpcgrate | | | | | 0.0037 | | | |
| | | | | | (0.004) | | | |
| ln(CourtBudg) | | | | | | 0.3789 | | |
| | | | | | | (0.544) | | |
| ln(ProsBudg) | | | | | | | 0.1984 | |
| | | | | | | | (0.533) | |
| p-value | 0.0025 | 0.0181 | 0.0205 | 0.0246 | 0.0152 | 0.0198 | 0.0233 | 0.0074 |
| $R^2$ | 0.7823 | 0.6556 | 0.6454 | 0.6299 | 0.6695 | 0.6481 | 0.6348 | 0.6255 |
| adjusted $R^2$ | 0.7098 | 0.5408 | 0.5271 | 0.5065 | 0.5593 | 0.5308 | 0.5130 | 0.5506 |
| BG test | 0.4057 | 0.2910 | 0.1209 | 0.2703 | 0.3988 | 0.4467 | 0.4092 | 0.2167 |

Notes: In addtion to the independent variable of interest (Clearance rate) different control variables were added in a stepwise process, ln indicates the natural logorhythm. Standard error in parentheses. Rates are given in %. Budgets (per capita) are given in local currency. BG test = p-values for Breusch-Godfrey LM test at alpha = 0.05.
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

### 3.1.2. Violation of trust

Figure 2 describes the evolution and persistence of violation of trust incidents between 2001 and 2015, indicating possible multiple breaks in the structure of the series.[6] Chow tests applied to the series reveal statistically significant breaks in 2003 and 2009, and which are probably due to unknown events or caused by a measurement error (table A4).

[6] The expected sentence length for violation of trust is up to five years or fine. In more server cases sentence length can be up to ten years (Art. 192, Law No. 1160/97; Penal Code of Paraguay).

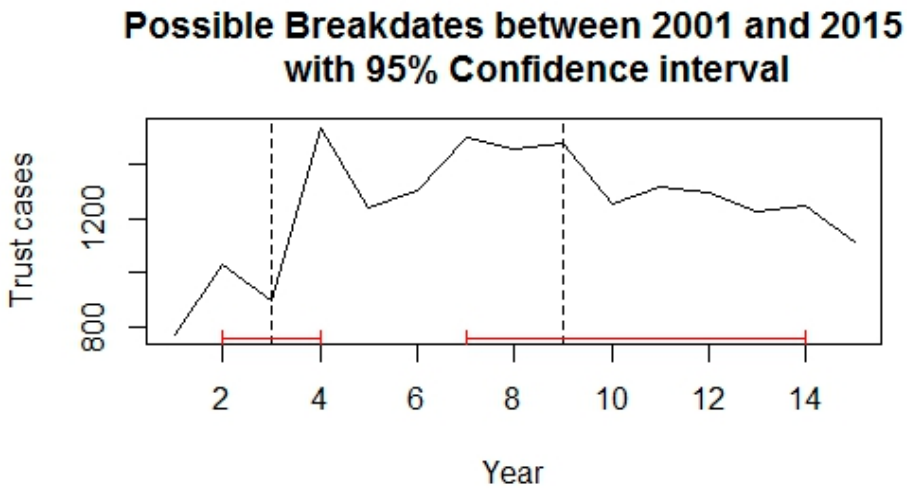


Figure 2: Possible breakdates for violation of trust series. Data: Public Ministry.

Regression results for violation of trust incidents are not as obvious as for fraud. The sign for clearance rate, socio-economic and budget variables are in line with theory, except for prosecutors who seem to increase incidents (table 6). However, none of these variables has a significant effect. Clearance rate is significant on a generous 0.1 level in model 3 and 4, and significant on a 0.05 level in the static model. Introducing lagged dependent variables have just a marginal effect and, as it seems, even induce autocorrelation (model 3 and 8) as revealed by the Breusch-Godfrey test. A one unit change in the clearance rate would decline violation of trust incidents by 2.4 percent in model 8. A one unit increase in the clearance rate would indicate a long run effect of -1.8 percent, but with a half-life of just about eight month (0.850) in model 3. Again, the results presented may suffer due to a small sample size. It might also be the case that most of the effects are already captured by fraud, because often fraud and violation of trust go together in real world cases, and in particular with respect to white-collar crime incidents. This may indicate that violation of trust is not necessarily a purposeful choice of a specific crime type rather than a consequence or by-product of a deviant behavior (Durlauf et al. 2008).

Table 6: Regression table for violation of trust incidents.

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Regression table for violation of trust incidents

| dependent = ln(Trust) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Intercept | 0.0301 | 0.0186 | -0.3123 | 0.0705 | 0.0274 | 0.0285 | 0.0285 | -0.2312 |
| | (0.045) | (0.043) | (0.184) | (0.050) | (0.044) | (0.044) | (0.045) | (0.138) |
| Lag. dep. Var. | -0.3298 | -0.1328 | -0.4426 . | -0.3425 | -0.3398 | -0.3440 | -0.3442 | -- |
| | (0.260) | (0.316) | (0.224) | (0.223) | (0.254) | (0.254) | (0.260) | |
| Clear.rate | -0.0207 | -0.0233 . | -0.0159 | -0.0237 . | -0.0224 | -0.0202 | -0.0198 | -0.0259 * |
| | (0.013) | (0.012) | (0.011) | (0.012) | (0.013) | (0.012) | (0.012) | (0.010) |
| ln(Archived) | 0.0259 | | | | | | | |
| | (0.082) | | | | | | | |
| ln(Pros.) | | 0.4823 | | | | | | |
| | | (0.459) | | | | | | |
| Unemploy.rate | | | 0.0619 . | | | | | 0.0451 . |
| | | | (0.033) | | | | | (0.022) |
| GDPpcgrate | | | | -0.0125 | | | | |
| | | | | (0.009) | | | | |
| GNIpcgrate | | | | | -0.0020 | | | |
| | | | | | (0.004) | | | |
| ln(CourtBudg) | | | | | | -0.2507 | | |
| | | | | | | (0.571) | | |
| ln(ProsBudg) | | | | | | | -0.0048 | |
| | | | | | | | (0.535) | |
| p-value | 0.1093 | 0.0709 | 0.0282 | 0.0498 | 0.1025 | 0.1048 | 0.1143 | 0.0150 |
| $R^2$ | 0.4727 | 0.5250 | 0.6181 | 0.5632 | 0.4808 | 0.4780 | 0.4668 | 0.5338 |
| adjusted $R^2$ | 0.2969 | 0.3667 | 0.4907 | 0.4176 | 0.3078 | 0.3040 | 0.2891 | 0.4490 |
| BG test | 0.6465 | 0.6881 | 0.0064 | 0.7302 | 0.6383 | 0.5916 | 0.6468 | 0.0358 |

Notes: In addtion to the independent variables of interest (Clearance rate and Archived cases) different control variables were added in a stepwise process, ln indicates the natural logorhythm. Standard error in parentheses. Rates are given in %. Budgets (per capita) are given in local currency. BG test = p-values for Breusch-Godfrey LM test at alpha=0.05.
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## 4. Conclusions and recommendations

This paper comprises the first exploratory study of the deterrent effect on white-collar crimes in the jurisdiction of Paraguay. It also shades light on the efficiency of the Paraguayan judicial system.

The results show that a highly significant deterrent effect is exerted by increasing clearance rate for fraud in all tested specifications and with less significant relevance for violation of trust incidents. However, deterrence to work properly requires certainty, severity, and celerity. Therefore, the combined effect of all three elements might be higher as reported (Mendes and McDonald 2001). Despite the limitations due to a lack of data, the results confirm deterrence theory.

However, it is worth noting that this exploratory study does not depict the entire criminal prosecution process, which starts usually with police investigative work followed by public prosecution, and ends with a sentence in court. In the particular case of white-collar crimes, all crimes are almost always cleared at the time when victims file criminal complaints, without previous intervention of the police. Hence, the Public Ministry has to shoulder both investigation and prosecution within the jurisdiction of Paraguay.

In general, more legal income opportunities and better labor conditions may mitigate violent crimes by providing a more optimistic future perspective especially for young people (Entorf 2009; Fajnzylber et al. 2002; Witte and Tauchen 1994). In fact, juvenile misconduct today can imply tomorrow's crime (Buonanno and Montolio 2008). However, it does not seem that this might be the case in deterring fraud and violation of trust. This is probably due to the nature and motives of white-collar crime. Macroeconomic variables of Paraguay, generally associated as a mitigating factor of

crime, are sound with an average GNI per capita growth rate of about 10.51 percent and an average GDP per capita growth rate of 2.47 percent over the same time period of this research.

It also seems that a soft on crime strategy was induced with the implementation of the new penal code based on a previous German version of 1969. Hence, high shares of dismissals, archiving cases and low sentences will continue to increase recidivism and encourage white-collar typical crimes like fraud and violation of trust. It should be noted that the offenses grouped here as white-collar crimes do not span the scale of offenses that can and should be regarded as white-collar crime. For example, public corruption, embezzlement, tax evasion, money laundering, bankruptcy fraud and bribery are notably absent.

As descriptive evidence reveal, the Paraguayan judicial system lacks of efficiency rather than funding. "Governments allocate resources to criminal justice with little, or no, attention to outcome" (Spencer 1993: 7) and can be well predicted by last year's budget (Davis, et al. 1966). However, different from the private sector where firms need to reduce costs to be competitive, the judicial system is a monopolist and the sole supplier of a specific public service. Short-term (mostly electoral) interests may expand the public sector, incorporating new employees (and voters) and thus re-enforcing the process of expenditure (Peacock 1978: 120-121).

The vast majority of victims depend on the expertise or good-will of the local prosecutor of the case despite the existence of a special unit which attends economic crimes and corruption (UDEA), but with limitations.[7] To make better use of their technical knowledge and offer a better service to society its usage should be less restrictive. More generally, expertise and technical knowledge should be used as a driver to increase celerity for a timely punishment, and decrease significantly accumulated backlogs in different areas by implementing fast-track trials and special courts (e.g. Dalla Pellegrina 2007). This should also create best-practices to resolve special types of crime and should reduce incidents not just for fraud and other white-collar crimes, enhancing victim satisfaction, and increasing public confidence (Cook et al. 2004; Peterson 2017). In general, as descriptive evidence reveal, a redistribution of funds and human capital should be a priority within the juridical system to increase efficiency. This can be reached by increasing shares in information technology while reducing administrative staff, increasing connectivity with other government institutions, active management of case progress, and produce basic statistics on a routinely basis and institutional level. It should also be thought about introducing a police force with investigative tasks to relieve investigative work of public prosecutors.

Nevertheless, the data indicates clearly an epidemic problem. Therefore, conducting further empirical studies is recommended and required to better understand white-collar crime in Paraguay, and help public policymakers to make better and more informed decisions.

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## Appendix A. Descriptive statistics of offence specific variables

Table A1: Descriptive statistics of offence specific variables.

[7] UDEA = Unidad especializada en Delitos Económicos y Anticorrupción. The Unit has limitations and is just able to act in the city of Asuncion (capital), passing a certain amount and if a public institution is a victim. In special cases the attorney general can advise the special unit to investigate.

**Descriptive statistics of offence specific variables**

| | Mean | Std. dev | Min | Max |
|---|---|---|---|---|
| Fraud | 4123 | 1807.90 | 1437 | 6811 |
| Clearance rate (%) | 17.22 | 3.09 | 12.73 | 23.60 |
| Archived | 328.80 | 184.86 | 110 | 644 |
| Violantion of Trust | 1244 | 218.05 | 771 | 1535 |
| Clearance rate (%) | 13.21 | 2.94 | 7.60 | 18.56 |
| Archived | 51.47 | 13.74 | 34 | 82 |

Notes: Data are from the Office of the Public Prosecutor. All figures are given in absolute numbers except clearance rate.

## Appendix B. Descriptive statistics of socio-economic variables.

Table A2: Descriptive statistics of socio-economic variables.

**Descriptive statistics of socio-economic variables**

| | Mean | Std. dev | Min | Max |
|---|---|---|---|---|
| Court Budget in Gs p. inhabitant | 84478 | 44898.51 | 30575 | 169601 |
| Prosecution Budget in Gs p. inhabitant | 42843 | 22896.06 | 16396 | 86307 |
| GDP per capita growth Rate | 2.47 | 4.85 | -5.23 | 12.51 |
| GNI per capita growth Rate | 10.51 | 7.27 | -4.79 | 20.87 |
| Unemployment Rate | 6.02 | 1.81 | 4.09 | 10.76 |
| Prosecutors | 296 | 50.59 | 218 | 372 |

Notes: Budgets per inhabitant are given in local currency (Guaranies, Gs; 1 EUR = 6348 Gs; 2017 average). Growth rates are given in %. Data from the Ministry of Finance, Central Bank, Office of the Public Prosecutor, UNESCO and World Bank.

## Appendix C. Unit root and stationarity tests

Table A3: Unit root and stationarity tests.

| | Unit root test | | | | Stationarity test | | |
|---|---|---|---|---|---|---|---|
| | ADF test | | | | KPSS test | | |
| | level | log | 1.diff | 2.diff | level | log | 1. diff |
| ln(Fraud) | 2.222 | 2.052 | -2.046 * | | 0.062 * | 0.122 * | |
| ln(Trust) | 0.201 | | -2.256 * | | 0.199 | | 0.102 ** |
| ln(Arch) | 0.082 | 1.173 | -1.630 . | -2.450 * | 0.088 ** | 0.092 ** | |
| Clear.rate | -0.463 | | -3.987 ** | | 0.085 * | | |
| ln(Pros.) | 2.183 | 2.347 | -1.749 . | -6.733 ** | 0.148 . | 0.168 . | 0.089 ** |
| GDPpcgRate | -2.061 * | | | | 0.068 ** | | |
| GNIpcgRate | -1.300 | | -7.058 ** | | 0.075 ** | | |
| Unemploy.rate | -3.669 ** | | | | 0.137 ** | | |
| ln(CourtBudg) | 2.655 | 2.631 | | -3.941 ** | 0.203 | 0.057 ** | |
| ln(ProsBudg) | 2.641 | 2.646 | | -2.841 ** | 0.199 . | 0.096 ** | |

Note: p-values are reported until ADF and KPSS tests indicate stationarity at $p < 0.05$. ln indicates the natural logorhythm.
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

**Appendix D. Chow tests**

Table A4: Chow tests for fraud and violation of trust series.

| | Chow tests for possible breaks | | | | |
|---|---|---|---|---|---|
| | 2003 | 2007 | 2009 | 2010 | 2013 |
| Fraud | 2.0560 | 0.5884 | ---- | 0.3904 | 0.0090 |
| | (4.9646) | (4.1203) | ---- | (6.0942) | (241.8817) |
| Violation of trust | 19.2117 | --- | 9.0862 | --- | --- |
| | (4.9646) | --- | (6.0942) | --- | --- |

Notes: Coefficients for fraud are on a 99 % level and for violation of trust on 95 % level. Critical values in parentheses. $H_0$ = no breaks. Based on data from the Public

**Appendix E. Efficiency of the judicial system (Fraud cases – Part 1**

Table A5: Efficiency of the judicial system (fraud cases) – Part 1.

**Efficiency of the Paraguayan judicial system (Fraud cases) - Part 1**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|
| Incoming cases | 1589 | 1971 | 1437 | 2637 | 3494 | 3375 | 3604 |
| Controlled cases | 401 | 408 | 446 | 579 | 705 | 750 | 944 |
| Archived cases | 115 | 110 | 116 | 123 | 189 | 259 | 316 |
| Dismissals | 151 | 132 | 139 | 210 | 236 | 216 | 320 |
| Resolved cases | 287 | 300 | 331 | 460 | 519 | 490 | 628 |
| Clearance rate % | 18.09 | 15.20 | 23.06 | 17.44 | 14.85 | 14.52 | 17.42 |
| Backlog | 1302 | 2973 | 4079 | 6256 | 9231 | 12116 | 15092 |
| Turnover ratio | 0.22 | 0.18 | 0.30 | 0.21 | 0.17 | 0.17 | 0.21 |
| Disposition time (days) | 1652.78 | 2036.73 | 1218.12 | 1727.85 | 2092.71 | 2148.22 | 1730.27 |

Notes: All figures correspond to fraud cases; Backlog is calculated since 2001; a controlled case is a case with an asigned procedural status (e.g. investigation, accused, desestimated etc.); Turnover ratio measures the relationship between resolved cases and unresolved cases at the end of a period; Disposition time (in days) measures the theoretical time necessary for a pending case to be solved in court in the light of the current pace of work.

## Appendix F. Efficiency of the judicial system (violation of trust cases) – Part 1

Table A6: Efficiency of the judicial system (violation of trust cases) – Part 1.

**Efficiency of the Paraguayan judicial system (Violation of trust cases) - Part 1**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|
| Incoming cases | 771 | 1028 | 898 | 1535 | 1241 | 1303 | 1494 |
| Controlled cases | 155 | 195 | 206 | 227 | 244 | 276 | 191 |
| Archived cases | 34 | 48 | 49 | 44 | 51 | 82 | 51 |
| Dismissals | 49 | 73 | 76 | 103 | 90 | 106 | 73 |
| Resolved cases | 105 | 125 | 133 | 156 | 167 | 165 | 113 |
| Clearance rate % | 13.64 | 12.12 | 14.80 | 10.19 | 13.49 | 12.64 | 7.60 |
| Backlog | 666 | 1569 | 2334 | 3713 | 4787 | 5925 | 7305 |
| Turnover ratio | 0.16 | 0.14 | 0.17 | 0.11 | 0.16 | 0.14 | 0.08 |
| Disposition time (days) | 2310.48 | 2647.39 | 2101.98 | 3217.54 | 2339.87 | 2522.74 | 4440.04 |

Notes: All figures correspond to violation of trust cases; Backlog is calculated since 2001; a controlled case is a case with an asigned procedural status (e.g. investigation, accused, desestimated etc.); Turnover ratio measures the relationship between resolved cases and unresolved cases at the end of a period; Disposition time (in days) measures the theoretical time necessary for a pending case to be solved in court in the light of the current pace of work.

## Appendix G. Efficiency of the judicial system (violation of trust cases) – Part 2

Table A7: Efficiency of the judicial system (violation of trust cases) – Part 2.

**Efficiency of the Paraguayan judicial system (Violation of trust cases) - Part 2**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Incoming cases | 1455 | 1477 | 1256 | 1314 | 1298 | 1224 | 1248 | 1111 |
| Controlled cases | 229 | 374 | 295 | 235 | 242 | 262 | 238 | 289 |
| Archived cases | 43 | 71 | 38 | 44 | 52 | 70 | 59 | 36 |
| Dismissals | 93 | 173 | 136 | 77 | 73 | 86 | 66 | 67 |
| Resolved cases | 159 | 256 | 223 | 154 | 162 | 162 | 145 | 206 |
| Clearance rate % | 10.94 | 17.33 | 17.74 | 11.69 | 12.48 | 13.23 | 11.64 | 18.56 |
| Backlog | 8601 | 9822 | 10855 | 12016 | 13152 | 14214 | 15317 | 16221 |
| Turnover ratio | 0.12 | 0.21 | 0.22 | 0.13 | 0.14 | 0.15 | 0.13 | 0.23 |
| Disposition time (days) | 2971.77 | 1740.57 | 1692.43 | 2757.00 | 2560.83 | 2394.03 | 2769.63 | 1601.47 |

Notes: All figures correspond to violation of trust cases; Backlog is calculated since 2001; a controlled case is a case with an asigned procedural status (e.g. investigation, accused, desestimated etc.); Turnover ratio measures the relationship between resolved cases and unresolved cases at the end of a period; Disposition time (in days) measures the theoretical time necessary for a pending case to be solved in court in the light of the current pace of work.

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