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Non-trial Resolutions for Corruption Crimes and the Brazilian Case

Presentata da: Lucas Alves Chacha

Coordinatore Dottorato

prof. Matteo Barigozzi

Supervisore

Prof.dr. S. Oded
Prof.dr. E. Kantorowicz-Reznichenko
Prof.dr. L.A. Franzoni

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To my dear family and friends,
especially to my parents,
for their love and support.

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Part I

INTRODUCTION

Chapter 1

Introduction

Corruption is a widespread issue that affects economies around the globe. Estimates suggest that bribes account for about 2% of global Gross Domestic Product (GDP)(IMF, 2016). However, this percentage represents only a part of the economic impact of corruption. The effects of corruption go beyond immediate financial losses, leading to various negative externalities that impact economic and social development.

Literature on corruption shows that it affects economic output in multiple ways. It degrades governance by prioritizing personal over public interest (Kaufmann and Wei, 1999; Méon and Sekkat, 2005; Kaufmann et al., 2006), leading to resource misallocation (Golden and Picci, 2005), and deters investment due to the unpredictability of corrupt environments, causing economic opportunities to be missed or relocated, directly impacting economic growth (Mauro, 1995). When corruption occurs in areas of human capital formation, social spending, investments in education, it disproportionately harms the poorer, thereby widening socio-economic gaps (Gupta et al., 2002). Corruption also harms fair competition, either by forcing businesses into corrupt practices to obtain contracts or by benefiting government-chosen companies instead of the most capable ones, leading to less innovation and economic progress (Ades and Di Tella, 1995, 1997). These factors collectively restrict income growth and development (Rose-Ackerman, 1978), highlighting the importance of addressing corruption as an important social and economic issue.

There are theoretical arguments about possible benefits of corruption, stating that it can 'grease the wheels' of business by overcoming bureaucratic constraints. The main criticism of this view is that any benefit, if it exists, arises from bad policies and institutions in the first place. More importantly, empirical studies show that the costs of corruption are greater than its benefits. Thus, corruption is more likely to 'sand' than to 'grease' the wheels of the economy (Kaufmann and Wei, 1999; Méon and Sekkat, 2005). Consequently, this research assumes that

corruption is harmful to any society and it must be prevented with appropriate policies.

The widespread harmful effects of corruption highlight the need to develop and apply effective solutions. In this context, this work explores policies that could potentially deter corruption. Effective enforcement strategies against corruption must address its root causes. Thus, it is essential to identify the incentive mechanisms that lead to corruption and understand how different enforcement policies impact these crimes. This perspective was first introduced by Becker (1968) in one of the initial microeconomic models analyzing crime, and later, Rose-Ackerman (1975) applied Becker's methodology to analyze corruption in a bribery market. These foundational studies have generated extensive literature on the economics of corruption.

While traditional prosecution methods remain prevalent[1], the increasing endorsement of non-trial resolutions by international frameworks such as the United Nations Convention Against Corruption (UNCAC) (United Nations, 2004) and the OECD Anti-Bribery Convention (OECD, 2009) reflects a growing consensus on their potential to enhance anti-corruption efforts. These international organizations officially support the implementation of collaborative agreements, self-reporting, Deferred Prosecution Agreements (DPAs), Non-Prosecution Agreements (NPAs), and similar measures. This study examines the efficacy of non-trial resolutions, with a specific focus on Brazil's recent anti-corruption initiatives.

By investigating whether these mechanisms effectively mitigate corruption and assessing their tangible impact, this work contributes to the broader discourse on crafting resilient anti-corruption strategies. These strategies aim to address both the symptoms and root causes of corruption, potentially leading to important conclusions over anti-corruption policies.

1.1 Problem Illustration

Corruption manifests in various offenses across different jurisdictions. For instance, Polinsky and Shavell (2001) explore the harmful effects of various forms of corruption in law enforcement, specifically focusing on bribery[2], extortion, and framing. According to the authors, bribery involves a payment from an offender to an enforcement agent to avoid sanctions. In this study, however, bribery refers to the payment of a value to a public official to obtain some general illegal benefit, simi-

[1]Non-trial resolutions, while more prevalent in common law countries, have not been as usual in civil law jurisdictions. In Brazil, for example, they were the exception rather than the norm in prosecution practices until the introduction of awarded collaborations in 2013 specifically for corruption crimes. In Chapter 3, the issue is better explored.

[2]In a definition distinct from the one used here.

lar to the definition presented in Engel et al. (2016) and Abbink and Wu (2017). Additionally, Polinsky and Shavell (2001) discuss extortion, where an enforcement agent forces an individual to pay an undue value for a public good or service, and framing, which is the act of falsely accusing an innocent person of a crime.

To illustrate the definition of bribery in Polinsky and Shavell (2001), consider an example where the standard fine for an offense is \$10,000. If the offender can pay a bribe of \$7,000 to avoid this fine, the deterrent effect is weakened. This type of corruption was studied also by Lambsdorff and Nell (2007); Basu (2011); Dufwenberg and Spagnolo (2014); Basu and Cordella (2016). Polinsky and Shavell (2001) argue that bribery is particularly harmful because it undermines the deterrence effect of legal sanctions. Deterrence is a key function of law enforcement, aiming to prevent individuals from committing offenses by making the expected costs outweigh the benefits. When bribery occurs, this balance is distorted, reducing the effectiveness of law enforcement.

To illustrate the case referred to in this study, imagine a scenario where a corrupt entrepreneur seeks to secure a lucrative government contract by inflating prices. The entrepreneur identifies a public official with the decision-making power necessary to approve the contract. In this case, the entrepreneur proposes a bribe, calculated to offset the risks of committing a crime and the potential benefits from securing the contract. This type of corruption is often referred to in the literature as collusive corruption or bribery (Engel et al., 2016; Abbink and Wu, 2017)[3].

Traditionally, collusive corruption could be uncovered by police, public prosecutors, or other competent authorities during routine investigations. If sufficient evidence is gathered, authorities can initiate legal proceedings, leading to penalties for those involved. These penalties vary by jurisdiction, ranging from fines and imprisonment to restrictions on participating in future public contracts.

However, there has been a shift towards non-trial resolutions, as advocated by international bodies as mentioned before. These resolutions offer an alternative path, allowing the parties involved to negotiate with authorities, potentially leading to a settlement without a trial. This approach often requires the accused party to provide detailed information about the crime, returning illicit gains, and cooperating with authorities to secure leniency.

In our example, if the entrepreneur is the first to be detected, they could negotiate a deal to disclose all details of the corruption, provide evidence, and return the illicit gains. This cooperation might also include implicating the public official or others involved. The same process could occur if the public official or multiple par-

[3]The distinction between collusive corruption and extortion (often referred to as harassment bribes (Lambsdorff and Nell, 2007; Basu, 2011; Dufwenberg and Spagnolo, 2014; Basu and Cordella, 2016)) lies in the balance of power. In collusive corruption, power is balanced as both parties benefit from the corrupt agreement. In extortion, power is unbalanced, allowing one party to extort the other for a bribe or benefit.

ties are detected first. Furthermore, non-trial resolutions encourage self-reporting. If parties believe that cooperating with authorities will result in a more favorable outcome, they may proactively come forward, even before detection.

Despite their growing adoption worldwide, NTRs are not without controversy. Critics argue that these agreements may undermine the deterrent effect of legal penalties, allowing wealthy or influential individuals to escape harsher punishments (Spagnolo, 2005). There are concerns about the transparency and fairness of the negotiation process, as it may disproportionately benefit those with the resources to secure better deals. Additionally, this approach might signal a lenient stance on corruption, potentially reducing the stigma associated with such crimes (Søreide and Vagle, 2022).

The case of Brazil offers a unique perspective on the implementation of NTRs. Prior to 2013, Brazilian laws did not permit negotiated settlements in corruption cases. However, following the anti-corruption reforms introduced in 2013, Brazil witnessed major corruption investigations, such as the Car Wash (*Lava Jato*) operation. These investigations highlight the significant changes in the country's approach to handling corruption, providing crucial context and motivation for this work, as is elaborated in the next section.

1.2 Motivation

Recognizing the detrimental impact of corruption on society and the economy, the discussion now shifts to the application of NTRs. While these methods are critical tools in the fight against corruption, their effectiveness is a subject of significant debate, especially when faced with resistance from powerful and influential sectors.

Critics argue that non-trial resolutions are too lenient, especially when addressing corruption among individuals with significant political and economic power. This lenient approach could actually encourage corruption by making potential offenders think they can easily get away with lighter consequences. Addressing corruption among powerful politicians and major corporations is particularly challenging due to their significant influence and resources. These groups often fight back against strong anti-corruption actions, fearing for their interests. This resistance makes it harder to hold influential corrupt figures accountable (Søreide and Vagle, 2022).

The Car Wash Operation in Brazil, starting in 2014, provides a strong example. Using the anti-corruption features introduced by the law in 2013, this massive investigation into corruption at Petrobras and other areas took a firm stance against deep-rooted corruption. It resulted in many convictions and recovered a substantial amount of stolen money[4], showing how focused legal efforts can overcome the

[4]It is estimated by the Federal Public Prosecution Office of the state of Paraná that R$ 4.3

challenges posed by powerful corrupt groups.

Marrara and Pietro (2023) critically analyzes the Brazilian Anti-Corruption Law (Law No. 12.846/2013), highlighting its innovative features that are key to its success. They provide detailed commentary on each article of the law, emphasizing the integration of administrative and civil liabilities that strengthen its efficacy. The law's stringent penalties and corporate liabilities are highlighted as key features that enhance transparency and accountability. The promotion of corporate compliance programs is noted as a progressive measure to mitigate corruption risks. Additionally, the law introduces negotiated resolutions, such as 'leniency agreements'[5]for corporate entities, akin to Deferred Prosecution Agreements (DPAs), which allow companies to negotiate penalties and avoid trial under certain conditions. Furthermore, the Law 12.850/2013 introduced the 'awarded collaborations' for natural persons, which function similarly to plea bargains but are specifically tailored to encourage individuals to cooperate with investigations in exchange for possible leniency. The negotiated solutions introduced by the law still have some judicial oversight, and trials are conducted after the agreements. However, these solutions are the closest in Brazilian legislation to fully non-trial resolutions. These elements, according to Marrara and Pietro (2023), are crucial for ensuring that the law not only punishes but also prevents corruption by fostering a culture of integrity and compliance across organizations.

Operation Car Wash, despite its early successes, exemplifies the unpredictability and challenges of combating corruption. The operation became politicized over time (Ribeiro, 2024), with its use of controversial measures such as pretrial detention and plea bargains being heavily criticized for overstepping constitutional rights (Marona and Kerche, 2020). Significant legal challenges arose, including debatable accusations of bias against key figures like Judge Sergio Moro, which led to the dismantling of the Car Wash task force and the annulment of convictions, contributing to a general feeling of impunity (AP, 2019). Additionally, the economic repercussions were profound, as the Brazilian Supreme Court reversed fines and freed key figures implicated in the operation, indicating a pushback against the anti-corruption measures (Spinetto, 2024).

This scenario illustrates the importance of using non-trial resolutions and anti-corruption strategies effectively. Operation Car Wash demonstrates the challenges of addressing high-level corruption and the need for thoughtful approaches to anti-

billions were paid as forfeiture and R$ 2.1 billion on fines were charged so far. The total amount of fines expected to be recovered is of R$ 14.7 billion only at the first instance of that state. Available at: `https://www.mpf.mp.br/grandes-casos/casos-historicos/lava-jato/resultados`.

[5]It is important to distinguish these leniency agreements from those used for cartel offenses, despite sharing the same name. In the Brazilian context, leniency agreements are specifically tailored to combat corruption, unlike their counterparts in other jurisdictions which primarily address anti-competitive behaviors in cartels.

corruption strategies. Chapter 3 discusses the innovations introduced in Operation Car Wash from legal and prosecutorial perspectives, including the use of non-trial resolutions. The final chapter reviews the best practices identified by this research for anti-corruption policies involving non-trial resolutions and examines which of these were applied in Operation Car Wash. This analysis helps to understand the real-world impact of these policies through this case study.

1.3 Research Object and Scope

The object of this work is corruption, but as mentioned before, there are many different concepts of corruption. Here and throughout the entire study, the concept of corruption is narrowed, and it is understood in alignment with the provisions of the United Nations Convention Against Corruption (UNCAC) United Nations (2004). Specifically, corruption is defined as bribery, wherein a bribe is paid to a public official to gain an illicit favor.

As discussed in Section 1.1, this study differentiates between harassment bribes and collusive bribery. Harassment bribes involve extortion, where one party, typically a public official, demands payment to provide a service or issue a license that the other party is already entitled to. Studies such as those by Lambsdorff and Nell (2007) and Dufwenberg and Spagnolo (2014) have extensively explored this type of corruption. In contrast, collusive bribery arises when both parties benefit from the corrupt agreement, such as in procurement frauds or contract overpricing. This type of corruption is particularly challenging to detect and prosecute because both participants have incentives to conceal their actions, as studied by Engel et al. (2016) and Abbink and Wu (2017). Collusive corruption also tends to involve larger and more complex crimes, necessitating alternative prosecutorial strategies to effectively deter and disrupt these arrangements. This work focuses specifically on collusive bribery.

Corruption can be further categorized as systemic or non-systemic. Systemic corruption refers to a pervasive presence of bribery across multiple levels of an economy, often captured by perception-based indices like the Corruption Perceptions Index (CPI) from Transparency International (2019a). These indices aggregate broader activities, some of which may not necessarily be illegal but are still considered detrimental, such as nepotism or favoritism in governance. While systemic corruption provides a macroeconomic perspective, this study concentrates on non-systemic corruption. The focus is on understanding the mechanisms and incentives behind individual bribery events rather than analyzing the broader economic impact of entrenched corruption practices, as extensively reviewed by Lambsdorff (2008).

The study also distinguishes between domestic and foreign corruption. Do-

mestic corruption involves all parties operating under the same legal framework, ensuring that both bribe givers and receivers are prosecuted under a unified jurisdiction. In contrast, foreign corruption introduces complexities due to differing legal systems and enforcement standards. For example, the United States criminalizes foreign bribery under the Foreign Corruption Practices Act (FCPA), whereas Brazil lacks specific legislation on this matter. This work focuses exclusively on domestic corruption, assuming that all parties are liable under the same jurisdiction. This simplification is essential for evaluating the effectiveness of anti-corruption measures across all involved parties.

Finally, the distinction between private and public corruption is crucial. Private corruption occurs within the private sector, such as when a supplier bribes a corporate employee to secure a contract. This type of misconduct is often treated as a civil offense in many jurisdictions (Rose-Ackerman, 2006). Public corruption, on the other hand, involves a private party bribing a public official to gain an illicit advantage. This work is solely concerned with public corruption, focusing on the intersection of private incentives and public governance.

In this study, the terms 'corruption' and 'bribery' can be used interchangeably to specifically denote collusive bribery or corruption (CBC), defined here as public, collusive, non-systemic, and domestic misconduct. From this point onwards, whenever the thesis refers to its specific object of analysis, it will consistently use the term CBC[6]. Other forms of corruption — such as harassment bribes or private bribery — will be explicitly identified and named accordingly as needed, ensuring clarity and maintaining the precise scope of the research.

1.4 Legal Framework

In order to deter criminal behavior, the law can set punishments[7] (sticks) for certain conduct. Nonetheless, law can also set benefits (carrots) for people who collaborate or help to avoid certain crimes.

According to the law and economics approach, as articulated by Posner (2014),

[6]Readers should note that CBC refers specifically to the practice of collusive corruption or bribery, whereas the corruption literature addresses a broader range of practices. In Chapter 2, it is emphasized that the term 'corruption' may have distinct meanings across different studies. Notably, whenever a cited work diverges too much from the object of this study, the difference is always highlighted. Another similar issue occurs with the definition of corruption crimes, in which most jurisdictions are crimes of practicing CBC, this is not universally true. However, as discussed in Chapter 3, the Brazilian legislation restricts its definition of corruption crimes solely to those resulting from CBC. Accordingly, the term 'corruption crime' employed in Chapter 5 directly reffers to the focus of this analysis.

[7]Punishments are also used to mitigate harm to society, such as through compensation to victims. Currently, this work focuses on the deterrent effect of punishments.

effective enforcement policies are designed with the objective of minimizing the sum of social harm from crimes and the cost of its prevention. This perspective underscores the importance of structuring anti-corruption policies not only to punish wrongdoing but also to create economic disincentives that reduce the occurrence of CBC. By optimizing the balance between enforcement intensity and the economic costs associated with implementing these policies, it is possible to deter corrupt activities while ensuring the efficient use of resources[8].

Importantly, there are two channels through which well-designed anti-corruption policies can be effective. They can work ex-ante, deterring the crime or impeding agents from performing it. Alternatively, they can be effective ex-post, by providing robust frameworks to prosecute crimes or disrupt undetected CBC[9]. The current research focuses on the deterrent aspect of the policies. However, the disrupting effects are mentioned whenever relevant[10].

This section introduces the mechanism of non-trial resolution policies. It covers the incentives of trial processes and specific non-trial strategies. The aim is to clearly explain how these mechanisms function and their role within the legal system.

1.4.1 Judicial Decisions

In civil law systems, the judicial system is responsible for interpreting the law and enforcing decisions over alleged misconducts. However, in common law countries, the courts also play a role in shaping the law through their rulings, as legal precedents set by the courts become part of the law itself.

In criminal law, criminal cases need to be resolved through trials or shorter judicial procedures. Or alternatively, in some situations, there is no need for a judge to decide, as the parties[11] can settle and reach an agreement independently (Clark and Ansay, 2002).

Below, the different legal instruments applied in resolving CBC crimes[12] are broadly introduced for a general audience. In the upcoming chapters, there is

[8]Section 1.8.1.2 explores in more detail the welfare analysis of law and economics.

[9]Undetected CBC activities may refer to paid bribes that remain undiscovered or ongoing CBC schemes.

[10]The deterrent effect of self-reporting is somehow simpler to show, since agents make their forecasts of the future and then make a decision. The parameters in which the decision was made are fixed, so there are a lot less degrees of freedom in the model.

[11]The parties involved can be litigants, or even defendants and the prosecution, depending on the judicial context.

[12]Most of the civil and other crimes may follow the same schemes. However, the most important characteristic of CBC is that the victims are not part of the trials or agreements, or else, they are not active players in the game.

a deeper analytical exploration of each of these legal features adapting it to the problem this work aims to solve.

Trials and Non-Trial Resolutions

In most jurisdictions CBC is a criminal offence (United Nations, 2004). In this case trials follow a legal process aimed at determining the guilt or innocence of individuals accused of these practices. Typically, this involves a series of steps starting with an investigation to gather evidence, followed by the filing of charges if sufficient evidence is found. The accused is then called to court, where both prosecution and defense present their cases, including evidence and witness testimonies. The process is overseen by a judge, and, in some jurisdictions, a jury may be involved in determining the verdict. If found guilty, the individual faces sentencing, which can include fines, imprisonment, or other penalties, depending on the severity of the CBC and the legal framework in place .

NTRs offer an alternative route by allowing the accused to negotiate with prosecutors before a case goes to trial. These agreements often involve the accused admitting to certain charges in exchange for a reduced sentence or penalties. The aim is to expedite the legal process, reduce the burden on court systems, and secure a certain level of punishment for wrongdoing without the uncertainties of a trial (Landes, 1971). Introducing non-trial resolutions into criminal cases changes the course of action by potentially speeding up the resolution of cases, ensuring some level of accountability, and saving resources for both the prosecution and the defense. However, it also raises questions about the adequacy of the punishment and the overall deterrent effect on future corrupt activities (Arlen, 2020). Moreover, since CBC cases necessarily involve more than one party, NTRs might incentivize self-reporting, thereby disrupting collusive agreements (Spagnolo, 2005).

Key forms of NTRs include Deferred Prosecution Agreements (DPAs) and Non-Prosecution Agreements (NPAs), which are used primarily in corporate law to allow companies to meet specific conditions instead of facing prosecution, thereby avoiding the repercussions of a criminal conviction while ensuring accountability. Arbitration and mediation involve neutral third parties to settle civil disputes outside court, and restorative justice seeks to repair harm by involving all stakeholders in the reconciliation process (Clark and Ansay, 2002).

A generic NTR begins when a legal issue or potential violation is identified by regulatory oversight or investigation, or through voluntary disclosure by the accused. Negotiations between the prosecuting or regulatory body and the accused then aim to reach a mutually agreeable resolution, which typically includes sanctions, fines, or corrective actions. The terms are formalized in a documented agreement, often requiring judicial or regulatory approval to ensure fairness. Upon ratification, the accused must fulfill the conditions set forth, such as paying fines

or implementing compliance measures, under the watchful eye of the authority monitoring adherence. Successful compliance results in resolving the case without a trial, while failure may lead to resumed prosecution (Dubber and Hornle, 2019). An example in the U.S. Deferred Prosecution Agreements (DPAs) involve a conditional delay of prosecution where the prosecutor agrees not to pursue formal charges in court for a specified period, provided the accused meets certain conditions such as implementing compliance measures, cooperating with investigations, paying fines, and making restitution. While DPAs require public disclosure through court filings, if the accused fails to adhere to these conditions, prosecution may be resumed, potentially leading to a trial based on the original charges (Clark and Ansay, 2002).

The timing of the disclosure of wrongdoing is crucial in legal contexts, significantly impacting the leniency of terms in NTRs such as DPAs. Early self-reporting before detection often results in more favorable terms, reflecting a proactive commitment to compliance and cooperation. In contrast, collaborating after detection, while still beneficial, typically leads to less lenient outcomes as it is seen as a reactive measure. This distinction underscores the importance of timely action in legal strategies to maximize the potential for leniency in resolutions (Clark and Ansay, 2002).

Notably, there are negotiated solutions that are trial-based. For instance, plea bargaining, where defendants negotiate with prosecutors to plead guilty to lesser charges for lighter sentences. It may involve varying levels of judicial oversight and may or may not include trials in some cases (Treuthart, 1996). Despite the possibility of trials, this is an important negotiated solution which is included in this study.

Arlen (2020) explores how DPAs and NPAs are employed within the U.S. legal system to handle complex corporate cases effectively, providing a comprehensive understanding of the legal principles underpinning non-trial resolutions as an important legal framework to promote judicial efficiency and fairness.

If specifically determined in the criminal law, parties can agree upon the execution of the punishments or rewards. Often, the possibility of the agreement comes in exchange for some collaboration. Non-trial resolution may work ex-ante deterring crimes (Kaplow and Shavell, 1994) or ex-post enhancing crime prosecution by saving costs from use of judicial system (Landes, 1971). These efficiency gains may imply lower punishments and higher deterrence.

Judicial Discretion and Mixed System

Sometimes, agreements of the parties are subject to judicial overview. The level of judicial discretion over agreements is crucial to determine the efficiency of the law.

Judicial discretion varies in its intensity. The law can rule the level of discretion that judges have over prosecution's agreement. It can go from a non-interference rule through some formal legal review up to the discussion on the content of the agreement (Søreide, 2018). Further literature review on these issues and practical examples are discussed in Chapter 3.

1.4.2 Non-Trial Resolutions for Corruption Crimes

Non-trial resolutions offer different incentives depending on the crime involved due to the varied structures and relationships among the parties. For example, in CBC, where the parties involved in the scheme mutually benefit from secrecy[13], incentives such as reduced penalties might be offered in exchange for exposing the CBC network. In contrast, in harassment bribes, where one party is victimized, resolutions might focus on protecting the victim to encourage reporting the crime (Basu, 2011). For cartels, leniency programs can be highly effective, offering significant benefits to the first defector, such as immunity or reduced fines, which not only disrupt the cartel but could also increase the defector's market share (Motta and Polo, 2003). Understanding the dynamics between the involved parties and the nature of the crime is essential to tailor NTRs effectively.

In CBC the victim is generally the wider society, making it challenging to identify specific individuals as victims. This characteristic makes public prosecutors the appropriate authorities to handle these cases. They have the power to negotiate alternative resolutions, including non-trial resolutions. Therefore, it is practical to focus on analyzing these resolutions for CBC, where the individual victims are not clearly defined (Søreide, 2018).

Here, a few legal instruments which imply distinct dynamics are presented. Importantly, the precise legal definition of each term may differ across jurisdictions. Therefore, their legal properties are better explored in Chapter 3.

Since this work explores CBC analytically, on Chapter 4 it focuses on possible games that can be played by agents. These games are constituted from a combination of timing and pay-offs from allowed actions[14]. Admittedly, each action and its respective payoffs are determined by the specific legal rules, as the legislation dictates the consequences of breaking or adhering to the law.

[13] As defined in Section 1.1.

[14] Sequentiality is also fundamental for calculating the game's equilibria. Here, in the following extensive games, actions are simultaneous. Implications from the sequentiality ('hold-up' problems) are discussed when relevant.

1.4.3 Sanctions

Sanctions for CBC vary between natural persons and corporate entities, reflecting the scope and nature of the offenses. For natural persons, common sanctions include: imprisonment, which may range from a few years to extensive terms depending on the gravity of the offense; fines; forfeiture of assets gained through corrupt means[15]; disgorgement of profits to prevent unjust enrichment; and prohibition from holding public office or serving as corporate directors. For corporate entities, penalties include hefty fines designed to inflict financial punishment; forfeiture and disgorgement of profits linked to the corrupt activities; debarment from public contracting, which prevents them from participating in government contracts and thus limits their business operations; blacklisting, which restricts their commercial activities; mandated compliance programs to prevent future offenses; and corporate probation during which business practices are closely monitored to ensure adherence to legal and ethical standards[16](Clark and Ansay, 2002).

The sanctions mentioned above vary across jurisdictions, reflecting different legal frameworks and cultural attitudes toward CBC. Chapter 3 examines how these penalties are applied in different legal contexts, specifically in the U.S., U.K., France, and Brazil. It also explores the use of NTRs in addressing CBC, highlighting the diverse approaches taken by these jurisdictions and the implications for both natural persons and corporate entities. Additionally, the chapter provides a comprehensive list of sanctions used in combating CBC across these jurisdictions, offering a comparative analysis of the key differences between them.

1.4.4 Sanction Reductions

The previous sections show that sanctions may be used as 'sticks' to prevent criminal behaviour. However, reductions of these sanctions can be used as 'carrots' to incentivize collaborations. Therefore, the type and intensity of reductions define the incentive for agents to engage in crimes (Posner, 2014).

DPAs often provide reduced penalties or sanctions to corporations that agree to cooperate fully with investigations, disclose wrongdoing, and implement robust compliance measures to prevent future offenses. These agreements are particularly valuable in complex CBC cases where obtaining evidence can be challenging without insider assistance (Arlen, 2020).

Amnesty programs may be offered to individuals who voluntarily disclose their

[15]This particular mandatory sanction is crucial in shaping the dynamics of CBC and its consequences on Chapter 4.

[16]Available at: `https://www.gov.uk/government/publications/global-anti-corruption-sanctions-information-note-for-non-government-organisations/global-anti-corruption-sanctions-information-note-for-non-government-organisations`

involvement in CBC, often before any investigation into their actions has begun. These programs can significantly reduce legal penalties but usually require full disclosure and cooperation with authorities (Dubber and Hornle, 2019).

Non-prosecution agreements are used when the value of the information provided by the cooperating party outweighs the benefits of pursuing a full prosecution. By agreeing not to prosecute, authorities can secure crucial information and cooperation from participants in CBC, facilitating broader investigations into corrupt practices (Arlen, 2012).

These non-trial resolutions are essential tools for law enforcement agencies as they enable more strategic, efficient, and effective responses to CBC, ensuring that justice is served while fostering a preventative compliance environment.

1.5 Corporate Vs Individual Corruption Crimes

The previous section highlighted that corporate and individual crimes are treated differently, not only in cases of CBC but also in relation to other offenses. This distinction raises the need to explore why these differences exist and, more importantly, to clarify when this study focuses on individuals and when it addresses corporations.

In economics and law, individuals and corporations exhibit distinct behaviors when it comes to incentives and responses to criminal behavior. Individuals aim to maximize their personal utility, often displaying risk aversion, while corporations focus on profit maximization and tend to adopt a neutral stance toward risk. This difference extends into the realm of criminal law, where the nature of punishments also varies. Individuals may face imprisonment and moral harm, while corporations are usually subjected to fines, exclusion from certain contracts, or reputational damage.

For individuals, sanctions are multifaceted, combining monetary penalties, potential imprisonment, and moral or social harm. These factors are influenced by individual perceptions of risk, which play a significant role in decision-making. The threat of imprisonment is particularly potent for individuals, as it directly affects personal freedom, while moral and social repercussions may amplify the disutility of being caught, especially in communities or professions where reputation matters. These individual-level considerations make tailored deterrence mechanisms, such as plea bargains, highly effective (Landes, 1971). Negotiated solutions for individuals often involve reduced sentences or alternative penalties, such as community service or probation, in exchange for cooperation or self-reporting, leveraging their vulnerability to personal risks.

On the other hand, corporate sanctions are predominantly financial, encompassing direct fines and potential losses in future revenues due to reputational dam-

age, exclusion from public procurement opportunities, or restrictions on market access. Unlike individuals, corporations cannot be imprisoned, and their decision-making is generally driven by a cost-benefit analysis aimed at preserving profitability. As a result, negotiated solutions for corporations, such as NTRs, tend to focus on monetary penalties, compliance commitments, and reputational repair mechanisms. These agreements often include provisions for internal reforms, independent monitoring, or enhanced transparency measures, aligning corporate behavior with legal and ethical standards while avoiding prolonged litigation or operational disruptions.

The divergence in negotiated solutions stems from the distinct incentives and vulnerabilities of individuals and corporations. For individuals, NTRs or similar agreements might prioritize eliciting cooperation, using the threat of imprisonment as leverage. For corporations, the emphasis shifts toward financial penalties and institutional changes that address systemic issues contributing to misconduct. This difference is crucial in the design and implementation of anti-corruption policies, as it reflects the need to balance accountability and practicality while maximizing deterrence across both individual and corporate actors. In Chapter 3, the legislation for individuals and corporation are scrutinized separately.

Another important issue is that, in cases of corporate CBC, individuals within firms, such as employees or executives, are the actual perpetrators of CBC. This raises complex questions about liability regimes—whether to hold individuals, corporations, or both accountable. Legal frameworks vary widely, with some emphasizing personal liability to deter individual misbehavior and others targeting corporate entities to ensure broader compliance. The literature, including works by Arlen and Kraakman (1997), explores these dynamics, particularly in scenarios where agency problems arise. Such problems occur when the interests of corporate employees diverge from those of shareholders, creating misaligned incentives that facilitate CBC.

The distinction between individual and corporate CBC is addressed throughout this work, with each type examined where relevant. For instance, Chapter 3 delineates the legal ramifications for corporate and personal offenses separately, while Chapter 4 builds its theoretical model around individual-level incentives. This model can occasionally be extended to corporate scenarios when the parallels are evident. Chapter 5 takes a broader empirical approach, analyzing both individual and corporate CBC cases, recognizing their frequent overlap. For example, a single inquiry might involve multiple individuals committing corrupt acts within a single corporation or across several entities. Whenever necessary, the thesis clearly specifies the type of CBC under discussion, ensuring that the analysis remains precise and relevant to the scope of the research. This dual focus allows for a comprehensive understanding of the mechanisms and incentives behind CBC,

whether perpetrated by individuals or corporations.

1.6 Research Gap

The academic literature on corruption in a broad sense has made significant advances in understanding various facets of the issue, yet gaps remain in comprehending the dynamics of CBC. Studies by Basu (2011); Basu and Cordella (2016) have explored the effectiveness of asymmetric punishments in deterring harassment bribery using a theoretical framework. Similarly, research by Lambsdorff (2008); Engel et al. (2016); Abbink and Wu (2017), using both theory and laboratory experiments, has demonstrated that self-reporting mechanisms, akin to NTRs discussed in this work, are effective in mitigating CBC by incentivizing individuals to disclose wrongdoing.

Additionally, the theoretical work by Motta and Polo (2003); Harrington (2008); Spagnolo (2005) on leniency agreements in anti-trust violations reveals that such strategies can deter crimes by disrupting collusion among parties. Additionally, Miller (2009); Brenner (2009) have empirically shown the effect of these policies. Therefore, it is possible to note that the anti-trust literature has significantly advanced in showing the incentive mechanism of offering sanction reduction to deter cartel crimes.

Despite significant insights from existing literature, the specific challenge of CBC — where parties collaborate to subvert regulations—remains underexplored. Previous studies have not fully addressed how these collaborative schemes consistently manage to evade standard anti-corruption efforts, nor have they adequately explored the efficacy of asymmetric punishments and self-reporting mechanisms in deterring CBC. Theoretical work on leniency agreements in anti-trust violations, such as those by Motta and Polo (2003), reveals similar strategies that disrupt collusion among parties, yet there is a distinct gap when applying these concepts to CBC directly.

It is important here to highlight the Brazilian 2013 anti-corruption policy, which serves as a major motivator for this study, as exposed in Section 1.2. This policy sparked more social than academic debate, becoming a highly politicized topic extensively discussed in the media and by the public, with no clear conclusion about its effectiveness in deterring CBC. Academically, the challenge lies in providing (or not) evidence of the policy's effectiveness by empirical standards. Some studies, such as those by Jones and Pereira Neto (2021); Prado and Machado (2021), infer the enforcement policy's success based on the scope of the Car Wash operation, which began shortly after the anti-corruption reform and heavily relied on its provisions, primarily examining the legal dimensions of the issue. However, a comprehensive economic assessment of Brazil's anti-corruption reform is still

lacking.

The Brazilian case is an important case study to demonstrate the effectiveness of introducing NTRs into anti-corruption legislation. Despite the apparent success of Operation Car Wash, there are no conclusive academic papers that provide sufficient evidence to determine whether the Brazilian anti-corruption reform of 2013 was effective in decreasing CBC in Brazil.

1.7 Objectives and Research Questions

This section outlines the objectives and research questions guiding the study, with each objective crafted to address specific open research questions. This approach identifies knowledge gaps and ensures this research is focused and relevant.

Furthermore, the study proposes hypotheses based on these questions. These are predictions about expected findings, rooted in theoretical insights and empirical evidence from existing research. The testing of these hypotheses aims to provide new insights, advancing understanding in the field and suggesting practical implications. This method highlights the significance of the study, emphasizing its potential contribution to both theory and practice.

1.7.1 Objective 1: Assessing the Deterrent Impact of Non-Trial Resolutions on Corruption

The effectiveness of NTRs in combating CBC is subject to debate. Providing offenders with the option to cooperate with authorities for reduced penalties may inadvertently lower the cost of engaging in CBC. On the one hand, NTRs can disrupt corrupt agreements and enhance prosecutorial efficiency by encouraging offenders to come forward. On the other hand, they could weaken the deterrent effect of expected punishments, potentially encouraging CBC. This duality raises critical questions: Can NTRs effectively deter CBC?

This study hypothesizes that while non-trial resolutions can be effective against CBC, excessively lenient strategies may fail to deter it and could even unintentionally encourage corrupt practices. Thus, the theoretical portion of the research examines the incentives of individuals in environments with and without non-trial resolutions, aiming to identify which enforcement policy features are beneficial and which are not.

1.7.2 Objective 2: Evaluating the 2013 Brazilian Anti-Corruption Enforcement Policy

The second objective examines the real-world impact of NTRs on CBC in Brazil following the 2013 anti-corruption legislation. It scrutinizes whether these policies are associated with a noticeable decline in crimes of corruption[17]. This inquiry is encapsulated in the research question: Has the Brazilian Anti-Corruption Enforcement Policy decreased corruption crimes in Brazil?

The hypothesis proposes that the 2013 Brazilian Anti-Corruption Enforcement Policy significantly reduced CBC levels in the country. Notably, the 2013 reforms introduced legal mechanisms similar to NTRs, a unprecedented development in Brazil's legal framework[18]. This makes Brazil an intriguing natural empirical experiment to evaluate whether NTRs are truly effective in combating CBC.

1.8 Methodology

This study applies several distinct methodologies to comprehensively address the complexities of CBC and the effectiveness of non-trial resolutions in combating this type of offence. Unlike previous studies that may focus on a single scientific approach, this research employs a multi-faceted strategy to capture the full scope of the issue.

Firstly, the study begins with an extensive literature review, meticulously examining existing academic work on corruption in a broad sense, and then with a particular focus on CBC and non-trial resolutions. This review sets the stage by identifying the current state of knowledge and the gaps that this study aims to fill. Following the literature review, a legal analysis of current laws relevant to CBC and NTRs is conducted. This analysis provides a critical examination of the legal framework, highlighting differences of existing strategies in addressing CBC.

Building on this foundation, the study introduces a theoretical economic framework designed to analyze individual decision-making processes within the context of CBC. This framework offers insights into the incentives and deterrents that influence the behavior of individuals involved in CBC, considering both the risks of engagement and the potential benefits.

Lastly, the study employs an empirical approach, comparing the theoretical predictions derived from the economic framework with actual data on Brazilian

[17] In brazil, the crime of corruption follows the definition of CBC used here.

[18] Chapter 3 shows the newly introduced provisions that are similar to NTRs. Consequently, Objective 2 also addresses the research question from Objective 1. However, while Objective 1 uses theory to demonstrate the effectiveness of the proposed enforcement measures, Objective 2 focuses exclusively on the empirical application of these enforcement rules in the Brazilian case.

corruption cases. This comparison aims to validate the theoretical model and assess its applicability to real-world scenarios, providing a grounded understanding of how theoretical constructs play out in practice.

1.8.1 Corruption Under Distinct Scientific Approaches

CBC can be examined through various scientific methods, each tailored to address specific problems. This work selects a few approaches for analysis. Firstly, the welfare approach, often used in law and economics, uses economic principles and methods to assess legal policies, emphasizing efficiency, incentives, and the impact of legal rules on the society's welfare. Secondly, the game theoretical approach provides a framework to analytically explore CBC as a strategic game. Although the game theoretical and welfare economic approaches are presented as separate methodologies for analytical purposes, law and economics often incorporate game theory to clarify its principal ideas and welfare economics to address its impact and efficiency. Next, the legal approach examines how laws induce the behaviors and consequences for individuals involved in CBC. Lastly, the empirical approach uses real world data to test the impact of anti-corruption policies on CBC. In this work specifically, the empirical approach tests the impact of the introduction of a new anti-corruption policy on the overall level of CBC over time.

All the approaches are not independent; they frequently rely on each other to try to solve a particular problem. Law and economics scholars would devise their models using game theory, economic frameworks, computational and empirical data. Notably, literature on legal approach to corruption is well resumed in Søreide (2018), microeconomics of corruption in Burguety et al. (2016), law and economics of corruption in Rose-Ackerman (2006, 2010) and empirical studies on corruption in Treisman (2007). Notably, some of the reviewd studies may not always refer to CBC as defined here.

In this chapter, an intuitive description of the framework and scientific approach is presented, followed by a simple analytical representation. The aim is to keep the content straightforward and accessible to a broad audience, because the discussions in subsequent chapters become significantly more technical. This approach ensures that readers have a solid understanding of the foundational concepts before delving into the more complex details later on.

1.8.1.1 The Game Theoretical Approach

Any game can be defined by a set of players, actions, and rewards (payoffs) for each action. At each stage in the game, only the allowed actions for that stage can be taken by the players. Game theorists are interested in the strategies (sequences

of actions) that lead to equilibrium payoffs for each player (von Neumann and Morgenstern, 1944).

In a simple CBC game, the players are the bribe payer and the receiver. The actions involve deciding whether to engage in a corrupt agreement, with the returns from CBC depending on the likelihood of detection by authorities. Players pay a bribe, expecting a reward in return. However, there is always a risk of being caught, and if detected, players face sanctions.

The bribe payer's expected outcome considers the cost of the bribe, the potential reward if not caught, and the penalty if detected. Similarly, the bribe receiver's expected outcome includes the received bribe and the possible sanction. These outcomes depend on the actions of both players and the probability of detection.

In this simplified example, the decision-making process seems straightforward. However, the situation becomes more complex when additional actions are considered. For instance, players might have the option to betray the agreement or self-report in exchange for leniency. The timing of actions, whether players act sequentially or simultaneously, also plays a critical role in decision-making. Sequential games can lead to opportunistic behavior, such as failing to deliver a promised favor after receiving a bribe, known as the 'hold-up' problem. Leniency policies can help mitigate this issue by providing a credible threat to the first mover, as explored by Buccirossi and Spagnolo (2006).

It is important to recognize that this setting is a simplification of real-world scenarios. CBC often involves multiple agents, varying costs for bribe takers, and uncertainties in actions, payoffs, and penalties. Despite these simplifications, this example lays the groundwork for the theoretical framework discussed in Chapter 4. The structure of the game evolves by introducing or altering players, actions, payoffs, or timing, enhancing our understanding of strategic interactions in CBC.

By analyzing these strategic interactions, it is possible to gain valuable insights into the mechanisms of CBC and the effectiveness of policies aimed at combating it. This framework provides a foundation for studying more complex scenarios, ultimately contributing to the development of strategies to reduce CBC and its impact on society.

1.8.1.2 Welfare Economics Approach

In Law and Economics, scholars aim to understand how rules and regulations interact with human behavior. When an activity results in negative externalities, which are harmful side effects on society, the role of the scholar is to measure the associated gains and losses. This understanding helps in proposing legal changes that maximize societal well-being.

Since the seminal work by Gary Becker (Becker, 1968), economists have devel-

oped a formal framework to analyze the decision-making process behind engaging in criminal activities[19]. Later, Rose-Ackerman (1975) specifically examined corruption markets, and Shleifer and Vishny (1993) explored corruption under Becker's framework. Lastly, Polinsky and Shavell (2001) formalize and summarize the literature in a comprehensive framework explored in more detail in Chapter 2.

Becker's approach can be used to analyze the impact of CBC on society. In this context, CBC causes harm to society, but corrupt agents also gain from these activities. Assuming multiple agents are involved and that bribes are neutral transfers between corrupt agents, the total gains from CBC can be summed across all agents. This allows for the measurement of the total welfare in society affected by CBC, calculated as the net gains or harm resulting from corrupt activities[20].

The gains from CBC vary across different transactions, depending on the bribe amount. To assess the overall impact on societal welfare, it is important to consider the distribution of these gains within the society. The total societal welfare can be calculated by evaluating the net difference between the gains from CBC and the corresponding harms, taking into account all types of CBC present in that society[21].

This approach reveals two critical aspects of the analysis. Firstly, in theory, the total benefits gained by corrupt individuals could exceed the harms to society, suggesting that CBC might be beneficial. However, this work assumes that CBC is inherently harmful, thus advocating for less CBC. This perspective also rejects the 'grease money hypothesis', which suggests that corruption can efficiently allocate scarce resources (Kaufmann and Wei, 1999)[22]. Secondly, there may exist an optimal level of sanctioning[23]. The focus is on identifying solutions that minimize the negative impact of CBC using all available legal measures.

This introduction provides an overview of the expected outcomes of the welfare economics of CBC. While this work does not strictly follow the specified analytical

[19]More recently, Polinsky and Shavell (2007) developed a comprehensive static model that incorporates various factors such as different liability rules, risk preferences, non-monetary sanctions, expected fines, judicial errors, deterrence effects, incapacitation effects, Principal-Agent relationships, settlements, repeat offenders, corruption in judgments, social norms, and self-reporting. Garoupa (1997) also provides an overview of the key literature and advancements since Becker (1968).

[20]The harm to society equals the benefit to the corrupt agent. The gain for the bribe payer is the difference between the benefit received and the bribe paid, while the gain for the receiver is the bribe itself. Thus, the total gain from CBC equals the total harm.

[21]Polinsky and Shavell (2001) also include the cost of law enforcement in their analysis of corruption. For simplicity, it is assumed that the cost of enforcement is either fixed or not specifically aimed at combating corruption. However, a general enforcement authority may detect corruption as part of its broader responsibilities.

[22]Althoug Kaufmann et al. (2006) definition of corruption is broader than the one used here.

[23]In this context, the optimal sanction is the one that minimizes the overall harm to society, aligning with the conclusions from Becker (1968).

framework in its empirical strategy or theoretical model it is further explored in Chapter 2.

1.8.1.3 The Legal Approach

The methodology of study in legal academic works predominantly focuses on legal analysis, which meticulously examines statutes, case law, and legal principles to interpret the legal landscape of a specific issue. This analytical approach emphasizes doctrinal research, involving a detailed scrutiny of legal texts to understand their application and impact. Legal scholars often engage in a critical evaluation of jurisprudence and legislation, aiming to uncover underlying legal doctrines and assess their coherence and efficacy in addressing contemporary legal challenges. Comparative legal analysis may also play a role, comparing legal approaches across different jurisdictions to highlight best practices or inconsistencies. This methodology is fundamentally rooted in the interpretation of legal texts and the application of legal reasoning, ensuring a deep and nuanced understanding of the law and its implications on various facets of society.

In most jurisdictions CBC is considered a crime (Peters, 2019). However, the precise legal definition of a corruption crime is not unambiguous. Once again, as defined in Section 1.3, this work follows the definition of corruption given by the provisions in the UNCAC (United Nations, 2004, 2012).

Even with a clear definition of a corruption crime, bribes can assume multiple forms. They can be paid in several distinct ways. Sometimes the distinction between bribes and costs of transactions are not clear. In this sense, the law must be generic regarding the mechanism but specify the conditions in which one behaviour is legal and other is not. These boundaries between a legal gift and an illegal bribe change between jurisdictions. However, here in this study, Chapter 3 delves into the variations in anti-corruption laws across different jurisdictions.

1.8.1.4 Empirical Approach

Empirical papers on corruption primarily employ a comparative methodology to analyze the levels of corruption[24] across different contexts and measure the correlation of various variables on these levels. This approach involves collecting and analyzing quantitative data to establish correlations and causations between corruption and factors such as economic development, political stability, legal enforcement, and cultural norms. Researchers utilize statistical methods to assess the effectiveness of anti-corruption policies, the role of institutional frameworks, and the influence of socio-economic conditions on corruption. By systematically

[24]Most of the time, empirical studies refer to a much broader concept of corruption. This section refers to corruption in each study sense.

comparing data, these studies aim to identify patterns, trends, and the underlying mechanisms of corruption, providing evidence-based insights into how it can be effectively mitigated. This empirical investigation is crucial for understanding the multifaceted nature of corruption and for designing targeted interventions to reduce its prevalence and impact.

Corruption is widely recognized for causing numerous negative externalities, as evidenced by a substantial body of literature. It is linked to increased inequality (Gupta et al., 2002), poor governance (Méon and Sekkat, 2005; Kaufmann et al., 2006), suboptimal investment decisions (Golden and Picci, 2005), reduced foreign investments (Mauro, 1995), diminished competition (Ades and Di Tella, 1995, 1997), and ultimately, decreased income growth and wealth (Kaufmann and Wei, 1999). These consequences of corruption often blur with its causes due to the difficulty in pinpointing the exact mechanisms that foster a propensity for corrupt practices.

Rose-Ackerman (1978) notes that the direction of causality — whether corruption causes adverse outcomes or adverse conditions foster corruption — remains debatable. However, it is suggested that causation likely works in both directions, highlighting the complex relationship between corruption and societal impacts.

In this work, the analysis of the Brazilian case will not concentrate on the economic characteristics that potentially lead to broader corruption. Instead, the focus will be on examining the trend of CBC (or crimes of corruption) over time series to determine the impact of the 2013 regulations on the overall level of CBC in Brazil. This investigation aims to assess whether these specific rules introduced in 2013 have effectively influenced the country's CBC landscape using the methodology from Miller (2009). The detailed exploration of this impact and the analysis of CBC trends in Brazil, in light of the 2013 legal changes, is presented in Chapter 5.

1.9 Main Findings

This section presents the main findings from the study, detailing how they contribute to the existing literature.

From the legal review, the legal frameworks of the US, UK, France, and Brazil, influenced by international guidelines like UNCAC and the OECD Anti-Bribery Convention, emphasize Non-Trial Resolutions (NTRs)[25] as essential tools in anti-corruption efforts. Each jurisdiction has developed judicial agreements varying in independence and judicial oversight. Their effectiveness is evident in major international cases, demonstrating the importance of cross-jurisdictional cooperation

[25]It is true that older anti-corruption provisions such as the FCPA in the US may have influenced these international agreements.

in addressing large-scale CBC.

However, concerns about the over-reliance on individual prosecution may lead to under-deterrence and weaken the rule of law (Søreide and Vagle, 2022). In contrast, Operation Car Wash in Brazil showcases a robust application of policies similar to NTRs[26] to both corporations and individuals, resulting in significant legal and political repercussions and illustrating the potential impact beyond corporate penalties.

From the theoretical analysis, this study uses a game-theoretical approach to explore if NTRs are theoretically effective in deterring CBC. It finds that the option for agents to self-report before detection, do not effectively deter CBC unless there is a perceived change in detection and conviction probabilities. Additionally, offering strategic, asymmetrical sanction reductions as credible threats can prompt cooperation from involved parties, creating a prisoner's dilemma scenario upon detection. Notably, for these credible threats to be effective, it is necessary for the prosecution to have sufficient discretion over their offers of sanction reductions. However, if these sanctions are too lenient, they might encourage CBC by lowering the expected penalties. Thus, the study concludes that NTRs can deter CBC when sanction reductions are strategically designed but warns that overly lenient penalties could undermine this effect.

On the empirical side, this study evaluates Brazil's 2013 anti-corruption policy, which aimed to promote self-reporting and collaboration among offenders. Using a methodology adapted from Miller (2009). The analysis confirmed an initial statistically significant surge in corruption crime detections followed by a significant, sustained decrease of the same variable. This results correlates to a trend that could indicate effectiveness of the policy. Moreover, this trend suggests the policy not only initiated a short-term crackdown but also possibly achieved a lasting reduction in CBC. This result, then, could point to an effective anti-corruption policy in that country.[27].

Lastly, the final chapter discusses the Car Wash operation, using real-world cases to validate enforcement policy recommendations proposed in this study. However, it notes that such policy recommendations face challenges, as corruption fights back. For instance, individualization of investigations[28] and prosecu-

[26]The policies put in place have some degree of judicial oversight.

[27]In previous studies, such results would suffice to demonstrate the causal impact of the policy in reducing corruption within the country. However, this study adopts a more cautious stance. Although the results may not establish causality, they could indicate that the policy is effective.

[28]Individualization of investigations, as emphasized in the Yates Memo, focuses on holding individuals accountable for corporate wrongdoing. It requires thorough examination of the roles and responsibilities of specific executives and employees involved in misconduct. This approach aims to deter future violations by ensuring personal liability for those responsible. This is discussed in more detail in Chapter 3.

torial discretion, encountered considerable political pushback, particularly when targeting influential figures in Brazil.

1.10 Study Limitations

The primary emphasis is on building a theoretical framework, generating predictions from this framework, and testing these predictions empirically. The theoretical component utilizes a straightforward model to capture the essence of NTR policies and their implications for creating a prisoners' dilemma situation for involved agents. This simplification means the model doesn't capture every potential action or outcome but allows for a manageable and focused analysis, avoiding the complexity that could overshadow the study's core objectives. In short, the theoretical part focuses on corruption occurring within the same jurisdiction, ensuring all parties face prosecution under a consistent legal system. This emphasis on domestic corruption cases allows for a clearer analysis, as international corruption introduces varying legal rules.

Second, the study concentrates on significant corruption cases, excluding minor bribes like those to avoid traffic fines or expedite bureaucratic processes. Such small-scale bribes occur often in the form of harassment bribes, in which one party extorts the other for gaining a benefit which was already entitled to the other party. It differs fundamentally from collusive corruption, where parties jointly benefit from illegal activities. Third, the analysis is limited to public corruption, as corruption within private firms typically affects the company's welfare and is considered less harmful to society (Rose-Ackerman, 2006). Additionally, private corruption is not always recognized as a criminal offense by jurisdictions[29].

Another source of limitation is that this thesis examines the impact of Brazilian anti-corruption laws over time, particularly after the landmark legislation introduced in 2013[30]. It analyzes how these laws have influenced corruption inquiries and legal proceedings in Brazil. However, the data post-2020 must be considered with caution due to the COVID-19 pandemic. The pandemic necessitated emergency procurements and an increase in public spending, which in turn led to heightened opportunities for rent-seeking behaviors and potential CBC. These conditions could have contaminated the data regarding crimes of corruption during this period, as the urgent need for resources may have overridden the standard procedural checks and balances designed to prevent CBC. This situation highlights the complexities of enforcing anti-corruption measures in times of crisis and

[29]This paragraph justifies the definition of CBC in Section 1.3.

[30]It is important to point out that in Brazil the enforcement policies resemble NTRs during the negotiation and settlement phases. However, these agreements still require judicial oversight, as they must be approved by a judge in court to be legitimized.

underscores the need for robust mechanisms that can withstand such emergencies.

Importantly, the empirical analysis is based on the model of Miller (2009), a semi-parametric approach that blends theoretical predictions with observed data to investigate CBC trends. While this method offers a structured way to explore causality, it is important to acknowledge that all causal models have limitations. These include assumptions about variable relationships that may not capture all influencing factors, potentially impacting the reliability of results. Nonetheless, the correlations found are able to point to evidence in direction of the effectiveness of the enforcement policies tested.

There are additional concerns regarding the theoretical and empirical limitations of this study. Notably, these specific limitations are addressed in Chapters 4 and 5, respectively.

Thus, the study seeks to address crucial aspects of CBC prosecution by highlighting key legal strategies within the current legislative framework, employing a theoretical model that simplifies complex interactions, and using semi-parametric modeling to provide empirical evidence. The insights gained are valuable, but they should be interpreted within the context of the study's methodological constraints.

1.11 Thesis Outlook

This section outlines the structure of the thesis, detailing the progression from the introduction to the conclusion. It provides an overview of how each chapter builds on the previous one, offering a clear path through the research and findings presented.

Chapter 2 offers a comprehensive and up-to-date literature review on the topic of corruption, particularly focusing on the role of NTRs and related enforcement policies in combating such illicit activities. This chapter critically examines the effectiveness of NTRs by drawing parallels with the prosecution strategies employed against other types of crime, such as cartels. It evaluates current results from different experiments in other jurisdictions, providing an understanding of how similar strategies are employed in different legal contexts. Additionally, this chapter situates these findings within the broader scope of the thesis, explaining how the insights from the literature review apply to the specific object of study. By doing so, it clarifies the current standing of the thesis on this subject and sets the stage for the reader to grasp the implications of these enforcement mechanisms in the broader fight against CBC. This overview not only highlights key findings but also maps out the trajectory of the argument as it unfolds in subsequent chapters, thereby orienting the reader to the thesis's core themes and analytical framework.

Chapter 3 performs a comprehensive legal review of current anti-corruption legislation in the US, UK, France, and Brazil. This chapter aims to establish a

comparative framework that highlights the distinct anti-corruption features unique to each country. Additionally, it delves into notable CBC case studies, including Siemens AG, Rolls-Royce, Airbus, and Operation Car Wash, using these examples to illustrate the application and impact of anti-corruption laws in various contexts.

Chapter 4 constructs a game-theoretical model to examine the strategies and behaviors of corrupt individuals in scenarios both with and without the option of non-trial resolutions. This analysis considers crucial legal features, including the requirement for forfeitures and the application of sanction reductions specifically to fines. The conditions under which these reductions are applied—such as when individuals choose to self-report prior to an investigation's initiation or decide to cooperate after being discovered—are scrutinized. Additionally, the chapter explores the influence of prosecutorial discretion in determining sanction reductions and investigates other strategic mechanisms like first comer rules, providing a comprehensive understanding of the dynamics at play in the fight against CBC.

Chapter 5 delves into the case study of anti-corruption laws introduced in Brazil in 2013, outlining a specific methodology and presenting robust estimations. It employs a semi-parametric model, following Miller (2009) approach. This analysis is supported by data on the opening of corruption crime inquiries by the Brazilian Federal Police from 2010 to the end of 2019, providing a detailed empirical basis for evaluating the law's effectiveness on reducing CBC.

Chapter 6 summarizes the study's main findings, evaluates the effectiveness of anti-corruption measures, and discusses policy implications. It also investigates the suggested policy recommendations and examines their real-world impact on the Car Wash operation in Brazil, analyzing the practical implications of these policies. Additionally, the chapter reviews the research goals and contributions, addresses the study's limitations, and suggests avenues for future research to enhance anti-corruption strategies.

Part II

LITERATURE REVIEW

Chapter 2

Literature Review

2.1 Introduction

This chapter examines the history and underlying theories of corruption, specifically focusing on the use of non-trial resolutions (NTRs) to fight collusive bibery or corruption (CBC). It tracks how enforcement against corruption has evolved over time, comparing the effectiveness of traditional legal measures with more innovative approaches. The chapter positions NTRs within their historical context on the evolution of crime deterrence. It also points out the current gaps in research and sets the stage for this study to explain how NTRs can be customized to disrupt and prevent CBC.

Most importantly, in studies of corruption, each author may define the term slightly differently. Readers should be aware that the definition of corruption may vary across the cited literature and may not always align precisely with the specific focus of this study, which is CBC.

This literature review begins by exploring the etiology of corruption in a sociological sense, so the wider causes are discussed before entering into a more quantitative and juridical literature. Secondly, the chapter discusses the economics of corruption, encompassing both theoretical insights and empirical analyses. This exploration provides a foundational understanding of the factors that drive corrupt practices and their impact in economic welfare.

The chapter then moves into a focused analysis of the economics behind using NTRs to combat crime. It reviews both theoretical models and empirical evidence to determine how NTRs can be effectively designed and implemented to reduce crime. This section examines various NTR mechanisms, such as deferred prosecution agreements, and other legal incentives that encourage individuals and corporations to resolve criminal cases without going to trial.

Building on this theoretical and empirical groundwork, the chapter then ad-

dresses the specific application of NTRs in the realm of CBC deterrence. It highlights key economic studies that have employed NTRs as tools to mitigate CBC, detailing the main theories behind these approaches and summarizing significant empirical findings[1]. This includes a discussion on how NTRs disrupt corrupt systems by incentivizing cooperation with law enforcement, thereby enhancing the overall efficacy of anti-corruption strategies.

While this chapter provides an overview of economic theories and empirical evidence, Chapter 3 will focus on legal analyses and case studies, such as the Car Wash operation. The separation ensures a focused exploration of academic perspectives here, while Chapter 3 addresses legislative details and practical case applications.

Chapter 4 builds directly on the insights from this review, proposing a new theoretical approach to address CBC, which remains a gap in the existing literature. This chapter, structured as a comprehensive literature review, will also explore critical gaps such as the necessity of imposing forfeitures and the debate between discretion versus fixed rules in the enforcement of anti-corruption measures. By examining these under-explored areas, the chapter aims to highlight theoretical deficiencies and suggest areas where further investigation could yield significant advancements in the effectiveness of NTRs in combating CBC.

Lastly, this chapter investigates the rationale behind the methodology selected for Chapter 5, alongside similar empirical research. The methodology is selected because it addresses the progression of CBC in the same location over time. In contrast, most empirical studies in economics typically compare correlations between variables across different countries and various measures of broader corruption. This chapter delves into the challenges of measuring CBC and assessing it in the same area over time.

2.2 Etiology of Corruption

The etiology of corruption concerns the underlying causes, conditions, and social dynamics that give rise to corrupt behavior. In the context of sociological and criminological scholarship, understanding how corruption is learned, normalized, and sustained within institutions is crucial for designing interventions that go beyond legal prohibitions. Rather than viewing corruption strictly as individual

[1]While this thesis does not employ experimental methods, it analyzes key findings from experimental research within this chapter. This approach provides insights into the dynamics of corruption and the behavioral responses to various anti-corruption policies, enhancing our understanding of how non-trial resolutions can be effectively utilized to combat corruption. This review situates the thesis within the broader academic discussion and identifies potential areas for future research.

economic incentive, these fields examine its collective dimensions—how networks, organizational cultures, and social norms shape people's propensity to engage in wrongdoing. By examining these factors, sociological and criminological research provide a deeper appreciation of *why* individuals or organizations might collude to violate ethical standards, even when doing so risks legal and reputational consequences.

A foundational contribution to the sociological study of corrupt behaviour, more specifically white-collar crime[2], was Sutherland (1949)'s classic work on differential association and elite deviance. The author argued that criminal behavior among professionals and officials often stems from learned techniques, attitudes, and rationalizations that are transmitted within close social circles. From this vantage point, corrupt practices become a product of socialization: individuals internalize norms that condone, excuse, or even valorize illicit acts, such as CBC, when they are regularly exposed to peers who treat such behavior as acceptable. This perspective diverged from the then-dominant view that crime was limited primarily to the economically disadvantaged. Instead, Sutherland (1949) demonstrated how the structural privileges, resources, and networks of elites could also foster corrupt arrangements, especially in business and governmental contexts. In doing so, he established a conceptual link between professional environments and the perpetuation of 'upperworld' wrongdoing.

Later sociological research expanded on how corruption becomes normalized within organizations. Ashforth and Anand (2003) famously discussed a three-stage process—rationalization, socialization, and institutionalization—through which unethical practices merge into routine activities. In their framework, actors involved with corruption find justifications for bending rules ('everyone is doing it', 'it's for the company's good'), pass on these justifications to newcomers through informal mentoring, and eventually embed them in the group's collective identity. Once entrenched, these corrupt norms can be self-reinforcing: challenging them may provoke hostility or retaliation from insiders, and external scrutiny may remain limited if the organization has a culture of secrecy. Such phenomena illuminate the collective aspects of corruption, underscoring that the causes are not simply about rational choice or individual greed, but also about belonging, identity, and peer acceptance within a corrupt subculture.

Criminologists have similarly investigated how corruption overlaps with white-collar crime and organizational deviance. Johnston (2005), for instance, categorizes corruption according to its sociopolitical context and the networks of power it relies upon. The author shows that the roots of corruption vary across 'syndromes', shaped by institutional arrangements and cultural patterns of elites. In

[2]Sutherland does not explicitly discuss CBC, but his framework on learned elite criminal behavior can be extended to encompass such practices, viewed at the time as an 'elite crime'.

contexts where patronage is historically entrenched, officials may feel compelled to exchange favors and bribes to maintain their status within a powerful network. In other contexts, quasi-criminal cliques within corporate or government structures develop a shared worldview that frames corruption as a tool for success or survival. Criminological perspectives like Johnston's thereby highlight the 'embeddedness' of corrupt practices in broader systems, cautioning that purely legalistic or punitive approaches may fail if they do not also address the social and organizational underpinnings of misconduct.

A recurring theme in sociological and criminological literature is the notion of 'techniques of neutralization', whereby individuals rationalize or mitigate their moral culpability. Scholars such as Punch (2000) have examined how such techniques operate among officials who engage in corruption[3], showing that many justify wrongdoing with appeals to higher loyalties, denials of victimhood, or comparisons to worse forms of misconducts elsewhere. These justifications form the cultural glue that holds corrupt networks together: while corruption is technically illegal, those involved may not perceive it as truly wrong if it is reframed as a shared necessity or a business-as-usual tactic. From an etiological perspective, these neutralizations are crucial in explaining the persistence of corrupt behavior in otherwise law-abiding settings, since they reduce moral costs and help wrongdoers maintain a positive self-image despite violating ethical or legal standards.

Criminological and sociological research has long explored the complex organizational effects of deterrence-based enforcement. While the goal of aggressive prosecution is to punish and deter wrongdoing, scholars have noted that harsh legal responses can unintentionally reinforce secrecy and cohesion among corrupt actors. Anechiarico and Jacobs (1996) argue that excessive oversight in the name of integrity may lead public servants to adopt evasive strategies that increase rather than reduce systemic corruption. In such contexts, enforcement risks creating perverse incentives: corrupt insiders may become more sophisticated and coordinated, making detection even harder[4].

Against this backdrop, sociologists and criminologists have examined the promise of NTRs —such as deferred prosecution agreements—as a potentially more effective approach for disrupting collusive cultures. Rather than triggering organizational defensiveness, NTRs aim to incentivize cooperation, self-reporting, and internal reform. Scholz (1984) have emphasized the importance of regulatory strategies that combine deterrence with persuasion[5], arguing that offering structured

[3]The examples on this study may approach more to the idea of harassment bribes, however, the main idea may be transported to the practice of CBC.

[4]See especially Chapters 1 and 4 of Anechiarico and Jacobs (1996) for discussion on how integrity systems may paradoxically foster evasive and collusive behaviors within public administration.

[5]Braithwaite (1985) seminal sociological study of coal mine safety enforcement supports this

leniency can weaken internal solidarity and foster behavioral change. These agreements can compel organizations to adopt ethics programs, compliance monitoring, and structural changes that address the cultural and procedural causes of misconduct.

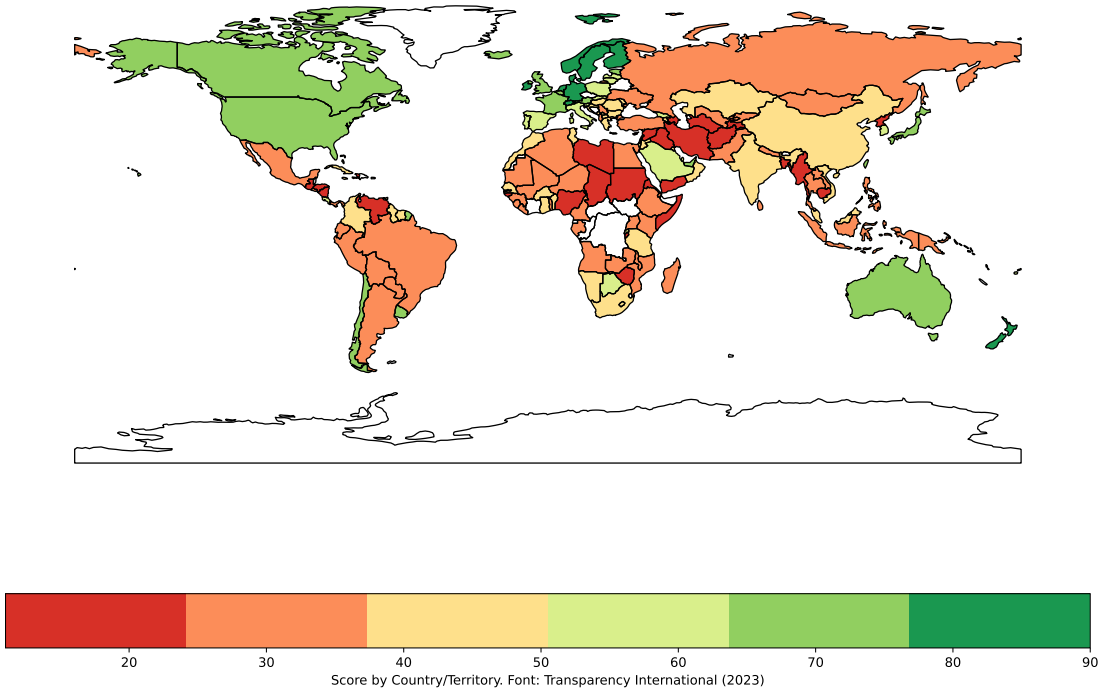
In summary, the sociological and criminological etiologies of corruption emphasize the ways in which corrupt behaviors can become embedded in an organization's social fabric or sustained through cultural acceptance. This brief selection of studies tied to the thesis' object represents only a small sample of the extensive body of sociological and criminological research that examines corruption as a social phenomenon. Through this broader line of knowledge, it is possible to investigate the deeper roots and far-reaching consequences of corruption. While these approaches richly illuminate the 'how' and 'why' of corruption, the present study adopts a more quantitative and legal perspective, translating these social complexities into measurable variables and legal concepts for empirical assessment. Such an approach offers a complementary method of investigating corruption, providing objective metrics and models that can inform policy and institutional reforms. By distilling complex realities into data-driven analyses, this work aims to generate objective evidence on the effectiveness of legal interventions, including NTRs, while acknowledging that deeper sociological and criminological factors underlie the ultimate causes of corruption.

2.3 Economics of Corruption

Corruption is a global issue that manifests differently across countries, with varying levels of prevalence and impact. This variation is illustrated in the Transparency International Corruption Perception Index (CPI), presented in Figure 2.1, which highlights the differing perceptions of corruption in a broader sense across nations.

view by showing how a persuasion-oriented approach led to greater compliance and cultural transformation among workers and management, reinforcing Scholz's theoretical proposition.

Figure 2.1: Transparency International Corruption Perception Index



It is important to point out that Transparency International defines corruption in a broader sense, encompassing a range of practices that may be lawful in a formal sense but are nonetheless unethical or abusive of power. These include activities such as nepotism, clientelism, misuse of public funds, conflicts of interest, and undue influence over public decision-making. The Corruption Perceptions Index (CPI) reflects this broad definition, capturing perceptions of both petty and grand corruption, as well as the integrity of public institutions and the effectiveness of anti-corruption efforts (Transparency International, 2019b).

The economics of corruption seeks to understand the differences in corruption levels across countries, as shown in Figure 2.1. It does so by examining the institutional and economic factors that contribute to corrupt practices. Research in this field has developed over decades, providing insights into the strategic behaviors, market dynamics, and institutional structures that either inhibit or foster corrupt activities. As noted by Bahoo et al. (2021), key areas of research include the economic frameworks of crime and corruption, the impact of legal institutions, the macroeconomic consequences of widespread corruption on national economies, and strategies for fighting and monitoring corruption, including CBC.

In the following sections, the text delves into both theoretical and empirical reviews to analyze how various institutional and economic contexts shape the

prevalence of corruption. The theoretical review focuses on established economic models that elucidate the strategic behaviors underlying corrupt activities, emphasizing how government structures and market conditions can either create or mitigate opportunities for corruption, focusing specially in CBC. The empirical review complements this by providing a data-driven analysis of the impact of broader corruption on economic growth, inequality, and public trust. The discussion bridges the gap between theoretical constructs and practical realities, exploring why some countries are more effective in combating corruption than others. It also critically evaluates the effectiveness of various anti-corruption tools, considering enforcement mechanisms, public sector incentives, and the role of international actors. By synthesizing these perspectives, the study offers a comprehensive understanding of corruption's complexities and provide practical insights into designing effective anti-corruption policies focusing specially on CBC.

The subsequent sections will explore key theoretical frameworks, assess empirical evidence, and discuss the challenges in accurately measuring corruption. This exploration includes reviewing influential studies that have shaped current economic thinking, providing a detailed examination of the causes, effects, and potential solutions to CBC within different institutional and economic contexts.

2.3.1 Theoretical Review

The study of corruption from a microeconomic perspective has been deeply influenced by foundational research from scholars such as Rose-Ackerman (1975) and Tirole (1986). Rose-Ackerman (1975) laid the groundwork by exploring how market structures and the clarity of government preferences influence corruption levels, especially in government contracting. Her findings highlight that competitive markets and clear governmental policies can reduce corruption opportunities, suggesting that anti-corruption measures need to target these underlying economic structures to be effective.

While Tirole (1986) does not directly discuss CBC, it offers a crucial framework for understanding strategic interactions and equilibrium behaviors in markets, which can be analogous to corrupt practices. The author's insights into how firms behave in oligopolistic settings—balancing between competitive pricing and maintaining market share—can be applied to analyze how similar strategic behaviors occur in corrupt transactions, where agents manipulate systems for personal gain.

Building upon these seminal works, the comprehensive review by Burguety et al. (2016) synthesizes decades of research into the microeconomics of corruption. They point out the consensus of using the principal-supervisor-agent framework to examine the mechanisms of CBC and evaluate public policies aimed at mitigating it. Notably, this is precisely the framework devised by Tirole (1986). By com-

bining theoretical and empirical insights, Burguety et al. (2016) offer a thorough analysis of how systemic changes in market competition and regulatory clarity can effectively reduce CBC.

The intricate landscape of corruption studies is enriched by a series of economic theories that not only intersect but also extend one another's findings, offering a deeper understanding of both the incentives for and the mechanisms of corruption. Beginning with the seminal work by Shleifer and Vishny (1993), the analysis reveals how the organizational structure of government significantly influences corruption. They highlight that centralized authorities, often found in less democratic regimes, facilitate organized corruption by reducing competition among officials, thereby making bribe extraction more efficient but also more endemic. This framework sets the stage for exploring how government structures either inhibit or foster corruption.

Building directly on this concept, Acemoglu and Verdier (2000) examine the complexities introduced by government interventions aimed at managing market failures. They argue that these interventions can inadvertently increase the opportunities for corruption, particularly when bureaucrats are endowed with significant discretionary powers. This perspective complements the work of Shleifer and Vishny (1993) by detailing the mechanisms through which government attempts to correct market anomalies might worsen the corruption problem. These interventions often create conditions that mirror the centralized control mechanisms identified by the authors as conducive to organized corruption.

In another complementary analysis, Ades and Di Tella (1997) explore the unintended consequences of industrial policies that facilitate rent-seeking and corruption. Their findings demonstrate how policies designed to stimulate economic growth through state intervention can inadvertently lead to increased corruption, especially when these policies involve substantial transfers of rents. This ties back to the discussions by Shleifer and Vishny (1993); Acemoglu and Verdier (2000), illustrating a micro-mechanism within the broader structural incentives that foster corruption.

Tanzi (1998) expands the discussion by situating corruption within a global and systemic context. The author explores how factors like globalization and the expansion of government roles in the economy have broadened the scope and visibility of corruption. This macroeconomic perspective on corruption intersects with the aforementioned studies by providing a broader socio-economic framework that explains why increased government intervention, as seen in many developing economies, often correlates with higher levels of corruption.

Furthering this macroeconomic analysis, Alesina and Angeletos (2005) link the size of government and the extent of its interventions to the prevalence of corruption. They argue that larger governments, which provide more opportunities for

rent-seeking, may paradoxically increase public support for redistributive policies that are intended to counteract the inequalities fostered by corruption. This theory enriches the earlier discussions by highlighting the cyclical nature of government intervention and corruption, suggesting a self-sustaining mechanism where larger government structures perpetuate higher levels of corruption and inequality.

Finally, Kaufmann and Wei (1999) empirically refute the 'efficient grease' hypothesis, challenging the idea that corruption can play an economically beneficial role. The 'efficient grease' hypothesis suggests that, in some contexts, corruption can enhance economic efficiency by helping to bypass inefficient regulations or bureaucratic delays. According to this view, bribes may act as a lubricant in rigid administrative systems, enabling faster decision-making or resource allocation. Their research shows that corruption does not necessarily reduce bureaucratic inefficiency but can increase the cost of business, thus reinforcing the broader economic analysis that corruption is generally detrimental to economic efficiency.

These interconnected studies collectively advance our understanding of corruption by illustrating how government structure, policy interventions, and economic incentives intertwine to foster or inhibit corrupt practices. They underscore the need for comprehensive anti-corruption measures that address both the structural causes and the economic consequences of corruption within a nuanced policy framework.

2.3.2 Empirical Review

The empirical research on corruption has significantly advanced over the years, with researchers employing a variety of methodologies to uncover various effects of corruption on the economy and society. Each of the studies mentioned provides critical empirical evidence that enhances our understanding of corruption from different angles, linking together to form a coherent narrative on the broader economic and social implications of corrupt practices.

The pioneering study by Mauro (1995) sets a robust foundation for empirical corruption research by systematically examining how corruption affects economic growth through its negative impact on private investment. His findings[6] illustrate

[6]In the study by Mauro (1995), the main regression analysis includes data from 58 countries. The variables analyzed encompass the institutional efficiency index, which measures the overall efficiency of a country's institutions, and the political stability index, which assesses the stability of political conditions. The study also considers ethnolinguistic fractionalization, reflecting the probability that two randomly selected individuals from a country belong to different ethnolinguistic groups. Economic indicators include per capita GDP growth from 1960 to 1985, the investment-to-GDP ratio over the same period, and per capita GDP in 1960. Education levels at the beginning of the period are captured through primary and secondary education variables. Population growth from 1960 to 1985, government expenditure as a percentage of GDP (net of defense and education spending), and the number of revolutions, coups, and political assassina-

that reducing corruption leads to substantial improvements in investment and growth, establishing a clear economic incentive for anti-corruption measures. This analysis paves the way for further empirical scrutiny into the specific mechanisms through which corruption influences broader economic variables.

Expanding on the implications of corruption in economic structures, Gupta et al. (2002) delve into the effects of generalized corruption on income inequality and poverty. They demonstrate that corruption enhances income inequality and deepens poverty by distorting public expenditures and tax systems to favor the wealthy. This provides a crucial socio-economic dimension to the economic growth discussion initiated by Mauro (1995), highlighting how corruption not only slows economic growth but also worsens social disparities.

Di Tella and Schargrodsky (2003) contribute to the empirical discussion by providing evidence on how specific anti-corruption interventions, such as increased auditing and wage adjustments, can effectively reduce corruption within public sectors. Their study innovates over previous ones by showing practical applications at the micro-level data on inferring effects of anti-corruption policies. This study also supports the theoretical model by Becker and Stigler (1974), which posits that higher wages and the probability of detection can deter corruption.

Aidit et al. (2020) analyzes data from the China Corruption Conviction Databank, revealing that bribe amounts vary by bureaucratic rank and economic authority, with peaks at entry-level and nearing-retirement officials. Chen and Liu (2018) identifies a U-shaped relationship between public-sector wages and coruption or bribery in China, suggesting that while initial wage increases may reduce corruption, beyond a certain threshold, higher wages might foster corrupt behavior. Cordis and Milyo (2016) advocate using detailed administrative records over survey data to measure corruption, uncovering a higher prevalence among low-ranking officials in the U.S. than is commonly reported. All these studies utilize the number of discovered offenses as a measure of corruption. The definition of corruption in these studies approaches the collusive bribery or corruption (CBC) from the present one, also the empirical feature applied on the latter is also used in the present research on Chapter 5.

Lastly, Olken (2007) adds another layer to the understanding of effective anti-corruption measures by testing the efficacy of grassroots participation versus traditional government audits in reducing corruption in Indonesian village road projects. His findings that government audits are more effective than community monitoring in reducing corruption offer practical insights that can guide policy-making, particularly in settings similar to those studied.

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tions during the period are also included. Additionally, the purchasing-power parity value for the investment deflator and its deviation from the sample mean in 1960 (PPI60 and PPI60DEV) are considered. These variables help explore the relationships between corruption, bureaucratic efficiency, political stability, and economic growth.

The focus of this work aligns more closely with the empirical methodology exemplified by Di Tella and Schargrodsky (2003) and Olken (2007) which studies the trend of corruption over time in a specific location. While studies like those by Mauro (1995) and Gupta et al. (2002) have sought to identify variables correlating with measures of corruption across various countries, this research narrows its scope to examining the trends of crimes of corruption within a single nation, specifically Brazil, and aims to detect any significant breaks in these trends following the implementation of enforcement policies in 2013.

Chapter 5 of this thesis is dedicated to conducting an empirical analysis that closely scrutinize how such policies have influenced CBC trends over time within Brazil. A key methodological challenge addressed in this chapter is determining how best to measure corruption consistently over time at the same location. The commonly used corruption perception indices may not serve as the most appropriate measure in this context, as they are based on perceptions that may not accurately reflect actual changes in CBC levels. This concern is elaborated upon in the subsequent Section 2.3.2.1.

Furthermore, the next section of the study explores the concept of criminal deterrence, drawing from anti-trust literature to develop a robust framework for measuring the impact of anti-corruption enforcement policies. The frameworks discussed in Section 2.5.3 will provide the necessary tools to assess whether the implementation of these policies has effectively deterred corrupt practices.

2.3.2.1 The Measurement Problem

The challenge of measuring corruption effectively is a significant hurdle in both understanding its dynamics and crafting policies aimed at its reduction. A corruption measurement quantifies the prevalence of corruption within a specific region or organization. Tools like Transparency International's Corruption Perceptions Index (CPI) and the World Bank's Worldwide Governance Indicators (WGI) assess these levels using data from surveys, expert assessments, and official records. These indices provide insights into the extent of corruption, influencing policymaking and highlighting areas needing governance improvements. Once again, these tools go beyond the notion of CBC, encompassing a broader range of activities such as fraud, harassment bribes, embezzlement, nepotism, abuse of power, and undue influence.

Corruption, inherently non-observable until detected by authorities, this characteristic complicates the ability to assess its real extent. Traditional metrics, often based on corruption perception indices, can be misleading, especially in the context of intensified crackdowns on corrupt activities. These indices tend to rise during periods of aggressive enforcement not necessarily because corruption has increased, but because the detection of corrupt acts becomes more frequent, leading to higher

visibility and subsequently influencing public perceptions. This phenomenon can be understood through the lens of Kahneman and Tversky (1973) work on availability heuristics, where individuals assess the probability of events based on their ease of recall rather than actual frequency. Additionally, the representativeness heuristic, another concept introduced by Kahneman and Tversky (1972), suggests that people often judge the likelihood of an event by comparing it to an existing prototype in their minds, which can lead to biased judgments.

Measuring the degree of corruption is not straightforward. For example, simply counting the number of crimes of corruption per capita does not accurately reflect the severity or impact of corruption. A single corruption case involving a $200 fine to avoid a speeding ticket cannot be compared to a bribery case where a public official is paid to secure a multi-million dollar contract. The value and implications of each act differ significantly, highlighting the complexity of assessing corruption accurately. Notably, this work's object reates more to the latter.

Addressing the methodological challenges in measuring corruption, Treisman (2007) critiques the reliance on perception-based indices and calls for a shift towards more robust, experience-based measures. This critique is vital as it questions the validity of the data used in many empirical studies, including those by other authors cited on the previous section, suggesting that a reevaluation of empirical strategies might be necessary to gain a more accurate understanding of corruptions's real-world impacts.

Golden and Picci (2005) address the limitations of perception-based measures by proposing a novel empirical approach to quantify corruption using data discrepancies in public infrastructure spending. Their method, which calculates corruption based on the unexplained differences between the money spent and the actual infrastructure delivered, provides a more objective measure that could potentially avoid the biases inherent in survey-based indices. By applying this model to Italy's regions, the authors demonstrate the utility of such tangible comparisons in revealing corruption, especially in cases where public spending data are reliable and comprehensive.

Meanwhile, Gutmann et al. (2020) explore the nuances that differentiate corruption perceptions from actual experiences. Their analysis emphasizes that while personal experiences with corruption strongly influence perceptions, these perceptions are also significantly shaped by broader socio-economic factors such as economic growth, income levels, and cultural influences. This divergence between perceived and experienced corruption underscores the complexity of using perception indices as reliable indicators of corruption levels, as they may reflect broader societal sentiments rather than direct interactions with corrupt practices.

Olken (2009) furthers this critique by directly comparing perceptions of corruption with actual levels of corruption in Indonesian village road projects. By

matching subjective perceptions gathered through surveys with objective data on 'missing expenditures' obtained from detailed project audits, the author reveals a mismatch: increases in measurable corrupt expenditures do not correspond proportionately to the increase in corruption perceptions among the villagers. This finding suggests that while perception-based measures capture some aspects of corruption, they often fail to reflect its full scope, particularly the more subtle and hidden forms of corrupt practices.

These studies collectively highlight the limitations of relying solely on perception-based measures to evaluate corruption. They point to the need for incorporating more concrete, data-driven metrics that can provide a clearer, more accurate picture of corruption levels. As this work focuses on assessing the impact of enforcement policies on CBC within Brazil, especially post-2013, this thesis departures from the most traditional empirical works that often use corruption perception indices to use an objective measurement. Here, the number of new inquiries on corruption crimes from the Brazilian Federal Police is the variable of interest. This topic is discussed in more detail in Chapter 5.

2.4 Non-Trial Resolutions

Non-trial resolutions (NTRs), as introduced in the previous Chapter, include mechanisms such as deferred prosecution agreements (DPAs), have been widely used within the criminal justice system to resolve cases efficiently and reduce the burden on court systems. This literature review begins with a broader examination of NTRs as general crime deterrence tools. This general approach is useful for understanding the fundamental principles and efficacy of NTRs in various legal and regulatory contexts before specifically applying these insights to the realm of CBC.

This general assessment serves as a precursor to a more focused analysis of NTRs applied specifically to CBC cases. By establishing how NTRs operate within broader criminal justice frameworks, the review sets the stage for a detailed exploration of how similar strategies can be adapted and implemented to address and mitigate corrupt practices.

2.4.1 Crime deterrence

The evolution of economic literature on criminal deterrence is a narrative of increasing complexity and specificity, tracing from foundational theories on the economic behaviors associated with crime to modern strategies that emphasize efficiency and specificity, such as non-trial resolutions (NTRs). Each successive work builds upon the last, refining the understanding of criminal behavior, the

effectiveness of various deterrent strategies, and the economic implications of law enforcement practices.

Becker (1968) seminal work introduced the idea that people make rational decisions based on the incentives set by the legal system. He argued that the likelihood of punishment is more effective in preventing crime than the severity of the punishment. This concept of rational deterrence has formed the foundation for later research, emphasizing a calculated approach to law enforcement that focuses on economic efficiency rather than punitive measures.

Ehrlich (1973) builds on and enhances Becker's economic theory of crime. The author developed a model that considers both the rewards and punishments of illegal activities, connecting the decision to engage in these activities to broader economic opportunities and limitations. His theory suggests that potential criminals rationally weigh the costs and benefits of illegal versus legal activities, including risks of punishment and potential rewards from both legitimate work and crime. The author empirical analysis uses data from U.S. states and shows that law enforcement significantly deters various types of crimes. His findings confirm that both the likelihood of getting caught and the harshness of the punishment can prevent crime. Furthermore, he found a strong link between income inequality and property crimes, indicating that greater economic disparities might increase the incentives to commit these crimes.

The dialogue between these theories introduces more nuanced considerations into the economic theory of crime, Garoupa (1997, 2007) further develops through his exploration of optimal law enforcement strategies. His works in the late 1990s and early 2000s discuss the balance between fines, imprisonment, and the strategic structure of law enforcement, arguing for the use of fines as cost-effective but recognizing the complex interplay between enforcement costs, criminal benefits, and social harms. The author's discussion on the allocation of sanctions within criminal organizations presents a sophisticated analysis of how criminal behavior adjusts in response to law enforcement strategies, suggesting that enforcement needs to be not only firm but also smart, adapting to the strategic responses of criminals.

In a similar fashion, Polinsky and Shavell (2007) formally develop the model of crime deterrence for a series of different anti-crime strategies. They extend the discussion of economic rationales for law enforcement by examining the optimal use of fines and imprisonment and the strategic allocation of enforcement resources. Their comprehensive approach to public enforcement integrates previous insights and pushes towards a system that strategically uses 'carrots' and 'sticks' to achieve the greatest deterrent effect at the lowest possible cost setting the stage for the use of NTRs as legal frameworks. Their analysis argues for a tailored approach to law enforcement that reflects both economic efficiency and the complexities of

human behavior.

Lastly, it is worth noticing that the previous cited works on economic theories of crime primarily focus on individual liability, assessing how personal decisions regarding criminal activities are influenced by economic factors. However, a corporate-oriented approach and its peculiarities are thoroughly explored by Arlen (2012). The author discusses the theory and application of corporate criminal liability and argues that optimally deterring corporate crime requires a system that imposes both individual and corporate liability, each with a distinct structure from traditional individual criminal liability. She contrasts the effectiveness of strict corporate liability with a duty-based liability regime, suggesting that the latter could motivate firms to implement optimal crime prevention and policing measures.

The development of modern law enforcement strategies, demonstrates a clear progression from early economic analyses of crime to the sophisticated, efficiency-driven approaches used today. These strategies have evolved from broad punitive measures to targeted, strategic interventions aimed at reducing social harm and increasing the efficiency of the legal system. This discussion underscores how decades of economic theories have been integrated into practical enhancements, shaping the evolution and specialization of criminal deterrence methods.

2.4.1.1 Welfare Economics Approach

This section formalizes the historical studies mentioned above into a comprehensive welfare model. It utilizes the formal framework proposed by Polinsky and Shavell (2007) to guide the analysis. The model incorporates various effects, including different liability rules, varying risk preferences, non-monetary sanctions, expected fines, judicial errors, the deterrence effect, the incapacitation effect, Principal-Agent relationships, settlements, repeat offenders, corruption in judgments, social norms, and self-reporting. Notably, this model is streamlined to highlight only the key conclusions of the criminal deterrence mechanisms that are the focus of the study[7].

Starting with the case where the penalty for a crime involves monetary sanctions or a fine, the theoretical framework aims to balance deterrence, social welfare, and enforcement costs. Polinsky and Shavell (2007) provides an academic synthesis on the optimal value of fines, introducing key variables and explaining their implications for enforcement policy.

Let us define the primary variables used in this analysis:

[7]It is worth mentioning the work of Garoupa (1997) which provides an overview of the relevant literature and also a similar comprehensive model containing the main advancements since Becker (1968).

g : The gain an individual obtains from committing a harmful act.

$z(g)$: The density function representing the distribution of gains among individuals.

h : The harm caused by the harmful act.

f : The fine imposed on the individual if the harmful act is detected.

w : The wealth level of an individual.

The fundamental assumption in this model is that the enforcement system is certain, meaning that individuals who commit harmful acts are always detected and fined. Additionally, it is assumed that monetary sanctions are a socially costless transfer, i.e., they do not directly affect social welfare beyond their role in deterrence.

Under a strict liability regime, individuals are sanctioned if they cause harm, regardless of their intent. The optimal fine, denoted as f^*, is set to equal the harm caused:

$$f^* = h$$

This ensures that an individual will commit the harmful act only if their gain g exceeds the harm h. Thus, the act is socially undesirable when $g < h$, and the fine $f = h$ deters such acts.

The social welfare function, W, under this model can be expressed as:

$$W = \int_f^\infty (g - h)z(g)\, dg \tag{2.1}$$

This equation integrates the net gains (benefits minus harm) over all individuals whose gains exceed the fine f. The enforcement authority aims to maximize W by appropriately setting f. When enforcement is costless, the optimal fine ensures that only those actions where the gain exceeds the harm are committed, aligning private incentives with social welfare.

In reality, the fine cannot exceed an individual's wealth w. Therefore, the optimal fine is constrained:

$$f^* = \min(h, w)$$

The fine derived above was classically proposed by Becker (1968). This constraint on the fine f leads to potential under-deterrence if $w < h$. In such cases, the fine does not fully reflect the social harm, allowing some harmful acts where $g < h$ to occur, as individuals cannot be fined beyond their wealth capacity.

When individuals are risk-averse, they experience disutility not just from the fine itself but also from the risk associated with the possibility of incurring the fine.

This risk-bearing cost necessitates a reevaluation of the optimal fine. If individuals are sufficiently risk-averse, the social welfare function W might suggest a lower fine to mitigate the disutility caused by risk, balancing between deterrence and the welfare loss from risk aversion.

The theoretical exploration of monetary sanctions underlines the importance of setting fines at a level that equates to the harm caused, while considering individuals' wealth constraints and risk preferences. The optimal fine, f^*, serves not only as a deterrent but also as a means to align private behavior with social welfare. However, in practice, achieving the first-best outcome may be challenging due to wealth constraints and the need to minimize the social costs associated with enforcement. Theoretical models thus provide a foundational framework for understanding and implementing effective monetary sanctions in public law enforcement.

To enhance the current model of monetary sanctions, several interesting features could be integrated to make it more comprehensive and applicable to real-world scenarios. One potential improvement involves incorporating the concept of repeat offenders. The current model primarily considers a single instance of a harmful act, but in practice, individuals may commit offenses multiple times. Including a mechanism for escalating fines or introducing additional penalties for repeat offenses could strengthen deterrence. For instance, the fine f could be adjusted based on the individual's history of offenses, with higher penalties for subsequent violations.

Another area for enhancement is the consideration of individuals' varying degrees of risk aversion. While the current model assumes a homogeneous response to fines, in reality, different individuals have different levels of risk tolerance. This variability can be captured by modifying the utility functions to reflect differing attitudes towards risk, which would, in turn, affect their decision-making processes. For example, the utility function U could be adjusted to incorporate a parameter that represents the individual's risk aversion level, altering how they perceive the disutility from potential fines.

Additionally, the model could be expanded to account for the role of non-monetary sanctions, such as community service or imprisonment, in conjunction with fines. This dual-sanction approach can be particularly effective in cases where the individual's wealth w is insufficient to cover the harm h caused by their actions. By including non-monetary penalties, the model can ensure that the deterrent effect remains strong even when monetary sanctions alone are inadequate. This addition would require a nuanced consideration of how these sanctions interact and their combined impact on deterrence and social welfare.

Moreover, the model could incorporate the concept of partial observability and imperfect enforcement, where not all offenses are detected, and not all detected

offenses result in fines. Introducing a probability factor p for detection and enforcement can provide a more realistic representation of law enforcement dynamics. This factor could be influenced by enforcement resources, such as the number of inspectors or police officers, and technological factors like surveillance systems. The relationship between enforcement intensity and detection probability could be explored to optimize the allocation of resources for maximum deterrence and cost-effectiveness.

Lastly, an extension of the model could explore the impact of public perceptions and social norms on the effectiveness of monetary sanctions. Social norms can influence the perceived severity of fines and the stigma associated with being caught. Integrating these psychological and social factors into the model would provide a more holistic understanding of compliance behavior, acknowledging that the effectiveness of fines is not purely a function of their monetary value but also of the social context in which they are applied.

In summary, enhancing the model to include features such as repeat offenses, varying risk aversion, non-monetary sanctions, imperfect enforcement, and social norms can provide a more comprehensive and realistic framework for understanding and optimizing the use of monetary sanctions in public law enforcement. These enhancements would allow for more tailored and effective policy interventions, better aligning legal frameworks with societal needs and behaviors.

2.4.2 Non-Trial Resolutions

The evolution of NTRs in economic literature demonstrates a significant shift towards integrating 'carrots'—incentives that encourage self-regulation and compliance—into the traditional 'sticks' approach of punitive measures. This development reflects a broader trend towards more tailored and efficient law enforcement strategies that effectively address both the economic and behavioral facets of criminal activities.

As mentioned above, the journey begins with the insights of Becker (1968), who established the foundational economic theory of crime that considers criminal behavior as a rational decision influenced by the costs of punishment and the likelihood of apprehension. Building on this, Kaplow and Shavell (1994) introduced the concept of self-reporting in their work, proposing a model where self-reporting can reduce enforcement costs and improve compliance. This model shows that by reducing the need for detection and offering lesser sanctions for self-reported offenses, the system can maintain deterrence while being more resource-efficient. The self-reporting mechanisms in Kaplow and Shavell (1994), involve agents voluntarily coming forward to disclose their misconduct in exchange for reduced sanctions, without the necessity of undergoing a trial. These mechanisms are precisely the type of tools categorized as NTRs within this study.

Deterrence as a result of NTRs within economic models, particularly the ex-ante type that prevents crimes before they occur, remains a controversial topic. For instance, Kaplow and Shavell (1994) highlight how efficient detection can enhance deterrence by allowing authorities to focus on other aspects of crime prevention, but not because NTRs themselves are deterrent to potential criminals. Notably, Polinsky and Shavell (2007) offer a more reserved view, suggesting that while self-reporting and settlements can streamline legal processes. In the following Section 2.4.2.3, the model of Polinsky and Shavell (2007) described above is enhanced to address the features of NTRs such as proposed by Kaplow and Shavell (1994).

Perhaps the most significant insights into the *ex-ante* deterrent effects of NTRs come from parallels drawn with antitrust literature. In the realm of antitrust violations, numerous studies have demonstrated that NTRs serve as effective deterrents. This topic is examined in more detail in the Section 2.5.3, providing a deeper analysis of how these findings apply across different legal contexts.

Some works focus on the *ex-post* benefits of NTRs, highlighting their disruptive power in breaking ongoing crimes, facilitating prosecution, and enhancing the screening process. The discussion on the impacts of NTRs begins with Landes (1971), who described their disruptive effects and the benefits for justice and prosecution through negotiated resolutions. Following this, Franzoni (1999) further explored the intricate balance between cost-saving through pre-trial negotiations and the potential undermining of deterrence when investigations are less intensive following failed negotiations. Lastly, Mungan and Klick (2016) discussed the adverse impacts of plea bargaining, particularly on innocent defendants, proposing significant compensation for exonerees to deter wrongful guilty pleas and enhance the distinction between guilty and innocent defendants without losing deterrence.

The analysis by Garoupa and Stephen (2008) and Givati (2014) offers a nuanced understanding of plea bargaining[8], revealing how their effectiveness and implementation are deeply influenced by the surrounding judicial, cultural, and ethical contexts. Garoupa and Stephen (2008) criticizes the inconsistent success of plea bargaining across various judicial systems, noting that the effectiveness of these negotiations heavily depends on the specific incentives and structures within different legal frameworks. This highlights the complex interplay between institutional settings and the efficacy of NTRs.

Building on this, Givati (2014) connects the economic rationale behind NTRs to broader societal values, examining how different countries' reliance on plea bargaining reflects their social priorities, particularly in balancing the punishment of the guilty with the protection of the innocent. This analysis underscores that the deployment of NTRs is not solely an economic or legal issue but is intricately tied

[8]Plea bargains are also of interest to this research, since they are also negotiated solutions. Although, they require some level of judicial oversight.

to cultural and ethical considerations. This perspective gains particular relevance in the context of Brazil, where there was little tradition of plea bargaining until the legal reforms of 2013. These reforms, which are central to this study, mark a pivotal shift in legal practices and underscore the importance of understanding how new legal tools either align with or challenge the existing societal values and legal norms within Brazil.

These selected works trace a progression from examining the general mechanisms of negotiated solutions to increasingly nuanced aspects of such legal frameworks. This reflects a broader trend within the literature, where the focus shifts from broad theories to more specific applications and implications. Similarly, this work continues this trend by exploring the very specific definition of corruption it intends to study. In crafting the model for Chapter 4, based on the frameworks outlined in Chapter 3, two aspects are identified as crucial and frequently mandated by various anti-corruption legislations: the necessity of forfeiture and the level of discretion afforded to prosecutors and judges in determining resolutions or agreements. The issue of forfeiture can be addressed through algebraic manipulation, allowing for quantitative analysis within the model. On the other hand, the discretion exercised by legal authorities involves a more theoretical discussion, reflecting its complexity and the subjective nature of judicial decision-making and the freedom of negotiation of prosecutors. This theoretical aspect is explored in detail below, emphasizing its significance in the practical application of legal frameworks against CBC.

2.4.2.1 Discretion

The role of discretion within the legal framework for combating CBC is a critical issue that balances the predictability and fairness afforded by fixed rules against the strategic flexibility provided by prosecutorial discretion. This balance is pivotal for devising effective strategies against CBC, as discussed in the economic and legal literature.

Reinganum (1988) analyses plea bargaining using asymmetric information, emphasizing how the economic decision-making process is influenced by the prosecutor's knowledge of case strength and the defendant's awareness of their guilt. This interaction informs negotiations, leading to outcomes where information is strategically used to shape sentences. The focus here on prosecutorial discretion illustrates how economic principles are increasingly applied to develop sophisticated approaches to law enforcement.

Further exploring discretion, Reinganum (2000) examines how federal sentencing guidelines affect judicial discretion and plea bargaining. Her game-theoretic model shows that although these guidelines are designed to standardize penalties and reduce judicial discretion, they result in longer average sentence lengths and

impact plea bargaining dynamics[9]. The guidelines encourage defendants to offer higher pleas, indirectly escalating the stakes of plea deals and influencing both the negotiation process and the ultimate sentencing outcomes. This analysis highlights the complex effects of reducing discretion: it can lead to stricter penalties and change how defendants and prosecutors strategize within the judicial process.

The current understanding, therefore, suggests that while fixed rules and guidelines provide a clear framework that may enhance the rule of law and ensure consistent sentencing, the flexibility offered by discretion allows prosecutors to tailor their strategies to specific cases, potentially increasing the overall effectiveness of anti-corruption efforts. This flexibility is particularly crucial in complex cases where the rigid application of rules might not adequately address the nuances of individual conduct or corporate structures.

To develop the CBC game described in Chapter 4, it is necessary to explore the role of prosecutorial discretion in tackling CBC. The game used in this thesis reaches conclusions similar to those in Reinganum (1988, 2000) studies, emphasizing the necessity of discretion once prosecutors assess their likelihood of securing a conviction. Fixed rules could lead prosecutors to offer unnecessarily large leniencies. While the conclusions align, the two game-theoretical models used are constructed differently, showcasing the robustness of these theoretical findings. This reinforces the argument that sophisticated and specific NTRs are crucial for both preventing and punishing corrupt practices effectively.

2.4.2.2 Corporate vs Individual Liability

It is important to highlight the differences in economic and legal theory dealing with individual and corporate liability. Arlen (2012), as discussed, examines U.S. enforcement practices, assessing how they align with theoretically optimal liability structures, particularly in terms of holding firms accountable for corporate crimes through various strategies like deferred and non-prosecution agreements.

Complementing this discussion, Oded (2016) explores the significant implications of shifting towards individual accountability in corporate corruption cases, as outlined in the U.S. Department of Justice's Yates Memo. This policy shift is designed to enhance deterrence by holding individuals accountable, thereby increasing the effectiveness of enforcement by ensuring that penalties reach the actual perpetrators, not just the corporate entities. This approach is aimed at fostering a corporate culture that actively deters corruption at all levels. However, the author also highlights the challenges of this strategy, such as the difficulties in establishing individual accountability within complex corporate hierarchies and the potential risks to the cooperative relationships between corporations and enforcement agen-

[9]Although the likelihood of resolution through plea bargainings remains unchanged.

cies if the pursuit of individuals is perceived as overly aggressive[10].

Adding to this discussion, the distinctions between firms and individuals in microeconomics and criminal law also play a crucial role. Economically, individuals aim to maximize their utilities and often display risk aversion, whereas firms strive to maximize profits and are presumed to maintain a neutral risk posture toward pay-offs. Legally, the differences are evident in the punishments administered: individuals face possible imprisonment, whereas corporations are more likely to be fined.

In Chapter 4 of the thesis, while the model presented does not differentiate agents in terms of liability, it is flexible enough to address potential differences between individual and corporate actors when necessary. This nuanced approach ensures that the model can adapt to the specifics of each case, whether it deals with individual perpetrators or corporate entities, acknowledging the unique incentives and legal consequences each faces. This allows for a comprehensive analysis that aligns with both economic theories and legal frameworks.

2.4.2.3 The Impact of NTRs on Welfare

Incorporating the concept of NTRs such as self-reporting, as introduced by Kaplow and Shavell (1994), brings a significant enhancement to the existing model of monetary sanctions and welfare analysis in law enforcement of Becker (1968). Their model adds a novel dimension to the deterrence and social welfare optimization by including a mechanism where individuals report their own harmful acts, thus providing an alternative to traditional trial-based resolutions.

The self-reporting mechanism introduces an *ex ante* sanction r, which individuals pay if they voluntarily report their harmful acts. This sanction is typically set to be less than the expected sanction pf they would face if caught without self-reporting, where p is the probability of detection and f is the fine. This setup aligns the incentives of individuals with social welfare by encouraging them to self-report, thus reducing the overall enforcement burden.

The inclusion of self-reporting significantly reduces enforcement costs, as it obviates the need for extensive investigation and detection efforts. Since individuals who self-report are not subject to further investigation, the cost c associated with enforcing the law is lowered. This cost-saving is represented in the social welfare function by reducing the enforcement expenditure component.

The social welfare function W under the self-reporting regime can be reformulated to include the benefits from reduced enforcement costs and the altered deterrence dynamics. The welfare function becomes:

[10]Søreide and Vagle (2022) points out that no individuals faced convictions in cases like Herbalife Nutrition Ltd in the US and Airbus SE in the UK and other countries. On the contrary, Car Wash Operation in Brazil aimed heavily towards individual accountability.

$$W = \int_r^{\infty} (g - h)z(g)\, dg - pcF(r) \tag{2.2}$$

Here, $F(r)$ is the cumulative distribution function of the gains up to the threshold r where individuals choose to self-report. The introduction of self-reporting changes the lower limit of integration from f, on equation (2.1), to r, reflecting the shift in behavior from evading detection to voluntary compliance.

The self-reporting mechanism also mitigates the risk-bearing costs associated with the uncertainty of sanctions. Individuals who self-report face a known sanction r, reducing the disutility associated with the risk of uncertain outcomes. This reduction in risk-bearing costs enhances social welfare, especially in a society where individuals are risk-averse.

Kaplow and Shavell (1994) demonstrate that an optimal enforcement strategy with self-reporting involves setting the *ex ante* sanction r equal to the expected fine pf. This ensures that individuals' behavior aligns with the desired deterrence outcome, as the cost of self-reporting is set just below the expected penalty for not reporting. This alignment encourages compliance without the need for excessively high sanctions or detection efforts.

The adoption of self-reporting leads to higher overall social welfare compared to traditional enforcement mechanisms. The model shows that self-reporting can achieve the same deterrence levels at lower costs and with reduced risk-bearing for individuals. The optimal self-reporting scheme thus emerges as a superior enforcement strategy, providing a practical and efficient solution for managing harmful behaviors in society.

In summary, the integration of self-reporting into the law enforcement framework, as proposed by Kaplow and Shavell (1994), enhances the welfare model by reducing enforcement costs (by reducing the surveillance over the society), mitigating risk-bearing costs, and optimizing deterrence through better alignment of individual incentives with social welfare goals. This model extension offers a refined understanding of the economics of law enforcement, particularly in contexts where traditional trial-based resolutions may not be the most efficient approach.

2.5 Enforcement Policies Against Corruption

This section of the thesis examines the intersection of corruption studies and NTRs through a comprehensive literature review. By reviewing and synthesizing these studies, the discussion shows how theories of economic behavior coupled with corruption deterrence can inform the effectiveness and customization of NTRs to specifically address CBC.

This section draws parallels between general crime deterrence strategies and specific anti-corruption measures to demonstrate how NTRs can effectively combat CBC. It first explores legal theory, then moves to economic theory, and finally examines lessons from antitrust literature, a field more advanced in discussing leniency and self-reporting strategies.

2.5.1 Legal Theory

This section delves deeper into the legal theory underpinning the application of NTRs in combating CBC, providing an essential theoretical backdrop for their practical application.

NTRs provide flexible responses to specific cases of corruption, which is essential in situations where strict law enforcement could lead to unfair or ineffective results. NTRs encourage offenders to cooperate with law enforcement, helping to expose wider corrupt networks that might otherwise stay concealed. This flexibility is particularly useful in corruption cases, which often involve complex networks of criminal activity.

This characteristic of NTRs is explored by Nell (2008). The author adds a critical dimension to this discussion with a comprehensive evaluation of voluntary disclosure programs for corruption offenses. The author highlights the strategic use of these programs, which allow individuals involved in corruption schemes to report their offenses in exchange for leniency. This strategy aims to break the 'pact of silence' among corrupt parties, promoting betrayal to destabilize bribery networks. It can be interpreted as having then two aims: breaking the stability of bribery scheme and increasing the detection rate.

However, the use of NTRs is not without its controversies and challenges. These include concerns over the balance between accountability and practicality, the potential for unequal justice where powerful entities might negotiate more favorable terms, and the overall impact of these practices on public trust and legal system integrity. Such issues underscore the need for a nuanced understanding of both the theoretical foundations and the practical implementations of NTRs in anti-corruption efforts. Nell (2008) identifies significant design flaws in these programs across 56 countries, noting that they often fail to differentiate adequately between the roles of bribe-givers and bribe-takers and do not calibrate the leniency offered to effectively encourage self-reporting while maintaining legal integrity. The proposed strategic redesign of these programs seeks to enhance their effectiveness, making it more challenging for corruption to remain stable and undetected.

This theoretical exploration sets the stage for the subsequent analysis in the next chapter, which will provide an extensive legal review of current legislation regarding NTRs against corruption crimes in jurisdictions such as Brazil, the United Kingdom, the United States, and France. This forthcoming chapter also delves into

significant case studies that illustrate the application, challenges, and outcomes of NTRs in practice.

2.5.2 Economic Theory

The study of economic theories on corruption and NTRs has evolved, with scholars refining and expanding on each other's work. This progression has led to more nuanced and practical models for developing effective anti-corruption strategies.

The foundational ideas discussed by Polinsky and Shavell (2001) in their exploration of corruption in law enforcement and optimal enforcement strategies provide crucial insights into the economic and legal dimensions of deterrence. While their analysis primarily focuses on traditional deterrence tools[11] such as maximal penalties for corruption crimes and framing, along with strategic rewards for enforcement agents, they also introduce the treatment of extortion. The authors suggest that extortion should not be penalized under certain conditions, positing that imposing sanctions could lead to worse outcomes, such as an increase in the framing of innocents.

This aspect of their work hints at a complex interplay between different forms of corrupt practices and the legal responses to them[12]. By arguing against the penalization of extortion, they lay the groundwork for later discussions by scholars like Rose-Ackerman (2010) and Basu (2011), who delve deeper into the distinctions between different types of corruption, such as harassment bribes and the asymmetric punishments that might be more appropriate for them. This discussion on how different corrupt behaviors are categorized and tackled within the legal system points towards a more nuanced understanding of corruption and its deterrence.

The narrative begins with the seminal work by Rose-Ackerman (2010), who critiques the misalignment of penalties for corruption and extortion within existing legal frameworks. The author argues that the penalties imposed to convicted offenders often do not correspond to the economic gains derived from such corrupt activities, suggesting that a more proportionate approach to sanctions could enhance deterrence. Her analysis sets a crucial foundation by highlighting the

[11]Moreover, the work of Polinsky and Shavell (2001) is seminal in bridging traditional legal approaches to corruption with more innovative strategies, setting a theoretical foundation that would later influence the development of policies focusing on the differential treatment of various corrupt acts. Their insights into the optimal mix of penalties and rewards, and the strategic non-penalization of certain acts under specific conditions, offer a critical perspective that helps to frame subsequent advancements in the field, including the exploration of NTRs and other modern enforcement mechanisms designed to combat CBC more effectively. This groundwork is essential for understanding how traditional tools can evolve into more sophisticated legal strategies that are both context-sensitive and aligned with economic principles of deterrence.

[12]Notably, as stated in Section 1.1, the definition of corruption provided by Polinsky and Shavell (2001) is different from the one studied here.

economic inefficiencies in the legal penalties for corruption, paving the way for subsequent studies that seek more tailored and effective deterrent strategies.

Building directly on Rose-Ackerman (2010) critiques, Basu (2011) also uses asymmetric punishments to address specifically the type of corruption Rose-Ackerman (2010) discusses under extortion, which Basu (2011) calls 'harassment bribes'. Basu (2011) proposal for differentiating penalties between bribe-givers and bribe-takers aims to encourage self-reporters and disrupt the collusive pacts typical in corrupt transactions. By proposing that penalties should vary based on the role and action of the participants in corruption, the author provides a strategic view of fining based on the role played by each individual on a bribery scheme. More specifically, in the context of harassment bribes, the bribe receiver should be punished, while the bribe payer should face no penalties. This approach encourages bribe payers to report their misconducts without fear, thereby increasing detection and reducing corruption overall. The conclusions found in Basu (2011) are later refined in Dufwenberg and Spagnolo (2014) and Basu and Cordella (2016).

Buccirossi and Spagnolo (2000) then critique the implementation of leniency programs, which are designed to destabilize corrupt relationships by incentivizing self-reporting. Notably, this time, the authors do not only refer to extortive corruption, but to CBC in line with the object of the present study. They highlight the strategic potential but also the pitfalls of such programs, particularly when they are not properly calibrated to deter CBC without facilitating it. This discussion ties back to the earlier themes by emphasizing the need for carefully designed legal mechanisms that strategically use economic incentives to combat CBC effectively.

Søreide and Rose-Ackerman (2018) add another layer to this discussion by using economic theories about asymmetric information and rational choice to analyze corruption in bureaucratic systems. They highlight the complexity of designing anti-corruption policies that can effectively adapt to different bureaucratic realities, emphasizing the need for context-sensitive strategies that incorporate economic principles into policy design. The article suggests several specific practical measures against corruption: individuals involved in corruption should face criminal and administrative sanctions such as fines, imprisonment, disqualification from government work, and dismissal. Less severe breaches can be addressed through relocation or official reprimands. External monitoring and oversight should be intensified, especially for institutions with a history of corruption. Significant structural changes, including the reorganization of authority and responsibilities within corrupt entities, should be implemented. Leaders who fail to comply with anti-corruption duties should be disqualified and removed from their positions, and in severe cases, corrupt institutions should have their service provision responsibilities removed. Consideration should be given to compensating victims of corruption, though practical limitations may apply. Public sector managers should

be held responsible for implementing and maintaining compliance programs, with sanctions for failing to report or address CBC.

The progression of studies in this field shows a clear evolution from assessing penalty economics to developing advanced enforcement strategies like asymmetric punishment and calibrated leniency programs. These studies demonstrate how economic theories can lead to more effective anti-corruption strategies. It is important to note that earlier studies primarily focused on anti-corruption strategies aimed at deterring harassment bribes through self-reporting. However, this work aims to develop a theory specifically for collusive bribes, a topic less explored but addressed in Chapter 4. Notably, the theory devised in that chapter includes insights from antitrust and leniency literature, filling a notable gap in the existing research.

Theories on strategic use of leniency greatly improved following developments within anti-trust literature. These leniency strategies, pivotal in the anti-trust context for breaking cartels and other monopolistic practices, have shown significant parallels to strategies needed for tackling CBC. The effectiveness of leniency programs in encouraging self-reporting and collaboration for breaking the cycle of complicity within cartel networks has opened new avenues for similar applications in anti-corruption measures. These similarities and the most recent leniency strategies for anti-trust deterrence are discussed in detail in the next section.

2.5.3 Lessons from Anti-trust Literature

This section examines how economic theory, anti-corruption strategies, and NTRs interact, particularly focusing on the structural similarities and differences between cartel behavior in antitrust cases and corrupt schemes. While members of a cartel might defect to gain a larger market share, benefiting from their actions, participants in CBC schemes generally face net losses when they defect, and their strategies usually aim to minimize these losses. This key difference highlights the need for greater leniency in CBC cases to effectively encourage cooperation and self-reporting among involved parties.

Drawing from the insights of Motta and Polo (2003), who explore the dual effects of leniency programs[13] in both deterring and inadvertently facilitating col-

[13]Leniency programs in antitrust literature are policies that offer reduced penalties or immunity to participants of a cartel who voluntarily come forward to report their involvement and provide evidence against other members. These programs are designed to destabilize cartels by encouraging self-reporting, thereby facilitating the detection and dismantling of anti-competitive practices. By offering incentives for cooperation, leniency programs aim to increase the risks and decrease the benefits of participating in a cartel. A notable example is the U.S. Department of Justice's Corporate Leniency Policy, which has been instrumental in uncovering and prosecuting numerous cartels (Motta and Polo, 2003).

lusion, this discussion highlights the necessity of carefully calibrated leniency programs. These programs must be robust enough to dismantle cartel networks while avoiding the creation of incentives that could encourage further agreements. The theoretical foundation laid by this study is critical as they provide a framework for understanding how leniency can be adapted from anti-trust practices to combat CBC more effectively.

Furthering this discourse, the empirical analyses conducted by Brenner (2009) and Bigoni et al. (2012) provide valuable insights into the practical applications and outcomes of leniency programs. These studies reveal how leniency not only speeds up the detection and prosecution of cartels but also necessitates careful design[14] to ensure it does not weaken the deterrence needed to prevent the formation of new corrupt agreements.

Moreover, the empirical methodology adopted in Chapter 5 of this thesis is inspired by the work of Miller (2009) and used by Brenner (2009), who provide a rigorous methodological approach to studying the impacts of leniency programs on cartel behavior. The choice of this methodology is grounded in its proven effectiveness in analyzing cartel behaviors, which shares considerable similarities with corrupt practices, particularly in terms of the secretive and collusive nature of both types of activities. The adaptation of Miller's approach in the context of CBC research allows for a nuanced exploration of how leniency might impact corrupt practices, particularly in enhancing the detection and disruption of CBC networks[15]. This methodological choice reflects a deliberate strategy to align theoretical insights with empirical investigation, ensuring that the proposed anti-corruption strategies are both theoretically accurate and empirically validated.

2.5.4 Experiments on Anti-Corruption Policies

Controlled experiments are an important approach for understanding the efficacy of anti-corruption strategies. However, Chapter 4 of this thesis is theoretical and does not employ experiments to test its hypotheses. Instead, it uses insights from experimental research to enhance the theoretical discussion.

One notable study that aligns closely with the game design elements discussed in this thesis' theoretical framework is the research conducted by Engel et al. (2016). The authors investigate the effects of symmetric versus asymmetric punishment regimes on CBC through laboratory experiments. The findings suggest that asymmetric punishment, where the briber faces less severe penalties com-

[14] A carefully designed leniency program should seek optimality by imposing fines that are neither excessively high nor too low, thus avoiding any incentives for misbehavior.

[15] This methodology was effectively utilized by Berlin et al. (2018) to study the introduction of NTR mechanisms against CBC in China, demonstrating its applicability to the Brazilian case explored in this research.

pared to the bribe recipient, provides bribe givers with a credible threat that can be used to enforce corrupt agreements. This dynamic suggests that while asymmetric punishment can enhance the enforcement of CBC, it might also encourage the initiation of it due to the reduced risks for bribe givers. Although the author's experimental design shares similarities with the theoretical model proposed in this thesis, the present model incorporates additional factors such as forfeiture and prosecutorial discretion, which could lead to slightly different conclusions.

Similarly, the study by Abbink and Wu (2017) explores the impact of reward systems on deterring CBC in a controlled lab setting, examining scenarios where either both parties or only one can report the misconduct. The findings from the authors indicate that symmetric reward mechanisms, where both parties have the opportunity to report, are most effective at reducing CBC. This suggests that enhancing the symmetry in potential rewards for self-reporting could undermine the trust necessary for sustaining corrupt agreements, particularly when future interactions between parties are uncertain. This results approaches from the idea of CBC, where any party should be entitled to report its offences at any time.

The confirmation of the cited studies through controlled experiments showcases the potential power of well-crafted CBC game models. This evidence highlights how accurately designed theoretical models can effectively predict and analyze CBC dynamics, underlining the importance of robust model construction in understanding CBC behavior.

2.5.5 Empirical Works

This section explores empirical studies specifically aimed at assessing the impact of various anti-corruption strategies involving NTRs on levels of corruption and other relevant economic variables. It delves into research that evaluates the effectiveness of NTR-based measures in reducing corruption and their broader economic consequences, providing insights into which strategies are most effective and under what conditions they succeed.

The work of Acconcia et al. (2014) employs an agency model to examine Italy's legal reforms and their impact through accomplice-witness programs. This study highlights the significant role these programs play in disrupting criminal organizations by incentivizing members to testify against their associates, thus enhancing prosecution efforts and reducing crime. The empirical evidence supports the model's predictions, demonstrating an increase in the effectiveness of prosecutions and a decrease in crime rates, underscoring the importance of well-designed judicial systems and effective policy frameworks.

Further exploring the impact of leniency and asymmetric punishment, Berlin et al. (2018) scrutinizes the effectiveness of these measures in China following the 1997 legal reforms. The study reveals that the reforms intended to increase cor-

ruption reporting and deterrence, but it actually reduced both due to enhanced retaliation against reporters. This underscores the complexity of designing leniency and punishment systems that effectively encourage reporting without compromising overall deterrence. Notably, the authors adopted the methodology from Miller (2009), which is also the approach selected for this thesis due to its proven effectiveness in revealing the dynamics of CBC and the impact of leniency programs. These methods, which reflect the similarities between cartel behaviors and corrupt practices, are applied in the empirical section of this work to further explore how leniency can promote collaboration and self-reporting in corruption cases. This application bridges theoretical concepts with empirical evidence, aiming to fill the existing gaps in the literature on NTRs against CBC.

2.6 Final Remarks

This chapter has provided a comprehensive review of the literature relevant to this thesis. It began by exploring the economics of corruption and the dynamics of NTRs, offering theoretical context and outlining the current consensus on these topics. This background serves to orient the reader with the foundational concepts and contemporary viewpoints in the field.

The review then transitioned to examining specific works that investigate the use of NTRs as a tool to combat corruption. It started with theoretical perspectives and then moved to empirical evidence that supports the effectiveness of these strategies. This dual approach helps to illuminate the practical impacts and theoretical underpinnings of NTRs in anti-corruption efforts.

Key aspects of this thesis's model, such as the importance of discretion, the necessity of forfeiture, and the collusive nature of the game, were also discussed. The literature reviewed exposes the current gaps that Chapter 4 aims to address, enhancing the understanding of how these elements are handled within existing frameworks.

Furthermore, given the extensive research on leniency in antitrust cases and its relevance to both the theoretical and empirical components of this work, this area was thoroughly reviewed. The parallels between antitrust leniency and anti-corruption NTRs were highlighted, underscoring the inspiration behind the approaches taken in this thesis.

Looking ahead, the next chapter will delve into a legal review of current legislation and explore case studies to further ground the theoretical insights presented here in practical applications and legal realities. This progression ensures a holistic approach to tackling the complex issue of CBC through the lens of NTRs.

Chapter 3

Legal Review

3.1 Introduction

National anti-corruption policies are tailored to address the societal priorities. Therefore, distinct jurisdictions might have a different approach to fight collusive bribery or corruption (CBC). The focus of this study is on the impact of non-trial resolutions (NTRs) on domestic CBC. To achieve this, the chapter explores the variations in anti-corruption legislation across different jurisdictions to provide precise definitions and procedures for NTRs in corruption cases. This chapter has two goals, the first is to offer a comparative analysis of the anti-corruption legislation across various jurisdictions. And the second is to focus on the specifics of NTRs at these jurisdictions, and show how it can be used as an effective tool against CBC.

Crimes of corruption or bribery involve the offering, giving, receiving, or soliciting of something valuable in exchange for an undue advantage, which is an illegal practice that undermines institutional integrity, public trust, and fair competition in the private sector. The definition of corruption and bribery is similar across most jurisdictions and conventions. For instance, the United Nations Convention against Corruption (UNCAC) defines corruption as the 'abuse of power for personal gain', while the UK Bribery Act 2010 describes a bribe as 'financial or other advantage that is offered, promised, or given to induce or reward improper conduct'. Similarly, the U.S. Foreign Corrupt Practices Act (FCPA) prohibits the payment of bribes to foreign officials in exchange for business advantages. This consensus reflects the widespread agreement on the concept of corruption and the significance of preventing and punishing such activities.

In efforts to combat CBC, NTRs are often highlighted as key tools. These mechanisms resolve violations of laws or regulations outside the courtroom and are generally preferred over litigation due to their cost-effectiveness and time effi-

ciency. In cases of corruption, which is a criminal offense, NTRs take the form of settlements for individuals and deferred prosecution agreements (DPAs) or non-prosecution agreements (NPAs) for corporations.

Potential offenders can avoid trials and reach an agreement with the prosecution by self-reporting their offences, then cooperate with authorities to provide relevant information, and committing to the remediation proposed by the authorities. These three phases, self-reporting, cooperation or collaboration and remediation are independent, and an agreement can be reached without necessarily going through all of them.

More specifically, the act of self-reporting involves a company or individual voluntarily disclosing any illegal activities to the appropriate authorities before their knowledge of the misconduct. By doing so, they can often avoid or mitigate potential legal consequences. For instance, the U.S. Department of Justice's Criminal Division Corporate Enforcement and Voluntary Self-Disclosure Policy outlines that companies that self-disclose, fully cooperate, and remediate may receive a declination of prosecution under certain conditions (U.S. Department of Justice, 2023).

Empirical research, such as that conduced by Debevoise and Plimpton (2019), shows that companies self-reporting violations like those under the Foreign Corrupt Practices Act often receive lesser penalties. This indicates the legal benefits of proactive compliance. Moreover, Kaplan and Mikes (2012) highlight self-reporting's positive effects on corporate reputation, suggesting it helps protect and enhance a company's public image. These findings underline self-reporting's dual advantage in compliance and brand protection.

Collaboration involves working with the authorities to help the understanding and resolution of an offence. This can involve sharing information, conducting joint investigations, or negotiating a mutually acceptable solution. Collaboration can benefit both the authorities and the company or individual in question by facilitating a faster and more efficient resolution to the matter (Landes, 1971).

Remediation involves taking steps to address and correct any violations or issues identified. This can include implementing new policies and procedures, providing training to employees, or paying restitution to affected parties. Remediation is often a key component of NTRs, as it demonstrates a commitment to preventing future violations and improving compliance.

While NTR processes rely on self-reporting, cooperation, and remediation, the extent to which these factors impact the resolution of a case may vary depending on the specific circumstances. In certain cases, self-reporting may be of the most important, while in other instances, cooperation or remediation efforts may be more advantageous to the agreement. In this sense, the legal system cannot fully define the decision to enter into an agreement. Instead, it can merely provide guidance

on procedures that enable flexible agreements that benefit both prosecutors and defendants. Notably, this chapter focuses on analysing the law's provisions under the most objective perspective, however the discretion to enter into agreements remains a vital aspect of the process.

The analytical portion of this text will explore how different jurisdictions, specifically the United States, United Kingdom, France, and Brazil, handle corporate and individual offenses related to domestic and international corruption. It will discuss the nuances in each country's approach to the phases of self-reporting, cooperation, and remediation, emphasizing that these processes are not uniform across borders. This Chapter aims to provide a detailed comparison and contrast of these legal frameworks, highlighting the complexities faced by entities navigating these varied systems in cases of corruption, whether at a national or international level.

This research focuses mostly on domestic colusive bribery or corruption. The main reason for this is to analyze all parties involved in CBC incidents. In international corruption cases, it's often not feasible to hold bribe payers in different jurisdictions accountable for bribing international public officials. Consequently, assessing the impact of specific laws on individuals outside the jurisdiction is challenging. Despite this, distinguishing between domestic and international anti-corruption measures can be difficult. Therefore, this chapter will, where appropriate, highlight provisions more pertinent to either domestic or international corruption.

Notably, international corruption is a broad field in the study of corruption. The Foreign Corrupt Practices Act (FCPA) and the OECD Anti-Bribery Convention are examples of legislation against international corruption. Meanwhile, domestic bribery or corruption is enforced by a distinct body of legislation. In the US, for instance, corruption is regulated by Title 18, Section 201 of the U.S. Code. In the UK, in addition to abiding by the OECD Anti-Bribery Convention, it has its legislation concerning both national and international corruption in the Anti-Bribery Act 2010. Similarly, in Brazil, Federal Law 12.846/13 deals with both national and foreign corruption under the same legislation[1].

Lastly, there are legal distinctions between individuals and corporations in each jurisdiction. As demonstrated in the previous chapter, the incentives of both corporations and individuals can be similarly represented. Therefore, it is necessary to comprehend the legal differences between them to analyze the implications of NTRs in each case.

In order to highlight the differences between anti-corruption legislations in different countries, this Chapter provides a legal review from the relevant legislation

[1]Although Federal Law 12.850/13, which provides the rules for individual liability in corruption cases, does not refer to foreign corruption.

in the selected jurisdictions. These jurisdictions were chosen for their significant contributions to anti-corruption legislation. The FCPA in the U.S. and the UK's Bribery Act set crucial international precedents (Søreide, 2016). France's Sapin II law, introduced in 2016, provides a modern European perspective influenced by global experiences. Brazil, the primary case study and motivation, offers valuable insights from its 2013 reforms and Operation Car Wash.

In this chapter, the Section 3.2 explores the relevant anti-corruption legislation across all jurisdictions. Notably, it is crucial to analyze how international bodies guide their members in legally combating corruption misconducts. In this regard, Section 3.2 also explores the key provisions of the United Nations Convention Against Corruption, OECD Anti-Bribery Convention and the EU Legislation Against Corruption. After this, Section 3.3 examines the primary characteristics of NTRs in these jurisdictions. Subsequently, Section 3.4 provides a summary of the main aspects of anti-corruption efforts and NTRs across the four jurisdictions. Moving forward, Section 3.5 then explores the most notable NTRs in important corruption cases, drawing key conclusions. Lastly, Section 3.6 compiles the most significant insights from this legal review.

Lastly, it is important to point out that in this chapter, references to corruption follow the definitions provided by the legislation of each jurisdiction discussed. These legal definitions are examined in detail in Section 3.2. While they often overlap with the concept of collusive bribery or corruption (CBC), important differences may exist. Readers should interpret any mention of corruption-related crimes in light of how each jurisdiction legally defines and understands them.

3.2 The Anti-Corruption Legislation

This Section primarily focuses on the anti-corruption legislation of the UK, US, France, and Brazil. However, it is crucial to first understand the broader international context set by the United Nations Convention against Corruption (UNCAC), the Organisation for Economic Co-operation and Development (OECD) Anti-Bribery Convention and the EU level anti-corruption legislation. These pivotal international agreements provide foundational legal frameworks and guidance for preventing, detecting, and prosecuting corruption offences. By exploring the UNCAC and OECD Anti-Bribery Convention, it is possible to gain vital insights into their key provisions and impact, which significantly inform and influence the anti-corruption efforts within these specific jurisdictions.

3.2.1 The UNCAC

The United Nations Convention against Corruption (UNCAC) is an anti-corruption treaty which was adopted by the United Nations General Assembly in October 2003 and came into force in December 2005. It was the first global, comprehensive, and legally binding instrument to address bribery and corruption but also other crimes such as embezzlement and money laundering. The convention is an important achievement in the global fight against corruption, it has been ratified by 190 countries (United Nations, 2012).

The UNCAC aims to help fight corruption by several means, such as criminalizing, preventing, strengthening international cooperation and recovering stolen assets. Therefore, it requires states to adopt and enforce criminal laws[2] that prohibit corruption, embezzlement, and money laundering. Moreover, the convention requires states to provide effective sanctions for those who engage in corrupt activities. It also requires states to take measures to prevent corruption, such as promoting transparency and accountability in public administration, requiring public officials to declare their assets, and ensuring that procurement processes are fair and transparent. Notably, the UNCAC recognizes that corruption is a transnational problem and requires states to cooperate with each other in the prevention, investigation, and prosecution of corruption offences. Therefore, it requires states to provide mutual legal assistance. Lastly, the UNCAC requires states to adopt measures to identify, freeze, and confiscate assets that have been obtained through corrupt practices, and to return those assets to their rightful owners.

Most importantly, for the ends of this study is that the UNCAC emphasizes NTRs. They have been increasingly used in recent years as a tool for combating corporate crime and corruption. The Article 37 of the United Nations (2004) specifically recognizes the importance of NTRs in the fight against corruption. The article encourages states to consider the use of NTRs as a means of combating corruption, particularly in cases where the interests of justice would be served by such an agreement. Article 37 also acknowledges the potential benefits of NTRs, including their ability to encourage self-reporting, collaboration, and remediation, which can lead to more effective and efficient investigations and prosecutions.

The UNCAC's focus on NTRs is particularly important for both domestic and foreign corruption cases. In domestic cases, NTRs can help to address corruption within the public sector and private sector, promoting transparency and accountability. In foreign corruption cases, NTRs can help to address the problem of transnational corruption, which would be difficult to prosecute due to jurisdictional challenges and the lack of cooperation from foreign governments.

In conclusion, the UNCAC's emphasis on NTRs, as outlined in Article 37,

[2]The Brazilian anti-corruption laws from 2013 explored in this chapter were based on the provisions of the UNCAC.

is a critical tool for combatting corruption in associated countries. NTRs have the potential to encourage self-reporting, collaboration, and remediation, which can lead to more effective and efficient investigations and prosecutions. Moreover, NTRs can be used to address both domestic and foreign corruption cases, making them a versatile and important feature of the UNCAC's anti-corruption framework.

3.2.2 OECD Anti-Bribery Convention

The OECD Anti-Bribery Convention is an international agreement designed to combat corruption of foreign public officials in international business transactions. The convention was adopted by the member countries of the Organisation for Economic Co-operation and Development (OECD) in 1997 and came into force in 1999 (OECD, 2009). The convention has been signed by 44 countries, including major economies such as the United States, Japan, Germany, and the United Kingdom. The OECD regularly monitors the implementation of the convention by member countries and provides assistance to those countries in developing and implementing anti-corruption measures. It also has played a significant role in increasing international cooperation in the fight against corruption and improving transparency in international business transactions.

The convention requires member countries to criminalize corruption of foreign public officials, establish jurisdiction over the offence, and provide for effective sanctions, among other things. It also calls for member states to promote measures to prevent corruption, including effective accounting and auditing standards, and encourages cooperation between countries to investigate and prosecute cases of corruption.

Notably, this work tries to understand the main legislation regarding domestic corruption and despite the convention being primarily focused on combating corruption of foreign public officials, it provides important recommendations on the resolution of corruption cases in general. The Convention's Recommendation, includes several provisions that encourage member countries to adopt effective measures to combat domestic corruption, including non-trial resolution. In this sense, it is worth to highlight the recommendation[3] which states that member states should consider the use of self-reporting and collaboration in the resolution of foreign corruption cases. Although this recommendation specifically refers to foreign corruption cases, the use of non-trial resolution is also useful to solve cases of domestic corruption (OECD, 2009).

In summary, the OECD Anti-Bribery Convention provides recommendations that encourage member states to adopt effective measures to combat corruption,

[3]Item 7 from the Recommendation of the Council for Development Co-operation Actors on Managing the Risk of Corruption 16 November 2016.

including non-trial resolution. While the Convention's primary focus is on the corruption of foreign public officials, its provisions on non-trial resolution and effective sanctions can have important implications for domestic corruption as well.

3.2.3 The Anti-Corruption Legislation in the EU

Over the past decades, the European Union (EU) has developed a robust framework to combat corruption within its institutions and across its Member States. In 1995, the EU introduced the Protection of the European Communities' Financial Interests (PIF Convention)[4], an important moment for aligning the criminal law of Member States to protect the Union's budget and financial interests. Soon after, the 1997 Convention on the Fight Against Corruption Involving Officials of the European Communities or Officials of Member States of the European Union[5] broadened the EU's scope of anti-corruption rules by requiring Member States to criminalize both the giving (active) and receiving (passive) of bribes. Also, defines active corruption as being linked to the performance of public duties when those duties involve the implementation of EU activities. These measures helped establish common standards for prosecuting corruption crimes and clarified the jurisdictional reach of law enforcement bodies across the EU.

In the 1997 Convention on the Fight Against Corruption Involving Officials of the European Communities or Officials of Member States of the European Union, passive corruption is defined in Article 2 as '*the deliberate action of an official, who, directly or through an intermediary, requests or receives advantages of any kind whatsoever, for himself or for a third party, or accepts a promise of such an advantage, to act or refrain from acting in accordance with his duty or in the exercise of his functions in breach of his official duties*'. Meanwhile, Article 3 describes active corruption as '*the deliberate action of whosoever promises or gives, directly or through an intermediary, an advantage of any kind whatsoever to an official for himself or for a third party for him to act or refrain from acting in accordance with his duty or in the exercise of his functions in breach of his official duties.*' These definitions helped establish common standards for pursuing corruption-related offenses in the context of EU institutions and Member States and inspired future world reaching conventions as the OECD Anti-Bribery Convention and the UNCAC, as shown above.

In parallel, the Council of Europe Criminal Law Convention on Corruption of

[4]Available at:https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A41995A1127%2803%29.

[5]Available at:https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A41997A0625%2801%29.

1999[6] goes further by laying down extensive legal provisions on bribery[7]. It requires each state party to criminalize '*the intentional promising, offering or giving, by any person, directly or indirectly, of any undue advantage*' as active bribery (Article 2) and '*the request or receipt*' of an undue advantage as passive bribery (Article 3). Notably, this convention used the term 'bribery' to refer to corruption and draws a formal distinction between domestic and international bribery, recognizing that corruption can involve both national public officials and foreign or international public figures. This distinction clarified the scope of offenses for law enforcement, encouraged states to adopt legislation covering a broader range of corrupt acts, and facilitated cross-border cooperation by treating transnational bribery as seriously as purely domestic offenses.

At the EU level, institutional developments were introduced along with these legal measures. In 1999, the European Anti-Fraud Office (OLAF) was established to investigate fraud, corruption, and other illegal activities affecting EU financial interests, complementing the work of Member States' law enforcement. Later, in 2017, the EU introduced Directive (EU) 2017/1371 on the Fight Against Fraud to the Union's Financial Interests by Means of Criminal Law (the 'PIF Directive')[8], which built upon earlier conventions by offering more precise definitions and stricter requirements for Member States to harmonize penalties. Article 4 of the PIF Directive defines both passive and active corruption[9]. By doing so, the PIF Directive not only prescribes criminal liability for bribery but also ensures that offenses undermining the Union's financial interests are met with effective sanctions.

Alongside these legislative texts, the EU has strengthened its institutional capacity to investigate and prosecute corruption at a supranational level. In 2017, a Council Regulation established the European Public Prosecutor's Office (EPPO), an independent EU body empowered to investigate and prosecute offenses against the Union's budget, including corruption and fraud. Through close cooperation with national authorities, the EPPO addresses investigative gaps and prevents legal or jurisdictional barriers from impeding efforts to combat corruption.

Although these EU instruments focus primarily on safeguarding the Union's financial interests and preventing undue influence on officials carrying out EU-

[6]Available at:`https://rm.coe.int/168007f3f5`.

[7]When the Council of Europe Criminal Law Convention on Corruption (1999) entered into force in 2002, it had been ratified by 14 states. As of now, 48 states are parties to the convention.

[8]Available at: `https://eur-lex.europa.eu/eli/dir/2017/1371/oj/eng`.

[9]Under Article 4(1), passive corruption is described as the intentional act of an official who directly or through an intermediary requests or receives advantages of any kind, or accepts the promise of such an advantage, in order to act or refrain from acting in accordance with his or her duty. Under Article 4(2), active corruption involves promising or giving an advantage of any kind to an official, directly or indirectly, for the same unlawful purpose

related tasks, they have a broad impact on each Member State's legal framework. Member States are obliged to implement and enforce the relevant directives and regulations within their domestic legal systems, thereby fortifying their national mechanisms against various corrupt practices. The consistent criminalization and definition of bribery and related offenses help unify the approach to corruption across the EU, facilitating mutual assistance, coordinated investigations, and better cooperation overall. These instruments, reinforced by the Council of Europe's conventions, lay the foundation for clearer definitions, stricter penalties, and improved cross-border collaboration.

3.2.4 The Anti-Corruption Legislation in the US

There are several pieces of legislation regarding anti-corruption measures in the United States[10], the main ones are the Foreign Corrupt Practices Act (FCPA) and the U.S. code Title 18.

The FCPA is the main US law that prohibits bribery of foreign officials. It applies to US companies, citizens, and residents, as well as foreign companies and individuals who take actions in the US. The FCPA prohibits offering, promising, or giving anything of value to a foreign official in order to obtain or retain business or secure an improper advantage. It also requires companies to keep accurate books and records and to have internal controls to prevent and detect bribery (DOJ and SEC, 2009).

Domestic bribery is defined under the Title 18, Chapter 11, Section 201 of the US Code. It defines bribery as the giving, offering, or promising of anything of value to a public official with the intent to influence an official act or decision. It also prohibits public officials from accepting bribes in exchange for performing official acts (DOJ, 2021a) [11].

In this context, the U.S. Code and its procedures are more pertinent than

[10]There is also the False Claims Act (FCA) which prohibits individuals and companies from submitting false or fraudulent claims for payment to the US government. It also allows private individuals to bring lawsuits on behalf of the government, known as qui tam actions, and to receive a portion of any damages awarded (DOJ, 1863). Also the US securities laws, including the Securities Act of 1933 and the Securities Exchange Act of 1934, require companies to disclose accurate and complete information about their financial performance and business operations. These laws also prohibit insider trading, which involves using non-public information to make trades in securities (SEC, 2002). Lastly, the AML laws require financial institutions and other businesses to implement procedures to prevent and detect money laundering and the financing of terrorism. These laws require companies to perform due diligence on their customers and to report suspicious transactions to law enforcement authorities(DOJ, 2001). All of them may be conveniently used in cases involving bribery and corruption.

[11]Available at: `https://www.govinfo.gov/content/pkg/USCODE-2021-title18/html/USCODE-2021-title18-partI-chap11-sec201.html`.

the FCPA for this study because they address domestic corruption cases, which align more closely with the study's focus as detailed in Section 1.10. Therefore, under Title 18, Section 201 the violations of the law can result in criminal penalties, including significant fines and imprisonment for up to 15 years for bribery of public officials, and up to 2 years for giving or receiving gratuities[12].

3.2.4.1 Domestic and Foreign Anti-Corruption Legislation

The FCPA is focused on preventing corruption in the context of international business transactions. It applies to all U.S. companies, foreign companies listed on U.S. stock exchanges, and individuals who are citizens, residents, or employees of U.S. companies (DOJ and SEC, 2009). In contrast, domestic anti-corruption laws in the U.S., as other normal felonies on the U.S. Code, generally apply to any corruption that occurs within the United States, regardless of whether it involves international business transactions.

In summary, the FCPA prohibits U.S. companies and individuals from bribing foreign government officials to obtain or retain business. It also requires companies to maintain accurate books and records and implement adequate internal controls to prevent bribery. While domestic anti-corruption laws in the U.S. prohibit a wide range of corrupt practices, including bribery, kickbacks, embezzlement, and fraud.

3.2.5 The Anti-Corruption Legislation in the UK

The UK has several laws that might be used in cases involving corruption, such as the Bribery Act 2010, the Proceeds of Crime Act 2002, the Companies Act 2006 and the Public Contracts Regulations 2015. In short, the Bribery Act 2010 is the main UK law that prohibits bribery and corruption. It applies to both individuals and companies, and it has extraterritorial reach, meaning that it can apply to conduct that takes place outside the UK. The Act defines as offences offering or giving a bribe, requesting or receiving a bribe, bribing a foreign public official, and failing to prevent bribery[13]. The Proceeds of Crime Act 2002 provides for the confiscation of assets that are obtained through criminal activity, including corruption. It also creates offences related to money laundering, including the failure to report suspicious transactions[14]. The Companies Act 2006 requires companies to maintain accurate accounting records and to disclose information about

[12]The law provides for some exceptions, such as gifts given to public officials that are of nominal value or are given for a special occasion, such as a wedding or retirement.

[13]Available at: `https://www.legislation.gov.uk/ukpga/2010/23/contents`.

[14]Available at: `https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/317904/Fact_Sheet_-_Overview_of_POCA__2_.pdf`.

their financial transactions. It also requires directors to act in the best interests of the company and to avoid conflicts of interest. This violations might include bribery and attempt of bribery[15]. Lastly, the Public Contracts Regulations 2015 require public authorities to conduct procurement processes in a transparent and fair manner, and to exclude companies that have engaged in corrupt or fraudulent practices. Notably, it is not unusual to bribe public officials in order to defraud procurements [16].

The main anti-corruption law in the UK is the Bribery Act 2010. This is because it sets out a comprehensive framework for preventing and prosecuting corruption, and it covers a wide range of conduct, including bribery in both the public and private sectors, as well as bribery of foreign public officials.

In summary, the law criminalizes bribery and corruption in the private and public sectors. The Act's most important provisions include Section 1, which addresses the most common form of corruption; Section 2, which targets the bribery of foreign officials; Section 6, which targets the extraterritorial aspect of bribery, and Section 7, which imposes a duty on commercial organizations to prevent bribery by their employees and agents. These provisions are crucial in the fight against corruption, promoting transparency, accountability, and ethical business practices.

3.2.5.1 Domestic and Foreign Anti-Corruption Legislation

The Anti-Bribery Act 2010 prohibits both domestic and foreign corruption, but there are some key distinctions between the two. Once the domestic corruption refers to corrupt conduct that occurs within the UK's jurisdiction, and foreign corruption refers to corrupt conduct that occurs outside of the UK's jurisdiction, the Act does not provide a specific distinction between them. It does not specify if domestic or foreign corruption should be enforced or punished by different standards. Although, it specifically prohibits the bribery of foreign public officials (Section 6). The Act applies to UK-based individuals and companies as well as foreign-based individuals and companies with a connection to the UK. This includes UK citizens or residents, companies incorporated in the UK, or foreign individuals and companies whose bribery offence has a UK connection.

The Act also includes provisions for extraterritorial jurisdiction over foreign bribery offences, meaning that individuals and companies can be prosecuted in the UK for foreign bribery even if the offence occurred outside the UK. The Act aims to promote transparency and ethical business practices in both domestic and international contexts and to hold individuals and companies accountable for corrupt behaviour.

[15] Available at: `https://www.legislation.gov.uk/ukpga/2006/46/contents`.
[16] Available at: `https://www.legislation.gov.uk/uksi/2015/102/contents/made`.

3.2.6 The Anti-Corruption Legislation in France

The most important piece of legislation against corruption in France is the Law No. 2016-1691 of 9 December 2016. It is officially titled 'Law on Transparency, the Fight Against Corruption and Modernization of Economic Life' also called as Sapin II Law[17], named after Michel Sapin, the former French Minister of Finance who introduced the law, it marks a significant development in the country's anti-corruption efforts.

The Sapin II Law encompasses a wide range of obligations and prohibitions aimed at preventing and detecting corruption and influence peddling, targeting both individuals and companies. One of its cornerstone requirements is that large companies, specifically those with over 500 employees and a turnover exceeding €100 million[18], must establish internal anti-corruption measures[19]. These measures include the development of a code of conduct, setting up internal whistle-blowing mechanisms, conducting risk assessments, implementing due diligence processes for clients, suppliers, and intermediaries, establishing accounting controls, and providing training programs for employees at risk of encountering corruption.

This legislation also led to the establishment of the French Anti-Corruption Agency (AFA)[20]. The AFA's role is multifaceted, involving guiding, advising, and monitoring the anti-corruption efforts of both companies and public administrations[21]. It holds the authority to sanction entities that fail to meet the compliance standards set by the law.

The law also provides a framework for the protection of whistleblowers[22]. It ensures that individuals who report corrupt practices are kept confidential and protected from retaliation. In addition to safeguarding whistleblowers, the Sapin II Law imposes transparency requirements on public officials, mandating them to declare their assets and interests. This is a move towards enhancing the transparency of public life and governance.

For non-compliance, the law stipulates stringent penalties, including fines up to €200.000,00 and imprisonment for natural persons [23]. And for corporate ofences, Sanctions Committee may impose compliance procedures[24] These punitive measures underline the seriousness with which France views corruption and the com-

[17]Available at: `https://www.legifrance.gouv.fr/loda/id/JORFTEXT000033558528/?isSuggest=true`

[18]Law No. 2016-1691, Article 17, I.

[19]Law No. 2016-1691, Article 17, II.

[20]Law No. 2016-1691, Chapter I, Articles 1-5.

[21]Available at: `https://www.agence-francaise-anticorruption.gouv.fr/en/lagence`

[22]Law No. 2016-1691, Chapter II, Articles 6-15.

[23]Law No. 2016-1691, Articles 17 V.

[24]Article 131-39-2 of France's Criminal Code, available at: `https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000033563257/2022-03-30`

mitment to enforcing these regulations.

It is most important to note, that the Sapin II Law, introduced the Convention judiciaire d'intérêt public (CJIP)[25] as a novel mechanism for addressing corporate corruption and influence peddling. Enacted as part of this comprehensive anti-corruption framework, the CJIP represents a significant shift in the French legal approach, allowing for the resolution of corruption cases without a formal admission of guilt. This mechanism provides a means for companies to negotiate settlements that may include financial penalties, the implementation of compliance programs, and provisions for compensating any identified victims. The introduction of the CJIP under the Sapin II Law signifies France's commitment to aligning with global anti-corruption standards and demonstrates a pragmatic and modern approach to legal challenges associated with corporate misconduct. This framework is further scrutinized on Section 3.3.4, where the mechanism of non-trail resolutions from the jurisdictions of interest are deeper explored.

In summary, the Sapin II Law represents a fundamental stride in France's fight against corruption. It emphasizes the importance of proactive measures in corruption prevention, accountability, and transparency in both public and private sectors. This law is a testament to France's ongoing efforts to foster ethical practices and combat corruption, thereby promoting a more transparent and accountable global business environment.

3.2.6.1 Domestic and Foreign Anti-Corruption Legislation

Sapin II law addresses both national and international corruption. In terms of domestic corruption, the Law specifically targets corrupt activities within French territory. This includes corruption involving French public officials and corrupt practices committed by French companies or individuals within France. On the international front, the Sapin II Law not only applies to French companies operating abroad but also extends to foreign companies conducting business in France[26]. This aspect of the law places France in line with international anti-corruption treaties, such as the OECD Anti-Bribery Convention[27].

Comparatively, while the Sapin II Law uses a unified approach to combat corruption, the application and enforcement differ in domestic and international contexts. Domestically, the jurisdiction and legal mechanisms are more straight-

[25]Law No. 2016-1691, Article 22 and Article 41-1-2 of France's Criminal Code.

[26]Law No. 2016-1691, Article 17 holds that its provisions apply to legal persons: '*belonging to a group of companies whose parent company has its registered office in France*' [...] '*in France or abroad*'.

[27]Just like in the OECD Anti-Bribery Convention, the law explicitly addresses the bribery of foreign public officials, a critical element in international business transactions, thereby highlighting the global nature of modern corruption

forward, focusing largely on public sector corruption. Internationally, however, the law approaches the complexities of cross-border legal implications and the diverse legal systems of other countries. This involves a broader focus on the private sector, particularly multinational corporations and their international dealings.

3.2.7 The Anti-Corruption Legislation in Brazil

The crime of bribery or corruption is defined in the Brazilian Penal Code (Law No 2.848/40). The legislation distinctly defines the crimes of soliciting bribes, or passive corruption (Art. 317), and offering bribes, or active corruption (Art. 333)[28]. However, it was in 2013 that the two most important anti-corruption laws were introduced. The Laws No 12.846/13 and 12.850/13. The first targeting corporate corruption crimes and the last one aiming to address liabilities in corruption crimes to individuals.

Federal Law No. 12.846/13, also known as the anti-corruption law, was designed to clarify administrative and civil liabilities for companies [29] involved in corruption activities. Consequently, the provisions cited here affect only corporations, while individuals remain liable for their offenses. Companies in Brazil cannot be criminally held accountable for offenses, so the sanctions under Law No. 12.846/13 only apply civilly and administratively.

The law defines 'to promise, offer, or give, directly or indirectly, undeserved advantage to public official or related person'(Art. 5, I) as being a 'Harmful act against national public administration'. This description matches with bribery offences in other jurisdictions, thereafter the study relevant corruption activity. It also distinguishes corruption from fraud on public biddings (Art. 5, IV). Lastly, like the American legislation, the law sets strict liability for corporations engaging corruption.

For individuals, the law No. 12.850/13 enacted on August 2nd 2013 targets Criminal Organizations. However, it has been largely used by prosecutors on corruption crimes. Since bribery crimes are necessarily committed by a group of people. The Brazilian Prosecution Office uses the innovations brought on the law to prosecute the defendants. Notably, the law introduces the 'awarded collaborations' (Art. 4)[30], which in short, introduced NTRs as a mean to combat corruption.

[28]In Brazilian law, the corruption crimes defined in Articles 317 and 333 of the Penal Code closely reflect the notion of collusive bribery or corruption (CBC), involving mutual agreement between a public official and a private party. In contrast, harassment bribes are treated separately under the crime of '*concussão*' (Article 316), where a public official unilaterally demands an undue advantage by abusing their position. This distinction highlights the public and collusive nature that characterizes CBC.

[29]In Brazil, companies cannot be criminally liable, except for environmental crimes (Law No 9.605/1998).

[30]It was introduced in the Deferal Law 12.850/13, but the procedures were better detailed

3.2.7.1 Domestic and Foreign Anti-Corruption Legislation

The Brazilian anti-corruption law addresses foreign corruption only on law 12.846/2013. Notably, law 12.850/2013 does not mention foreign corruption. In the first case, it addresses civil and administrative liability for crimes of corruption committed by national or foreign companies[31] against national or international public administration (Law 12.846/2013, Art. 1º). Notably, like the UK's legislation and differently from the American one, national or foreign corruption is prosecuted, enforced and sanctioned by the same actors.

Most importantly, the enactment of Laws No. 12.846/13 and 12.850/13 introduced groundbreaking legal mechanisms, closely resembling NTRs, which possibly represent the most significant advancements in Brazil's anti-corruption framework (Marrara and Pietro, 2023). This makes the Brazilian case the obvious candidate for the empirical strategy in this study. The specific features of these NTR mechanisms, along with comparisons to similar frameworks in other jurisdictions, are discussed in detail in the following section.

3.3 Non-Trial Resolutions

In the context of corruption cases, a range of NTRs offers diverse legal approaches to suit different circumstances. These include Declination/NPA-like resolutions, which end investigations without prosecution but impose sanctions; DPA-like resolutions, which defer prosecution under certain conditions; Civil/Administrative-like resolutions imposing sanctions without criminal conviction; and Plea Agreement-like resolutions requiring guilt admission. Additionally, Mixed Resolutions blend these approaches (OECD, 2019). The adoption of these various forms varies across different jurisdictions, reflecting the need for flexibility and context-specific strategies in international law enforcement.

The historical development of NTRs in addressing corruption cases has evolved significantly over time. Initially, these resolutions were primarily used as tools to facilitate enforcement in complex foreign bribery cases. They offered a pragmatic way to handle cases that were often too complicated or resource-intensive for traditional trials. Over time, their usage expanded, reflecting a shift in legal strategies and enforcement priorities (OECD, 2019).

NTRs, such as settlements, have become more prevalent due to their ability to efficiently resolve cases while ensuring some form of accountability for corporate wrongdoing. The growing complexity of transnational bribery cases, coupled with the challenges of coordinating investigations and legal proceedings across multiple

under th Federal Law 13.946/19.

[31] Foreign companies with representation on national territory (Art. 1º § 1º)

jurisdictions, has made NTRs an attractive option (Oded, 2020). These resolutions typically involve agreements between the accused parties and prosecuting authorities, which can vary from admissions of guilt to cooperation in further investigations.

As countries increasingly adopted these mechanisms, there was a corresponding need for clear guidelines and principles to ensure their effective and fair application. This led to the development of standards and principles like those outlined in the letter addressed to the Organisation for Economic Co-operation and Development (OECD) (UNCAC, 2018), which emphasize transparency, accountability, and the appropriate use of NTRs to combat corruption effectively.

3.3.1 The Seven Principles on Non-Trial Resolutions as a Tool Against Corruption

The seven principles for NTRs in foreign bribery cases are outlined in a letter addressed to the Organisation for Economic Co-operation and Development (OECD) (UNCAC, 2018). This letter, signed by a coalition of civil society organizations, presents these principles as recommendations for the OECD's consideration and implementation. The signatories aim to influence the OECD's approach towards handling foreign bribery cases, advocating for a methodology that is transparent, fair, and accountable. These principles are proposed as a means to enhance the effectiveness and integrity of NTRs in tackling foreign bribery, reflecting the collective perspective of civil society on the importance of adhering to high standards of justice and legal propriety in international economic relations.

The first principle advocates for the cautious use of NTRs, particularly for repeat offenders, focusing on the severity of the offense rather than the size of the company. This aims to ensure equitable application of justice. Transparency is the cornerstone of the second principle, demanding public disclosure of all resolution details, including offender identities and agreement terms. This transparency is vital for maintaining public trust and ensuring due process. The third principle emphasizes the need for significant sanctions in these resolutions, reflecting the gravity of the offense. It asserts that these sanctions should complement, not replace, criminal law and not impede legal actions in other jurisdictions.The fourth principle revolves around the necessity of an admission of guilt or, at minimum, an acknowledgment of responsibility, especially in cases of grand corruption. Judicial review, the fifth principle, is deemed essential for upholding the integrity of the resolution process. It involves public scrutiny and stakeholder involvement, ensuring adherence to standards and preventing undue influence. The sixth principle addresses the accountability of senior-level individuals, advocating for clear guidelines that ensure serious prosecution or disqualification for high-ranking offenders.

Lastly, the seventh principle highlights the importance of reparation and involving authorities and victims from affected countries. It calls for early inclusion of these parties to ensure comprehensive justice and proper use of reparations for the public good.

Overall, these principles aim to balance effective resolution with the need for justice, transparency, and legal integrity in cases of foreign bribery.

3.3.2 Non-Trial Resolutions in the US

NTRs, such as plea agreements, deferred prosecution agreements, and non-prosecution agreements, have become increasingly important in cases of domestic corruption in the United States. These agreements allow prosecutors to resolve cases efficiently and with less expense, while also encouraging self-reporting, cooperation, and remediation by companies and individuals.

Under Title 18, Section 201 of the U.S. Code, bribery of public officials and witnesses is illegal. However, companies and individuals who discover potential violations of this law or other corruption-related offences may be reluctant to self-report and cooperate with law enforcement due to the potential for severe penalties and reputational damage. To address this issue, the U.S. Department of Justice (DOJ) has established policies that incentivize companies and individuals to self-report and cooperate with investigations.

Individuals willing to self-report or collaborate to earn judicial benefits would do it under the US Sentencing Guidelines (USSG) [32]. Therefore, any non-trial resolution would be evaluated under the following principle that '[...], *the fine range for any other organization should be based on the seriousness of the offence and the culpability of the organization. The seriousness of the offence generally will be reflected by the greatest of the pecuniary gain, the pecuniary loss, or the amount in a guideline offence level fine table. Culpability generally will be determined by six factors that the sentencing court must consider. The four factors that increase the ultimate punishment of an organization are: (i) the involvement in or tolerance of criminal activity; (ii) the prior history of the organization; (iii) the violation of an order; and (iv) the obstruction of justice. The two factors that mitigate the ultimate punishment of an organization are: (i) the existence of an effective compliance and ethics program; and (ii) self-reporting, cooperation, or acceptance of responsibility.*' (DOJ, 2021b).

Under the DOJ's Corporate Enforcement Policy, companies that self-report, cooperate, and remediate potential FCPA violations may receive a presumption of declination of prosecution, provided they meet certain criteria[33]. In addition, indi-

[32] Available at: `https://www.ussc.gov/guidelines/2021-guidelines-manual-annotated`

[33] '*To qualify for a declination under this Policy, a company is required to pay all disgorgement,*

viduals who cooperate and provide substantial assistance in an investigation may be eligible for a reduced sentence or immunity from prosecution[34]. Importantly, in the United States, the prosecution can negotiate non-trial resolutions with defendants through Non Prosecution Agreements or Deferred Prosecution Agreements. In these cases, it is expected that companies self-report before detection (or imminent detection) to grant better deals for themselves. However, since the scope of the FCPA is to prosecute foreign investigations, they are not the main focus of this work. Nonetheless, the procedures used to prosecute corruption under the FCPA may inspire domestic anti-corruption prosecution.

Corporations involved in domestic corruption it is also possible to rely on the provisions of the USSG, §8C2.5 (g), which defines the concepts of self-reporting, cooperation and acceptance of responsibility. Another way to disclose information about misconducts is provided by the DOJ's Principles of Federal Prosecution of Business Organizations[35]. It encourages prosecutors to consider a company's voluntary disclosure, cooperation, and remediation efforts when making charging decisions and negotiating plea agreements or deferred prosecution agreements.

Note that, for individuals, if the reporter is a federal employee, it is always possible to rely on the Title 5 U.S.C. § 2302. The Section 2302 protects federal employees who report wrongdoing or illegal activity, including the payment of a bribe, from retaliation. If an individual pays a bribe and wants to report it under this law, they can do so by making a protected disclosure to the appropriate agency or authority.

In summary, NTRs are important in cases of domestic corruption in the United States because they allow prosecutors to efficiently resolve cases and encourage self-reporting, cooperation, and remediation by companies and individuals.

3.3.3 Non-Trial Resolutions in the UK

Corruption is prosecuted in the UK through various legal procedures, including criminal proceedings and civil recovery proceedings. Criminal proceedings are initiated by the Crown Prosecution Service (CPS) and can result in criminal convic-

forfeiture, and/or restitution resulting from the misconduct at issue. Where another authority collects disgorgement, forfeiture, and/or restitution, the Department will apply, in appropriate circumstances, the Department's Policy on Coordination of Corporate Resolution Penalties in Parallel and/or Joint Investigations and Proceedings Arising from the Same Misconduct, Justice Manual 1-12.100. (U.S. Department of Justice, 2023).

[34]Benefits of self-reporting, as outlined in the document, include a presumption of declination in the absence of aggravating circumstances, significant reductions in fines (up to 75% off the low end of the U.S. Sentencing Guidelines fine range), avoidance of a guilty plea, and potential waiver of the requirement for a monitor if effective compliance programs are demonstrated.

[35]Available at: `https://www.justice.gov/jm/jm-9-28000-principles-federal-prosecution-business-organizations`

tions, fines, and imprisonment for those found guilty of corruption offences. Civil recovery proceedings, on the other hand, are brought by the authorities seeking to recover the proceeds of corruption or other unlawful conduct, including assets and property obtained through corrupt activities. Additionally, the UK also has a number of agencies responsible for investigating and prosecuting corruption, including the Serious Fraud Office (SFO), the National Crime Agency (NCA), and the Financial Conduct Authority (FCA). These agencies work together to investigate and prosecute corruption cases and may also utilize NTRs such as Deferred Prosecution Agreements (DPAs) and civil recovery orders to resolve cases more efficiently.

In the UK, NTRs like DPAs and civil recovery orders are increasingly being used to tackle cases of domestic corruption. These resolutions are cost-effective for prosecutors and encourage self-reporting, cooperation, and remediation by both individuals and companies involved in the case. The UK Bribery Act 2010 prohibits bribery of public officials and commercial organizations, and companies and individuals who discover potential violations of this law or other corruption-related offences may be reluctant to self-report and cooperate with law enforcement due to the potential for severe penalties and reputational damage. To address this issue, the UK's Serious Fraud Office (SFO) has established policies that incentivize companies and individuals to self-report and cooperate with investigations. For example, the SFO's Operational Handbook encourages prosecutors to consider a company's voluntary disclosure, cooperation, and remediation efforts when making charging decisions and negotiating DPAs.

Under the SFO's Corporate Co-operation Guidance[36], companies that self-report, cooperate, and remediate potential Bribery Act violations may receive a DPA, provided they meet certain criteria. In addition, individuals who cooperate and provide substantial assistance in an investigation may be eligible for a reduced sentence or immunity from prosecution.

However, the rules applicable to companies and individuals differ. Companies are subject to stricter rules and regulations, such as the Bribery Act and the Money Laundering Regulations, which require companies to establish compliance programs and internal controls to prevent and detect potential violations. Individuals, on the other hand, may be subject to criminal liability for bribery, fraud, and other corrupt practices under various laws (Crown Prosecution Service, 2019).

Under the Bribery Act 2010, a commercial organization can face an unlimited fine if found guilty of the offence of failure to prevent bribery. The fine imposed on the organization will depend on factors such as the nature and seriousness of the offence, the size of the organization, and the extent to which the organization

[36]Available at: `https://www.sfo.gov.uk/publications/guidance-policy-and-protocols/guidance-for-corporates/corporate-co-operation-guidance/`.

cooperated with the investigation.

In practice, fines for corruption offences in the UK have been substantial. For example, in 2016, the construction company Rolls-Royce agreed to pay a settlement of £671 million to the Serious Fraud Office (SFO) to resolve allegations of bribery and corruption in multiple jurisdictions[37]. In 2019, the global engineering firm Guralp Systems was fined £2 million for conspiracy to make corrupt payments to a Korean public official in violation of the Bribery Act[38].

If corporations do not cooperate and if found guilty, they could face an unlimited fine, and the court may also impose ancillary orders such as confiscation orders or Serious Crime Prevention Orders. In addition to criminal liability, the organization may also face civil liability, such as claims for breach of contract or breach of fiduciary duty.

In the UK, there is no specific rule that provides a legal advantage to corporations that self-report corruption crimes. However, under the UK's sentencing guidelines, self-reporting and cooperation with authorities can be taken into account as a mitigating factor in determining the appropriate sanction for the corporation. Therefore, when a corporation self-reports a corruption offence, it may be viewed more favourably by authorities than if the offence had been discovered through other means. In such cases, the corporation may be given credit for its cooperation and may receive a reduced penalty or other benefits, such as avoiding prosecution altogether[39]. However, it is important to note that self-reporting and cooperation are not guaranteed to result in a reduced penalty, and the severity of the offence will ultimately determine the penalty imposed. The UK authorities have discretion in determining the appropriate penalty and will take into account various factors, including the level of cooperation and self-reporting, when making their decision (The United Kingdom Ministry of Justice, 2011). Overall, while there is no formal 'first comer rule' in the UK, corporations that self-report and cooperate with authorities may receive some credit and benefit in the determination of the appropriate sanction for their corruption offence.

Importantly, there is a difference in reporting before or after an investigation

[37]Available at: `https://www.judiciary.uk/wp-content/uploads/2017/01/sfo-v-rolls-royce.pdf`.

[38]Available at: `https://www.sfo.gov.uk/cases/guralp-systems-ltd/`.

[39]Under UK law, DPAs must be approved by a judge in order to take effect, and the decision to approve a DPA is subject to review by the courts. Under Section 45 of the UK's Crime and Courts Act 2013 sets out the legal framework for DPAs in the UK. Subsection (7) of that section states that a DPA must be approved by a judge, who must be satisfied that the DPA is in the interests of justice and that its terms are fair, reasonable and proportionate. Moreover, Subsection (10) of Section 45 provides for judicial review of a decision to enter into a DPA, stating that 'any decision to enter into a [DPA] may be reviewed by the High Court on an application made by the prosecutor or the defendant.' This means that if either party is dissatisfied with the decision to approve a DPA, they can apply to the High Court to have the decision reviewed.

under the UK's Bribery Act 2010. Section 7 of the Act, which addresses corporate liability for failure to prevent bribery, provides a defense for companies that can demonstrate that they had 'adequate procedures' in place to prevent bribery. Admittedly, if a company becomes aware of bribery or corruption, it may choose to investigate the matter internally before reporting it to the authorities. However, if the company fails to report the issue and it later becomes the subject of an investigation, it may be more difficult for the company to demonstrate that it had adequate procedures in place. On the other hand, if a company reports the issue promptly and cooperates fully with any subsequent investigation, this may be taken into account in assessing whether the company had adequate procedures in place. Therefore, reporting before or after an investigation can have a significant impact on a company's liability under the Bribery Act.

Another important issue is that in the UK, self-reporting a crime of bribery does not necessarily mean that a person is obliged to collaborate with authorities. Or even, that collaborators should plea guilty of their offences.

In summary, NTRs are important in cases of domestic corruption in the UK because they allow prosecutors to efficiently resolve cases and encourage self-reporting, cooperation, and remediation by companies and individuals. Companies and individuals who discover potential violations of corruption-related laws should seek legal advice and carefully consider the potential benefits and risks of self-reporting, collaboration, and remediation efforts.

3.3.4 Non-Trial Resolutions in France

In France, NTRs have become increasingly significant in handling cases involving corruption and other corporate misconduct. These resolutions include judicial public interest agreements (conventions judiciaires d'intérêt public, CJIP[40]) and plea bargaining (comparution sur reconnaissance préalable de culpabilité, CRPC[41]). These mechanisms offer an efficient means to resolve legal disputes without a full trial, encouraging companies and individuals to cooperate, self-report, and undertake remedial actions.

The judicial public interest agreement (CJIP) is a key instrument introduced by the Sapin II Law. Under Article 22 of this law, the CJIP allows legal entities accused of certain offenses, including corruption, influence peddling, and laundering the proceeds of tax fraud, to negotiate a settlement with public prosecutors. This settlement can include fines, compliance program obligations, and damages, but avoids a criminal conviction. The amount of the fine is limited to 30% of the

[40] As mentioned in Section 3.2.6, it was created by the Law No. 2016-1691, Articles 22. Available at: `https://www.legifrance.gouv.fr/codes/id/LEGIARTI000033563888/2016-12-11`

[41] Articles 495-7 to 495-16 of the French Code of Criminal. Available at: `https://www.legifrance.gouv.fr/codes/id/LEGISCTA000006167486/`

company's average annual turnover over the last three years. The CJIP has been used effectively in several high-profile cases, reflecting its importance in the French legal landscape for addressing corporate misconduct.

Over time, the use of CJIPs has evolved to address a broader range of economic crimes, including tax fraud and money laundering. The conditions under these agreements have also become more rigorous. Companies are now often required to implement comprehensive compliance programs, undergo regular audits, and sometimes appoint an independent monitor to oversee these changes (Vozza, 2022).

Plea bargaining (CRPC), governed by Articles 495-7 to 495-16 of the French Code of Criminal Procedure, is another form of non-trial resolution. This process allows individuals who admit to their wrongdoing to negotiate a punishment with the public prosecutor, subject to a judge's approval. The CRPC process is quicker and often less costly than a full trial, and it can lead to reduced sentences for cooperating defendants.

These non-trial resolution mechanisms share several benefits. They enable the efficient resolution of cases, reducing the burden on the judicial system. They also incentivize companies and individuals to self-report and cooperate with authorities by offering the possibility of lesser penalties and avoiding the stigma of a criminal conviction. Furthermore, these mechanisms facilitate the implementation of compliance programs and corrective measures, contributing to the overall goal of preventing future misconduct.

The CJIP, in particular, reflects a shift in the French approach towards corporate criminal liability, aligning more closely with practices in other jurisdictions like the U.S. and the UK. It allows for a pragmatic and solution-focused approach to dealing with corporate offenses, balancing the need for punishment and deterrence with the realities of global business operations and legal complexities.

In summary, NTRs in France, particularly through the CJIP and CRPC, represent a modern and effective approach to dealing with cases of corruption and corporate misconduct. They provide a mechanism for legal entities and individuals to address their wrongdoings while mitigating the potential negative impacts of prolonged legal battles, thereby playing a crucial role in the French legal system's response to corruption.

3.3.5 Non-Trial Resolutions in Brazil

The laws No 12.846/13 and 12.850/13 introduced important provisions regarding NTRs. More specifically, self-report and collaboration in exchange of judicial benefits. The first deals with corporate leniency on corruption activities and the second with 'awarded collaborations' for individuals on criminal organizations. These two provisions were largely adopted by prosecutors on the Car Wash operation and

others subsequent investigations. However, its use on ordinary corruption crimes may not be so widespread in practice.

The Federal Law 12.846/13 introduces the Leniency Agreements for corruption activities (Art. 16). Before the law, corporations could only apply for leniencies for anti-competitive offences [42]and bid riggings[43](Marrara, 2015).

For corporations, sanctions for crimes of corruption can go from 0,1% to 20% of Annual Gross Revenue (Art. 6,I); Never Below Criminal Benefit (Art. 6 §3). Also, there are non monetary sanctions like, asset seizure, halt of activities and debarment[44](Art. 6, II and Art. 19, I - IV).

Regarding the fines for individuals, the law No. 12.850/13 set maximum sanctions for crimes of participating on criminal organizations are more than four years of imprisonment. This definition put corruption crimes under the scope of the law, since fines for corruption in Brazil goes from 2 up to 20 years of imprisonment [45].However, under specific conditions, the benefit may vary from judicial pardon going through a reduction of 2/3 of the sanctions to the substitution of imprisonment sanctions for softer privative restrictions (Art. 4). Importantly, in many cases, the defendant is not going to court, although the agreements are subjected to judicial review to be approved[46].

It is important to notice that the law defines that enforcements are only applicable in cases in which four or more people are engaging bribery. This orientation may leave out small bribes, commonly performed by less than four individuals, e.g. bribe for getting a government licence from a bureaucrat or even bribe a police officer for avoiding a speeding ticket. In those cases, there is no explicit alternative for the defendant to plea guilty and get the benefits from this law. However, the newly implemented provisions in law No. 13.655/18 allows generically for negotiated solutions between prosecutors and defendants for crimes against state administration, this could possibly include corruption, still there is no clear conditions or criteria for liability in which it can be applied yet.

Notably before these laws, if companies or individuals performed any type of corruption (bribery), they would have no alternatives to lower their sanctions[47].

[42]Law No. 10.149/00 and subsequently No. 12.529/11

[43]Law No. 8.666/93, Art. 17

[44]Including prohibition of receiving government benefits a subsides.

[45]Decree Law No. 2.848/40, Art. 317 and 333

[46]Although there is no *de jure* major difference on judicial discretion over the agreements, because in both cases judges are only interested in certifying formal adequacies of the agreements. In Brazil, there is at least one rejection of an 'awarded collaboration' from the Brazilian Public Prosecution by the Brazilian Supreme-Court Minister Ricardo Lewandowsk (Petition No. 7.265/DF) because of the agreement's content. This can increase *de facto* judicial discretion over the awarded collaborations.

[47]In case of civil offences, firms could enter in an non-trial agreement along with the Public Prosecution to cease a malpractice (Law No. 7.347/85, Art. 5).Corruption activities, on the

Before the institution of the awarded collaborations, defendants could plea guilty in exchange for sanction reductions [48], however, the defendant would still go to court, and there was no obligation to collaborate with investigations. There were also NTRs for defendants who agree on imposed Prosecution conditions, the feature is known as '*sursis*'[49] and it can be used to suspend an accusation process from two up to four years. In some cases, depending on conditions, it could lead to the extinction of the process [50]. Notably, the *sursis* could not be applied to corruption crimes, since the enforcement is only applicable to minor offences that have minimum sanctions lower than one year.

One notable characteristic of the law, is that the law implies that self-reporters would necessarily collaborate with authorities. It also implies that collaborators should plea guilty of their offences. This is clear from Art. 16 of law 12.846/13, in which it is clear that conditions must be matched jointly.

Most importantly, if an investigation is ongoing, defendants cannot collaborate on the same conditions as self-reporters. On law 12.850/13 Art. 4, § 4, the prosecution can only not bring up a lawsuit if there is no previous knowledge of the misconduct[51],if the reporter is not a gang leader and the first to self-report. Also, the same rules apply to corporations under law 12.846/13 in Art. 16[52].

3.4 Comparative Analysis

This section presents a comparative analysis of the anti-corruption legislation in Brazil, the US, the UK and France. Here, a couple of legal features important in the fight against corruption were selected.Tables 3.1 and 3.2 highlight the biggest differences in the relevant legislation, criminal liability, monetary and non-monetary sanctions, legal instruments, self-reporting and cooperation benefits, remediation, judicial review discretion, prevention from collateral costs, and recidivism. This analysis aims to provide an overview of the main features of each country's anti-corruption legal framework and their potential strengths and weaknesses in combating corporate domestic corruption.

The Table 3.4 provides a comparison of the anti-corruption laws in Brazil, the

other hand, were not eligible to it.

[48]Decree Law No. 2.848/40, Art. 65

[49]Law No. 9.099/95, Art. 89

[50]Law No. 9.099/95, Art. 89, §5

[51]The law considers that if it was before any investigation, then there is no previous knowledge . This condition was added by Law 13.946/2019

[52]Law No. 12.846/13, Art. 16, §1, I, It may grant up to 2/3 of reduction on sanction. This kind of leniency is considered to be moderated and may be counter-productive in some situations, usually optimum deterrence arise from full leniency only for first comers (Buccirossi and Spagnolo, 2000).

Table 3.1: Anti-Corruption Laws Regarding Corporate Domestic Corruption Offences

Feature	Brazil	US	UK	France
Relevant Legislation	Law Against Corruption (Law 12.846/13)	U.S. Sentencing Guidelines §8C2.5, (g)	Anti-Bribery Act 2010	Sapin Law II (Law No. 2016-1691)
Criminal Liability	No (Only Civil and Administrative)	Yes	Yes	Yes
Monetary Sanction	0,1% to 20% of Annual Gross Revenue (Art. 6, I); Never Below Criminal Benefit (Art. 6, §3) [a]	U.S. Sentencing Guidelines §8C4.6.	Section 11	Up to €1.000.000,00 (Article 17, V)
Non-Monetary Sanction	Yes (Art. 6, II and Art. 19, I - IV)	Yes (§8C4.6. Sentencing Guidelines)	Yes (Section 11)	Yes (Article 22 Sapin 2, Article 41-1-2 French Penal Code)
Legal Instrument	Leniency Agreements	NPA/DPA and Plea Agreements	DPAs [b]	Conventions Judiciaires D'intérêt Public (CJIP)
Cooperation Benefits	2/3 of the fine (Art. 6,§2)	50% of low end of fine before detected (25% after detected)	No maximum	Yes (up to a 30% of the average annual turnover) (Article 41-1-2 , 2°)
Remediation	Yes (Decree 8.420/158 Cap. IV - *Programa de Integridade*)	Yes - *9-47.120 – FCPA (5 -c)*	-	Yes - Compliance Measures (Article 17)
Superior Review Discretion	High (Portaria Conjunta No. 4/2019)	Low	Yes [c]	Yes (Article 41-1-2, III French Penal Code)
Prevention from Collateral Costs	sanction avoidance Art. 19, VI (Subsidies)	Avoidance from Debarment and Delicense; Prevention from Reputational Damage[d]	Yes [e]	Not criminally Charged (Article 41-1-2, II French Penal Code)
Can recidivists apply?	Yes (Art. 2, §7)[f]	No - *9-47.120 FCPA (2)*		Does not cover

[a]Further information on Decree 8.420/2015, Art. 17,18 and 19

[b]DPAs were introduced on 24 February 2014, under the provisions of Schedule 17 of the Crime and Courts Act 2013. Further information can be found in the guidance for corporates on Deferred Prosecution Agreements from SFO.

[c]Section 45 of the UK's Crime and Courts Act 2013 sets out the legal framework for DPAs in the UK. Subsection (7) of that section states that a DPA must be approved by a judge.

[d]The DOJ's Principles of Federal Prosecution of Business Organizations, also known as the "Filip Factors".

[e]SFO's Operational Handbook provides guidance on the agency's approach to DPAs and CROs.

[f]Not only if leniency previous leniency agreement is broken.

United States, the United Kingdom and France specifically regarding corporate domestic corruption offences. First, in Brazil, criminal liability is not imposed on corporations for domestic corruption offences, while in the US and UK, corporations are criminally liable. Also, only Brazil and the US offer cooperation benefits to corporations, while the UK does not have a maximum limit on the cooperation benefits. Moreover, Brazil and the US provide self-reporting benefits to corporations, while the UK does not. Additionally, Brazil has a leniency agreement as a legal instrument, while the US has NPA/DPA and plea agreements, the UK has a Deferred Prosecution Agreement (DPA) and France Conventions Judiciaires D'intérêt Public (CJIP). Finally, Brazil and the UK have a provision for preventing collateral costs, while the US and France do not have such a provision.

A crucial aspect to consider is the extent of judicial oversight on settlements. While the United States uniquely limits the discretion of judicial review over such agreements, other countries maintain some degree of judicial intervention. As Søreide and Vagle (2022) highlights, this can lead to what may be perceived as an illusion of choice. In jurisdictions like the UK, the enforcement of corporate bribery laws often results in a blend of settlements and court decisions. Conversely, in the United States, firms are inclined to pursue settlements, operating under the assumption that their cases are unlikely to be scrutinized in court.

Table 3.2 compares the anti-corruption laws regarding individual domestic corruption offences in Brazil, US, UK and France. Brazil's relevant legislation includes the Law Against Organized Crime and Brazilian Penal Code, which provide monetary and non-monetary sanctions, respectively, but do not specify monetary sanctions. The country also offers self-reporting benefits and cooperation benefits, including a judicial pardon and up to 2/3 of prison sanctions reduction. The USA's Title 18 Section 201 U.S. Code offers up to three times the value of the bribe for monetary sanctions and up to 15 years for non-monetary sanctions, with discretionary self-reporting and cooperation benefits. The UK's Anti-Bribery Act 2010 does not specify monetary sanctions, while offering 12 months to 10 years of non-monetary sanctions and discretionary self-reporting and cooperation benefits. The French Sapin 2 law refers to 433-1 435-1 of the French Penal Code, it states that individuals caught in either passive or active corruption might go in prison for up to 10 years and pay fines up to €1.000.000,00. In the French case, the Comparution sur reconnaissance préalable de culpabilité (CRPC)(Articles 495-7 to 495-16) may apply to individuals who collaborate and help authorities with the prosecution in exchange of lowering their sanctions. Brazil and the USA both have the first comer rule, while only Brazil disallows the ring leader from receiving benefits. Brazil's judges do not participate in negotiations but they do approve the settlements, just like it is in France. However, in the USA and UK judges are less influential. Legal instruments used in Brazil, US, UK and France include awarded

Table 3.2: Anti-Corruption Laws Regarding Individual Domestic Corruption Offences

Feature	Brazil	USA	UK	France
Relevant Legislation	Law Against Organized Crime (Law 12.850/13) ; Brazilian Penal Code (Decree Law 2.848/40)	Title 18 Section 201 U.S. Code	Anti-Bribery Act 2010	Sapin Law II
Monetary Sanction	Does Not Specify (Law 12.850/13, Art. 2)	Up to three times the value of the bribe (T 18, § 201, (b), (4))	Does Not Specify (Anti-Bribery Act, 11.)[a]	Up to €1.000.000,00 (Articles and Article 433-1 435-1 French Penal Code)
Non Monetary Sanction	4 - 20 Years for Corruption (DL 2.848/40, Art. 317 and Art. 333); 3 - 8 For Organized Crime (Law 13.850/13, Art.)	Up to 15 years (Title 18 § 201, (b), (4))	From 12 months to 10 years (Anti-Bribery Act, 11.)	Up to 10 years prison (Articles and Article 433-1 435-1 French Penal Code)
Self-Reporting Benefits	No judicial prosecution (Law 12.850/13 Art. 3, § 4)	Discretionary (USSG)[b]	Discretionary	Discretionary (Article 41-1-2, I)
Cooperation Benefits	Judicial Pardon; up to 2/3 of the prison sanctions (Art. 4)	Discretionary (USSG)	Discretionary	Discretionary
No Ring Leader allowed	Yes (Art. 4, §4, I)	No	No	No
Judicial Discretion	High[c]	Low	Low	High
Legal Instruments	Awarded Collaborations	Plea Bargains and Settlements	Settlements	Comparution sur reconnaissance préalable de culpabilité (CRPC)(Articles 495-7 to 495-16)

[a] on summary conviction to a fine not exceeding the statutory maximum. Anti-Bribery Act, 11, (a)
[b] For U.S. Federal employees Title 5 U.S.C. § 2302
[c] Judges do not participate on the negotiations (Art. 4, §6)

collaborations, plea bargains and settlements, and the CRPC respectively.

In summary, there are some differences between anti-corruption law between the analysed jurisdictions. In the next Chapter, the efficacy of some feature on de fight against corruption is analysed. If the differences lead to any loss of efficacy, they are pointed out in the policy recommendation section in the last chapter.

3.5 Important Corruption Court Cases

This section focuses on examining significant corruption cases within the targeted jurisdictions, particularly how they were addressed through non-trial resolutions. It aims to extract key insights from these instances. In the previous Sections the discussion was confined to the purely legal dimensions of anti-corruption legislation and NTRs, approached strictly from a legal perspective. This section, however, delves into practical applications, exploring how various corruption cases have been resolved using non-trial methods across different regions.Moreover it examines a range of cases, referencing legal literature to provide a critical evaluation and shed light on notable aspects of executing NTRs in real-world corruption scenarios.

3.5.1 Siemens AG

The Siemens AG corruption case, which unfolded in the mid-2000s, stands as a pivotal moment in the global fight against corporate corruption. This historic scandal not only brought to light egregious malpractices but also underscored the need for rigorous anti-corruption measures in the corporate world.

Siemens AG, a German multinational conglomerate, found itself embroiled in a sprawling corruption investigation that spanned continents. The company, involved in diverse sectors including energy, healthcare, and industry, faced allegations of engaging in widespread bribery to secure lucrative contracts across the globe (DOJ, 2018).

Investigations revealed that the company had employed systematic bribery practices, using slush funds amounting to hundreds of millions of euros. The corrupt activities were not confined to a single jurisdiction but permeated various countries, including Argentina, Bangladesh, Nigeria, and Venezuela.

Siemens' case marked a watershed moment in addressing cross-border corruption. The scandal reverberated globally, prompting investigations in multiple jurisdictions (DOJ, 2008). Authorities in the United States, Germany, and other countries collaborated to unravel the intricate web of corruption, signaling a shift towards international cooperation in tackling corporate malfeasance.

In 2008, Siemens reached a historic non-trial resolution by agreeing to pay

over 1.6 billion in fines to U.S. and German authorities[53]. This marked one of the largest corporate settlements at the time. The significance of this resolution lay in its effectiveness in holding Siemens accountable for its wrongdoing without protracted legal proceedings. As Sidhu (2019) concludes, it demonstrated the viability of NTRs as a powerful tool in addressing complex corporate corruption cases.

The Siemens scandal significantly reshaped global corporate governance norms (Sidhu, 2019; Blanc et al., 2019). This incident not only highlighted Siemens' internal weaknesses but also showed poor governance on anti-corruption protocols across various industries. As a result, Siemens undertook sweeping reforms, leadership overhauls, and stringent anti-corruption measures, setting a precedent for corporate conduct worldwide. These changes established a benchmark for corporate ethics, compliance, and transparency, fundamentally altering the corporate approach to these critical issues. Nonetheless, there are critics to the judicial method. Ivory and Soreide (2020) critically examine the global shift towards standardized settlement practices in anti-corruption efforts. Their analysis reveals a paradoxical scenario where, despite the push for transparent and predictable domestic settlement guidelines, states and international bodies fall short of clearly defining their expectations, creating a gap between their stated aims and practical implementation.

The Siemens AG corruption case left an enduring legacy in the corporate world. It catalyzed a paradigm shift towards greater transparency, accountability, and international collaboration in combating corruption. The precedent set by Siemens contributed to the evolution of corporate ethics and the adoption of robust anti-corruption frameworks by companies worldwide (OECD, 2019).

In retrospect, the Siemens AG corruption case not only exposed the challenges posed by corruption in multinational corporations but also played a crucial role in shaping contemporary anti-corruption practices, setting a precedent for corporate accountability and systemic change.

[53]The official press release regarding Siemens' settlement in the largest corporate corruption investigation in history states that the Securities and Exchange Commission (SEC) filed a settled enforcement action against Siemens Aktiengesellschaft on December 12, 2008. Siemens, a Munich, Germany-based manufacturer of industrial and consumer products, was charged with violations of the anti-bribery, books and records, and internal controls provisions of the Foreign Corrupt Practices Act (FCPA). The company offered to pay a total of $1.6 billion in disgorgement and fines. This sum included $350 million in disgorgement to the SEC, a $450 million criminal fine to the U.S. Department of Justice, and approximately €395 million (about $569 million) to the Office of the Prosecutor General in Munich, Germany. Additionally, Siemens had previously paid a fine of approximately €201 million (about $285 million) to the Munich Prosecutor in October 2007 (Securities and Exchange Commission, 2008)

3.5.2 The Rolls-Royce Case in the UK

On January 16, 2017, Rolls-Royce reached a settlement with the UK Serious Fraud Office (SFO), the U.S. Department of Justice (DOJ), and the Brazilian Public Prosecution Office, concluding inquiries into bribery and corruption across nine countries spanning almost 25 years. The company consented to pay penalties totaling £671 million as part of a Deferred Prosecution Agreement (DPA) with the UK SFO. This agreement awaited judicial endorsement, and on January 17, 2017, both the SFO and Rolls-Royce petitioned the court for approval (Serious Fraud Office, 2017).

The Rolls Royce settlement case from 2017 was a landmark in the legal and corporate world, particularly highlighting issues of international corruption and bribery. This case, involving the UK-based global engineering company Rolls Royce, was resolved not through a trial but via a Deferred Prosecution Agreement (DPA).

In the case of Rolls Royce, the DPA was a resolution to allegations spanning several decades, which accused the company of using bribery and corruption to secure contracts in numerous countries. The nature of these allegations necessitated a complex and multi-faceted legal response, involving cooperation with different international legal bodies.

Under the terms of the DPA, Rolls Royce agreed to several conditions. The most significant of these was the payment of fines. The company was ordered to pay around £497 million plus interest and costs to the UK's Serious Fraud Office (SFO), part of a global settlement that also included payments to the United States and Brazil. The total sum paid in fines was approximately £671 million. Beyond the financial penalties, Rolls Royce was required to fully cooperate with the SFO and other law enforcement and regulatory authorities. This cooperation was not just limited to the ongoing case but extended to future compliance with international law (Serious Fraud Office, 2017).

A critical aspect of the settlement was the emphasis on internal reform within Rolls Royce. The company was mandated to enhance and implement new compliance controls and procedures to prevent and detect future instances of bribery and corruption. This aspect of the settlement underscored the shift towards not just penalizing wrongdoing but also ensuring systemic changes within corporations to prevent future offenses. As part of this commitment, Rolls Royce was also required to regularly report on the implementation and effectiveness of these new measures.

The global scope of the settlement was another notable aspect. The agreement involved not just the UK's SFO but also included the US Department of Justice and authorities in Brazil. This international dimension was indicative of the growing trend towards global cooperation in tackling corporate corruption.

For Rolls Royce, the settlement, though financially burdensome, allowed the

company to avoid a conviction. A conviction would have had far-reaching implications for its global operations, potentially barring it from competing for contracts in several countries. The DPA thus offered a path that penalized the company for past wrongdoings while allowing it to continue its operations and undertake significant internal reforms.

In the aftermath of the Rolls Royce corruption scandal, while the Deferred Prosecution Agreement (DPA) was a notable response, subsequent policy implementations raise concerns about their adequacy in preventing future occurrences. Peltier-Rivest (2020) contest the policies implemented by Rolls-Royce's post-settlement, showing that the anti-bribery and corruption strategies are not well implemented. The study reveals that, despite the DPA's emblematic nature, when benchmarked against the new anti-corruption standards[54], exhibits substantial deficiencies. Key issues identified include the absence of measurable anti-bribery objectives, insufficient training provisions, and a lack of clarity and independence in the roles of ethics and compliance officers.

The Rolls-Royce 2017 settlement in the UK is a pivotal case in international corporate law and anti-corruption efforts. It highlights the growing significance of DPAs in resolving corporate misconduct and the importance of coordinated international cooperation in tackling corruption and bribery. The case also underscores the complexities of managing corporate ethics and compliance in a global business environment. Despite the serious nature of the allegations, the outcome allowed Rolls-Royce to move forward, reflecting a balancing act between justice and corporate survival (Serious Fraud Office, 2017).

3.5.3 The Airbus Case

In one of the most significant and closely observed corruption enforcement actions, Airbus Group S.E. faced a landmark settlement, which differed from earlier cases like Siemens and Rolls-Royce in several respects. Most notably, it involved a coordinated resolution across three major authorities—France's PNF, the UK's SFO, and the US DOJ—under multiple legal frameworks (e.g., Sapin II, the Bribery Act, and the FCPA), resulting in a record-high global fine. Additionally, it initially placed greater focus on the possibility of individual accountability, even though many individual prosecutions were ultimately discontinued. The multinational aerospace giant agreed to pay a combined fine of $3.96 billion, marking this as the largest global anti-corruption settlement to date. This resolution culminated from extensive investigations into Airbus's widespread corruption, fraud, bribery, and export-related misconduct, violating laws across multiple jurisdictions including the U.K. Bribery Act, France's Sapin II, the U.S. Foreign Corrupt Practices Act

[54]Peltier-Rivest (2020) utilizes ISO 37001 standards as a benchmark for comparison

(FCPA), and ITAR (United States Department of Justice, 2020; Serious Fraud Office, 2020; Airbus, 2020).

It consolidated international collaboration among authorities. French, British, and American authorities were involved, showcasing a significant evolution in the approach to cross-border enforcement of anti-corruption laws. The case achieved a larger scale when comparing to previous cases such as Siemens and Rolls-Royce, the Airbus case emphasized joint investigative efforts and shared resolutions among multiple nations even larger than the previous ones. The DPAs in this case were unprecedented in their scale and coordination across different legal systems, consolidating the trend toward negotiated settlements in large-scale corruption cases. This approach allows for more flexible and cooperative resolutions compared to traditional prosecutions. Furthermore, the scope of misconduct and geographic reach in the Airbus case was notably broad, covering a range of corrupt activities across multiple countries. This global span of misconduct underscored the increasingly complex and international nature of corporate corruption, a trend that has become more pronounced compared to earlier cases.

One of the notable aspects of the Airbus case was the initial emphasis on individual accountability. While many corporate settlements result chiefly in financial penalties with limited personal repercussions for executives, this investigation seemed poised to diverge from that trend: several individuals were subjected to significant fines and legal scrutiny. Such heightened focus on personal liability was widely regarded as a meaningful deterrent against future unethical conduct. Tom Andrews, the then-CEO of Airbus, resigned amid the scandal—despite having no direct involvement in the bribery—while much of the wrongdoing was attributed to middle management and third-party intermediaries. Nonetheless, although various individuals and associated entities faced charges, many of these were eventually dropped, underscoring that, in the end, the prospect of genuine individual punishments did not fully materialize in practice.

In the Airbus corruption case, there was initially a focus on individual accountability, with charges leveled against specific individuals associated with the company. However, pursuing these individual prosecutions, especially those relying on international white-collar crime investigations, proved challenging. The inherent complexities and difficulties in prosecuting such cases, particularly when dependent on international cooperation and evidence, led to the discontinuation of most individual investigations. For example, Britain's Serious Fraud Office (SFO) ultimately ceased its criminal investigation into individuals connected to Airbus, highlighting the practical challenges and complexities of holding individuals accountable in large-scale corporate corruption cases.[55].

[55]Recent developments on individual prosecution have not been yet studied on recent academic paper, although news on individual prosecution can be found at

Of course, the organization which allowed the bribery scheme to be possible must account for their governance mistakes. As Boakye et al. (2022) argue, corruption is not solely a result of individual unethical behavior but stems from an organizational culture that normalizes such practices. This cultural influence leads to groupthink and a lack of ethical reflection among members. They propose a 'collective myopic-bribery framework' to understand how organizational culture and cognitive structures contribute to unethical practices. While acknowledging the detrimental effects of bribery on an organization's morale and reputation, the paper also views scandals as opportunities for organizational learning and renewal. It suggests that confronting scandals openly can help organizations reshape their ethical frameworks. They concludedirections for future research, emphasizing the need to understand how individual leaders and temporal strategies influence organizational perceptions of unethical conduct.

Finally, the financial penalties imposed on Airbus were substantial, setting a new precedent in anti-corruption enforcement and reflecting a growing trend toward imposing significant fines to deter corporate misconduct. The size of the penalty in the Airbus case was intended not just as a punitive measure, but also as a clear message to the global corporate world about the severe consequences of engaging in corrupt practices. In summary, the Airbus corruption case represents a significant advancement and consolidation of NTRs in the fight against corporate corruption, characterized by enhanced international cooperation, the use of legal instruments and NTRs, emphasis on comprehensive internal reforms, broad geographic reach of investigations, and substantial financial penalties. This case signifies a maturing of global anti-corruption efforts, setting new standards for future enforcement actions.

3.5.4 Car Wash Operation

The introduction of NTRs, such as Leniency Agreements, has significantly shaped Brazil's approach to high-profile corruption cases. These agreements have become a cornerstone in Brazil's fight against corporate corruption, especially in the wake of Operation Car Wash, a massive investigation that uncovered widespread corruption which is empirically explored in Chapter 5 of this work. This Section focuses on how these agreements in Brazil have developed, detailing the penalties imposed, financial aspects, and their influence on corporate governance.

Operation Car Wash was a large-scale investigation in Brazil that began in 2014, uncovering widespread corruption involving high-ranking politicians, business executives, and state-owned enterprises, most notably Petrobras, the coun-

:https://www.reuters.com/business/aerospace-defense/uk-prosecutor-ends-investigation-into-airbus-individuals-sources-2021-05-04/.

try's national oil company. Initially centered around money laundering at a car wash in Brasília, the operation quickly expanded, revealing a complex web of bribery and kickbacks that permeated Brazil's political and corporate sectors. The operation led to numerous arrests, convictions, and significant political upheaval, marking it as one of the most extensive anti-corruption efforts in Brazilian history. The revelations from Operation Car Wash also had far-reaching implications beyond Brazil, exposing similar corruption networks in other countries across Latin America.

As exposed here, Brazil introduced Leniency Agreements as part of the law No. 12.850/13. The financial penalties under Leniency Agreements in Brazil have been significant. A notable example is the agreement with the construction giant Odebrecht, part of the Operation Car Wash scandal, which involved a multi-billion-dollar settlement spread across several jurisdictions. This case highlighted the extent of financial penalties and the increased emphasis on corporate accountability. Penalties include entities agreeing to pay $5 billion in fines and restitution, with Petrobras alone reporting $2.1 billion in bribes and almost $17 billion in asset devaluations. The investigation expanded internationally, involving cooperation with authorities from 61 countries[56].

Besides monetary penalties, these agreements have had a profound impact on corporate governance in Brazil. Companies involved in corruption scandals have had to overhaul their compliance structures radically, incorporating rigorous ethical guidelines and transparency measures. This shift has had broader implications for the business culture in Brazil, steering it towards more ethical practices.

While Leniency Agreements have been pivotal in resolving complex corruption cases, they have also faced criticism. Empirical literature points towards counter effects from lenience (Søreide and Vagle, 2022) to evade criminal responsibility merely by paying fines, potentially undermining the justice system's integrity. On the other hand, proponents view these agreements as pragmatic, preventing economic fallout and job losses that might follow corporate convictions.

Brazil's use of Leniency Agreements in addressing major corruption cases illustrates a balancing act between punitive action and the promotion of corporate reform. These agreements have played a critical role in reshaping Brazil's approach to corporate corruption, fostering a culture of compliance and ethical business practices. As Brazil continues to grapple with corruption, the evolution of these NTRs remains a key aspect of its legal strategy, reflecting a nuanced approach to complex economic and corporate crimes.

In Brazil, distinct from other prominent corruption scandals, natural persons were actively prosecuted[57] in conjunction with the investigations targeting compa-

[56]Available at: `https://www.mpf.mp.br/grandes-casos/casos-historicos/lava-jato`

[57]However, they were prosecuted, but no heavy convictions were observed.

nies and state-owned enterprises. Søreide and Vagle (2022) note that in cases like Herbalife Nutrition Ltd (US) and Airbus SE (UK and other countries), despite the imposition of hefty fines, no individuals faced conviction in the UK, for instance. In stark contrast, Brazil witnessed the prosecution of a significant number of individuals, which notably included the conviction and subsequent incarceration of both former and incumbent presidents. However, following a series of pivotal decisions[58], primarily from the Brazilian Supreme Court, there are currently no politicians from the Car Wash scandal serving jail time in Brazil today.

3.6 Final Remarks

This chapter reviews the key anti-corruption laws in the US, UK, France, and Brazil. It examines the balance between the need for clear and predictable laws and the practical flexibility offered by NTRs in complex bribery cases. The chapter also provides a comparative analysis, focusing on the main legal aspects of anti-corruption laws in these countries, such as criminal liability, sanctions, and legal tools. Tables 3.1 and 3.2 in Section 3.4 summarize the key differences in how each country's legal framework addresses corporate and individual corruption.

The flexibility achieved using NTRs has its critics. Søreide and Vagle (2022) argues that over-reliance on settlements in corporate bribery cases can weaken the rule of law. While settlements offer benefits like flexibility and quicker resolutions, they can also lead to under-deterrence of bribery. The authors warn that if settlements become too lenient or common, they may undermine thorough investigations, result in less public information about misconduct, and weaken the overall deterrent effect of anti-bribery laws.

High-profile cases like Siemens AG, Rolls Royce, Airbus, and Brazil's Operation Car Wash illustrate the effectiveness of corporate NTRs in penalizing companies for corruption. These cases show that significant fines can be imposed, and corporate reforms can be enforced. However, they also highlight the difficulty of holding individual executives and politicians accountable. In cases like Operation Car Wash, political influence can protect individuals from prosecution. Additionally, prosecuting individuals for white-collar crimes across different jurisdictions, as seen in the Airbus case, presents serious legal and investigative challenges. This contrast shows the varying success rates in holding corporations versus individuals accountable in large-scale corruption cases.

The next chapter develops a theoretical model of corruption. This model will analyze how different legal features influence an individual's decision to engage in

[58]A critical decision among these was the ruling from Supreme Court Justice Fachin in 'Embargos de declaracao no HC 193.726', which effectively initiated the annulment of convictions for former president Lula and several others under the Car Wash (Lava Jato) operation umbrella

bribery. The chapter will also explore how a country's use of NTRs in combating individual and corporate corruption might lead to more successful outcomes

Part III

THEORETICAL MODEL AND EMPIRICAL EVIDENCE

Chapter 4

A Microeconomic Approach to Corruption and Non-Trial Resolutions

4.1 Introduction

Collusive bribery or corruption (CBC) occurs when a bribe payer and bribe receiver conspire to take advantage of a rent or contract. If the bribe receiver is a public official, such agreements are harmful to society[1]. Previous studies on microeconomics of corruption have modelled this relationship as a three-tier principal-agent problem, where the principal (society) incurs losses from an agreement between the agent (bribe payer) and the supervisor (bribe recipient) (Burguety et al., 2016). Here, the analysis simplifies CBC to focus on bribe payers and receivers in two scenarios: The first scenario does not allow self-reporting by agents willing to disclose their offenses before detection by authorities, nor does it permit for collaboration with authorities after being caught, forcing individuals to always face trials. The second scenario introduces non-trial resolutions (NTRs), allowing individuals to avoid trial by self-reporting before detection or cooperating with authorities after their offenses are uncovered. Importantly, agents who choose to self-report or collaborate are offered a reduction in sanctions as an incentive to encourage such actions.

Sanction reduction policies have both positive and negative effects on the occurrence of criminal activities. While they lower expected fines and can incentivize

[1]Kaufmann and Wei (1999) argue that, even when bribery works as a facilitator for bureaucratic inefficacy (grease money hypothesis), it is still detrimental to society's welfare as a whole. It can also be argued that private bribery is also harmful to society, although it is not a crime in most jurisdictions because is is considered to be a firm's agency problem.

criminal behaviour, they also increase the likelihood of detection and conviction by encouraging self-reporting and collaboration with authorities. The predominant effect of sanction reduction policies in the context of CBC remains unclear. This uncertainty raises a critical question: Can sanction reduction policies effectively deter CBC? To explore this issue, this work presents a game-theoretical model that analyzes the outcomes of a CBC game where players have the option to report their counterparts and receive sanction reductions. This approach aims to provide a deeper understanding of the dynamics and effectiveness of sanction reduction policies in deterring CBC.

Extensive research has been conducted on the effectiveness of asymmetric punishments in preventing the payment of small bribes. These researches are majorly based on the hypothesis put forward by Basu (2011) regarding the effectiveness of the anti-corruption strategy of granting immunity to bribe payers who self-report their misconduct (Basu and Cordella, 2016). The argument is that such a policy provides an incentive for bribe payers to report their wrongdoing. However, this policy is not without controversy, as its success depends on the performance and accountability of law enforcement institutions (Dufwenberg and Spagnolo, 2014). Moreover, it may induce the 'Hold up' problem of corruption and actually stimulate bribery (Buccirossi and Spagnolo, 2006).

Notably, as presented in Chapter 2, the existing literature has mostly focused on 'harassment bribes', or illegal payments that are solicited by the bribe receiver in return for a service or good that the bribe payer is already entitled to. This paper investigates the effects of sanction reductions in CBC, where a bribe is paid for an illegal benefit. Unlike harassment bribes, in CBC, both parties benefit from the corrupt agreement, making it less likely for bribe payers to report their actions Engel et al. (2016); Abbink and Wu (2017).

The literature on leniency for antitrust violations often examines the practice of granting leniency to cartel members who report their wrongdoings. However, there are significant differences between cartel formation and CBC that can result in divergent outcomes despite the apparent similarities between the two scenarios. One crucial distinction is that, in a CBC game, the benefits from criminal activity arise from the explored bribery agreement, whereas in antitrust violations, they come from avoiding competition. Consequently, if an agent in a CBC game self-reports and/or cooperates with authorities, the reduced sanction is not as attractive as leniency from an antitrust offense, since most legal systems require offenders to return their illicit gains through measures such as forfeiture or disgorgement in cases of CBC.[2]. By contrast, in antitrust violations, self-reporting

[2]The previous chapter highlights that domestic anti-corruption legislation in the US, UK, and Brazil mandates that defendants return the illicit gains obtained through corruption. In Brazil, the primary focus of this study, Law No. 12.846, art. 16 § 3, explicitly requires that

agents can benefit both from leniency on their fines and from breaking the cartel agreement and profiting from market share exploitation. Thus, NTRs for CBC offences provide weaker incentives for self-reporting and collaboration than those for antitrust violations.

In summary, this chapter builds on the existing literature by adapting the concept of leniency to the specific context of CBC. It tailors the framework to include features that align with the objectives of this study and accurately represent the Brazilian context, which will be empirically tested in the following chapter. Key provisions, such as mandatory forfeiture of illicit gains and the possibility for self-reporting both before and after detection, are integral to the analysis. The findings indicate that well-structured policies can encourage collaboration, enhance prosecutorial efficiency, and deter CBC. However, the study also highlights the potential risk of overly lenient fine reductions inadvertently incentivizing CBC by lowering expected penalties compared to scenarios without NTRs. The theoretical insights, along with the subsequent empirical results, are further explored in Chapter 6, where they are contextualized with practical observations drawn from Brazilian case studies.

The structure of this Chapter is as follows. Section 4.2 introduces the basic framework and variables through a simple game. Section 4.3 expands the game to examine the impact of sanction reductions on the players' decisions. Section 4.4 solves the game using backward induction. Lastly, Section 4.6 presents the main conclusions and limitations of the study.

4.2 Simple Corruption Game

The aim of this chapter is to solve the colusive bribery or corruption (CBC) game with non-trial resolution (NTR). However, to introduce the analytical framework smoothly, it is helpful to first present a simpler game. In this simpler example, agents cannot self-report, and if detected, the authorities start an investigation leading to trials. By using this example, most of the game requirements can be established, and initial conclusions can be drawn regarding the impact of the bribe and the decision to engage in CBC.

4.2.1 The Simple Game Setting

This section introduces the key elements of the CBC model, including the players, the parameters, the timing protocol, the information set, the payoffs, the costs, and

negotiated fines must never fall below the damage caused by the corrupt act, ensuring a baseline of accountability.

the rewards. The model is solved for the equilibrium bribes, taking into account the different variables and constraints.

The game here is played by two players, a bribe *payer* and a bribe *receiver*[3]. The relevant parameters for this first examples are the price of the bribe b, the advantage from CBC a, the cost c for the *receiver* to perform the bribe, the sanctions s that players pay if detected by the authority and the perceived probability of being detected by the authorities α[4]. If the CBC is detected, then there is a probability of β that they are convicted. Note that, for this first example, the sanction s is determined by the legislation and summarized as a monetary fine f[5] and the seizure of all the illicit gains as forfeiture[6]. In other words, a fine plus everything that the agents have gained from CBC (a for the *payer* and b for the *receiver*).

The model presented here resembles the structure of many other types of criminal behavior, particularly those involving coordination or mutual benefit among offenders. While the analysis is tailored to the specific dynamics of CBC, some of its insights may be cautiously interpreted in the context of other crimes with similar structures. Nonetheless, it is important to emphasize that the conclusions drawn apply directly and exclusively to the game of CBC.

The game has discrete time t. In t_0 agents observe a rent seeking opportunity through bribery and decide if they want to enter in CBC or not. This implies that agents pay their costs and earn their gains for entering in CBC at this stage. In t_1, the authorities play and randomly succeed or not in detecting the crime. If CBC is detected, both agents go to trial, and authorities decide if they are convicted or not in that stage. It implies that agents either enjoy the earning of CBC or the fines from conviction at this stage.

[3]As stated in Chapter 2, there might be differences between individuals and corporations. Whenever relevant, the differences are going to be explored.

[4]Note that, the perceived probability of detection does not need to be equal to the actual observed probability of detection. Since players are all making the decision *ex-ante*. However, the perceived probability must be the same for both players.

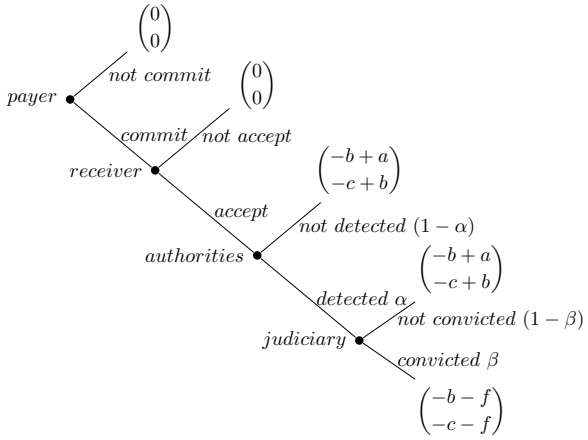
[5]In many jurisdictions there are non-monetary sanctions both for individuals (imprisonment) and corporations (licence and activity impediments). As Becker (1968) points out, they are complementary and necessary to optimal deterrence. Here, for the moment, one can assume that agents are able to translate the non-monetary fines in the value of f. Nonetheless, the argument on non-monetary fines is further developed in the following sections.

[6]As we use the Brazilian example in this study, and as showed in Chapter 3, Article 16, § 3 of Law No. 12.846 explicitly states that any negotiated fine must not be lower than the damage caused by the corrupt act, reinforcing the principle that illicit gains should not be preserved. This provision operates alongside the possibility of asset forfeiture or seizure, ensuring that the financial consequences of corruption extend beyond fines to include the recovery of unlawfully obtained assets.

4.2.2 Judiciary and Trials

Figure 4.1 shows the players' decision tree, where the values on the top of the parenthesis are the payoffs for the payer, and on the bottom for the receiver[7].

Figure 4.1: Simple Corruption Game Tree with Trials



It should be noted that the payer will only pay and the receiver will only carry out the act of CBC once they have both agreed to it. Therefore, it must be assumed that there is a hidden commitment device that ensures parties carry out CBC as agreed. This assumption is necessary because imposing some form of sequentiality at this stage would significantly alter the game's outcome, leading to a 'Hold up' effect (Buccirossi and Spagnolo, 2006). Although an interesting analysis, it falls outside the scope of this study.

It is possible to decompose the pay-offs by summing up all distinct possible pay-offs. First the agent pays the cost (which is b for the payer or c for the receiver) of entering in a CBC scheme. In the next period, there is a chance of α of being detected by the authorities, if detected a chance of β of being convicted. Therefore, the expected return in case of being fined is $\alpha\beta f$.

There are now two possibilities of earning the CBC gains a or b. Either by not being detected in the next period. For instance, the bribe payer would have:

$$(1-\alpha)a.$$

Or by being detected and not convicted

[7]Note that the game could start with the receiver asking for a bribe, it would not change the dynamic of the game.

$$\alpha(1-\beta)a.$$

It is possible to sum the possibilities in which the bribe payers succeed in CBC and earn a at the end of two periods as:

$$(1-\alpha)a + (\alpha(1-\beta)a),$$

or simply,

$$(1-\alpha\beta)a.$$

Therefore, it is possible to write the expected value for the bribe payer as:

$$E[y_{payer}] = -b + (1-\alpha\beta)a - \alpha\beta f. \tag{4.1}$$

Likewise, the expected value of CBC for the bribe receiver is:

$$E[y_{receiver}] = -c + (1-\alpha\beta)b - \alpha\beta f. \tag{4.2}$$

4.2.3 Feasibility of Corruption

Corruption occurs when it is profitable for both the *payer* and the *receiver*. This situation arises when the bribe suggested by the payer benefits both parties. Consequently, the players willingness to enter in CBC for the payers, is determined by the maximum bribe they can offer while still benefiting from the arrangement, represented by $\bar{b}$. For the receiver, it involves the minimum bribe they are prepared to accept, indicated by $\underline{b}$. In order to calculate these minimum and maximum bribes, it is necessary to identify the domain in which bribes are profitable, or else, the areas where the net benefit of CBC is positive.

It is possible to calculate the domain in which bribes are profitable for the bribe payer as:

$$E[y_{payer}] = -b + (1-\alpha\beta)a - \alpha\beta f > 0. \tag{4.3}$$

And for the bribe receiver as,

$$E[y_{receiver}] = -c + (1-\alpha\beta)b - \alpha\beta f > 0. \tag{4.4}$$

Consider that the bribe is endogenously determined by the players bargaining process. In this example without sanction reduction policies, and given the equations (4.3) and (4.4), agents will enter in CBC if the proposed bribe is bigger then the expected return from CBC $E[y_i]$. Therefore, the *payer* commits to pay a bribe if

$$b < (1-\alpha\beta)a - \alpha\beta f \equiv \overline{b}. \tag{4.5}$$

And the *receiver* accepts it if,

$$b > \frac{\alpha\beta f + c}{(1-\alpha\beta)} \equiv \underline{b}. \tag{4.6}$$

Therefore, there is an equilibrium bribe b^*, which divides the surplus of CBC for both agents. If agents have equal bargaining power, the players surplus is divided and the chosen bribe b^* lies in the interval between the minimum acceptable bribe $\underline{b}$ (4.5) and the biggest possible bribe $\overline{b}$ (4.6). More precisely at the point in which $\frac{E[y_{payer}]+E[y_{receiver}]}{2}$ or,

$$b^* = \frac{\frac{\alpha\beta f+c}{(1-\alpha\beta)} + (1-\alpha\beta)a - \alpha\beta f}{2} \tag{4.7}$$

The equation above is a Nash bargaining solution to the equilibrium bribe.

Proposition 1. *In a game without non-trial resolutions, CBC will occur if the proposed bribe b is bigger than* $\frac{\alpha\beta f+c}{(1-\alpha\beta)}$ *and lower than* $(1-\alpha\beta)a - \alpha\beta f$*. Moreover, if agents have an equal bargaining power, there is an equilibrium bribe* b^* *which equally divides the CBC surplus between both agents.*

4.3 Corruption Game and Non-Trial Resolutions

In this section the game is expanded to encompass NTRs. For this exercise, the policy is summarized as the possibility of agreements between offenders and the judicial or prosecutorial authorities to avoid trials[8]. The agreements offer judicial benefits to the agents and can only happen if they agree to cooperate and disclose their misconduct. Importantly, here it is assumed that self-reporters will necessarily cooperate afterwards. As a result, the other party is reported and convicted because of it.

Leniency models in anti-trust literature are very similar to the model in this work. Chen and Rey (2013) have demonstrated the effectiveness of leniency programs in deterring the formation of cartels, particularly when leniencies are offered to self-reporters and to collaborators who join after an investigation has already begun. It should be noted that CBC possesses particular characteristics that differentiate it from cartels, these differences can have significant implications for outcomes. Specifically, in cartels, defectors earn substantial rewards as a result of

[8]This is an oversimplification of the institution. These policies show a variety of distinct features depending on the jurisdiction.

reduced competition. However, in CBC cases, corrupt actors are typically required by law to return the gains obtained from their illicit activities, which limits the benefits that can be derived from non-trial agreements. As a result, breaking CBC networks may prove more challenging than dismantling cartels in practice.

It's essential to keep in mind that this work primarily focuses on *ex-ante* decisions. The model does not consider *ex-post* benefits such as facilitation of prosecutions, costless judicial decisions, and screening effects. It's worth noting that scholars in the plea bargaining literature have explored *ex-post* effects of agreements, as seen in Landes (1971), Kobayashi (1992), Franzoni (1999), and Mungan and Klick (2016).

4.3.1 The Sanction Reductions

In this new setting the current model must account for two new features. First, it must be possible for players to self-report and collaborate before an investigation starts or collaborate after it starts. Therefore, there are two more choices for players in their action-space. Lastly, the new stages must have a new set of payoffs in y that account for the sanction reductions.

Most importantly, the model must incorporate a distinct set of sanctions s for each type of agreement. Each agreement has a rule for reducing the fine f. If agents unilaterally self-report before detection and collaborate afterwards, they receive a reduced fine of $(1 - R)f$, where $R > 0$. Here it is assumed that, if both agents decide to self-report, both would get the sanction reduction. However, if the CBC is detected and an investigation begins, agents can still collaborate, but the fine reduction is lower, at $(1 - C)f$, where $R > C > 0$. In summary, the fine reductions are more lenient for early self-reporters than for collaborators after being detected.

Given the new set of possible outcomes, there is a new set of rewards y from each possible outcome. For instance, if a *payer* reports a CBC to the authorities, then the *payer* is convicted[9] and pays a sanction $s = (1 - R)f + a$ while the *receiver* is convicted with the full fine $s = f + b$.

4.4 Solving by Backward Induction

This section employs backward induction to analyze the CBC game, starting from its end stages and tracing back to the initial decisions. The aim is to identify Subgame Perfect Equilibria (SPE), revealing the optimal strategies for each player.

[9]Some agreements involve a non-prosecution agreement, so the reporting party is not formally convicted.

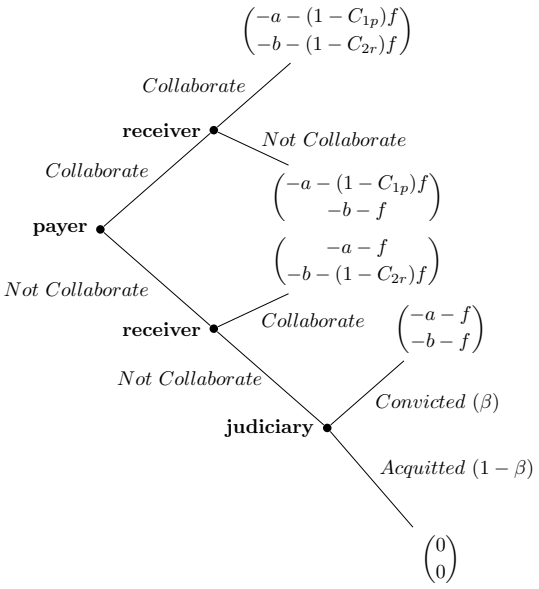
This analysis considers the dynamic interplay of decisions and probabilistic elements within the game, providing a complete understanding of decision-making processes and their implications in achieving SPE.

4.4.1 Trial and Collaboration Phase

In a scenario where the prosecution is equally likely to detect either the bribe payer or the receiver, the following process unfolds: If the prosecution first detects one party, they offer this party a chance to collaborate in exchange for a reduced fine $(1 - C_1)f$, if the first party detected is the payer, then they receive some fine reduction of C_{1p}, or if it is the receiver C_{1r}. The party not initially detected then witnesses this agreement and is subsequently offered a different benefit for their collaboration, represented by C_{2p} or C_{2r}, depending on whether the second detected is the payer or the receiver respectively.

For instance, if the bribe payer is the first to be detected, if they agree to collaborate, their penalty is calculated as $a+(1-C_{1p})f$, where C_{1p} is the reduction in penalty given to the party detected first. Figure 4.2 illustrates the detailed structure of this scenario, when the bribe payer is the first party detected and offered a deal.

Figure 4.2: Collaboration and Trial Phase when the Payer is the First Detected



Notes: The tree shows the players in bold; the actions at the edges of the tree's children; the pay-offs are in the parenthesis where the ones at the top are for the payer and at the bottom for the receiver.

To elucidate the analysis of the scenario above using backward induction, it is essential to examine the decision-making process of the last participant to receive a proposal, in this case the receiver. The core of the payer's decision on whether to collaborate hinges on the anticipated action of the receiver.

The receiver opts to collaborate if the payoff from collaboration is better than their perspectives on trial, i.e. $-b-(1-C_{2r})f > -\beta(b+f)$, or[10],

$$C_{2r} > \frac{(b+f)(1-\beta)}{f}. \tag{4.8}$$

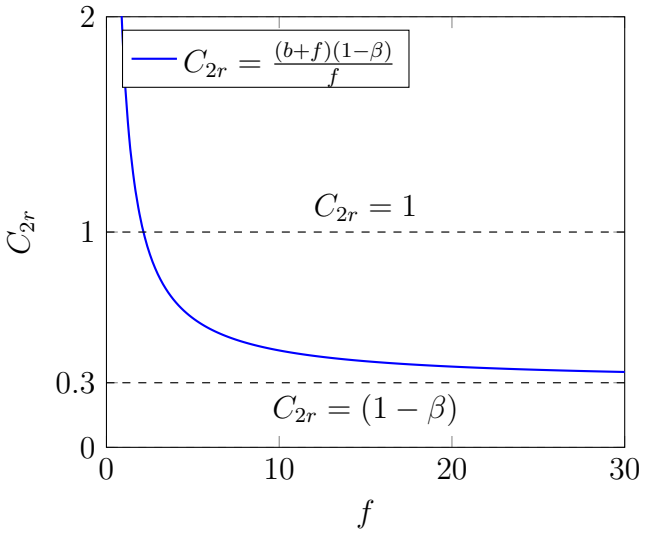
If this condition holds, the payers know for sure that the receivers are going to collaborate when approached, if they opt not to collaborate, they incur a payoff of $-a-f$. However, if they choose to collaborate, they receive a payoff of $-a-(1-C_{1p})f$, which is more advantageous compared to the certain conviction, for any $C_{1p} > 0$. Therefore, condition (4.8) is sufficient to make both agents collaborate if the payer is the first detected.

[10]The solution of the inequation $-b-(1-C_{2r})f > -\beta(b+f)$ which leads to (4.9) is shown in Appendix A.1.

The condition given by (4.8) indicates the existence of a positive constant C_{2r} which encourages collaboration among players. This constant represents the overall penalty $(b+f)$, which includes both the fine and any additional forfeiture, considered in proportion to the fine alone f. This ratio is then adjusted by the probability of being acquitted $(1-\beta)$[11].

Note that condition (4.8) suggests that if the fines are too small, then the sanction reduction $C_{2r} > 1$. This means authorities would offer rewards to the reporting party exceeding the fines, i.e., rewards or bonuses, which are uncommon. Similarly, if the ratio of the bribe value to the fine value, $\frac{(b+f)}{f}$, is too high, indicating a large CBC scheme with fixed fines, players would find little incentive to cooperate in cases of significant CBC. Figure 4.3 shows how the minimum compensation C_{2r} decreases while the fine grows.

Figure 4.3: Sanction Reduction C_{2r} against fine f



Notes: Assuming $b = 5$ and $\beta = 0.7$ for demonstration purposes

The plot above demonstrates that forfeiture plays a key role in the agents decision. Since sanction reductions are applied by law only over the sanctioned fines, all gains from CBC must be returned. When the gain is too large, players

[11]Another way to interpret this result is that it quantifies in the numerator the expected sanction that players avoid if acquitted, and in the denominator, the portion of the sanction that can be reduced through collaboration. Thus, it can be viewed as the proportion of the total sanction at risk that collaboration can mitigate.

have no incentive to cooperate; they would still opt for a trial because if acquitted, they would not need to return the gains from CBC. In fact, as fines get larger in relation to the gains of CBC, the compensation converges to the probability of acquittal $(1-\beta)$[12].

Similarly, if the receiver is the first party detected, the payer's decision to collaborate hinges on the value of C_{2p}. Specifically,

$$C_{2p} > \frac{(a+f)(1-\beta)}{f}. \tag{4.9}$$

In this scenario, if the first party detected is aware that the second party will collaborate upon receiving an offer, they would be inclined to collaborate for any $C_{1r} > 0$, provided that (4.9) is satisfied.

Proposition 2. *The prosecution can ensure collaboration and full disclosure of activities from both involved parties by implementing an ex-ante rule. This rule stipulates that the reduction in fines for the party detected last, denoted as C_{2p} and C_{2r}, must be higher than $\frac{(a+f)(1-\beta)}{f}$ and $\frac{(b+f)(1-\beta)}{f}$ respectively. In this situation, the party detected first will collaborate for any C_{1p} and C_{1r} bigger than zero. The rationale behind this strategy is that the first party detected becomes aware that the other party will collaborate and reveal their offenses, thereby encouraging their own cooperation.*

The Role of Prosecutorial Discretion

Prosecutorial discretion can be defined as the power of prosecutors to make decisions about whether or not to bring criminal charges, what charges to bring, and how to pursue each case (Levine, 2014). It encompasses the broad decision-making authority that prosecutors have, including decisions related to filing charges and plea bargaining, which significantly shape the criminal justice process. This research not only considers prosecutorial discretion in its traditional sense but also takes a broader view. It examines discretion as the capacity of the prosecution to propose, negotiate, and settle agreements with defendants. This expanded perspective allows for a more comprehensive understanding of how prosecutors exercise their authority in various legal contexts.

If, conditions (4.8 and 4.9) are true. Then, the first party detected would collaborate for any positive sanction reduction offered. Given that this party possesses sufficient evidence to ensure the conviction of the other party, revealing the CBC scheme ensures the latter faces the full penalty without a chance to

[12]The intuition here is easy to imagine. If the approached party has 40% chance of being acquitted, than naturally enough, the prosecution needs to offer some reduction in the fine of more than 40%.

negotiate with the prosecution. By the time the second party is approached, the authorities will already have enough evidence, eliminating the need for sanction reductions for any party[13]. Thus, offering a fine reduction to the second person to come forward is an unachievable promise, never to be put into practice. It serves merely as a threat since the first person invariably resolves the matter before the second has a chance to respond.

The proposed scenario operates as follows: The prosecution informs the first detected party, "*If you choose not to disclose the evidence, be aware that I will present a significantly better deal to the other party, who will likely cooperate. The decision is yours.*". Under this threat, the party is going to collaborate. Once the first party collaborates, then the prosecution does not need to offer the second party any reduction.

Another consequence of this could mean that the rule for C_{2r} or C_{2p} could be even more lenient[14] than the calculated values in equations (4.8 and 4.9). Because the amounts specified in the rule will never actually be used, as they serve as a threat to the players. In fact C_{2r} or C_{2p} could be as high as 1, making the fines go to zero and it would still have the same effect. Under this framework, the leniency offered to the second player to come forward could essentially function as a credible threat in the context of Schelling's concept.

The analysis from Thomas Schelling (1960) on credible threats highlights the importance of a threat being believable and enforceable to influence behavior effectively. In the case of anti-corruption measures, offering a lenient deal to the second player who provides evidence against CBC can be seen as a strategic application of Schelling's theory. This leniency serves as a credible threat because it is a clear, executable action that authorities can consistently apply. The knowledge that such a lenient offer exists incentivizes players to come forward before their counterpart does, thereby making the threat credible.

The credibility of this threat hinges on the players' belief that the authorities will indeed offer more lenient terms to the second party who cooperates. This belief motivates players to act quickly to avail themselves of the more favorable terms, reinforcing the effectiveness of the threat. Therefore, the strategic leniency outlined in the rules for C_{2r} and C_{2p} in (4.8 and 4.9) exemplifies a **minimum credible threat** under Schelling's concept, as it is a deliberate and enforceable strategy designed to deter CBC by encouraging cooperation with the authorities.

It is clear that prosecutorial discretion is crucial for effectively proposing offers. If the rules are fixed, then the prosecutor would be compelled to carry out these proposals, leading to unnecessary fine reductions for the second party. This is

[13]Off course, some agreement can be done to avoid taking the case to trials, even under the expectation of sure conviction.

[14]One could argue that in a scenario with risk aversion, they could be less lenient.

because the prosecution would already have sufficient evidence to proceed and prosecute both parties for the crime without needing to offer a deal to the second approached party.

Proposition 3. *The prosecution must be capable of offering sanction reductions as threats and have the flexibility to retract these offers when advantageous. Consequently, prosecutorial discretion is vital for implementing optimal strategies.*

It is important to highlight the potential negative effects of prosecutorial discretion. On one hand, this discretion can be a valuable tool for enforcing the law and lending credibility to offers made by the prosecution to defendants. However, on the other hand, there is a risk that authorities could misuse this discretionary power to arbitrarily release defendants from charges. Worse still, they might exploit this power to solicit bribes in exchange for dropping charges, a scenario more aligned with the type of corruption studied by Polinsky and Shavell (2001). Therefore, the net benefit of granting such discretionary power to authorities is undoubtedly a topic that warrants further study.

One particular case of misuse of discretionary power is seen in judicial oversight over agreements. If judges have the authority to nullify or propose alternative deals to defendants that are equally or more favorable than those made with the prosecution, it allows defendants to negotiate their situation between different authorities. In this work, the final chapter, specifically in Section 6.2.2, addresses the issue of judicial oversight and the consequences of judicial discretion in the Car Wash case. This section highlights how judicial power has been used to undo many prosecutorial agreements, thereby undermining the authority of the prosecution and diminishing the efficacy of these agreements.

It is important to note the mutual benefits for both the prosecution and the judiciary when an agreement is reached. Such agreements enhance efficiency and reduce costs for the authorities involved (Landes, 1971). In situations where no agreement is made, a trial becomes the next course of action. In this model, the probability of conviction (β) for the reported party is assumed to be 1. Consequently, to lower the expenses and workload related to trials, the prosecution is motivated to offer some C_{1r} or C_{1p} greater than zero to facilitate an agreement. Furthermore, even after having the enough evidence, the authorities should offer the second party a similar deal to avoid trial as well[15].

[15]In practice, there are two rules for C_2, one is in the case that the first party has not collaborated (given by (4.8 and 4.9)), other in case that they collaborated, which would be equal to the 'cost of trials'.

The Case of Lacking Sufficient Evidence

The previous example might seem unrealistic because the mere threat of punishment could lead parties to accept almost no sanction reductions. Of course, this example assumes that the first party to come forward would provide enough evidence to ensure the conviction of the other party. However, if the players cannot provide sufficient evidence to seal the deal, there is a level of sanction reduction that would still encourage them to come forward and collaborate with the authorities.

Let's define the power of evidence as the probability of conviction after reporting, represented by γ[16], where $\beta \leq \gamma \leq 1$. Thus, $\gamma = \beta$ indicates no relevant evidence provided, while $\gamma = 1$ signifies sufficient evidence has been provided. This allows us to reformulate the conditions for C_{1p} when the bribe payer is the first detected as follows:

$$C_{1p} > \frac{(a+f)(1-\gamma)}{f}, \tag{4.10}$$

where $C_{1p} > 0$ if $\gamma > \beta$.

Note that condition 4.10 represents a general case and can reproduce the results seen in previous examples. For instance, if sufficient evidence is provided to convict the parties, then $\gamma = 1$ and $C_{1p} = 0$.

In this scenario, the authorities would have already the evidences provided by the payer and the condition offered to the receiver, must not be as lenient as (4.8). It can be reduced to:

$$C_{2r} > \frac{(b+f)(1-\gamma)}{f} \tag{4.11}$$

By symmetry, it is deducible that for the receiver, if this party is the first to be detected, they would receive a fine reduction of $C_{1r} = \frac{(b+f)(1-\gamma)}{f}$, and the second one, the payer in this case, would receive a fine of $C_{2p} > \frac{(a+f)(1-\gamma)}{f}$ solely because the first has agreed to collaborate. In other words, the rule will be the same for both players:

$$C_{1p} = C_{2p} = C_p > \frac{(a+f)(1-\gamma)}{f}, \tag{4.12}$$

$$C_{1r} = C_{2r} = C_r > \frac{(b+f)(1-\gamma)}{f}, \tag{4.13}$$

[16]Assuming that both players can provide the same amount of evidence to convict the other party.

and these values are the minimum acceptable offers that would make players prefer the agreement to a trial.

Note that the policy above works if and only if the authority uses the credible threat to first approached party that if they do not collaborate, the second party will receive a more lenient sanction reduction of (4.9 and 4.8). Because this induce the party to collaborate and only then it is possible to apply fines of (4.12 and 4.13).

Proposition 4. *If the authority threats the party of applying a lenient rule to the last party detected, then both parties collaborate for a minimum sanction reduction of* $C_p > \frac{(a+f)(1-\gamma)}{f}$ *and* $C_r > \frac{(b+f)(1-\gamma)}{f}$.

It should be clear that if $\beta < \gamma < 1$, then the reductions (4.12 and 4.13) are less lenient than the reductions in (4.9 and 4.8). Consequently, it is possible to conclude that a fixed rule would not be efficient. Because it would tie the authoritiy to give a more lenient, and not necessary, sanction redution to the second party detected. While, if the authorities have some discretionary power to credibly threat the first party to be lenient to the next one, then both parties can receive less lenient sanction reductions.

In summary, if offenders cannot provide enough evidence to secure a conviction, it makes no difference whether they are the first or last detected; the sanction reductions applied will be the same for both the payer C_p and the receiver C_r. Notably, if the evidence is sufficient for a conviction, the fine reductions will be marginally above zero.

4.4.2 Report Phase

In the phase before detection, but after the agreement on CBC, agents have no incentive to report the CBC for any reduction factor R that is less than 1. This scenario is often unrealistic in most legal jurisdictions, as it implies that authorities would offer some kind of bonus to the reporting party. The only exception might be if the agents recognize a significant change in the probabilities of detection and conviction compared to what they estimated when they initially agreed to the CBC. However, it is important to note that this hypothesis is not considered in the current exercise.

In short, the parties do not even consider self-reporting before closing the CBC agreement unless they expect that there will be any changes in the expected probability of detection α.

To encourage agents to self-report a corruption crime before being detected by authorities, implementing a 'first-comer' rule can be effective, as it can induce a 'race to the court' effect. This mechanism operates on the premise that the

first party to report the corrupt activity to the authorities receives more lenient treatment or reduced sanctions compared to those who come forward later or are caught. The anticipation of a more severe penalty for those who delay cooperation or are detected second creates a sense of urgency among involved parties. This urgency can lead to a competitive scramble to self-disclose corrupt actions to the authorities, aiming to benefit from the most lenient sanctions available. This was proposed as an efficient way to combat cartels by Harrington (2008), and it may also apply to the CBC case.

4.4.3 Initial Phase

In the initial stage of the scenario, agents (both bribe payers and receivers) are tasked with choosing strategies that yield positive outcomes. Corruption occurs if CBC is profitable for both parties and the bribe offered is between the largest profitable bribe for the payer $\overline{b}$ and the minimum acceptable bribe for the receiver $\underline{b}$.

In the case that the bribe payers are the first to propose the bribe, if authorities do not use a credible threat, they understand that collaboration upon detection is not feasible. This understanding influences their strategy, leading to the following condition for proposing a bribe:

$$-b + (1 - \alpha\beta)a - \alpha\beta f > 0. \tag{4.14}$$

The inequation above is exactly the same condition as in the case without NTRs (4.3). Once again, the decision to offer a bribe depends on balancing potential gains against the risks and costs. The term $-b$ represents the cost of the bribe, $(1-\alpha\beta)a$ signifies the potential gain adjusted for the risk of detection and subsequent trial, and $\alpha\beta f$ reflects the adjusted risk of facing penalties. In this case the maximun profitable bribe is equal to (4.5).

Conversely, if authorities use a credible threat, agents operate under the assumption that they will eventually report the CBC, regardless of whether they are the first or second to be detected. In this scenario, bribe payers will only agree to engage in CBC if it satisfies the following condition[17]:

$$-b + (1 - \alpha)a - \alpha f(1 - C_p) > 0. \tag{4.15}$$

[17]It is important to note that the advantage a does not factor into the sanctions following detection. If the bribe attempt is not accounted at the beginning, it will not result in forfeiture. On the other hand, if it is presumed that the advantage a is accounted at the beginning of the bribe agreement, then the corresponding decision would be

$$-b + a - \alpha(a + (1 - C_p)f) > 0.$$

Both assumptions and decision conditions lead to the simplified expression (4.15).

Here, the decision rule changes. The term $-b+(1-\alpha)a$ represents the net benefit from the bribe, adjusted for the probability of not being detected. Moreover, the latter part of the equation, $-\alpha f(1-C_p)$, accounts for the expected penalties in case of detection and collaboration. The agents then decide to engage in CBC only if this calculated benefit outweighs the potential risks and costs.

In this case, the maximum payable bribe is given by,

$$\bar{b} = (1-\alpha)a - \alpha f(1-C_p). \tag{4.16}$$

For the receiver, the decision to accept a bribe depends on specific conditions. If conditions for collaboration are not met, i.e. authorities do not use a credible threat, the criterion for accepting a bribe is defined by equation below:

$$-c + (1-\alpha\beta)b - \alpha\beta f > 0, \tag{4.17}$$

In this situation, the receiver evaluates the benefit of the bribe, adjusted for the risk of detection and potential collaboration, against the cost and the risk of penalties if detected. Notably, it is the same condition as in (4.4), and it represents the decision to accept the bribe if it results in a positive value. However, if the authorities use a credible threat, the condition for them to enter in CBC is given by:

$$-c + (1-\alpha)b - \alpha f(1-C_r) > 0. \tag{4.18}$$

It is now possible to calculate the minimum acceptable bribe $\underline{b}$,

$$\underline{b} = \frac{\alpha f(1-Cr) - c}{(1-\alpha)} \tag{4.19}$$

Lastly, it is possible to calculate the equilibrium bribe b^* that agents would use if they lie on the collaboration region. This is given by $b^* = \frac{\underline{b}+\bar{b}}{2}$, or substituting,

$$b^* = \frac{(1-\alpha)a - \alpha f(1-C_p) - \frac{\alpha f(1-C_r)+c}{(1-\alpha)}}{2} \tag{4.20}$$

It is important to note that this conclusion is primarily applicable to ex-ante decisions—decisions made before entering into a corrupt agreement. If, after entering into an agreement, the agents perceive changes in the probability of detection α or the likelihood of conviction β, their strategies may shift[18]. In such cases, collaboration with authorities may occur even without the use of credible threats by the prosecution. Furthermore, agents might even opt for self-reporting, thereby

[18]Chapter 3 of this thesis explores the works that study how variations in the probability of detection influence players' decisions to self-report, primarily focusing on the study from Harrington (2008).

altering the expected outcomes and dynamics of the corrupt agreement. This highlights the fluidity and complexity of decision-making in CBC scenarios, where perceptions and probabilities play a significant role in shaping agents' actions.

4.4.3.1 Does Non-trial Resolutions Deter Corruption?

At this stage, it is evident that NTRs enable authorities to more effectively tackle CBC by leading the involved parties into a situation resembling a prisoner's dilemma, encouraging them to cooperate and disclose the corrupt dealings. However, a critical question remains: does the introduction of NTRs act as a deterrent to CBC? It is possible to address this question by comparing the payoffs from CBC for the agents before and after introducing the policy. If the policy renders the CBC agreement more costly for the agents, then it can be concluded that it will deter the activity.

First, it is possible to analyze whether NTRs deter CBC without threatening the bribe payer with offering a more lenient sanction reduction to the bribe receiver if they do not collaborate. The equivalence between (4.3) and (4.14) suggests that the introduction of NTRs does not change the propensity of agents to engage in corrupt practices, specifically because they anticipate no cooperation when the conditions for collaboration are not met. This occurs because the payoffs from CBC remain the same as in the situation without the policy.

However, when the prosecution uses the credible threat to induce collaboration, it raises an important question: Is there a certain threshold for C_p^* that diminishes the motivation for payers to engage in CBC? It is possible to describe such scenario where the rewards of CBC without NTRs surpass those under a regime with effective NTRs. This scenario is captured by the following inequality:

$$-b + (1 - \alpha\beta)a - \alpha\beta f > -b + (1 - \alpha)a - \alpha f(1 - C_p^*).$$

Where the left side of the inequation represents the gains from engaging in CBC without the presence of effective NTRs, while the right side quantifies the returns under the assumption that agents will cooperate if caught. Therefore, resolving the inequation identifies the critical value of C_p^* that render the decision to engage in corrupt practices less favorable for the payer, assuming they anticipate cooperation upon detection. Rearranging the condition above leads to:

$$C_p^* < \frac{(a + f)(1 - \beta)}{f}, \tag{4.21}$$

for $b > 0$, $a > 0$ and $f > 0$.

The result reveals that a certain level of fine reduction C_p^* which makes engaging in CBC is exactly equal to the minimum credible threat characterized on condition (4.9).

If authorities use a credible threat and parties provide full evidence, $C_p = 0$, therefore lower than (4.21), hence it is definitely deterrent. However, if there are not enough evidence then, then it is possible to compare the condition (4.21) with condition (4.10), or else:

$$\frac{(a+f)(1-\gamma)}{f} < C_p^* < \frac{(a+f)(1-\beta)}{f}, \tag{4.22}$$

Since $\gamma > \beta$ if there are any useful provided evidence, then there is a policy that deters CBC if correctly applied.

The findings illustrate that a specific threshold exists which encourages agents to cooperate and deters them from engaging in CBC, especially when contrasted with scenarios lacking NTRs. However, if the reduction is too lenient and exceeds $\frac{(a+f)(1-\beta)}{f}$, the payer is aware that they will collaborate if detected, but becomes more inclined towards CBC. This happens because the incentives for cooperation decrease so much that the expected penalties becomes higher than the ones in the case without non-trial resolution, thus, incentivizing CBC.

In the bribe receiver's scenario, likewise the example for the payer, there exists a level of C_r^* that is lenient enough to make the agents decide to collaborate if detected but also deters CBC when compared to the case without NTRs or the case when conditions for collaboration are not met. By analogy, it is given by

$$C_r^* < \frac{(b+f)(1-\beta)}{f}, \tag{4.23}$$

for $c > 0$, $b > 0$ and $f > 0$. Comparing to the minimum acceptable condition for collaboration (4.11), it leads to:

$$\frac{(b+f)(1-\gamma)}{f} < C_r^* < \frac{(b+f)(1-\beta)}{f}. \tag{4.24}$$

Proposition 5. *If the prosecution uses credible threats to induce collaboration, the optimal levels of fine reductions C_p^* and C_r^* that deter CBC are $\frac{(a+f)(1-\gamma)}{f} < C_p^* < \frac{(a+f)(1-\beta)}{f}$ and $\frac{(b+f)(1-\gamma)}{f} < C_r^* < \frac{(b+f)(1-\beta)}{f}$. However, if the fine reduction is more lenient than this, agents would still collaborate, but CBC would be less expensive than under the case without NTRs. Therefore, incentivizing CBC.*

In a practical example, if the payer decided to cooperate under the threat of the next party receiving a better deal, consider how authorities might decide on a fine reduction for a bribe payer under the optimal rule $C_p^* < \frac{(a+f)(1-\gamma)}{f}$. Assume the bribe payer gained \$1 million from corrupt activities, and the law sets a fine of \$500,000. If the evidence gathered through cooperation is strong enough to convict the payer with a 90% certainty, the reduction should consider the acquittal

probability post-evidence, which is 10%. Mathematically, the fine reduction would be calculated from the total illicit gain, proposed fine, and the new acquittal probability, leading to a formula like this: $(1,000,000 + 500,000)/500,000 \times 10\%$. Consequently, the authorities should propose a 30% reduction on the initial fine. This means, after applying the reduction, the bribe payer would effectively be charged \$350,000 in fines plus the seizure of one million in forfeiture[19]. If the proposed reduction is smaller than 30%, than this party is not going to accept the deal, and will eventually take their chances on court. This approach ensures the sanction aligns with both the illicit gain and the evidence's strength, promoting effective justice administration.

In conclusion, the prosecution must use a credible threat towards the offenders and offer a sanction reduction C_p^* or C_r^* that respects the conditions (4.22 and 4.24). Consequently, it would induce collaboration from both parties and deter CBC. However, this decision depends on parameters that are hard to estimate such as the value of the bribe b and the advantage from CBC a, as well as the probability of conviction before β and after γ the evidence is provided. These parameters are most likely of the knowledge of the offenders and not of the prosecution. This difference on the ability to correctly assess the variables and its implications on the light of the results above is briefly discussed on the next section.

4.5 Challenges in Assessing Key Variables

Despite the apparent precision of these thresholds, determining the optimal fine reductions in practice is challenging. The main difficulty lies in correctly estimating the parameters $\{b, a, \beta, \gamma\}$. Each of these plays a pivotal role in shaping the decision to bribe or accept a bribe, as well as in the ex-post choice of whether to cooperate with authorities under the threat of sanction. However, none of these variables is perfectly observable to all participants—especially the prosecutorial authorities—at the outset.

Below, we detail how each parameter may be misjudged by either the prosecution or the players (payer and receiver), and we discuss the potential pitfalls and strategies to mitigate them.

[19]On the other hand, let's assume that the probability of conviction is 80% without any evidence provided ($1 - \beta = 0.2$). Now, if the agents know beforehand that the proposed deal would offer a leniency greater than $(1,000,000 + 500,000)/500,000 \times 20\%$, or a 60% reduction, meaning they would pay less than \$200,000 in fines, they would be more inclined to enter into the CBC scheme from the start.

The Bribe b

The bribe b is the amount the receiver demands or the payer offers. In the simplest scenario, both parties internally know the exact bribe amount. Yet, from the viewpoint of law enforcement, b might be hidden or only partially observable. If the authorities underestimate b, the overall sanction (fine plus forfeiture) could fail to reflect the bribe's true economic significance, making CBC more profitable than anticipated. Conversely, an overestimate of b could lead to fines that exceed a proportionate level of punishment, potentially driving cooperation rates down but also fueling perceptions of unfairness or prosecutorial overreach.

Due to the clandestine nature of CBC, receivers often set the amount in line with their risk or perceived bargaining power, and payers may negotiate, as discussed in Section 4.2.3. The prosecution might rely on internal documentation (if any), whistleblower accounts, wiretaps, or bank records—each prone to biases or incompleteness. Inaccuracies about b can distort the calibration of C_r^* (the reduction for receivers), as the critical thresholds directly depend on the sum $(b + f)$.

Prosecutors can use forensic accounting, data analytics, and coordinated international information-sharing (for instance, cross-border bank record tracing) to narrow the gap in their estimates of b. Introducing robust rules for the forfeiture of suspected gains and heightened transparency in negotiations can also disincentivize the parties from underreporting bribe amounts.

The Advantage of Corruption a

The advantage a reflects the illicit benefit the bribe payer secures by making the payment—this could be winning a public contract, obtaining a license without the requisite qualifications, or receiving an unlawful tax break. Unlike b, which flows to the receiver, a is known only to the payer.

Although the payer generally knows a, the receiver may only have a vague idea of the payer's true benefit. The prosecutorial authorities face an even harder informational challenge because they seldom have full details of the contract's future profits or the intangible competitive advantage the payer gained.

If the prosecutor significantly underestimates a, the maximum profitable bribe $\overline{b}$ (from the payer's perspective) is understated, which might lead to insufficient fines that leave CBC highly profitable. On the other hand, if the prosecutor grossly overestimates a, then fines may be excessive, resulting in contentious legal battles over the fairness of the penalty. Excessive sanctions could also harm legitimate business operations or dissuade self-reporting in borderline or uncertain cases.

The Probability of Conviction β

The probability of conviction β captures the likelihood that a party would be found guilty absent new incriminating evidence. It reflects existing prosecutorial proof, the legal environment, procedural norms, and the perceived competence of courts. From the players' standpoint, β represents the baseline risk of going to trial without turning state's evidence.

Both payer and receiver might have private information about the strength of the government's case (for example, if they know critical documents have been destroyed or a key witness is unreliable). The prosecution, conversely, can overestimate β due to optimism or underestimate it if they are unaware of key defense strategy from defendants. Either way, a mismatch in perceived β can derail negotiations: If defendants believe β is lower than the prosecutor's offer suggests, they might refuse deals; if the prosecution erroneously lowers the sanction anticipating a high β, it could reduce deterrence.

Transparent negotiations, limited discovery provisions, and realistic internal assessments can bridge the gap in perceived β. Courts can also require minimal disclosure of material evidence to the defense during negotiations, thereby aligning the parties on a narrower range for β.

The Probability of Conviction γ after Evidence is Provided

Whereas β denotes the conviction probability in the baseline scenario, γ is the probability of securing a conviction once a cooperating party supplies incriminating evidence. By definition, $\gamma \geq \beta$. If the provided evidence is fully decisive ($\gamma = 1$), the authorities no longer need to offer major concessions to the second or third party who comes forward.

The payer or receiver may overrate the strength of what they can offer (γ close to 1), expecting a large leniency. Conversely, the prosecutor might worry that the evidence is less decisive than it appears (so γ is only marginally above β). Such misalignments can push the prosecution to grant larger fine reductions or, conversely, propose too modest deals and lose early cooperation.

Explicit guidelines for how evidence is weighed in corruption cases (*e.g.*, as in competition-law leniency programs) help clarify γ. Additionally, drafting precise cooperation agreements—defining the scope, type, and verifiability of evidence—imposes discipline on the prosecutorial side: once they see the actual documentation or testimony, they can revise γ. If it is weaker than promised, the authorities have grounds to adjust or revoke the offered reduction. Likewise, advanced rulings by a judge on the admissibility of specific pieces of evidence can clarify early on how probative that evidence might be at trial.

In conclusion, prosecutorial discretion plays a central role in this context.

Prosecutors must decide whether to offer a sanction reduction deal based on the strength of the evidence provided to convict the other party. This requires the ability to assess the value of the evidence and, if necessary, adjust the terms of the deal accordingly.

4.6 Conclusion

This study employs a game-theoretical approach to examine colusive bribery or corruption (CBC). It aims to determine whether non-trial resolutions (NTRs) contribute to the prosecution and deterrence of CBC. To achieve this, the analysis first considers the game in the absence of NTRs and then introduces them, allowing for a comparison of outcomes.

Corruption arises when the bribe payer's willingness to pay, defined as the highest bribe they are prepared to offer, surpasses the bribe receiver's threshold for engaging in CBC, which is the lowest bribe they are willing to accept. In situations where both parties have identical bargaining power, the equilibrium bribe acts as a Nash Bargaining solution, equitably allocating the benefits derived from CBC between the two participants.

When NTRs are implemented, agents have the option to self-report either before or after detection. However, this study reveals that under standard fine reduction rules, agents lack the motivation to self-report prior to being detected, unless they perceive changes in their environment that alter the probabilities of detection and conviction due to the new policies. Thus, the option to self-report before detection does not serve as an effective deterrent as an *ex-ante* rule. Nonetheless, if the impact of NTRs on enhancing the efficiency of the judicial or prosecutorial process increase the probability of detection or conviction, then, self-reporting may be observed.

The research found that fostering cooperation from both parties can be achieved by proposing asymmetrical sanction reductions, used solely as credible threats rather than actual offers. Specifically, the promise of a more lenient fine reduction for the second detected party can create a situation resembling a prisoner's dilemma, which incentivize both parties to cooperate upon detection. The sanction reductions that are effectively going to be carried out, however, are conditional and strategic; they depend on the amount and strength of the evidence provided. The extent of the proposed reductions correlates with the probability of conviction based on the presented evidence. In scenarios where the evidence is enough to convict all parties involved in the CBC scheme, only a minimal sanction reduction is necessary to effectively achieve cooperation from both parties.

If agents know they will cooperate upon detection, there is a threshold where CBC becomes less profitable than in scenarios without NTRs, thus deterring CBC.

Importantly, if sanction reductions are too lenient, agents might still opt to cooperate. However, in these cases, the lower fines could encourage CBC by leading to reduced expected penalties.

In practice, the authorities' guidelines should articulate the following process: When the first detected party is approached, they are informed that they have the option to cooperate. Refusing to cooperate triggers an offer of significant leniency to the subsequent involved party, potentially leading to a full waiver of the fine. Should the party choose to cooperate (a decision heavily influenced by such a threat), the authorities then determine the sanction reduction. This reduction is calculated based on the sum of the CBC gains and the fine, divided by the fine, and then multiplied by the probability of acquittal post-evidence submission. If this practical rule is implemented, it should deter CBC among agents more effectively than in scenarios lacking NTRs.

In summary, this study demonstrates that NTRs can deter CBC by setting well-designed strategic sanction reductions, creating a prisoner's dilemma scenario for involved agents. However, excessively lenient sanctions may unintentionally promote CBC by reducing the expected costs of engaging in such activities.

Chapter 5

The Brazilian Empirical Example

5.1 Introduction

As explored in Chapter 3, in Brazilian law, the crimes of corruption defined in Articles 317 and 333 of the Penal Code closely align with the concept of collusive bribery or corruption (CBC). These provisions specifically address situations in which a public official solicits or receives an undue advantage (Article 317), or where an individual offers or promises such an advantage to a public official (Article 333), clearly framing the conduct as public and collusive in nature. Importantly, Brazilian legislation distinguishes these acts from harassment bribes through the separate crime of '*concussão*', outlined in Article 316. In cases of *concussão*, the public official demands or extorts an undue advantage by abusing their position of authority, often without any mutual agreement or negotiation. Therefore, whenever this study refers to corruption crimes under Brazilian law, the reader should understand them as equivalent to the concept of CBC used throughout the analysis.

The Brazilian laws No. 12.846/13 and No. 12.850/13 were enacted in August 2013 as a response to the Brazilian protests of June 2013. Protesters demanded (among other things) stronger measures against corruption from the government. The laws were inspired by the guidelines of the United Nations Convention Against Corruption (UNCAC)[1]. They introduced the possibility for individuals and corporations involved in crimes of corruption to disclose their activities in exchange for sanction reductions. Notably, they also provide other measures to inhibit crimes of corruption besides the self-reporting mechanisms. In this sense, the law No. 12.846/13 (Anti-Corruption Law) also sets strict liability for firms on crimes of corruption conducted by their employees. It institutes compliance measures as

[1]Brazil signed the Agreement of the Convention on the 9th December 2003 and ratified on 15th June 2005. However, until 2013 little enforcement was observed.

possible punishments and states other sanctions in case of corporate corruption. Furthermore, the law No. 12.850/13 (Law against organized crimes) also instituted new types of investigation procedures for Brazilian authorities. All these provisions have features that may somehow deter crimes of corruption[2].

After the enactment of the laws, in 2014 and later years a series of big corruption investigations were observed nationwide. Given this context, are the recent big corruption investigations an output of widespread corruption or an effective shift of the prosecution standards? More specifically, did the anti-corruption policy from 2013 help to decrease crimes of domestic corruption in Brazil[3]?

There are empirical evidences that sanction reductions could help deter crimes of collusive nature. Most of them come from experiments (Bigoni et al., 2015; Engel et al., 2016; Abbink and Wu, 2017). However, in the antitrust literature the studies from Brenner (2009) and Miller (2009) use the number of cartel detections in Europe and the US respectively to test the efficacy of sanction reduction (leniency policies) over criminal activities. The basic idea is to extract a sign from the noisy data of criminal detections. Notably, if the data is consistent with any enhanced detection, the number of detected crimes should increase immediately after the introduction of the policies. Furthermore, if the data is consistent with long term deterrence, there should be a decrease in the number of detected crimes which should be below[4] the previous number of detections. Acconcia et al. (2014) use the approach to analyse if the Italian accomplice-witness program was effective against mafia crimes. While Berlin et al. (2018) tried this approach to test the effect of Chinese anti-corruption policies. The present work uses the same methodology from these articles and finds that there is evidence that the anti-corruption policy put in place could be effective against crimes of corruption.

The work here is divided as follows, in Section 5.2 the most important aspects from corruption and the ways to measure it are discussed. Following, in Section 5.3 the approach from Miller (2009) which is going to be used here is better explained. Next, in Section 5.4 the particular Brazilian institutional background is explained,

[2]As highlighted in Chapter 3, the negotiated solutions analogous to NTRs represent the most significant provision and the primary innovation introduced by the legislation. Furthermore, Chapter 4 demonstrates that NTRs are theoretically effective in combating crimes of corruption, forming the basis for the hypothesis tested in this study. This chapter, however, focuses on evaluating the overall effectiveness of the legislation. The challenge of isolating the impact of NTRs from other provisions is addressed in Section 5.3.1. Nonetheless, the evidence supporting the effectiveness of NTRs is more thoroughly examined in the subsequent chapter.

[3]In short, this Chapter answers the targets the Objective 2 of this thesis.

[4]The hypothesis presented by Miller (2009) suggests that future detections of misconduct will be lower than the levels observed before the policy was implemented. This outcome would indicate more than just a 'return to the mean', implying that agents have not merely learned to circumvent the new policies. If misconduct detections are indeed lower than the pre-policy levels, it can be concluded that the implementation of the new policy effectively reduced misconduct.

so that in Section 5.5 the relevant data is presented and briefly explored. Section 5.6 introduces the empirical strategy so in Section 5.7 the results are presented. Lastly, the conclusion and final remarks are drawn in Section 5.8.

5.2 Brief Contextualization

Perhaps the most challenging aspect of approaching CBC empirically is that it is highly unobservable. Individual preferences or willingness to pay bribes occurs only inside people's minds. Nonetheless, even when agents decide to pay a bribe, there is no good record of the aggregate transactions. In other words there is no good measure about the quantity of bribes in the economy, or even the total value of bribes paid in a certain period. In order to measure the level of crimes of corruption, one must rely on the traces it leaves behind.

The most popular way to measure corruption is by using perception indices (CPIs). A series of empirical studies using CPIs has successfully explored cross-national relations between economic variables and broad corruption (Treisman, 2007; Rose-Ackerman, 2006). It is important to note, however, that CPIs do not exclusively refer to the specific concept of CBC addressed in this work—public, collusive, non-systemic corruption or bribery. Instead, they encompass a broader range of undesirable behaviors, such as embezzlement, nepotism, and regulatory capture (Transparency International, 2019b). Nevertheless, CPIs remain a valuable parameter for understanding the type of corruption crimes that is the focus of this study.

It is also important to point out that CPI measures how people perceive corruption, not the actual level of it. This perception often increases during a major anti-corruption effort. As corruption crimes are uncovered on a large scale, media coverage intensifies, making the public more aware of these cases. This increased awareness can lead to a higher perception of widespread corruption[5], even if the actual level of corruption has not changed[6]. Although the CPI may be a good measure for comparing corruption related offences across countries, it is not an effective measure for tracking them in the same location over time.

The Figure 5.1 shows the evolution of the Transparency International Corruption Perception Index[7] for Brazil.

[5]There are methodological attempts to minimize this kind of bias. However, it is still the case that the indices are fundamentally measuring perceptions (Transparency International, 2019b).

[6]Or even decreased.

[7]100 = Completely clean; 0 = Completely Corrupt.

Figure 5.1: Transparency International Corruption Perception Index for Brazil

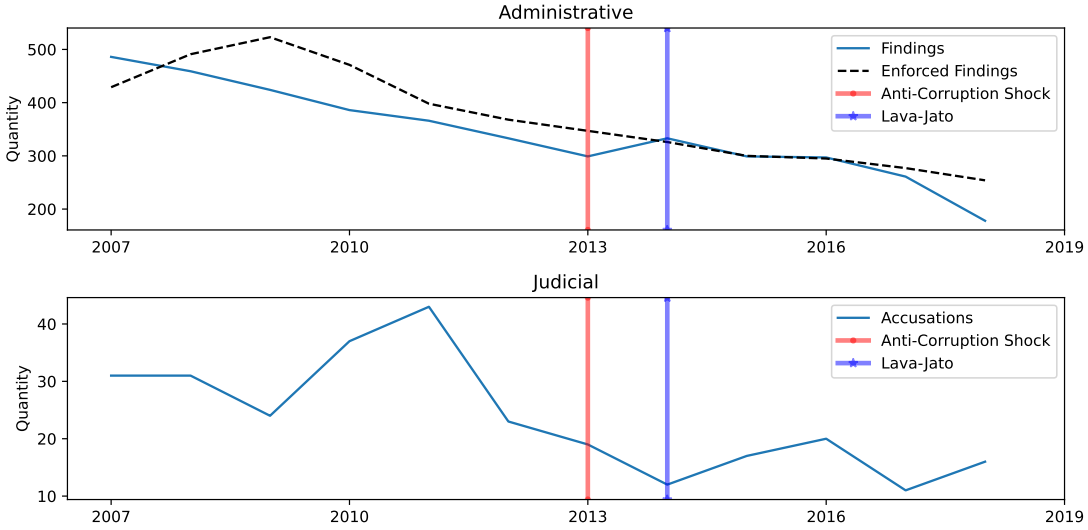
The Figure 5.1 shows that the perception about corruption in Brazil increased since the anti-corruption shock. One could infer that crimes of corruption are growing after 2013. This statement argues against the hypothesis of effectiveness of the Brazilian anti-corruption laws.

In another strand of literature, authors look for objective observable evidence of changes in corruption. To cite a few, Golden and Picci (2005) derived their index of corruption from differences between the expected stock of infrastructure and the observed ones, Di Tella and Schargrodsky (2003) from differences in prices of homogeneous goods in public contracts and Ferraz and Finan (2011) and Olken (2007) looked at the number of irregularities on audited public contracts.

The Figure 5.2 shows the recent series of parameters used by Ferraz and Finan (2011)[8]. They show that, at least since 2011, their corruption indicator is declining in Brazil. This evidence contradicts the ones shown in Figure 5.1. It can be concluded from this example that measures of corruption can be misleading without a proper context.

[8]The data was obtained from the Annual Activities Report from the the Brazilian external audit agency (TCU), available at: `https://portal.tcu.gov.br/transparencia/relatorios/relatorios-de-atividades/relatorios-de-atividades.html`

Figure 5.2: Irregularity findings by the Brazilian External Audit Agency (TCU)



This work attempts to assess corruption from observable detection of the corruption crimes. Moreover, the methodology proposed here derives from the antitrust literature, which tries to measure the unobservable cartel formation in the economy using crime detection (Miller, 2009; Brenner, 2009).

5.3 Methodology

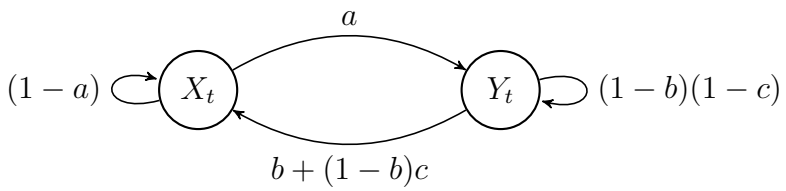
In the natural sciences, researchers often infer unobservable phenomena by matching predicted signs to noisy data. Similarly, CBC is not directly observable, but certain outcomes of CBC, like the number of corruption inquiries and convictions, can be observed. Therefore, a theory on the mechanics of CBC is necessary to predict these signs or to understand how observable variables should behave in response to changes in the unobservable data.

Miller (2009) proposed one way to test empirically if an antitrust policy can deter cartel formation. While this study primarily focuses on CBC, Spagnolo (2005) has noted that Miller's methodology is applicable across various crime types, including corruption crimes. This methodology has also been successfully employed to assess policy effectiveness in a range of different crimes (Brenner, 2009; Acconcia et al., 2014; Amir et al., 2018; Berlin et al., 2018), suggesting its broad applicability despite differing crime structures.

Miller (2009) innovates by constructing a semi-structural model of cartel formation showing the mechanism of transition from collusion to non-collusion. The model consists of a two-state first order Markov process. Either they collude X_t

or they do not collude Y_t. A firm can transit from not colluding to collude (start colluding) with a probability a, and can be detected with probability b or simply desist from collusion with probability c. Figure 5.3 shows the Markov transition diagram from Miller's model[9].

Figure 5.3: Markov Transition Diagram of Miller (2009)



The diagram illustrates the mechanism by which firms shift from colluding to not colluding, effectively showing how the observable detection of the crime may change over time. However, the model does not address the incentive mechanisms behind collusion[10]. Thus, while the model is useful for guiding the empirical strategy, it is less effective in explaining the impact of proposed enforcement changes.

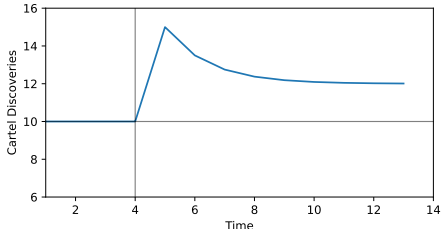
In his empirical approach, the criminal level is measured by observing the number of cartels detected by an Antitrust Authority (AA) before and after a policy shock. If a certain anti-crime enforcement is successful, it is expected that crime detection rises (spike) in the first moment due to enhanced detection efficiency. Later, after a while it drops to levels lower than before the enforcement shock (deterrence effect). More specifically, for the hypothesis from Miller (2009) to be true, it is necessary to observe a significant decrease in future misconduct detections compared to the rates before the implementation of a new policy. Such a decrease would extend beyond a mere 'return to the mean', suggesting that agents are not just finding ways around the new regulations. Instead, if misconduct detections fall below the levels seen prior to the policy's introduction, it would provide strong evidence that the new policy has been effective in actively reducing instances of misconduct, rather than merely altering how they are reported or detected. Figure 5.4[11], exemplifies the expected path of the variable.

[9]In the second Part of my thesis, I model the decision to bribe. From the preliminary results, one can expect a similar mechanism of corruption crime detection.

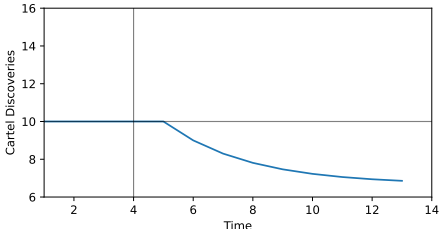
[10]There is extensive literature on this topic; see (Harrington, 2008; Spagnolo, 2005; Aubert et al., 2006; Motta and Polo, 2003). Much of this literature inspired the theoretical model in Part II of my thesis

[11]The path of the detected cartels on time on Figure 5.4 is given using arbitrary probabilities of collusion, detection and desistance.

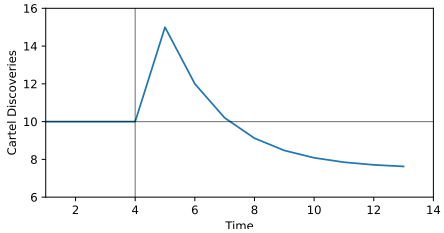
Figure 5.4: The Expected Number of Cartel Discoveries by Period (Extracted from Miller (2009))



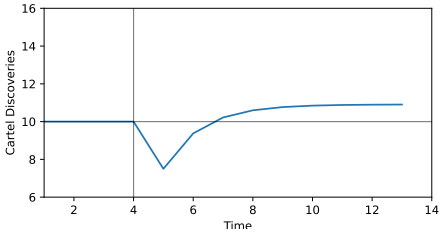
(a) Enhanced Detection



(b) Enhanced Deterrence



(c) Enhanced Detection Deterrence



(d) Weaker Detection and Deterrence

Once again, this study does not focus on cartel activities, yet the methodology used is effective for analyzing various types of misconduct. Following Miller's model, several studies have applied the same approach to different criminal contexts. Brenner (2009) utilized this methodology to examine cartel activities in the European Union. Similarly, Acconcia et al. (2014) investigated mafia-related crimes in Italy, while Berlin et al. (2018) focused on corruption offencens in China. All these studies adopted Miller's semi-structural method to deduce the impact of specific policies. They looked for increases in detections as indicators of improved prosecutorial efficiency. As previously discussed, a subsequent decrease to levels lower than pre-policy intervention would suggest a deterrent effect of the new policy. The details of each study are elaborated below.

Brenner (2009) examines the 1996 European Union Leniency Program. The study observed a notable increase in cartel detections after four years, indicating enhanced prosecutorial efficiency, but not sufficiently to confirm effectiveness as defined by Miller (2009)[12]. Moreover, Brenner did not find evidence of a reduction in cartel detections below pre-policy levels, which would have indicated increased deterrence. Thus, the study could not conclusively demonstrate the policy's effectiveness. The author speculates that the distinction of antitrust being a criminal

[12]The study also noted that the duration of investigations decreased by about 1.5 years, implying that more information was disclosed and investigation and prosecution costs were reduced

offense in the U.S. and a civil matter in Europe might have contributed to the policy's limited impact when compared to the findings of Miller (2009).

Acconcia et al. (2014) followed a similar approach to analyse mafia related crimes. Likewise, they use the number of crimes to analyse the effect of the introduction of an accomplice-witness program on mafia related crimes in Italy. Notably, their findings point to a positive effect on prosecution and deterrence of mafia crimes. They conclude that prosecution increased because of spikes in criminal detection. While deterrence increases because of the following downward trend on crimes. Lastly, they found that the number of whistleblowers is negatively correlated with judicial acquittances, suggesting an increase in judicial efficiency.

Berlin et al. (2018) applied Miller's method to assess the effectiveness of asymmetric punishments for corruption offences introduced by China's criminal law reform of 1997. Notably, this is precisely the same effect that this paper wants to address. However, the authors found a significant drop in crimes of corruption after the policy change. They concluded that the criminal law reform failed to improve detection and deterrence because it did not generate the necessary asymmetry.

Some other empirical studies might use similar approaches, not necessarily the same as Miller (2009). For instance, Amir et al. (2018) argue that leniency and whistle blowing schemes would have a similar effect on crimes of tax evasion. Notably, they use tax revenue as the relevant variable to analyse effects of policy introduction. In this sense, one should expect that tax revenue would increase if the policy is effective. However, different from other crimes, if tax evasion is deterred, tax revenue should remain high after the introduction. Note that, if the relevant variable is the detection of crimes of tax evasion, one should expect to observe Miller's dynamics to predict policy effectiveness.

Building on the approach of Miller (2009) and subsequent studies, this methodology is applied to the Brazilian case[13]. This analysis might establish a link between the effectiveness of NTRs and the broader impact of the 2013 anti-corruption legislation, as NTR frameworks were identified in Chapter 3 as the most significant innovation of this reform. Chapter 4 further demonstrated that such measures can be effective in deterring corruption crimes. Since CBC heavily relies on mutual trust among involved parties, the introduction of these policies likely increases the immediate risk of detection due to heightened fear of betrayal. Additionally, the measures raise the cost and difficulty of engaging in new corrupt activities, thereby discouraging corruption or bribery agreements post-implementation and enhancing criminal deterrence. However, the specific connection between NTRs and the effectiveness of the 2013 legislation is more thoroughly addressed in the next chapter[14]. This chapter focuses primarily on evaluating the overall effective-

[13]Relevant variables are discussed in Section 5.5

[14]Read Section 6.4.2.

ness of the 2013 anti-corruption reforms. This issue and other caveats are more explored in the next section.

5.3.1 Caveats

The methodology presented has limitations. Originally designed for anti-trust leniency policies, it requires adaptation to the specifics of corruption crimes. It also relies on Miller's semi-structural model, leading to an expected dynamic that depends on various parameters. The model's simplicity is another limitation, as it only considers two states (colluding or not) and three actions (collude, be detected, desist). This section explores the application of Miller's model to the Brazilian CBC case and other practical limitations.

First, crimes of corruption are usually detected after the crime is committed, while antitrust offences or cartels are usually detected while firms are colluding[15]. In Miller's model, the agents can only be in two states. Either they are colluding or not exclusively. In this sense, the model is memoryless, or else, if agents give up colluding, they cannot be detected while they are not in collusion.

A notable limitation is that cartels typically operate within a single industry, with corporations seldom participating in multiple cartels. In contrast, corruption crimes generally involves individuals[16]. This leads to corruption crimes potentially spreading through networks, where different individuals might engage in multiple bribery transactions. Similar to mafia crimes, apprehending a key figure in a corruption network can jeopardize the entire scheme (Acconcia et al., 2014), potentially resulting in greater deterrent effects for corruption cases compared to antitrust offenses. This aspect could be analyzed by controlling for the number of defendants involved in inquiries. Unfortunately, such data is unavailable in this study. Therefore, it is assumed that the number of individuals per inquiry remains constant or is evenly distributed over time. However, if this type of data were accessible, it could enable more nuanced analyses, such as assessing the concentration of the bribery market.

Another source of imprecision is the variation in the value of corruption cases. Some involve multi-million dollar sums, while others are much smaller. Unfortunately, as with the lack of information about the number of defendants involved, there is also limited data on the value of these cases. This makes it difficult to compare different corruption cases effectively.

[15]Sometimes CBC is more similar to anti-trust offences. When the bribe is a continuous process, such as receiving preference in a routine service. Then it is similar to antitrust offences. In the Brazilian case, at least in the most known CBC cases, bribes were paid in exchange of benefits in a specific event.

[16]Here, not only does the judicial regime differ, but the agents' incentives vary too. Individuals usually aim to maximize personal utility, while corporations focus on profit maximization.

A notable source of change in dynamics comes from the policy parameters. As many works in industrial organization shows, the size of the leniency is important to determine if a leniency policy is effective. Motta and Polo (2003); Spagnolo (2005); Harrington (2008) point toward the effectiveness of the full leniency[17] in contrast to giving moderate leniencies[18]. The authors also found that the paying order is relevant. Or else, if only the first to report receives the leniency, this causes parties to break their trust. Lastly, if fines accumulate as Motchenkova (2004) suggests, agents are more likely to be deterred fearing that another party would report in the future. Not to mention that certain characteristics of sanction reduction policies for corruption[19] cannot apply to leniency for antitrust offences. Notably, those differences are not possible to address on Miller's model. It can only check for policy effectiveness. Nonetheless, Chapters 4 theoretically explore the expected differences of each distinct sanction reduction policies.

A significant caveat of this study is the role of multiple features introduced by the 2013 anti-corruption reform. For instance, the taskforces (cooperation between law enforcement bodies), introduced as part of the 2013 anti-corruption legislative framework[20], in shaping enforcement outcomes. All major operations during this period, including Car Wash, Zelotes, and Acrônimo, utilized taskforce structures, highlighting their pervasive influence on Brazil's anti-corruption enforcement landscape. However, disentangling the specific impact of taskforces from the broader success of the 2013 legislative reforms remains a methodological challenge. Taskforces were an integral mechanism within the enforcement strategy enabled by the reforms, and their contributions are inseparable from the systemic success attributed to these policy changes. Notably, the theoretical model in Chapter 4 does not isolate taskforces as a distinct variable, focusing instead on the efficacy of negotiated solutions akin to NTRs in deterring corruption crimes. Therefore, while taskforces were employed across operations and undeniably significant, their effects are viewed as part of the institutional and systemic achievements tied to the 2013 reforms.

In fact, it is not possible to disentangle any other provision or feature of the anti-corruption legislation from having a correlation with the dependent variable. Thus, the results reflect the impact of the legislative reforms as a whole on corruption

[17]Full leniency meaning that the self-reporter would bare no sanctions, and the opposite party would pay full sanctions.

[18]Moderate leniencies meaning that self-reporters pay some sanction, but not the full sanction, while the reported party pays the full sanction.

[19]Harassment bribes are different from collusive bribes. The first type happens when a public official asks for a bribe to provide a good or service which the other party is entitled to. In this case, one party gains and the other loses from the bribery. CBC happen when both parties benefit from the agreement. In this sense, more similar to antitrust offences.

[20]Law No 12.850, Art 3rd, VIII.

crimes, rather than isolating the specific effects of NTRs on them.

The relationship between NTRs and crimes of corruption is derived from the findings in Chapter 4, which provide theoretical evidence that NTRs, such as those implemented in Brazil, are effective against crimes of corruption. As discussed in Chapter 3, the primary innovations of the anti-corruption legislation are the leniency agreements and awarded collaborations. These features are likely the main drivers of the observed impacts on crimes of corruption. Other provisions, while facilitated by the reforms, were already in existence and being used to combat corruption crimes prior to 2013. This suggests that the systemic effects observed are predominantly tied to the introduction and widespread use of NTRs and related mechanisms, though the broader legislative framework provided the necessary support for these successes.

Therefore, the results might be interpreted with caution. Although they test the efficacy of NTRs against crimes of corruption, the findings from this chapter state only about correlations between the policy reform and crimes of corruption.

Lastly, it is important to acknowledge a key caveat in analyzing the detection of new corruption cases in Brazil: the potential variability in law enforcement capacity over time. The introduction of the 2013 anti-corruption legislation coincided with a surge in media attention and awareness campaigns, all of which likely enhanced institutional focus and operational capacity in the short term. However, these heightened efforts may have been temporary, with enforcement capacity potentially diminishing over time due to resource constraints, political interference, or the natural waning of institutional momentum. Such a displacement effect, where an initial surge in anti-corruption activity gives way to reduced efforts, complicates the attribution of observed trends solely to the legislative changes. While robustness tests, such as those in Section 5.7.2.1, address the monetary support in anti-corruption efforts throughout the period studied, the nuanced impacts of institutional focus and temporary prioritization remain difficult to fully disentangle. This context frames the results, underscoring the need for caution in interpreting the results and situating them within a broader understanding of enforcement dynamics.

In conclusion, the methodology used in this study faces several limitations, which is a common issue when dealing with inherently non-observable phenomena like corruption. However, Miller's method offers a way to isolate observable impacts of corruption crimes, testing whether changes in criminal rates result from increased prosecutorial efficacy or enhanced deterrence. While this study provides insights into CBC behavior under specific conditions, it is crucial to test these findings in further studies with different scopes to establish a more robust consensus on the effectiveness of Brazilian anti-corruption policy.

5.4 Institutional Background

To adapt Miller's methodology to Brazil's corruption scenario, an understanding of the nation's legal framework and criminal procedures is essential. Chapter 3 thoroughly details Brazil's anti-corruption legislation, outlining applicable laws, penalties, and other pertinent details. However, the focus here is on the procedural aspects crucial to explaining why the selected variable — Brazilian police inquiries into corruption crimes — best represents the 'detection of corruption crimes' as required by Miller's methodology. This approach ensures a tailored application of the method to Brazil's unique legal and procedural context.

Inquiries into corruption crimes are the most reliable variable for measuring crime detection by authorities. They represent the formal initiation of investigations, marking the point where a crime has been identified and is deemed significant enough for official action. Unlike arrests or convictions, which occur later in the process, inquiries capture the earliest stage of detection, making them particularly useful for assessing the impact of anti-corruption policies. However, inquiries are not without limitations. A single inquiry can involve multiple individuals or corporations[21], ranging from complex bribery networks to simpler, isolated cases. This variation can create bias when comparing large-scale inquiries to smaller ones.

Despite these challenges, inquiries remain the most comprehensive and timely indicator of detection, provided their limitations are acknowledged and factored into the analysis. From this point onward, whenever the study refers to detections, new cases, or any related dependent variable, it should be understood within the context of this definition and its associated caveats.

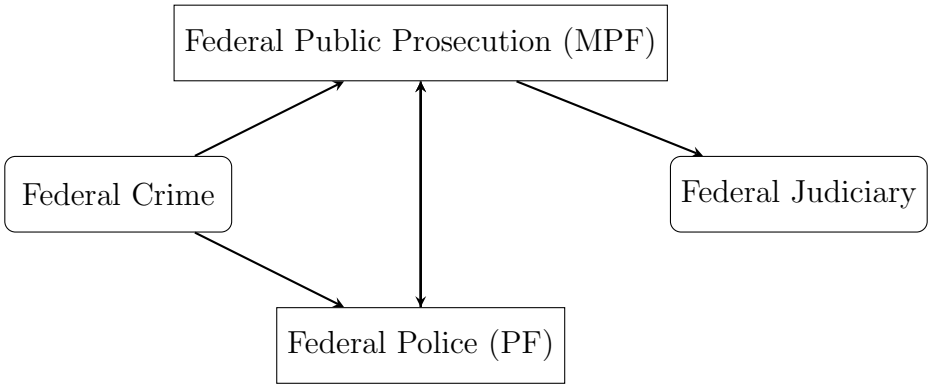
Following Federal Law No. 3.689/41, both the Brazilian General Attorney's Office (Public Prosecution) and the Federal Police alone are competent to investigate crimes of corruption of public interest. However, the standard procedure (*de facto*) is for both institutions to carry out investigations together. Normally, the corruption investigation starts at the Federal Police (Art. 5, I), which concludes it and delivers it to the Public Prosecution to proceed with the accusation (Art. 24). However, the investigation can start at the Prosecution and then be forwarded to the police to conduct parallel investigations conjointly (Art. 5, II). Only in exceptional cases the Prosecution carries out one investigation only by itself[22].

The Diagram in Figure 5.5 shows the flux of process in the Brazilian system.

[21] Although corporation may be cited in inquiries, they are never criminally liable under the Brazilian legislation, as shown in Chapter 3.

[22] It was only in 2015 the Brazilian Supreme Court formalized the understanding that the Brazilian Prosecution could investigate a case alone ((HC) 89837/STF). Before this decision, criminal investigation was a Police monopoly.

Figure 5.5: Brazilian Criminal Investigation Procedures Flowchart



It is reasonable to conclude that the Federal Police is generally the first to detect potential corruption offence in Brazil. Even though the Public Prosecution can sometimes also be the first to detect. However, in the standard investigation cases, the prosecution will only know about an eventual corruption crime after the police finishes its investigations.

5.5 The Data

The data used here was downloaded from the online search engine of the Brazilian Public Prosecution (MPF), where it is possible to find judicial processes and police inquiries[23]. It consists of 885.675 investigations conducted by the Brazilian Federal Police, sorted by date of the beginning of the investigation from January 2009 to January 2020.

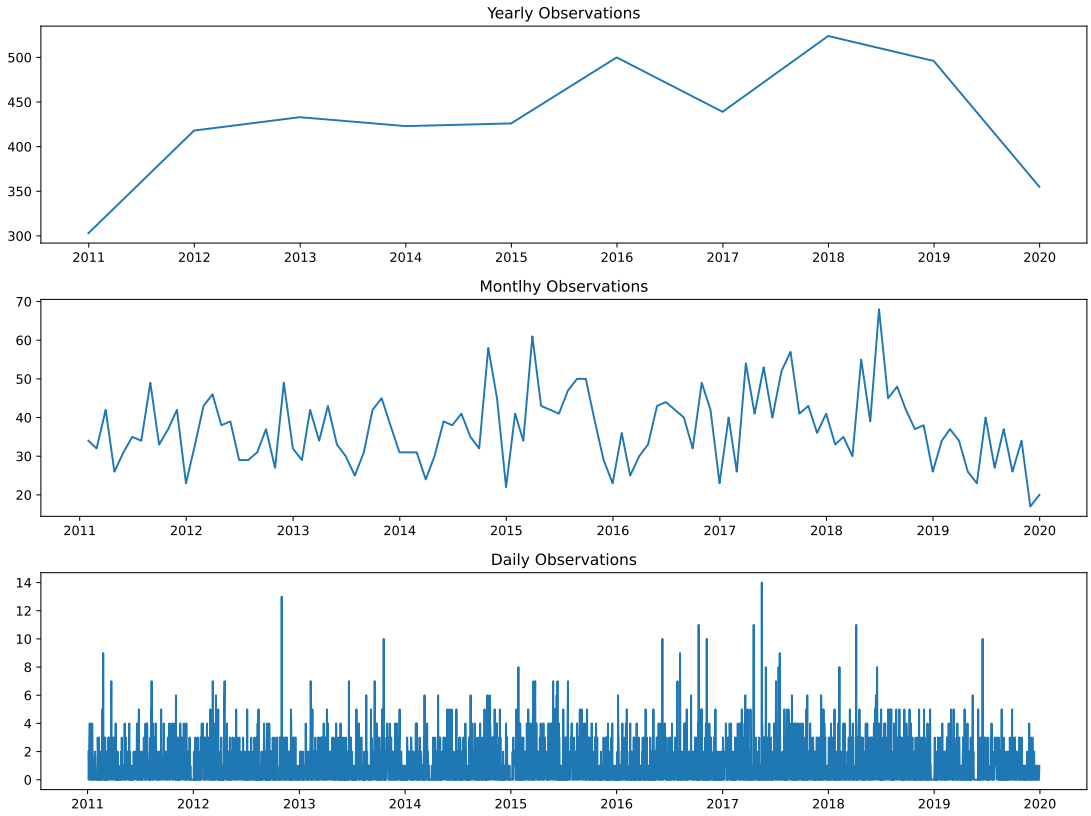
It is possible to find data from before 2009 and after 2020 in the database. However, the periods before 2009 can be biased for minor states which did not use the informational system at the time. Moreover, the period from 2020 onwards was excluded from the list due to the covid-19 health crisis. Because of the exceptional use of emergency procurements and contracts, which lead to a rent-seeking supply shock. This could have altered the number of denounces and investigations on corruption in Brazil during the crisis.

Figure 5.6 shows the number of inquiries regarding crimes of passive and active corruption[24] from 2010 to the end of 2019.

[23]Available at: `http://apps.mpf.mp.br/aptusmpf/portal?servidor=portal` and downloaded between February and March of 2020. The code I created for scraping the data is available at: `https://github.com/caxaxa/MPF_Crime_Scraper`.

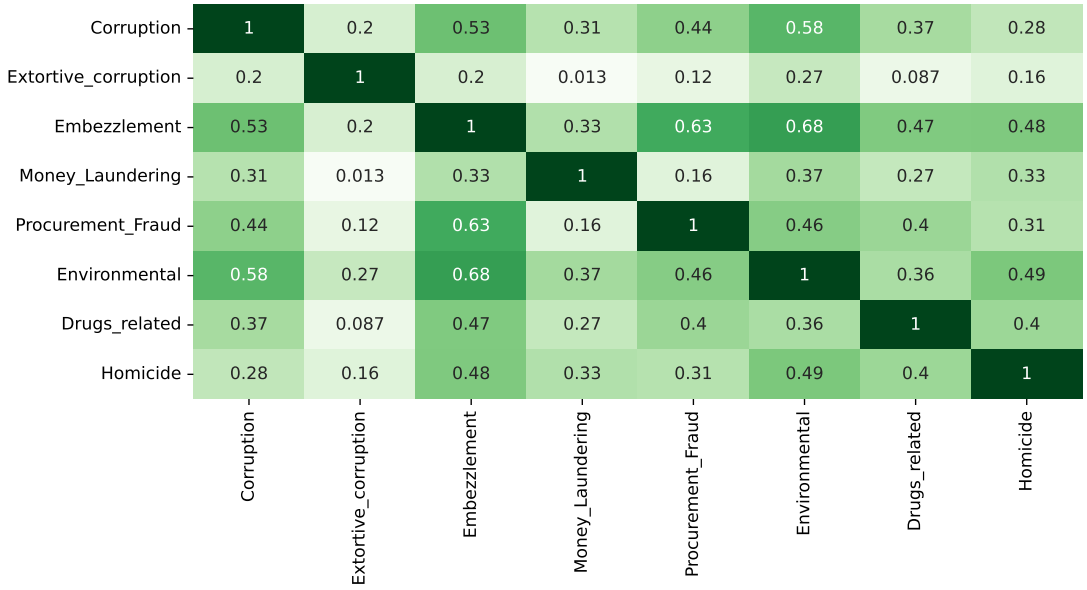
[24]Articles 317 and 333 from the Brazilian Penal Code, Federal Decree-Law No. 2.848/40.

Figure 5.6: Corruption Inquiries by Starting Dates



The database also provides the crime, and the state in which the investigation is conducted. The Tables B.1 and B.2 show some aggregate values from the dataset, also Figure 5.7 shows the correlation between multiple different crimes in Brazil.

Figure 5.7: Crime Correlation Matrix



From Figure 5.7 it is possible to observe some level of correlation between crimes. Primarily, a connection is observed between embezzlement and environmental crimes, likely due to the presence of corruption in both instances. For example, a bribery can precede or be entangled with embezzlement, or bribes might be given to ignore environmental violations. Often, these crimes are investigated within the same inquiry. Another explanation is because the law enforcement at large responds to exogenous other variables. Therefore, this paper also controls for a set of external variables. The chosen ones[25] are the quarterly Brazilian real GDP growth[26], the monthly Brazilian unemployment rate[27] and the monthly average of the main national treasury bonds real interest rate (SELIC)[28].

The literature on corruption encompasses a broad spectrum of variables. Yet,

[25]Section 5.7.2.1 expands the list of controls to address GDP and the budget of the law enforcement bodies.

[26]Source Instituto de Pesquisa Economica Aplicada (IPEA), available at: `http://ipeadata.gov.br`.

[27]Before 2012, the source is Fundacao Sistema Estadual de Analise de Dados (SEAD), available at: `https://www.seade.gov.br/`. After 2012 the data is from Instituto Brasileiro de Geografia e Estatistica (IBGE), avalable at: `https://www.ibge.gov.br/estatisticas/sociais/educacao/9127-pesquisa-nacional-por-amostra-de-domicilios.html?=&t=series-historicas`. The data was corrected using the global monthly weighted average.

[28]The nominal rate was gathered from the Brazilian Central Bank, available at: `https://www.bcb.gov.br/estatisticas/txjuros`, and deflated by the IPCA inflation index, available at: `http://ipeadata.gov.br`.

the majority of corruption research concentrates on the cross-country impacts of these variables, which are often time-invariant. These include factors such as the concentration of power, the nature of governmental systems, predominant religions, press freedom, political rights, fiscal decentralization, among others. Treisman (2007) provides an extensive survey of the most influential studies in this field, showcasing a diverse range of critical features and their effects in cross-country analyses of corruption.

5.6 Empirical Strategy

The main empirical strategy resembles the works from Miller (2009), Brenner (2009) and Berlin et al. (2018). The first two based on cartel detections, but the last one focused on corruption crimes, precisely the objective in this work. The authors' approaches can be adapted to this case and formalized as follows:

$$Y_t = \beta_0 + \beta_1 D_t + \beta_2 T1_t^n + \beta_3 T2_t^n + \beta_4 X_t + \varepsilon_t \tag{5.1}$$

for,
t= Observation period (month or day); and
n= Order of the polynomial.

Where
Y_t= Number of new corruption inquiries. Or, detected corruption;
D_t= Dummy for the impact of the enforcements, being 0 before August 2013 and 1 after;
$T1$= Time effect of all sample. Being 1 at the first observation 2 at the next and so on;
$T2$= Time effect from the beginning of the policy shock. Being 1 after august 2013, 2 in the next month and so on;
X_t = Vector of control variables (GDP, unemployment rate and interest rates)[29]; and
ε_t= Is the error term from functional predictions, it is expected to be normally distributed and i.i.d.

In order to test different shaped curves that might fit the expected detection curve, the matrices $T1$ and $T2$ assume values of different order polynomials to check for distinct goodness of fit. Consequently, if the regression shows a polynomial with a spike after the policy shock followed by a decrease on the estimated mean, this may be evidence of an effective policy, both in terms of detection and deterrence.

[29]Note that β_0 and β_1 are constants, while β_2, β_3 and β_4 are vectors. Where, β_2, β_3 have dimensions (1 x n), and β_3 has dimension (1 x 3).

The Equation (5.1) is presented in a linear form and regressed using OLS. Nonetheless, it can be regressed using Poisson and Negative Binomial estimation methods. Notably, although the estimated OLS coefficients are not linear on the parameters, they can be linearized through simple transformations.

As discussed on Section 5.3, this research tests two hypotheses:

First hypothesis: There is an immediate spike in detection of crimes of corruption.

$$H_0 : \beta_1 \leq 0, \text{ against } H_1 : \beta_1 > 0$$

Second hypothesis: After the spike, the mean predicted detections ($\hat{Y}$) are lower than the pre-policy period.

$$H_0 : \hat{Y}_{2013} \leq \hat{Y}_{2020}, \text{ against } H_1 : \hat{Y}_{2013} > \hat{Y}_{2020}$$

If both hypotheses can be supported by rejecting H_0 in both cases, then it is possible to conclude that the policy was effective in enhancing prosecution and further deterring new corruption crimes.

The hypothesis tests aim to indicate a corruption detection dynamic, and if successful, they point to the effectiveness of the policy shock[30]. To distinguish a crackdown in corruption cases from a pro-crime effect, a subsequent downtrend is necessary. If a policy inadvertently supports crime, it would consistently result in higher detection rates due to the new crime baseline. Moreover, to differentiate deterrence from a mere return to the mean, the second hypothesis must hold true; otherwise, it could imply that criminals exploited the self-reporting policy for convenience, while criminals with similar profile would continue their activities in new schemes. It could also indicate a learning effect. In this case, agents might internalize reporting risks and overcome the policy's deterrence effect, suggesting the policy may not be effectively reducing corruption levels. Consequently, if the first and second hypothesis hold true, it is evidence that points towards a possible effectiveness of the policy, assuming other variables are constant or controlled. This unique pattern of criminal detection is thoroughly discussed in Miller (2009).

5.7 Results

The results from the OLS regressions indicate that models incorporating either an overall linear or no trend, combined with high-order polynomial in the post-policy intervention, are effective in fitting the data. Notably, the models that employ

[30]Past works like Miller (2009); Brenner (2009); Berlin et al. (2018); Acconcia et al. (2014) points towards the causality of the studied event on the dependent variable. However, here, this study makes a more caution claim, as it considers the multiple effects of omitted variables on the possible dynamics of the dependent variable.

optimally shaped polynomial terms lend robust support to two key hypotheses. Firstly, they corroborate the hypothesis of an immediate increase in the detection of corruption following the implementation of Brazil's anti-corruption policy. Secondly, they support the hypothesis that, towards the end of the observed period, the levels of offense detection are lower than those recorded prior to the policy's introduction. These findings provide evidence that points to a possible successful anti-corruption enforcement policy in Brazil during the analyzed period, suggestiong a reduction in corruption over time.

5.7.1 Main Regression

Crime literature shows that potential criminals are influenced by the environment (Becker, 1968). Notably, since this work uses macro data, it may be affected by other macroeconomic variables. First, the regression is controlled for unemployment. This variable should affect newly detected corruption by the supply side, as rent and opportunities determine the willingness to perform crimes (Becker, 1968; Mauro, 1995). Secondly, GDP is a proxy for the government budget. Therefore, bigger GDP would lead to more public contracts, corruption opportunities and to a better equipped public prosecution. Lastly, as corruption is a rent seeking activity, it should be bigger as real interests fall.

The analysis detailed in Table 5.1 investigates the effect of a policy intervention on the number of offenses using Ordinary Least Squares (OLS) regression[31] with a range of control variables[32] and polynomial terms. This table presents the results from six distinct models, each incorporating a unique combination of polynomial terms[33]. This strategy shows how different order polynomial fit the data of crimes of corruption[34]. The order of each regressed equations is shown on the rows '*Full Series Polynomial*' and '*Post-Policy Polynomial*' in Table 5.1. As an example, the model (1) shows the series regressed without any polynomial time trend, while

[31]The series visually exhibits fluctuations over time, as shown in Figure 5.6, which might intuitively suggest the stationarity of the series. However, in order to be statistically precise about it, an Augmented Dickey-Fuller test over the monthly data rejects the null hypothesis of a unit root, with an ADF statistic of -4.636 and a p-value below 0.01. This indicates that, despite its visual behavior, the series is statistically stationary.

[32]Namely, unemployment, GDP and real interest rates.

[33]Like in Miller (2009) the reader finds only the best fitted models, second order regressions showed very little fit and significant coefficients. The reader can regress all the combination they want by running this work notebook on the Google Colab platform available at: `https://github.com/caxaxa/PhD_Empirics/blob/main/Data_Analysis.ipynb`.

[34]Here the chosen method uses global polynomials, i.e. there is a polynomial function that predicts the entire series. Most of the time these functions tend to be very unstable. Therefore, one possible improvement is to try locally weighted scatter-plot smoothers (LOWESS). This is done in the next subsection.

equation (2) shows a linear trend in all its period and another linear trend starting right after the policy intervention. Following this logic, models (3) has third order polynomials for entire series and another starting after the policy intervention, while models (4), (5) and (6) have lower orders for the entire period and higher order polynomials after the policy intervention.

Each model in the analysis comprises a constant term, a dummy variable for the policy intervention (H1 Dummy), and controls for GDP, Unemployment, and Real Interest rates. The coefficients for these variables are shown alongside their standard errors, which are presented in parentheses across the six different model specifications. The H1 Dummy variable, signifying the policy intervention, exhibits varying levels of significance across the models. In models (2), (4), (5), and (6), the H1 Dummy is statistically significant, suggesting that the policy intervention had a notable immediate impact on the number of offenses, offering support to the First Hypothesis to be true for these models.

The R^2 and Adjusted R^2 values provide insights into how well the models explain the variation in the dependent variable. There is a general increase in these values from Models (1) to (6), indicating an improved model fit as the polynomial terms become more complex. However, this increase in R^2 should be interpreted with caution as more complex models can potentially lead to overfitting. The Residual Standard Error, which measures the average difference between the observed and predicted values, decreases across the models, pointing to better predictive accuracy in the latter models.

The coefficients for GDP and unemployment show varied influences across the models, the signs of the estimated coefficients follow their expected theoretical behavior although often accompanied by wide standard errors and a lack of statistical significance. This suggests a level of uncertainty regarding the effects of these economic variables on the number of offenses. The consistently negative coefficients for real interest rates across all models, though not statistically significant, suggest a potential inverse relationship with the number of offenses—a pattern consistent with what one might expect in a rent-seeking activity like corruption.

The Figure 5.8 shows the data, the mean predicted values and the 95% confidence interval of the estimations. It shows equations (1) through (6), arranged from left to right, top to bottom. It clearly shows the spikes in the estimation and their following downtrend.

Table 5.1: OLS Regression with Controls

	Dependent variable: offences					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	40.633***	22.250***	36.293**	36.805***	37.835**	36.696**
	(6.064)	(8.272)	(16.124)	(12.713)	(15.362)	(15.427)
H1 Dummy	5.109	12.441***	9.849	11.054**	11.296**	11.124**
	(3.814)	(4.496)	(7.391)	(4.872)	(4.967)	(4.933)
GDP	-5.675	82.644	56.860	28.853	19.412	23.930
	(50.864)	(53.697)	(87.345)	(69.798)	(69.356)	(66.539)
Unemployment	-0.473	1.598*	-0.488	-0.044	-0.032	0.092
	(0.688)	(0.827)	(1.861)	(1.682)	(1.840)	(1.851)
Real Interest	-258.180	-289.252	-283.970	-291.438	-302.679	-305.245
	(185.859)	(176.156)	(191.256)	(182.748)	(186.111)	(185.224)
Full Series Polynomial	None	1st Order	3rd Order	None	1st Order	1st Order
Post Policy Polynomial	None	1st Order	3rd Order	3rd Order	4th Order	5th Order
Observations	108	108	108	108	108	108
R^2	0.057	0.194	0.232	0.227	0.233	0.235
Adjusted R^2	0.020	0.146	0.153	0.173	0.171	0.174
Residual Std. Error	9.121	8.514	8.478	8.379	8.387	8.376
F Statistic	1.545	4.052***	2.937***	4.199***	3.767***	3.810***
	(df=4; 103)	(df=6; 101)	(df=10; 97)	(df=7; 100)	(df=8; 99)	(df=8; 99)

Note: *p<0.1; **p<0.05; ***p<0.01.
Models (5) and (6) have polynomials up to second order and a higher order of 4th and 5th respectively.

Figure 5.8: New Corruption Inquiries Multivariate OLS Regression

In our strategy, any correlation with the dynamics of an effective policy shock can only be inferred through the combined support of both the first and second hypotheses, highlighting the interconnected nature of these factors in shaping the observed outcomes. In order to test the second hypothesis, as discussed in Section 5.6, it is necessary to test if the last mean predicted values in the series are statistically lower the the ones immediately before the policy intervention. The Table 5.2, brings the test for such differences along with other important statistics of goodness of fit.

Table 5.2: Testing the Second Hypothesis

Model	**Pre-policy**	**Last Value**	**Diff**	**P-Value**	**AIC**	**BIC**	**Log-like**
Eq (1)	37.39	39.74	2.35	0.479	788.87	802.28	-389.43
Eq (2)	34.60	28.80	-5.79	0.195	775.87	794.64	-380.93
Eq (3)	36.13	23.66	-12.47	0.063*	778.59	808.10	-378.30
Eq (4)	36.32	23.26	-13.06	0.013**	773.33	794.79	-378.67
Eq (5)	35.95	22.04	-13.91	0.013**	774.46	798.60	-378.23
Eq (6)	35.88	21.33	-14.55	0.012**	774.17	798.31	-378.09

The 'Pre-policy Value' and 'Last Value' columns represent the predicted values of the dependent variable immediately before the policy intervention (May 2013) and the last predicted value of the series (December 2019), respectively. The 'Diff' column indicates the extent of change attributed to the policy.

Equation (1) shows a slight increase in the dependent variable post-intervention, but with a p-value of 0.479, this change is not statistically significant. This suggests that the policy intervention had a negligible impact according to this model configuration. While (2) reveals a decrease in the dependent variable, yet the change is again not statistically significant (p-value = 0.195). This model implies that the policy might have a diminishing effect, but the evidence is not strong enough to conclusively support this claim. However, (3) presents a more substantial decrease with a p-value closer to the traditional threshold of significance (0.063). This suggests that the model detects a potential impact of the policy, albeit not strong enough to be considered statistically significant. Lastly, (4), (5), and (6), which have significantly supported the first hypothesis true, show significant changes post-intervention, with p-values (0.013, 0.013, and 0.012, respectively) below the 0.05 threshold. These models suggest a strong and significant decrease from 13 to 14 less corruption inquiries per month following the policy implementation, indicating that the second hypothesis might also be true in these models. These models jointly, offer evidence of a possible effective policy intervention against corruption in Brazil.

The 'AIC' Akaike Information Criterion (Akaike, 1974), 'BIC' Bayesian Information Criterion (Schwarz, 1978), and 'Log-Likelihood' values provide insights into each model's fit. Lower AIC and BIC values suggest a better model fit considering the number of parameters. Model (4), with the lowest AIC and BIC, can be considered the best-fitting model among those analyzed. The log-likelihood values, highest in (5) and (6), also support their effectiveness in capturing the data's patterns. This shows that the models that provide the best evidence of the effectiveness of the Brazilian policy are also the best fitted for the data.

5.7.2 Robustness Tests

To ensure the validity of the findings, this section presents a series of robustness checks employing various models and methods. The analysis begins by examining the role of law enforcement capacity through the budgets of police and prosecution agencies, providing a critical control for enforcement-related factors. A Locally Estimated Scatterplot Smoothing (LOWESS) analysis confirms the findings, illustrating a distinct pattern of an initial increase followed by a significant decline in corruption detections post-policy implementation. This aligns with the hypothesized impact of the anti-corruption policy. Incorporating lagged variables into regression models further consolidates these results, improving statistical sig-

nificance and confirming both the immediate rise and subsequent decrease in corruption offenses. While count data models such as Poisson and Negative Binomial regressions effectively fit control variables and support the observed initial increase in offenses, they were less conclusive in capturing the expected reduction towards the end of the series. Together, these complementary approaches underscore the robustness of the findings and the success of the anti-corruption policy implemented in Brazil in 2013.

5.7.2.1 The Role of Law Enforcement Capacity

One potential caveat to the analysis of new corruption case detection in Brazil is the possibility of changes in the operational capacity of law enforcement agencies over time. For instance, the enforcement capacity may have declined following the introduction of the anti-corruption policy, either due to resource constraints, political interference, or diminishing institutional focus. Alternatively, the introduction of the policy could have triggered a displacement effect, wherein the sudden prioritization of anti-corruption efforts temporarily increased law enforcement capacity, only for it to decline as the initial momentum dissipated.

To address these concerns, it is critical to include appropriate control variables that measure the capacity of law enforcement bodies. A practical proxy for enforcement capacity is the annual global budget allocated to these institutions. Specifically, the Ministério Público da União (MPU) budget provides a comprehensive measure of prosecutorial capacity, encompassing both federal and regional prosecution offices. While the Federal Public Prosecutor's Office (MPF) focuses solely on federal cases, the MPU offers a broader perspective on institutional capacity. Similarly, the Federal Police (PF) budget serves as a useful measure for law enforcement capacity at the federal level. Ideally, a complete analysis would also consider the budgets of state-level police forces, which is unfortunately not available; however, the PF budget alone offers a meaningful point of comparison.

Figure 5.9: Evolution of the MPU, MPF. PF and Brazilian GDP in (R$)

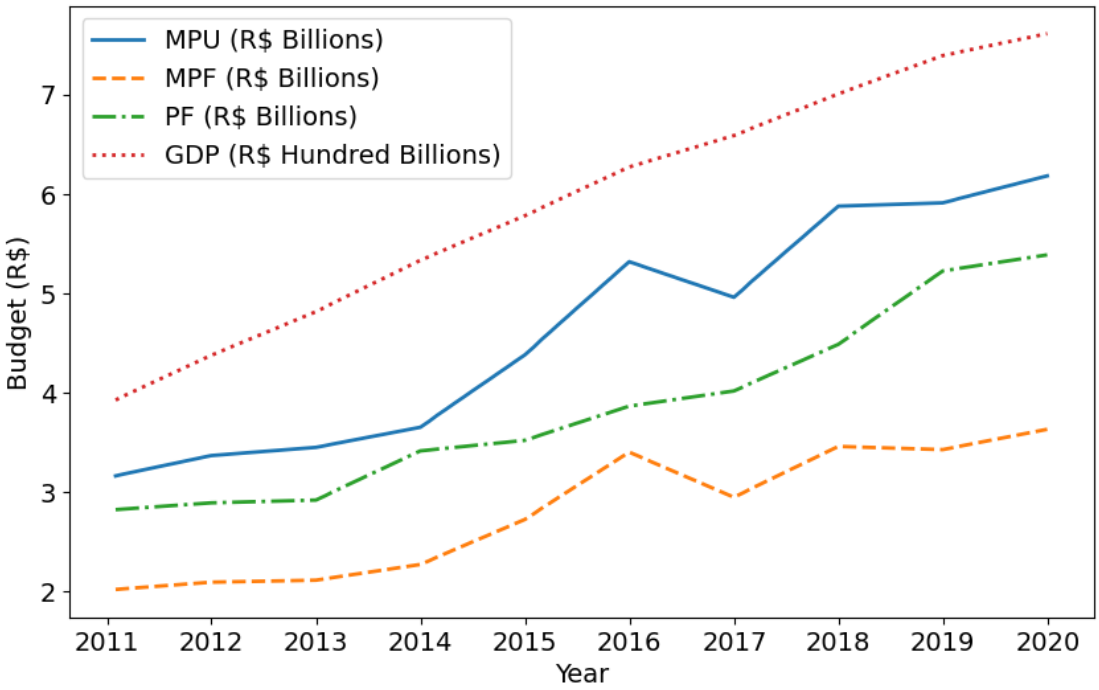


Figure 5.9 illustrates the annual budgets of the MPU, MPF, and PF alongside GDP, showing a steady upward trend throughout the study period. Unlike the detection of new corruption cases, these budgets exhibit consistent growth over time with minor fluctuations. This trend challenges the hypothesis of a decline in enforcement capacity or a displacement effect on the monetary side linked to the policy's introduction. Instead, it suggests that these budgets were influenced more by the government's overall fiscal capacity than by specific anti-corruption policies. The Table 5.3 shows the correlation matrix between GDP and the budget of the law enforcement bodies.

Table 5.3: Correlation matrix of MPU, MPF, PF, and GDP.

Index	**MPU**	**MPF**	**PF**	**GDP**
MPU	1.0	0.991	0.949	0.972
MPF	0.991	1.0	0.914	0.950
PF	0.949	0.914	1.0	0.957
GDP	0.972	0.950	0.957	1.0

The correlation matrix in Table 5.3 reveals a strong positive correlation between the budgets of the MPU, MPF, PF, and GDP. This finding underscores

that law enforcement budgets were primarily driven by the government's general expenditure capacity rather than by the implementation of the anti-corruption policy. Consequently, it can be inferred that changes in enforcement capacity were not directly related to the policy's introduction but were instead part of broader fiscal trends.

Including law enforcement budgets as control variables could address concerns about enforcement capacity. However, their strong correlation with GDP introduces a significant risk of multicollinearity, which inflates standard errors and undermines the reliability of coefficient estimates. To avoid these issues, the primary regression prioritized using GDP as an explanatory variable instead of the budgets. GDP not only shapes the budgets of law enforcement agencies but also reflects the broader economic context, influencing both law enforcement efficiency and the demand for corruption-related crimes.

In any case, to test the robustness of the models the Table B.3 presents the regression results incorporating these budgets as additional control variables in levels. Interestingly, including these variables does not alter the primary findings. However, the constant term reflecting a positive number of new corruption crimes loses significance in most regressions. The policy dummy variable remains statistically significant and positive, and the estimated number of new corruption cases during the post-policy period is still significantly lower than in the pre-policy period, as shown in Table B.4. These findings reinforce the robustness of the main analysis, confirming that the observed effects are not attributable to variations in enforcement capacity over time.

Lastly, additional combinations of the best-performing model (with linear trends for the post-policy and full periods) are explored. These models incorporate the budgets for the MPU, MPF, and PF both in levels and first differences. As shown in Tables B.5 and B.6, the results consistently support the conclusions of the main regression. The dynamic of new cases following the 2013 policy intervention aligns with the expected trajectory described in Miller's model, further validating the main findings.

5.7.2.2 Avoiding Overfitting and the LOWESS Regression

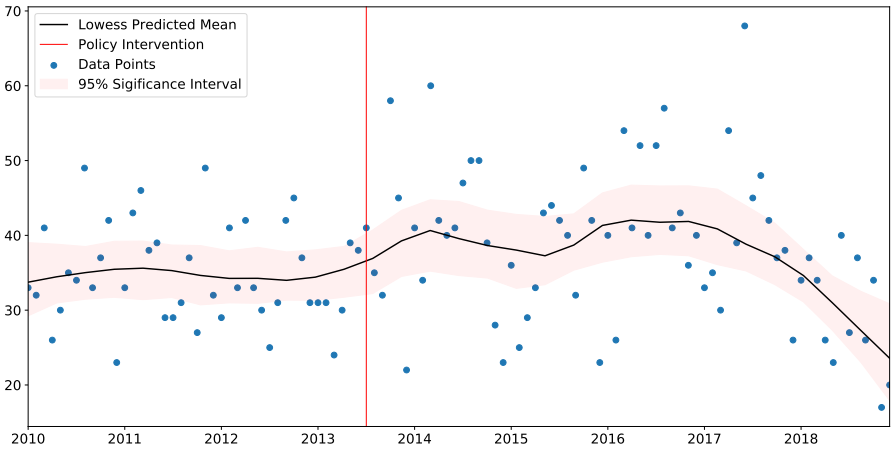
In statistical modeling, particularly in Ordinary Least Squares (OLS) polynomial regressions, there is a notable risk of overfitting, especially when employing high-degree polynomials. Overfitting occurs when a model becomes excessively complex, capturing the noise in the data rather than the underlying trend. This complexity often results in a model that performs well on the fitted data, but porely on unseen data.

High-degree polynomial regressions, despite their flexibility in fitting a wide range of curves, can lead to overfitting by adapting too closely to the specific

fluctuations in the training dataset. This situation results in a model that is less generalizable and potentially misleading in its predictions. The model may appear to have a good fit due to a high R-squared value, but this can be deceptive as it may simply be capturing the idiosyncrasies of the dataset rather than the true underlying relationships.

To mitigate the risk of overfitting, it is often advisable to use simpler models or to employ techniques that strike a balance between fitting the data well and maintaining model simplicity. One such technique is Locally Estimated Scatterplot Smoothing (LOWESS) (Cleveland, 1979). LOWESS, a non-parametric method, creates a smooth line through a scatterplot by fitting simple models in a localized manner. This approach allows for capturing the trend in the data without overly complex models, thereby reducing the risk of overfitting. LOWESS is particularly useful for exploratory data analysis, providing a flexible yet robust way to understand the underlying patterns in the data. The Figure 5.10 shows the predicted LOWESS[35] curve over the data of the Brazilian corruption inquiries.

Figure 5.10: New Corruption Inquiries LOWESS



Note that, the mean predicted value at the end of the whole period is statistically significantly lower than the pre-policy period. The immediate pre-policy period has a mean predicted value of 35.46 inquiries per month, with a lower bound[36] of 32.06 new inquiries per month. At the end of the period, the mean

[35]Estimate using a fraction of 0.2. Available at `https://github.com/caxaxa/PhD_Empirics/blob/main/Data_Analysis.ipynb`

[36]With 95% confidence level.

drops to 23.57 and the upper bound is 31.61. It represents an average drop of 33.53% on new corruption inquiries some time before the implementation of the anti-corruption policy. Therefore, it rules out H_0 from the second hypothesis. Consequently, it is evidence of enhanced deterrence after the policy shock.

Conversely, there are no statistically significant peaks, although the mean predicted values increase before decreasing. Or else, none of the higher points is statistically different from the points on the pre-policy period[37].

5.7.2.3 Regression with Lagged Variables

As discussed in Section 5.3.1, corruption are usually detected after the crime is committed. Therefore, crimes detected in the present periods happened in the past. Consequently, agents who committed the crime were acting under the past environment. To address this issue, as another possible robustness test, the same equations are regressed for one year lagged control variables. As Table B.7 shows and Table B.9, there is little difference between the results. The coefficients for constant, dummy and real interest rates are still similarly significant. Showing that the control variables have a more permanent effect over crimes of corruption.

5.7.2.4 Main Regression Without Controls

Running the main equation of a study without control variables is a critical robustness test, primarily to assess the impact of omitted variable bias. This approach highlights how the inclusion of control variables influences the primary relationship under study. If removing these controls significantly alters the results, it may indicate that the original findings are sensitive to the specific set of included controls, thereby raising concerns about the robustness and generalizability of the conclusions. Therefore, the main series is regressed without the selected control variables, results (Table B.10 and Table B.11) that results are very robust to the exclusion of the control variables. Showing that the sign is persistent, however, the addition of the control variables enhance the significance of the estimated coefficient, showing that it is important to denoise the data for more precise conclusion.

5.7.2.5 Countable Dependent Variable Regressions (Poisson and Negative Binomial)

Lastly, to approach the original work of Miller (2009), a Poisson model is tested[38]. In this estimation, the higher order polynomials perfectly fit the data, so the inverted matrices are almost singular, so the order of the polynomials is slightly

[37]The results using daily data are similar, as Figure B.2

[38]Similar results can be found for Negative Binomial (Table B.12) estimations.

changed. Here the Equation (1) is characterized by linearity in all its parameters. In contrast, Equation (2) incorporates a first-order polynomial trend throughout the entire series, whereas Equation (3) applies a linear trend exclusively to the post-intervention period. Equation (4) features a linear trend across the whole series, coupled with an additional linear segment in the post-intervention period. Meanwhile, Equation (5) adopts a quadratic trend in the post-intervention phase. Finally, Equation (6) exhibits a quadratic trend both throughout the entire series and specifically in the post-intervention period. These varying polynomial configurations are designed to capture the different potential non-linear behaviors of the time series, each slightly differing from the others to progressively approximate the curvature of the non-linear series. The Table B.8 shows the regressions (1) to (6), containing the coefficients for the intercept and the policy dummy for different order polynomials.

The results show that there is a consistent upward shift after the policy shock. This is given by the consistently positive and significant value of the Dummy variable in all estimations. Therefore, it is possible to successfully reject H_0 from the first hypothesis. Consequently, it means that the predicted detections of corruption increase immediately after the policy shock. If the second hypothesis is also true, then this is consistent with an increase in prosecution efficiency. It also shows that the Control Variables have a much better fit than the OLS used in the main strategy.

Models (3), (4), (5) and (6) show a lower predicted value at the end of the period. However, they are not statistically significant. Nonetheless, on equation (3) the downward slope[39] is significant at 99% significance level. Showing a clear sign of a upward spike and further downward trend. This is consistent with Miller's hypothesis of increased crime detection and deterrence. Similarly, on the quadratic equation (5), the quadratic coefficient[40] is also significant at 99% significance level and negative. Meaning that the function is concave downwards on period $T2$. Therefore, the curve of corruption detections has a maximum point after the policy shock and then it decreases. Although, they all failed to rule out the second hypothesis. Nonetheless, the best fitting models from OLS estimation were not possible to regress using Poisson estimations.

5.8 Final Remarks

Brazil's 2013 anti-corruption policy was designed to encourage self-reporting and cooperation among offenders as a means to combat corruption. This study adapts the methodology from Miller (2009) to evaluate the policy's effectiveness by test-

[39] Poisson coefficient = -0,003

[40] Poisson coefficient = -0.000236

ing two key hypotheses. First, that there was a sharp increase in the detection of corruption cases immediately following the policy's implementation. Second, that this was followed by a decline in detection rates to levels lower than those observed before the policy. This pattern would suggest that the policy had a deterrent effect, rather than a pro-crime impact. If the policy had unintentionally encouraged corruption, detection rates would likely remain high due to a new baseline of criminal activity. Moreover, to rule out the possibility of a temporary spike followed by a return to the norm, the drop in detection must go below pre-policy levels. Otherwise, it could indicate that offenders exploited the self-reporting mechanism or adapted their behavior to avoid enforcement, while others continued engaging in corruption through new schemes. When these two patterns—a post-policy spike followed by a sustained decline—occur together, they may be interpreted as evidence that the anti-corruption policy was effective.

The detailed analysis utilizing Ordinary Least Squares (OLS) regression models provides evidence supporting both hypotheses concerning the impact of the Brazilian anti-corruption policy. In particular, models (4), (5), and (6) from Table 5.1 not only validate the initial hypothesis of an immediate increase in corruption detections following the policy implementation but also convincingly affirm the second hypothesis of a sustained and significant decrease in offenses towards the end of the observation period as shown in Table 5.2.

These models, characterized by the most robust fit as indicated by the lowest AIC and BIC values, reveal a pronounced decline in the number of new corruption inquiries. The findings indicate a decrease ranging from 13 to 15 inquiries per month when comparing the figures immediately before and after the policy intervention. This notable reduction in corruption offenses is both statistically significant and of substantial practical importance. It could suggest that the policy intervention had a marked impact, not just eliciting an immediate response, but more crucially, in effecting a sustained reduction in corruption activities over time.

In this comprehensive analysis, robustness checks employing various methodologies robustly substantiate the effectiveness of Brazil's 2013 anti-corruption policy. It starts by adding the Law Enforcement Bodies' budget as a control for the enforcement capacity, showing that results are robust to that control. Then, the use of Locally Estimated Scatterplot Smoothing (LOWESS) clearly illustrated an initial surge and a notable subsequent decrease in corruption detections, aligning with the policy's expected impact. This trend was further supported by models incorporating lagged variables, which reinforced the findings of an immediate rise and a sustained decline in corruption cases. Despite the Poisson and Negative Binomial regressions' adeptness at fitting control variables and confirming the initial increase in offenses, they provided less consistent support for the hypothesized

reduction in offenses towards the end of the period. Additionally, the significant decrease observed in new corruption inquiries, highlighted in LOWESS and lagged variable analyses, underscores the policy's long-term effectiveness. The robustness of these findings is evident even when control variables are removed, emphasizing the solidity of the conclusions. In essence, these varied approaches collectively support the rejection of H_0 for both tested hypotheses, providing evidence that may indicate the effectiveness of the policy.

In summary, considering the observed dynamics and after addressing key caveats and limitations, the evidence presented in this study suggests a correlation between the introduction of Brazil's anti-corruption legislation in August 2013 and improvements in the prosecution and deterrence of corruption. The results support both hypotheses tested, revealing a pattern that aligns with the expected effects of an effective policy intervention. Nevertheless, these findings should be interpreted with caution. While they point toward the possible effectiveness of the legislation, they do not amount to definitive proof. Instead, this study contributes to the broader effort to shed light on a long-standing and unresolved question regarding the efficacy of Brazil's anti-corruption policies[41].

[41]The code and other statistical results are available at: `https://github.com/caxaxa/PhD_Empirics/blob/main/Data_Analysis.ipynb`

Part IV

CONCLUSION

Chapter 6

Conclusion

This thesis investigates the effectiveness of non-trial resolutions (NTRs) against collusive bribery or corruption (CBC). The research incorporates legal and economic foundations, theoretical frameworks, and empirical analyses to explore the complex nature of CBC and evaluate the efficacy of NTRs as a deterrent mechanism.

The main argument is that CBC harms economic growth and social welfare, a position strongly supported by the literature review and empirical evidence presented. The game-theoretical model constructed in Chapter 4 demonstrates that combating CBC with NTRs is a viable strategy, yet its implementation is complex. Successful application requires carefully managing several critical elements. First, the optimal value of sanction reductions must be precisely calculated to ensure they are strong enough to encourage cooperation without being so lenient as to promote criminal activity. Second, the strategy for handling offenders must allow for prosecutorial discretion so that prosecutors can adjust their tactics based on the specifics of each case and the behaviors of the involved parties. If these elements are not well-balanced, there is a risk that the strategy could unintentionally create an environment that fosters CBC instead of deterring it.

The empirical part developed on Chapter 5 provides an analysis of Brazil, showcasing the country's success in fighting crimes of corruption[1] through the anti-corruption legislation from 2013. It introduced the 'awarded collaborations', similar to plea bargains, and 'leniency agreements', comparable to DPAs[2]. Before the 2013 anti-corruption policies, there was virtually no chance[3] for individuals to negotiate their legal standing. The unique introduction of these measures, akin

[1] As argued in that Chapter, crimes of corruption in Brazil are defined very similarly to the concept of CBC used throughout this work.

[2] Distinct from leniency granted in cartel cases.

[3] The existing judicial features are explored in Chapter 3.

to NTRs[4] into Brazil's legal framework made it an ideal context to study the effects of implementing such policies abruptly and to observe their influence on the country's overall CBC levels.

In a way, Chapter 5 does not answer if NTRs alone were the driving factors for the observed efficacy of the 2013 anti-corruption reform. It is acknowledged that the combined effect of all provisions introduced in 2013 cannot be entirely disentangled. The effectiveness demonstrated in Chapter 5 may stem from the aggregation of these provisions rather than solely from the use of NTRs.

To demonstrate that NTRs could have played a significant role in reducing CBC practices in Brazil, it is important to consider the contributions of the broader context of the thesis. Chapter 5 establishes an empirical relationship between the 2013 anti-corruption legislation and the observed dynamics corruption crimes, showing evidence that can point to an overall effectiveness of the policy intervention without isolating the specific contributions of individual provisions[5]. Chapter 4 complements this by modeling negotiated solutions akin to NTRs in the Brazilian context, showing a theoretical effectiveness in deterring and prosecuting CBC. As discussed in Chapter 3, the 2013 legislation's primary innovation was the formalization of NTRs, while other provisions already existed in Brazilian law. Moreover, NTRs were central to high-profile operations like Car Wash, and even when not directly applied, their existence likely created a deterrent effect by instilling fear of their potential use. Altogether, these insights suggest that NTRs had an effective role in deterring CBC in Brazil, both as a prosecution tool and a preventive measure.

In the following sections, the dissertation wraps up the discussion on NTRs and their role in fighting CBC. It looks closely at Brazil's well-known Car Wash case, connecting what the theoretical model predicts with what actually happened. This examination reveals where NTRs have worked well and where they have fallen short in Brazil. These findings point out the limitations in the current research and suggest areas for further study. By comparing theoretical expectations with actual results, the study clearly shows under what conditions NTRs can be most effective and what challenges they might face.

6.1 Policy Recommendations

Drawing the conclusions of Chapter 4 about the best use of NTRs, several policy recommendations emerge. These recommendations are aimed at enhancing the

[4]Anti-corruption enforcement tools adopted since 2013 still involve a certain degree of judicial oversight at the conclusion of agreements; however, the negotiation phase closely resembles the process used in NTRs.

[5]It is notable that Miller's theory operates under the assumption of NTR-like provisions, as seen in antitrust contexts.

effectiveness of anti-corruption measures while ensuring they are equitable and do not harm economic and social welfare.

6.1.1 Optimal Leniency

In Chapter 4, this study demonstrates that offering sanction reductions to offenders or potential offenders can deter CBC. However, this strategy is effective only under specific conditions. Otherwise, it may inadvertently encourage CBC.

The study emphasizes a key difference in how effective sanction reductions are before and after detection. Without significantly large incentives that exceed potential sanctions[6], agents have no incentive to reveal their corrupt activities before being caught. They would only consider disclose their offences if they believe they are more likely to get caught because of new enforcement policies established after their corrupt agreement.

Conversely, sanction reductions given to parties after they are detected are effective. These reductions are carefully calibrated to be lenient enough to induce fear among corrupt agents that other parties might defect and expose the bribery scheme. However, these reductions cannot be so lenient that they incentivize agents to commit offenses in the first place.

This approach's success critically depends on the prosecution's ability to pose credible threats. By signaling that they can offer better deals to subsequent parties, prosecutors effectively leverage these threats to enhance deterrence. This dynamic, where the fear of being undercut by another party's cooperation with authorities deters ongoing and future CBC, underscores the importance of strategic, well-tailored leniency rules.

6.1.2 Prosecutorial Discretion

One crucial insight from this study is the necessity of prosecutorial discretion in formulating anti-corruption strategies. The study highlights that fixed rules could undermine the prosecution's ability to use the threat of offering better deals to other parties as a leverage tool. With fixed rules, offenders would know their exact payoffs and may not be convinced that others could receive more favorable deals. Conversely, if the prosecution is free to negotiate, propose, and retract deals, they can threaten to use information from another party by offering that party a better deal, effectively pressuring the defendants. Consequently, by utilizing credible threats of leniency, under Schelling (1960) concept, authorities can effectively encourage the first party detected in a CBC scheme to cooperate. This tactic is

[6]Agents would receive bonuses or rewards, which is not realistic in any of the studied jurisdictions.

rooted in the principle that once the first party provides sufficient evidence, extending a deal to the second party becomes unnecessary, as the prosecution would already possess adequate evidence to ensure a conviction. This approach underscores the importance of flexibility in legal strategies to adapt to the dynamics of each case, ensuring more effective enforcement of anti-corruption measures.

The strategy underscores the importance of prosecutorial flexibility, allowing the prosecution to adapt offers based on the unfolding situation and withdraw them when they are no longer necessary. This strategic flexibility is critical in avoiding unnecessary leniency once sufficient evidence is obtained, ensuring that resources are used efficiently and justice is served effectively.

Additionally, the discussion suggests that the threats of deals for the other party[7] could be overly lenient, functioning primarily as deterrent threats rather than actual offers. These offers have to be lower than a minimum credible threat. Because, in order to a threat to influence behavior effectively, it must be both believable and enforceable (Schelling, 1960). In simpler terms, the prosecution must have the authority to present an offer like this: "*Should you decide to withhold the evidence, please understand that I will then offer a substantially more favorable deal to the other party, who I anticipate will be more cooperative. The choice is now in your hands.*"

It is important to note that prosecutorial discretion comes with a crucial assumption: the deal between the prosecution and defense should be enforceable. This implies that judicial oversight should be minimal in the case of agreements, because the parties have already agreed on the outcomes. Allowing judges to oversee these agreements adds a layer of uncertainty that could make the deals more lenient and potentially increase the likelihood of CBC.

In summary, prosecutorial discretion is necessary but not sufficient for the success of the strategy. Other factors, such as the enforcement of the deals and carefully calculated offers as discussed in the last Section 6.1.1 and in Chapter 4, are also essential for a effective anti-corruption strategy through negotiated non-trial deals.

6.1.3 Individual Accountability

The literature highlights the significant role of individual accountability in combatting corporate CBC. Oded (2016) examines the Yates Memo's emphasis on prosecuting individuals within corporations to enhance deterrence, while Søreide and Vagle (2022) discusses the practical implications of this approach in high-profile cases like Herbalife and Airbus. Despite the imposition of substantial fines in these instances, individual prosecutions were notably limited. In the Airbus

[7]Sch as C_{2r} and C_{2p}, as discussed in Chapter 4

case, as discussed in Section 3.5.3, there was an initial focus on holding specific individuals accountable, however, most of those charges were eventually dropped, showing the challenges of pinning direct liability on individuals in complex cross-border investigations.

In contrast, Brazil's Car Wash operation applied a more rigorous approach to individual accountability, resulting in the prosecution and conviction of prominent public figures, including political leaders. A notable feature of Car Wash was the frequent use of pretrial detentions, which imposed substantial constraints on suspects well before final judgments were rendered. While this initially showcased the deterrent power of targeting individuals, the approach likewise encountered significant challenges. Over time, many of these convictions were overturned by Brazilian upper courts. A fate similar to the Airbus case as discussed in Section 3.5.3. Nonetheless, unlike Airbus, Car Wash did subject certain defendants to considerable punitive measures during the investigation stage, thereby providing a semblance of accountability prior to any subsequent reversals.

Taken together, the theoretical model from Chapter 4 and the case studies presented in Chapter 3 affirm that a focus on individual accountability can be effective both as a deterrent and as a prosecutorial strategy in combating CBC. By heightening personal risk for decision-makers within organizations, this approach appears capable of mitigating wrongdoing and reinforcing the credibility of enforcement efforts. Nonetheless, as evidenced by the procedural challenges and subsequent reversals encountered in both the Airbus investigation and the Car Wash operation, these measures can also generate major political setbacks. The complexities and repercussions of these setbacks in the Car wash operation are explored in greater detail in the following section.

6.2 10 Years of Car Wash: What we Learned

The Car Wash Operation in Brazil, famously started in 2014 as an investigation into minor money laundering activities at a local car wash, rapidly expanded to uncover widespread bribery schemes within Petrobras, Brazil's state-controlled oil company as explained in detail in Chapter 3, Section 3.5.4. As the investigation unfolded, it revealed a vast network of briberies[8] involving major Brazilian companies, unfolding exactly as predicted by Ades and Di Tella (1997). The operation's scope widened to include a host of influential politicians and business leaders, not just within Brazil but also in other countries, showcasing its international ramifications.

[8]Once again, the acts of bribery and corruption identified in Operation Car Wash share a similar legal definition with the CBC practices discussed throughout this text.

The Operation initially praised as successful in combating the corruption scheme, managing to recover billions of dollars[9] through awarded collaborations and leniency agreements. These agreements allowed companies and individuals to settle charges by cooperating with investigators and returning ill-gotten gains, thus avoiding more severe penalties (Marona and Kerche, 2020).

However, despite these achievements, the Car Wash Operation has faced significant criticism and encountered major setbacks on several fronts. Institutionally, politically, and within the judiciary, the operation has been questioned, with critics arguing that it overstepped legal boundaries, was used for political purposes, and relied on questionable practices. These challenges have cast doubt on the operation's effectiveness and fairness, raising concerns about the long-term sustainability of its successes and the integrity of the methods used. As a result, while the Car Wash Operation has been a landmark event in Brazil's fight against CBC, its apparent successes are now under scrutiny, with its overall impact and legacy remaining subjects of debate (Spinetto, 2024).

In this sense, the empirical analysis presented in this study contributes evidence suggesting that Brazil's efforts to combat corruption have been worthwhile. Not only Car Wash, but all other anti-corruption cases starting after the introduction of the anti-corruption policy of 2013, might have lowered the overall corruption crime level in the country at least until 2020.

The Car Wash operation can be utilized to closely examine some of the policy recommendations proposed in this work. By comparing the suggestions made here with what was actually observed in the Car Wash scenario, it becomes feasible to track the developments and outcomes related to the policy implementations discussed in this study.

6.2.1 Successful Characteristics

The Car Wash operation initially relied on a considerable degree of prosecutorial discretion, allowing prosecutors to negotiate directly with defendants. This flexibility led to 399 awarded collaboration deals and 28 leniency agreements with corporations. In its early years, the operation faced less judicial oversight, as the cases were primarily in the first and second instances. After 2020, most cases advanced to Brazil's last instance, where the defense was significantly more successful than the prosecution. Notably, the empirical methodology of this work only extends up to 2020, primarily due to the effects of COVID-19. Therefore, it assesses the operation's successful aspects rather than the challenges and dismantling that began post-2020. The criticism of the prosecution's freedom and discretion is discussed in the next Section.

[9] As already discussed on Section 1.2.

It is notable that many of the awarded collaborations occurred spontaneously before the prosecution was even aware of them. According to the theoretical predictions of this work, such actions should not occur unless the sanction reductions were significantly larger than the fines, or if there was a substantial change in the probability of detection, altering the expected value of the agreements. The scenario observed here is clearly a result of the latter. The Car Wash operation not only implemented NTRs but also enhanced other deterrent measures such as organizing task forces, increasing the efficiency of political, prosecutorial, and judicial bodies, introducing pretrial deterrence, and crucially, creating a network effect. This network effect arose as parties found themselves involved in cases interconnected with other parties tied to the same CBC scheme, significantly heightening their perceived risk of detection compared to before the operation began.

Another notable characteristic of Car Wash pointed out by this work is the approach to corporate corruption liability. Brazilian enforcement policy reform of 2013 emphasizes individual accountability, marking a notable shift from practices in the US and UK. In these cases corporations typically face fines but individuals rarely bear direct consequences (Søreide and Vagle, 2022). This enhanced prosecution of individuals, including high-profile politicians, demonstrates Brazil's commitment to ensuring that those responsible for crimes of corruption are held directly accountable. Such a strategy likely enhances deterrence more effectively than merely imposing corporate fines, as it fosters a culture of integrity within corporations, aligning with principles similar to those in the Yates Memo.

However, focusing on individuals introduces several challenges. It complicates legal processes and can overextend enforcement resources. Additionally, it may disrupt the cooperative relationships between corporations and law enforcement, which are vital for untangling complex corruption cases.

Despite these challenges, Brazil's approach was well received by the general population[10], but less so by the judicial and political elite, as the upcoming setbacks are discussed below.

6.2.2 Observed Setbacks

Operation Car Wash, initially effective in exposing widespread corruption within Brazil's major corporations and government institutions, has subsequently encountered several significant setbacks. As the investigation moved beyond Petrobras to include other major companies and high-profile individuals, it encountered resistance. Challenges included institutional pushback, political interference, and legal criticisms. These issues have complicated the operation and illustrated the

[10]Brazilians protested on the streets all over Brazil in 2019 in behalf of Car Wash. Available at `https://www.bbc.com/portuguese/brasil-48820975`.

persistent nature of CBC, showing that corruption eventually fights back.

As previously noted, Brazil's anti-corruption enforcement mechanisms were subject to judicial oversight, indicating that the enforcement approach was not purely reliant on NTRs. Moreover, this oversigt led to significant controversies, notably the questioning of Judge Sergio Moro's competence[11]. Additionally, the pretrial arrests[12] made during the operation have been heavily scrutinized, criticized and reverted by brazilian Supreme Court[13], setting a precedent that raises concerns about the potential for such measures to be used for political purposes in contemporary Brazil[14]. These developments highlight the complex balance between effective legal action and the maintenance of judicial fairness and integrity.

The Car Wash Operation initially unfolded in a decentralized manner in the first instance, even though it was centralized under the jurisdiction of Curitiba. Notable participation also came from Rio de Janeiro and Sao Paulo, and the task force comprised a diverse array of public officers, including police officers and public prosecutors. However, the arrests of significant political and entrepreneurial figures during the operation led to profound challenges concerning the criminal and civil rule of law in Brazil, particularly in relation to last-instance sanctioning. Because the ultimate decisions on both corporate and individual matters necessarily escalate to the Supreme Court, the court acquired immense power over the sanctions applied in the Car Wash Operation (Spinetto, 2024). This influence manifested in several notable setbacks, including the overturning of the mandatory imprisonment after second-instance convictions[15], which resulted in the release of many individuals previously convicted by lower courts. Moreover, monocratic decisions by single judges led to substantial fines being nullified[16].

Ultimately, these judicial reversals culminated in the annulment of convictions for key figures like the Brazilian incumbent president Lula, which enabled him to participate in and win the national elections. These developments highlight

[11]The Brazilian supreme court vote judge Moro to be incompetent in the case of Lula's CBC on the Habeas Corpus No. 164.493 STF. Available at:https://portal.stf.jus.br/processos/detalhe.asp?incidente=5581966

[12]This work does not look into the nature of credible threats using pretrails arrests. But it can be understood as an important sanction which can be used as credible threat.

[13]Available at: https://www.jusbrasil.com.br/jurisprudencia/stf/442405222?_gl=1*1ub3pnt*_ga*MjA5MTI5OTMzNi4xNzE1MjIzMzg0*_ga_QCSXBQ8XPZ*MTcxNTIyMzM4My4xLjAuMTcxNTIyMzM4My42MC4wLjA.

[14]Available at: https://www.stj.jus.br/sites/portalp/Paginas/Comunicacao/Noticias/22072022-Medidas-cautelares-diversas-da-prisao-podem-durar-por-tempo-indeterminado--decide-Quinta-Turma.aspx

[15]Decision over ADC 43, 44 and 54. Available at: https://www.conjur.com.br/2020-nov-16/stf-publica-acordaos-julgamento-prisao-segunda-instancia/.

[16]For instance, the nullification of more than U$ 1.6 Billion in fines from Odebrecht S.A. by Justice Dias Toffoli. Available at: https://jus.com.br/artigos/109042/o-ministro-dias-toffoli-anula-multas-bilionarias-da-odebrecht-debate-no-stf.

the significant political impact of high-level judicial decisions on the outcomes of major anti-corruption efforts like the Car Wash Operation.

This situation underscores the role of judicial oversight in NTRs. Chapter 4 reveals that the presence of judicial oversight over crimes can inadvertently increase the likelihood of acquittal, consequently making leniency agreements more challenging and stringent. Furthermore, the possibility of a judge overriding these agreements, as observed in Brazil, poses a significant risk to the integrity and effectiveness of the entire enforcement policy. Such judicial interventions can undermine the confidence in and the predictability of negotiated settlements, jeopardizing the goals of anti-corruption frameworks and complicating the implementation of effective legal strategies against CBC.

6.3 The Relevance of the Brazilian Experience Internationally

After analyzing the legal regimes of the United States, United Kingdom, and France, the results of this study highlight how Brazil's 2013 shift toward NTRs was uniquely impactful, revealing distinct enforcement dynamics and challenges compared to these jurisdictions.

Brazil's rapid adoption of non-trial resolutions offers a unique case study on both the effectiveness and limitations of these mechanisms. While the United States and the United Kingdom each have a comparatively longer tradition of employing DPAs and NPAs in corruption cases, France's trajectory more closely mirrors Brazil's recent pivot. Under the Sapin II law of 2016, France introduced Conventions Judiciaires d'Intérêt Public (CJIPs) as an entirely new framework for settling corporate offenses, echoing Brazil's abrupt adoption of NTRs in 2013. By contrast, the UK incrementally formalized its use of Deferred Prosecution Agreements through the Crime and Courts Act 2013, and the US had employed similar agreements for decades. This parallel between Brazil and France suggests that a future study of France's outcomes with CJIPs might yield insights into whether newly minted NTR regimes for corruption crimes can replicate Brazil's early success, or encounter comparable hurdles.

The abrupt transformation in Brazil was both an advantage and a challenge. It opened pathways for large-scale operations—most notably Car Wash—to swiftly leverage the new incentives for collaboration and self-disclosure. Prosecutors, previously limited to traditional judicial processes, could now negotiate directly with suspects, allowing them to secure significant amounts of evidence in record time. On the one hand, this shift enabled major investigations to expand fast and wide, exposing influential political and corporate figures. On the other hand, the sudden-

ness of the transition left little time to refine the details of prosecutorial discretion, judicial oversight, and the legal boundaries for negotiated deals. Whereas countries like the United States refined their FCPA enforcement incrementally over decades and the UK incorporated lessons from existing European binding norms[17] when rolling out their frameworks, Brazil's adoption of NTRs occurred without the cushion of accumulated practical knowledge.

Brazil's experience also parallels, in certain respects, other jurisdictions that introduced major anti-corruption reforms and soon witnessed an explosion of large corruption cases investigations. In France, shortly after Sapin II was enacted, the Airbus case was resolved through a record-breaking settlement. Similarly, in the United Kingdom, the introduction of DPAs coincided with the SFO launching major corruption inquiries into Rolls-Royce and other companies, leading to unprecedented fines. These episodes resemble what happened in Brazil: an emerging legislative framework, intense media scrutiny, and heightened prosecutorial momentum generated a 'displacement effect', driving a surge in self-reporting, cooperation, and the exposure of large-scale corrupt schemes. However, whether these large operations were primarily the result of the introduction of non-trial resolutions or simply a broader displacement effect remains unclear.

This study made every effort to disentangle potential confounding effects in the data to better isolate the role of NTRs in triggering these enforcement waves. While NTRs were introduced in all of these jurisdictions, allowing authorities to resolve complex cases more efficiently, the question of whether they led to lasting deterrence remains open. Unlike in France and the UK, where the long-term impact of these reforms is still uncertain, this work provides evidence of a possible further deterrence from the introduction of the legislation.

Davis et al. (2024) explore how international institutions, notably the OECD Working Group on Bribery and the UNCAC Conference of the States Parties (COSP), have responded to the Brazilian enforcement experiences from 2013. The study finds that while these institutions have reinforced policies promoting strong enforcement and international cooperation, they have largely failed to address critical issues such as due process violations, the political ramifications of high-profile prosecutions, inconsistencies in international cooperation, and the economic disruptions caused by aggressive anti-corruption enforcement. The authors argue that the dominance of law enforcement perspectives within these institutions has led to a focus on efficiency and deterrence at the expense of procedural fairness, human rights, and broader systemic reforms.

In sum, Brazil's abrupt incorporation of non-trial resolutions into its anti-corruption framework, and the rapid spike in major investigations it triggered, offers a distinctive comparative example. While other jurisdictions gradually re-

[17] As discussed in Section 3.2.3.

fined their NTR practices, Brazil's 'shock introduction' prompted both remarkable achievements and intense controversy. The immediate lessons stem from the sheer effectiveness of the new legal instruments in detecting new corruption cases. Yet the subsequent political and judicial backlash underscores the fragility of reform when it lacks deep institutional and cultural anchors. Observing how anti-corruption efforts unfold in newer legislative contexts, such as France's Sapin II or countries that recently adopted NTR-like mechanisms, may shed further light on whether Brazil's experience is exceptional or a common feature of the adoption of NTRs.

6.4 Literature Contribution

The insights developed in this dissertation represent a unified theoretical and empirical effort to address the unique challenges of CBC deterrence, particularly under the anti-corruption legislation introduced in 2013 in Brazil. This legislation, which introduced provisions akin to NTRs, marked a significant departure for Brazil—a country without a prior tradition of negotiated solutions for corruption cases, unlike jurisdictions such as the United States or the European Union. This distinct context necessitated the development of a tailored theoretical framework to understand CBC within the constraints and opportunities created by Brazil's new policies.

The theory introduced in Chapter 4 builds upon prior research discussed in Chapter 2 but introduces key modifications to reflect the nuances of the Brazilian context differentiating it from established cases in other jurisdictions, as discussed in Chapter 3. By doing so, the theoretical framework hypothesizes how these novel policies might influence incentives for collusion and cooperation among corrupt agents, providing a foundation for the empirical exercise in Chapter 5. The key points of the specific advances in the literature are pointed out below.

6.4.1 Theoretical Contribution

The theoretical chapter builds upon and extends the existing literature by addressing the specific challenges of fighting CBC under Brazil's unique legal and institutional context. Previous theories on corruption have predominantly focused on harassment bribes, where one party (often a victim) is compelled to pay a bribe to access a service or right to which they are entitled. Works such as Basu (2011) and Dufwenberg and Spagnolo (2014) have demonstrated that negotiated solutions, particularly those involving asymmetric penalties that penalize bribe receivers more heavily, can effectively disrupt these transactions. However, these models lack a framework for analyzing environments characterized by CBC, where

both parties gain from the illicit agreement and are therefore less incentivized to defect or self-report. This fundamental difference necessitates a separate analytical approach.

The literature on antitrust leniency programs, notably Motta and Polo (2003) and Spagnolo (2005), provides valuable insights into collusive environments where all parties cooperate to commit offenses. However, antitrust violations differ from CBC in critical ways. In antitrust cases, one party can achieve a significant one-time gain by self-reporting and disrupting the collusion, such as capturing a monopolistic market share through price setting. Bribery, by contrast, involves a more stable dynamic: one party pays a bribe, and the other delivers a specific advantage, creating a balance of gains that is more resistant to disruption. This stability makes CBC harder to undermine with leniency programs alone, necessitating an adaptation of antitrust frameworks to the CBC context.

Closer to the present study, works such as Bigoni et al. (2015), Engel et al. (2016), and Abbink and Wu (2017) have examined CBC settings. However, these studies overlooked two key factors critical for the Brazilian context. First, as highlighted in Chapter 3, Brazilian law mandates that negotiated agreements must include the forfeiture of damages, ensuring that deals cannot be more lenient than the harm caused[18]. This provision fundamentally alters the dynamics of negotiations and was explicitly modeled in this work to reflect Brazil's legal requirements. Second, while earlier studies emphasized asymmetric punishments as simpler to implement, the Brazilian framework introduces prosecutorial discretion, a feature not unique to Brazil but underexplored in prior models. The integration of discretion allows for more dynamic and case-specific strategies, significantly enhancing the applicability of leniency mechanisms in Brazil's corruption cases.

By building on these foundational works, this dissertation develops a theoretical model tailored to Brazil's anti-corruption policies, addressing gaps and adapting concepts to fit the country's specific context. While prior research consistently pointed to the potential efficacy of negotiated solutions for CBC and other collusive crimes, Brazil presented unique challenges that required careful consideration. The theoretical framework developed here not only accounts for these peculiarities but also predicts that, despite these constraints, such policies should be effective in deterring CBC. This prediction forms the basis for the empirical analysis, which tests the hypotheses generated by the model and aim to provide evidence that the Brazilian policies of 2013 succeeded in enhancing enforcement and deterrence. This is further explored in the Section below.

[18]Law No. 12.846, art. 16 § 3.

6.4.2 Empirical Contribution

On the empirical front, this study makes a significant contribution by departing from traditional approaches that rely on corruption perception indices such as the CPI. While these indices offer insights into broader corruption trends, they often encompass a wide range of corrupt practices beyond CBC, which is the specific focus of this work. By narrowing the scope to CBC, as defined in Section 1.3, this study offers a more precise assessment of Brazil's anti-corruption policies. It uses time-series data on police inquiries into corruption crimes which, under Brazilian law, align closely with the definition of CBC adopted in this analysis. The study adapts the framework developed by Miller (2009)—originally designed to evaluate cartel behavior—to assess whether Brazil's 2013 anti-corruption reforms improved the detection of corruption and contributed to its long-term deterrence.

The findings reveal a dual dynamic that could indicate the legislation's overall success in combating corruption crimes[19]. Immediately following the policy's introduction, there is a notable surge in corruption inquiries, possibly signaling enhanced prosecutorial efficiency. Over time, detection rates fall below pre-policy levels, poyyibly suggesting that potential offenders adjusted their risk assessments and could have refrained from engaging in corruption crimes. Notably, it is important to clarify that the empirical analysis tests the broader effects of the 2013 legislation rather than isolating the impact of NTRs. Disentangling the specific contributions of NTRs from other legislative provisions—such as the creation of task forces or pretrail arrests —is challenging, as all components are designed to collectively influence CBC.

To connect the effectiveness of NTRs to the observed success of the 2013 policy intervention in reducing corruption crimes, the study relies on several key points. First, the theoretical analysis in Chapter 4 demonstrates that NTRs are effective in deterring and prosecuting CBC, particularly under the specific conditions present in Brazil. Second, as highlighted in Chapter 3, the 2013 legislation introduced NTR-like provisions as a novel component, while other measures, although reinforced by the broader legislative package, were already in existence. Finally, the empirical analysis in Chapter 5 is grounded in Miller's model, which was explicitly designed for empirical inference under frameworks incorporating NTR-like measures. While the evidence presented may not, on its own, be sufficient to conclusively prove the empirical deterrent effect of NTRs on CBC, taken together, it strengthens this hypothesis, drawing on the Brazilian case analyzed in this study.

This empirical findings from this thesis address a critical and often politi-

[19] As discussed in Chapter 5, the results are interpreted with considerable caution. While they do not provide definitive proof that the policy introduction successfully deterred corruption crimes, the observed correlations suggest a potential effectiveness of the policy, indicating it may have contributed to deterrence.

cized debate in Brazil: whether these anti-corruption measures taken in 2013 achieved meaningful results or were primarily tools of political contention. While widely supported by the population[20], the policies have faced criticism on political grounds, with detractors questioning their legitimacy and efficacy. By pointing to an empirical support for the success of the 2013 legislation in combating corruption crimes, this study informs both academic and public discourse, highlighting the potential of well-designed anti-corruption frameworks to produce lasting change.

At the same time, this study provides meaningful contributions to the literature on anti-corruption measures while acknowledging the inherent limitations of semi-parametric studies, which rely on observed correlations and expected behavioral patterns. As discussed in Section 5.6, these approaches are inherently susceptible to alternative interpretations and methodological flaws. The aim here is not to present a definitive account but to offer a robust foundation for understanding the impact of anti-corruption policies. By presenting evidence consistent with the success of the 2013 reforms, this work encourages further exploration and scrutiny from diverse perspectives. The insights provided are intended to enrich the dialogue on effective anti-corruption strategies and inspire future research. For a deeper exploration of unresolved questions and potential avenues for further studies, the next section explores new directions for inquiry based on the findings and limitations of this thesis.

6.5 Further Studies

This work offers important insights into the use of NTRs to combat CBC, drawing from both its theoretical approach and empirical strategy. However, it also raises questions that should be addressed in future studies.

The theoretical framework developed in this thesis assumes CBC involving just two agents. However, observations from Brazil reveal that corruption crimes often involves multiple parties, forming complex networks. When one party in such a network is detected, they are more likely to expose the entire scheme, as they perceive a higher likelihood of being implicated in other related corrupt activities. This network effect suggests that NTRs could be more effective at dismantling large-scale CBC schemes than initially predicted by this study. To better understand these dynamics, future research should incorporate Agent-Based Modeling, Complex Systems and Systems Dynamics to formally model network effects within an economic framework, providing a more rigorous analysis of CBC in complex, multi-agent networks.

[20] 80% of Brazilians supported the Car Wash Operation after its end on 2021. Available at: `https://www.poder360.com.br/lava-jato/em-1a-pesquisa-apos-fim-de-forca-tarefa-80-dizem-apoiar-operacao-lava-jato/`.

In this sense, future research would also benefit from integrating criminological and sociological perspectives expanding on the literature presented on Section **??** to deepen the understanding of CBC's complex dynamics. While the theoretical framework here simplifies CBC to dyadic interactions, real-world cases like Brazil's Car Wash reveal the prevalence of intricate CBC networks, where the exposure of one participant often leads to the unraveling of entire schemes. Criminology's focus on organizational crime and sociology's exploration of trust and institutional behavior could further elucidate how NTRs disrupt these networks and influence social norms.

Exploring the issue of crimes of corruption post-2020 is critical for future research, particularly focusing on metrics of corruption that are not susceptible to the influences of COVID-19. The global pandemic has undoubtedly altered many aspects of governance and enforcement, potentially obscuring underlying trends in corruption or altering the effectiveness of anti-corruption measures. By examining data and cases from the post-pandemic period, researchers can gain insights into whether shifts in corruption patterns are temporary or represent longer-term changes. Furthermore, evaluating measures of corruption that are immune to pandemic-related disruptions could provide a more stable and accurate understanding of corruption dynamics and the effectiveness of countermeasures implemented during and after the pandemic. This points looks promising to explore not only CBC but trends on broader corruption perceptions.

While this thesis highlights the primary role of NTRs in the 2013 anti-corruption policy, the effects of other features, such as taskforces and pretrial arrests, remain unclear. Further research is essential to clarify their contributions, improve future policies in Brazil, and provide guidance for other jurisdictions.

The political dimension of CBC is also material for future research, particularly the implications of political dynamics on anti-corruption efforts. Politics can significantly influence the enforcement of laws and the administration of justice, with changes in political leadership or shifts in political priorities potentially leading to significant changes in how corruption is addressed. Investigating the interplay between political forces and anti-corruption measures can reveal how political will, or the lack thereof, impacts the success or failure of these initiatives. Understanding these dynamics is crucial for designing effective anti-corruption strategies that are robust against political interference and can adapt to changing political landscapes.

Finally, examining examples of anti-corruption efforts in various other jurisdictions is essential for a comprehensive study of global anti-corruption practices. Different countries may adopt diverse approaches based on their legal traditions, cultural norms, and institutional frameworks. By comparing these various approaches, researchers can identify best practices and common pitfalls. This com-

parative analysis not only enriches the understanding of what works and what does not but also helps in tailoring anti-corruption strategies to specific contexts. Such studies can provide valuable lessons and insights that can be applied to improve anti-corruption efforts worldwide, making it a crucial area for continued research.

6.6 Final Remarks

This thesis conducted an extensive review of the relevant literature and legal framework to provide a deeper understanding of the phenomenon it set out to study and successfully addressed its two main objectives. Theoretically, it demonstrated that well-crafted anti-corruption policies based on NTRs can serve as effective tools for deterring CBC. Empirically, it presented evidence that points toward a possible reduction in the overall incidence of crimes of corruption following the implementation of Brazil's 2013 anti-corruption legislation, suggesting that the reforms may have contributed to improved detection and deterrence of the studied crimes.

The final conclusion of this study is clear but detailed, covering the complexities and limitations involved. This makes it a valuable contribution to the field of study. However, these findings should not be viewed as definitive proof, but rather as efforts to improve our understanding of anti-corruption strategies.

Appendix A

Chapter IV - Appendix

A.1 Finding C_2

For $b > 0$ and $f > 0$, it is possible to solve the inequation $-(1-C)f-b > -\beta(b+f)$ with the following steps:

$$
\begin{aligned}
\text{Given inequality:} \quad & -(1-C)f - b > -\beta(b+f) \\
\text{Distribute the negative sign:} \quad & -f + Cf - b > -\beta b - \beta f \\
\text{Rearrange terms involving } C: \quad & Cf > -\beta b - \beta f + f + b \\
\text{Combine like terms:} \quad & Cf > -\beta(b+f) + (b+f) \\
\text{Factor out common terms:} \quad & Cf > -(b+f)(\beta - 1) \\
\text{Multiplying } (\beta - 1) \text{ by } -1 \quad & Cf > (b+f)(1-\beta) \\
\text{Divide both sides by } f: \quad & C > \frac{(b+f)(1-\beta)}{f}
\end{aligned}
$$

Appendix B

Chapter V - Appendix

B.1 Supporting Plots and Tables

Table B.4: Testing the Second Hypothesis with MPU and PF Budgets

Model	**Pre-policy**	**End Value**	**Diff**	**P-Value**	**AIC**	**BIC**	**Log-like**
Eq (1)	33.64	33.45	-0.19	0.962	778.73	797.50	-382.36
Eq (2)	36.81	27.08	-9.73	0.058**	777.12	801.26	-379.56
Eq (3)	35.12	22.95	-12.17	0.084*	781.39	816.26	-377.69
Eq (4)	36.83	23.74	-13.09	0.021**	776.90	803.72	-378.45
Eq (5)	36.75	22.41	-14.34	0.015**	777.94	807.45	-377.97
Eq (6)	36.61	21.73	-14.88	0.013**	777.62	807.12	-377.81

Table B.1: Number of Investigations of Corruption Crimes per Brazilian State (Corruption, Embezzlement and Extortive Corruption)

date region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018-	2019	2020-12-31
AC	31.0	19.0	23.0	11.0	18.0	21.0	20.0	30.0	21.0	22.0	20.0	0.0
AL	9.0	3.0	26.0	22.0	22.0	13.0	24.0	28.0	30.0	31.0	16.0	0.0
AM	32.0	28.0	36.0	68.0	47.0	48.0	67.0	38.0	44.0	31.0	34.0	3.0
AP	34.0	31.0	47.0	53.0	48.0	23.0	30.0	35.0	35.0	28.0	16.0	0.0
BA	48.0	62.0	64.0	89.0	102.0	80.0	74.0	81.0	89.0	86.0	53.0	2.0
CE	24.0	39.0	57.0	60.0	76.0	69.0	64.0	48.0	51.0	90.0	63.0	0.0
DF	50.0	57.0	97.0	128.0	162.0	155.0	171.0	162.0	188.0	192.0	157.0	2.0
ES	0.0	17.0	16.0	17.0	26.0	14.0	18.0	33.0	33.0	38.0	19.0	1.0
GO	32.0	24.0	40.0	42.0	43.0	35.0	43.0	37.0	54.0	49.0	27.0	0.0
MA	22.0	31.0	24.0	41.0	37.0	53.0	57.0	42.0	65.0	77.0	58.0	1.0
MG	61.0	51.0	80.0	102.0	102.0	113.0	92.0	82.0	102.0	85.0	71.0	1.0
MS	23.0	36.0	55.0	78.0	84.0	81.0	84.0	73.0	51.0	43.0	26.0	0.0
MT	49.0	39.0	50.0	62.0	41.0	35.0	53.0	44.0	28.0	29.0	15.0	0.0
PA	28.0	34.0	76.0	68.0	45.0	50.0	84.0	82.0	67.0	64.0	32.0	5.0
PB	13.0	20.0	16.0	24.0	21.0	28.0	18.0	35.0	34.0	43.0	34.0	0.0
PE	32.0	29.0	43.0	69.0	65.0	51.0	46.0	56.0	57.0	39.0	23.0	1.0
PI	18.0	24.0	36.0	35.0	40.0	38.0	32.0	23.0	42.0	30.0	26.0	0.0
PR	69.0	103.0	147.0	143.0	166.0	75.0	78.0	41.0	60.0	25.0	50.0	2.0
RJ	74.0	74.0	113.0	124.0	82.0	82.0	90.0	103.0	83.0	108.0	101.0	4.0
RN	13.0	14.0	36.0	24.0	43.0	52.0	43.0	32.0	52.0	43.0	29.0	0.0
RO	16.0	12.0	23.0	20.0	23.0	30.0	23.0	28.0	22.0	18.0	22.0	0.0
RR	10.0	17.0	26.0	21.0	31.0	24.0	18.0	19.0	35.0	34.0	29.0	1.0
RS	12.0	35.0	50.0	56.0	54.0	65.0	76.0	69.0	75.0	54.0	51.0	2.0
SC	28.0	49.0	67.0	56.0	56.0	37.0	34.0	33.0	25.0	42.0	32.0	0.0
SE	2.0	6.0	12.0	18.0	8.0	14.0	9.0	17.0	15.0	26.0	23.0	0.0
SP	107.0	103.0	131.0	132.0	129.0	151.0	183.0	182.0	189.0	162.0	117.0	2.0
TO	52.0	24.0	31.0	23.0	28.0	26.0	20.0	34.0	30.0	20.0	22.0	0.0
Sum	889.0	981.0	1422.0	1586.0	1599.0	1463.0	1551.0	1487.0	1577.0	1509.0	1166.0	27.0

Table B.2: Number of Annual Brazilian Investigations per Crime

Date	Total	Corruption	Embezz-lement	Environ-mental	Extortive Corruption	Swindle	Theft	Drugs	Against Property	Financial Financial	Authority Abuse	Procure ment Fraud
2009	84612	521	734	16	52	3217	2695	1835	9674	764	101	775
2010	79977	569	700	35	67	3923	1745	1960	8773	938	101	612
2011	81835	867	1088	179	77	9081	3969	2327	4051	1267	161	1026
2012	76483	1103	1099	186	74	12060	4663	2036	975	1089	145	1080
2013	85489	1191	1109	234	50	17926	4637	4907	801	1155	105	1323
2014	90158	985	1108	273	70	23121	7106	4645	505	1116	105	1180
2015	84525	1137	1177	533	62	18213	7249	4662	287	1289	73	1073
2016	80539	1088	1191	291	53	19022	7060	3906	254	1050	86	1125
2017	80188	1266	1241	236	61	18626	7346	3579	193	1074	75	1339
2018	76688	1073	1263	399	49	17522	6625	4012	177	968	71	1272
2019	62349	743	890	317	20	11078	3593	2758	63	787	45	894

Table B.3: OLS Regression Controlling for MPU and PF Budgets

	Dependent variable: offences					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	52.810***	-18.926	-24.313	30.248	22.490	25.734
	(7.708)	(36.526)	(62.376)	(35.495)	(45.226)	(45.552)
Dummy	10.642**	9.263*	10.553	10.430*	10.361*	10.242*
	(5.039)	(5.048)	(7.504)	(5.287)	(5.222)	(5.182)
GDP	78.483	115.000*	112.441	37.551	35.137	36.943
	(56.742)	(58.743)	(104.878)	(78.317)	(77.006)	(74.292)
Unemployment	-0.137	1.555	0.440	0.238	0.435	0.524
	(0.883)	(1.141)	(2.097)	(2.010)	(2.020)	(2.022)
Real Interest	-365.099**	-358.638*	-311.290	-298.426	-314.185	-312.843
	(181.115)	(181.927)	(194.116)	(184.972)	(190.750)	(189.916)
MPU	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PF	-0.000**	0.000	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Full Series Pol	None	1st Order	3rd Order	None	1st Order	2nd Order
Post Policy Pol	None	1st Order	3rd Order	3rd Order	4th Order	5th Order
Observations	108	108	108	108	108	108
R^2	0.172	0.214	0.241	0.230	0.237	0.239
Adjusted R^2	0.123	0.151	0.145	0.160	0.158	0.161
Residual Std. Error	8.628 (df=101)	8.491 (df=99)	8.520 (df=95)	8.447 (df=98)	8.453 (df=97)	8.440 (df=97)
F Statistic	(df=6; 101)	(df=8; 99)	(df=12; 95)	(df=9; 98)	(df=10; 97)	(df=10; 97)
	3.506***	3.374***	2.513***	3.257***	3.014***	3.052***

Note: *p<0.1; **p<0.05; ***p<0.01.

Table B.5: OLS Regression MPU, MPF and PF Budgets in Level and in First Difference

	Dependent variable: offences					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-8.394	18.880**	18.900**	16.743*	17.073**	24.240***
	(35.788)	(9.348)	(8.990)	(8.822)	(8.597)	(8.385)
Dummy	10.786**	11.730**	10.547*	9.846**	8.645*	14.870***
	(4.998)	(5.427)	(5.550)	(4.713)	(4.858)	(4.857)
GDP	111.834*	82.098	78.992	92.061*	87.859	68.507
	(65.311)	(55.464)	(54.624)	(53.503)	(53.065)	(54.614)
Unemployment	1.809	2.157**	2.071**	2.316**	2.180**	1.542*
	(1.133)	(0.953)	(0.886)	(0.923)	(0.871)	(0.826)
Real Interest	-338.702*	-351.572*	-351.387**	-346.711*	-343.772*	-314.678*
	(185.778)	(178.429)	(176.910)	(177.849)	(176.156)	(176.653)
MPF	0.008					
	(0.009)					
PF	0.005					
	(0.010)					
Diff MPF		20.784		25.209*		
		(16.226)		(14.928)		
Diff MPU			29.390		33.796*	
			(18.681)		(17.590)	
Diff PF		21.078	20.764			35.858
		(29.863)	(29.060)			(27.633)
Observations	108	108	108	108	108	108
R^2	0.203	0.220	0.227	0.216	0.223	0.207
Adjusted R^2	0.139	0.157	0.164	0.162	0.168	0.152
Residual Std. Error	8.550 (df=99)	8.458 (df=99)	8.423 (df=99)	8.437 (df=100)	8.403 (df=100)	8.485 (df=100)
F Statistic	(df=8; 99)	(df=8; 99)	(df=8; 99)	(df=7; 100)	(df=7; 100)	(df=7; 100)
	3.159***	3.496***	3.628***	3.945***	4.093***	3.738***

Note: *p<0.1; **p<0.05; ***p<0.01.

Table B.6: Testing the Second Hypothesis with MPU, MPF and PF Budgets in Level and in First Difference

Model	Pre-policy	End Value	Diff	P-Value	AIC	BIC	Log-like
Eq (1)	35.96	27.69	-8.27	0.106	778.61	802.75	-380.30
Eq (2)	35.54	26.78	-8.76	0.092*	776.29	800.43	-379.14
Eq (3)	36.09	26.72	-9.37	0.071*	775.39	799.53	-378.70
Eq (4)	36.19	28.40	-7.78	0.087*	774.83	796.29	-379.41
Eq (5)	36.72	28.32	-8.40	0.066*	773.95	795.41	-378.98
Eq (6)	33.98	25.93	-8.05	0.108	776.06	797.52	-380.03

Figure B.1: New Corruption Inquiries Poisson Regression

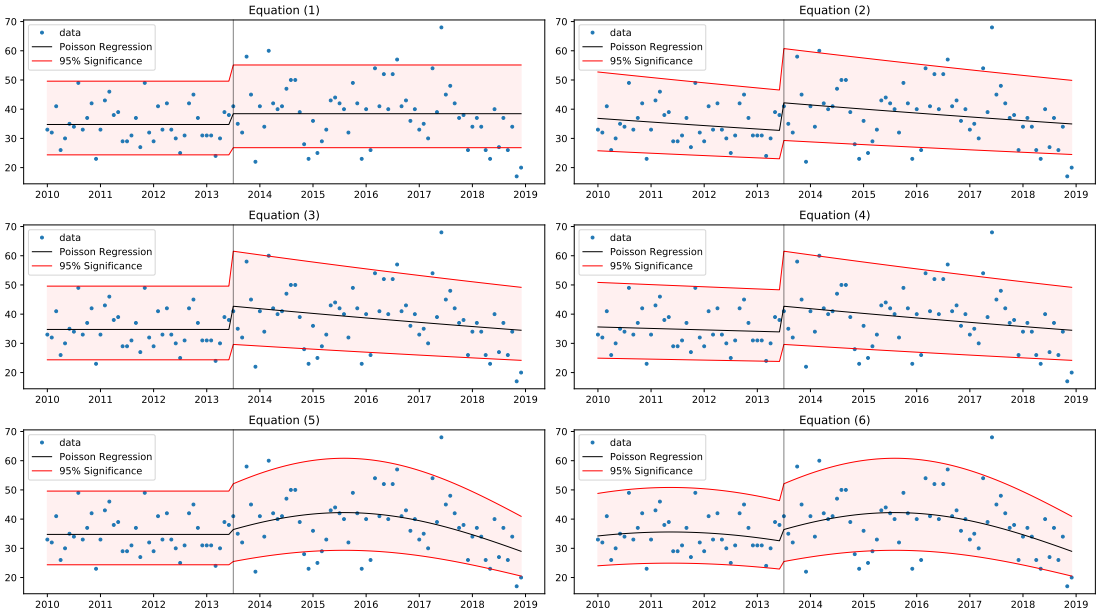


Table B.7: Lagged OLS Regression

	Dependent variable: New Corruption Inquiries					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	35.143***	19.389**	37.491**	37.657***	39.096**	37.981**
	(6.256)	(7.941)	(16.788)	(13.252)	(16.024)	(16.074)
Dummy	3.640	12.273***	9.793	11.022**	11.276**	11.089**
	(3.788)	(4.607)	(7.406)	(4.878)	(4.972)	(4.936)
lag Unemp.	-0.011	1.869**	-0.649	-0.160	-0.185	-0.065
	(0.703)	(0.800)	(1.937)	(1.743)	(1.913)	(1.921)
lag real int. rate	-29.251	-233.350	-292.809	-296.302	-314.524	-318.821
	(186.350)	(182.305)	(206.394)	(196.459)	(201.229)	(200.359)
lag GDP	-1.749	87.750	59.346	30.402	21.064	26.096
	(51.650)	(54.013)	(88.562)	(70.860)	(70.202)	(67.352)
Full Series Polynomial	None	1st Order	3rd Order	None	1st Order	1st Order
Post Policy Polynomial	None	1st Order	3rd Order	3rd Order	4th Order	5th Order
Observations	108	108	108	108	108	108
R^2	0.039	0.184	0.231	0.225	0.232	0.234
Adjusted R^2	0.002	0.136	0.151	0.171	0.170	0.172
Residual Std. Error	9.207 (df=103)	8.566 (df=101)	8.488 (df=97)	8.390 (df=100)	8.396 (df=99)	8.385 (df=99)
F Statistic	1.040	3.801***	2.907***	4.148***	3.733***	3.777***

Note: *p<0.1; **p<0.05; ***p<0.01

Table B.8: Poisson Regression with Controls

	Dependent variable: New Corruption Inquiries					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.705***	3.619***	3.255***	3.213***	3.721***	3.726***
	(0.108)	(0.109)	(0.132)	(0.158)	(0.243)	(0.300)
Dummy	0.137**	0.378***	0.350***	0.331***	0.243***	0.298**
	(0.068)	(0.086)	(0.076)	(0.086)	(0.090)	(0.116)
Unemployment	-0.012	0.014	0.041***	0.043***	-0.022	-0.026
	(0.012)	(0.013)	(0.015)	(0.016)	(0.032)	(0.034)
Real Interest	-6.941**	-9.051***	-7.960**	-7.686**	-9.928***	-9.897***
	(3.352)	(3.397)	(3.375)	(3.421)	(3.492)	(3.632)
GDP	-0.181	0.575	2.029**	2.170**	2.613**	2.650**
	(0.915)	(0.926)	(0.988)	(1.029)	(1.017)	(1.050)
Full Series Pol.	None	1st Order	None	1st Order	None	2nd Order
Post-policy Pol.	None	None	1st Order	1st Order	2nd Order	2nd Order
Observations	108	108	108	108	108	108
R^2						
Adjusted R^2						
Res. Std. Error	1.000(df = 103)	1.000(df = 102)	1.000(df = 102)	1.000(df = 101)	1.000(df = 101)	1.000(df = 99)
F Statistic	(df = 4; 103)	(df = 5; 102)	(df = 5; 102)	(df = 6; 101)	(df = 6; 101)	(df = 8; 99)

Note: *p<0.1; **p<0.05; ***p<0.01

Table B.9: Testing the Second Hypothesis with Lagged Variables

Model	**Pre-policy**	**End Value**	**Diff**	**P-Value**	**AIC**	**BIC**	**Log-like**
Eq (1)	35.07	38.64	3.57	0.312	790.88	804.29	-390.44
Eq (2)	34.05	28.28	-5.77	0.194	777.17	795.95	-381.59
Eq (3)	36.19	22.69	-13.50	0.044**	778.85	808.35	-378.42
Eq (4)	36.38	22.22	-14.16	0.007***	773.63	795.09	-378.81
Eq (5)	36.00	20.92	-15.09	0.007***	774.69	798.83	-378.34
Eq (6)	35.94	20.18	-15.76	0.006***	774.39	798.53	-378.20

Table B.11: Testing the Second Hypothesis Without Controls

Model	**Pre-policy**	**End Value**	**Diff**	**P-Value**	**AIC**	**BIC**	**Log-like**
Eq (1)	34.76	38.45	3.69	0.042*	784.92	790.28	-390.46
Eq (2)	33.91	34.35	0.43	0.901	783.95	794.68	-387.97
Eq (3)	34.32	21.17	-13.14	0.037*	776.00	797.45	-379.99
Eq (4)	34.76	21.17	-13.59	0.001***	770.80	784.21	-380.40
Eq (5)	33.91	20.08	-13.84	0.005***	772.24	788.33	-380.12
Eq (6)	33.91	19.33	-14.58	0.004***	772.38	788.47	-380.19

Table B.10: OLS Regression without Controls

	Dependent variable: offences					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	34.762***	35.609***	32.467***	34.762***	35.609***	35.609***
	(1.401)	(2.715)	(4.801)	(1.295)	(2.549)	(2.551)
Dummy	3.693**	8.687**	9.139	9.027**	9.024**	8.276*
	(1.792)	(3.559)	(6.968)	(4.116)	(4.544)	(4.439)
T_1^1		-0.041	0.716		-0.041	-0.041
		(0.114)	(1.026)		(0.107)	(0.107)
T_1^2			-0.039			
			(0.059)			
T_2^1		-0.085	-1.314	-0.949*	-0.599	-0.411
		(0.128)	(1.260)	(0.524)	(0.436)	(0.387)
T_2^2			0.014	0.045**	0.023**	0.014*
			(0.064)	(0.019)	(0.011)	(0.008)
T_2^3			-0.001	-0.001***		
			(0.001)	(0.000)		
T_2^4					-0.000***	
					(0.000)	
T_2^5						-0.000***
						(0.000)
Observations	108	108	108	108	108	108
R^2	0.039	0.082	0.208	0.202	0.206	0.205
Adjusted R^2	0.029	0.055	0.152	0.171	0.167	0.166
Residual Std. Error	9.077 (df=106)	8.956 (df=104)	8.483 (df=100)	8.389 (df=103)	8.409 (df=102)	8.414 (df=102)
F Statistic	4.248**	3.087**	3.749***	6.516***	5.294***	5.261***

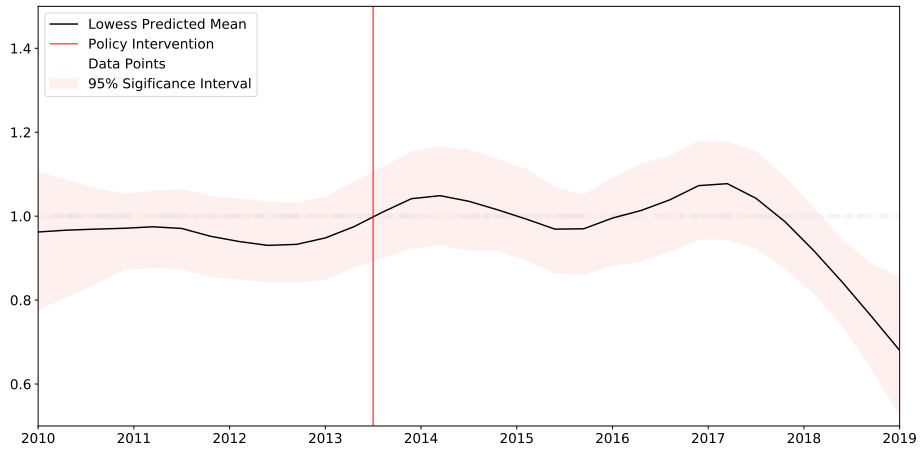
Note: *p<0.1; **p<0.05; ***p<0.01

Table B.12: Negative Binomial Regression

	Dependent variable: offences				
	(1)	(2)	(3)	(4)	(5)
Constant	3.703***	3.244***	3.197***	3.721***	3.768***
	(0.157)	(0.180)	(0.215)	(nan)	(nan)
Dummy	0.135	0.351***	0.331***	0.243***	0.250***
	(0.099)	(0.105)	(0.116)	(nan)	(nan)
				(nan)	(nan)
Unemployment	-0.012	0.043**	0.045**	-0.022***	-0.026***
	(0.018)	(0.021)	(0.021)	(nan)	(nan)
Real Interest	-6.976	-8.034*	-7.707*	-9.928***	-10.184***
	(4.921)	(4.563)	(4.623)	(nan)	(nan)
GDP	-0.171	2.037	2.194	2.613***	2.553***
	(1.344)	(1.344)	(1.401)	(nan)	(nan)
Full Series Period	None	1st Order	None	1st Order	None
Post-policy Period	None	None	1st Order	1st Order	2nd Order
Observations	108	108	108	108	108
Residual Std. Error	9.120 (df=103)	8.508 (df=102)	8.546 (df=101)	8.431 (df=101)	8.471 (df=100)

Note: *p<0.1; **p<0.05; ***p<0.01

Figure B.2: LOWESS Daily Frequency



List of Abbreviations

Abbreviation	Full Form
AFA	Agence Française Anticorruption (French Anti-Corruption Agency)
AIC	Akaike Information Criterion
AML	Anti-Money Laundering
BIC	Bayesian Information Criterion
CBC	Collusive Bribery or Corruption
CJIP	Convention judiciaire d'intérêt public
CPI	Corruption Perception Index
CPS	Crown Prosecution Service
CRPC	Comparution sur reconnaissance préalable de culpabilité
DOJ	Department of Justice
DPA	Deferred Prosecution Agreement
FCA	Financial Conduct Authority
FCPA	Foreign Corrupt Practices Act
LOWESS	Locally Estimated Scatterplot Smoothing
MPF	Ministério Público Federal
MPU	Ministério Público da União
NCA	National Crime Agency
NGO	Non-Governmental Organization
NPA	Non-Prosecution Agreement
NTR	Non-Trial Resolution
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PF	Polícia Federal
SFO	Serious Fraud Office
UNCAC	United Nations Convention Against Corruption
USSG	U.S. Sentencing Guidelines

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Summary in Portuguese

Resoluções Extrajudiciais (Non-Trial Resolutions - NTRs) são acordos que permitem aos infratores evitar julgamentos ao cooperarem com as autoridades, muitas vezes resultando em penalidades reduzidas. Essas resoluções são cada vez mais reconhecidas como ferramentas eficazes no combate à corrupção, uma visão apoiada pela Convenção das Nações Unidas contra a Corrupção (UNCAC) e pela Convenção Anti-Suborno da OCDE, que destacam seu papel crítico nos esforços globais de combate à corrupção.

Esta tese examina a eficácia das NTRs, como os Acordos de Leniência (análogos aos DPAs) e os Acordos de Não Persecução Penal (análogos aos NPAs), como ferramentas para combater a corrupção pública colusiva. Este tipo específico de corrupção, que ocorre quando ambas as partes conspiram para benefício mútuo, é particularmente perigoso porque frequentemente leva a formas de corrupção mais amplas e prejudiciais. Diferente de concussão ou extorsão (harassment bribes), que tendem a envolver quantias menores e geralmente são unilaterais—muitas vezes envolvendo o pagamento de um suborno devido à coerção ou para evitar uma sanção—a corrupção colusiva fomenta questões mais profundas e sistêmicas que podem minar gravemente as instituições públicas e o Estado de Direito.

O estudo visa avaliar o impacto dissuasivo das NTRs na corrupção e analisar os efeitos práticos da legislação anticorrupção brasileira de 2013. O primeiro objetivo explora se essas políticas de aplicação da lei efetivamente desestimulam a corrupção ou se estratégias mais brandas poderiam, inadvertidamente, incentivá-la. O segundo objetivo foca no impacto empírico das políticas anticorrupção do Brasil, investigando se essas medidas reduziram significativamente as infrações relacionadas à corrupção no país.

A tese começa com uma exploração da literatura relevante e uma análise detalhada das principais jurisdições na luta contra a corrupção. Também examina estudos de grandes casos de corrupção, identificando elementos-chave como reduções de sanções, confisco de bens, discricionariedade do Ministério Público e supervisão judicial para desenvolver um modelo teórico que explica as dinâmicas da corrupção colusiva.

A análise teórica foca nos processos de tomada de decisão dos agentes en-

volvidos em um jogo de corrupção. A análise demonstra que atores racionais são dissuadidos pela presença de políticas de redução de sanções. No entanto, se as sanções forem muito brandas, essas políticas podem, inadvertidamente, encorajar a corrupção, apesar da eventual cooperação com as autoridades mesmo após serem detectadas. Isso destaca a necessidade de uma abordagem equilibrada para a redução de sanções, enfatizando o papel crucial da discricionariedade do Ministério Público em oferecer ameaças críveis para garantir a cooperação dos réus. Além disso, a análise revela que autodenunciar crimes de corrupção antes de serem detectados pelas autoridades não é vantajoso para os réus, a menos que prevejam um aumento significativo na probabilidade de detecção ou condenação.

Para testar empiricamente a hipótese de que as NTRs combatem efetivamente a corrupção, a tese investiga o caso brasileiro, onde as reformas anticorrupção introduzidas em 2013 implementaram políticas semelhantes às analisadas na parte teórica. Usando um modelo semiestrutural, a análise fornece evidências que apontam para o sucesso dessas reformas na contenção dos crimes de corrupção.

Por fim, a tese acompanha a aplicação prática dessas políticas na Operação Lava Jato no Brasil, avaliando as consequências práticas de sua implementação. Os resultados mostram que, embora essas políticas ofereçam incentivos teoricamente eficazes e a operação Lava Jato tenha sido aparentemente bem-sucedida, elas permanecem controversas devido à complexa interação de fatores sociais e políticos que influenciam a aplicação da lei anticorrupção.

Summary in English

Non-Trial Resolutions (NTRs) are agreements that allow offenders to avoid trials by cooperating with authorities, often resulting in reduced penalties. These resolutions are increasingly recognized as effective tools in combating corruption, a view supported by the United Nations Convention against Corruption (UNCAC) and the OECD Anti-Bribery Convention, which underscore their critical role in global anti-corruption efforts.

This thesis examines the efficacy of NTRs, such as Deferred Prosecution Agreements (DPAs) and Non-Prosecution Agreements (NPAs), as tools for combating collusive public corruption or bribery. This specific type of corruption, which happens when both parties conspire for mutual benefit, is particularly dangerous because it often leads to more extensive and damaging forms of corruption. Unlike harassment or extortive bribes, which tend to involve smaller amounts and are usually one-sided—often involving paying a bribe due to coercion or to avoid a sanction—collusive corruption fosters deeper, systemic issues that can severely undermine public institutions and the rule of law.

The study aims to assess the deterrent impact of NTRs on corruption and evaluate the real-world effects of Brazil's 2013 anti-corruption legislation. The first objective explores whether these enforcement policies effectively deter corruption or if lenient strategies could inadvertently encourage it. The second objective focuses on the empirical impact of Brazil's anti-corruption policies, investigating whether these measures have significantly reduced corruption-related offenses in the country.

This thesis begins with an exploration of the relevant literature and a detailed analysis of the leading jurisdictions in the fight against corruption. It also examines major corruption case studies, identifying key elements such as sanction reductions, forfeitures, prosecutorial discretion, and judicial oversight to develop a theoretical model that explains the dynamics of collusive corruption.

The theoretical analysis focuses on the decision-making processes of agents involved in a corruption game. The analysis demonstrates that rational actors are deterred by the presence of sanction reduction policies. However, if sanctions are too lenient, these policies may inadvertently encourage corruption, despite

their eventual cooperation with authorities upon detection. This highlights the necessity of a balanced approach to sanction reduction, emphasizing the crucial role of prosecutorial discretion in offering credible threats to secure cooperation from defendants. Additionally, the analysis reveals that self-reporting corruption crimes before being detected by authorities is not advantageous for defendants unless they foresee a significant increase in the likelihood of detection or conviction.

To empirically test the hypothesis that NTRs effectively combat corruption, the thesis investigates the Brazilian case, where anti-corruption reforms introduced in 2013 implemented policies similar to those analyzed in the theoretical part. Using a semi-structural model, the analysis provides evidence that points towards a possible success of these policies in deterring crimes of corruption.

Lastly, the thesis tracks the real-world application of these policies in Brazil's Operation Car Wash, evaluating the practical consequences of their implementation. The findings show that while these policies offer theoretically effective incentives and the Car Wash operation was seemingly successful, they remain controversial due to the complex interplay of social and political factors influencing anti-corruption enforcement.

Summary in Dutch

Non-Trial Resolutions (NTR's) zijn overeenkomsten die verdachten in staat stellen om rechtszaken te vermijden door samen te werken met de autoriteiten, wat vaak resulteert in verminderde straffen. Deze regelingen worden steeds meer erkend als effectieve instrumenten in de strijd tegen corruptie, een standpunt dat wordt ondersteund door het Verdrag van de Verenigde Naties tegen Corruptie (UNCAC) en het Anti-Omkoopverdrag van de OECD, die het cruciale belang ervan in de wereldwijde anti-corruptie-inspanningen benadrukken.

Dit promotieonderzoek onderzoekt de doeltreffendheid van NTR's, zoals Deferred Prosecution Agreements (DPA's) en Non-Prosecution Agreements (NPA's), als instrumenten in de strijd tegen collusieve publieke corruptie (collusive corruption). Dit specifieke type corruptie, waarbij beide partijen samenspannen voor wederzijds voordeel, is bijzonder gevaarlijk omdat het vaak leidt tot meer omvangrijke en schadelijke vormen van corruptie. In tegenstelling tot intimidatie of afpersingsomkopingen (extortive bribery), die vaak kleinere bedragen omvatten en meestal eenzijdig zijn—vaak door middel van een omkoping vanwege dwang of om een sanctie te vermijden—fostert collusieve corruptie diepere, systemische problemen die publieke instellingen en de rechtsstaat ernstig kunnen ondermijnen.

De studie heeft tot doel de afschrikwekkende werking van NTR's op corruptie te beoordelen en de reële effecten van de Braziliaanse anti- corruptiewetgeving van 2013 te evalueren. Het eerste doel is te onderzoeken of deze handhavingsmaatregelen effectief zijn in het afschrikken van corruptie of dat gematigde strategieën deze onbedoeld kunnen aanmoedigen. Het tweede doel richt zich op de empirische impact van de Braziliaanse anti-corruptiemaatregelen en onderzoekt of deze maatregelen de corruptiegerelateerde misdrijven in het land aanzienlijk hebben verminderd.

Het onderzoek begint met een verkenning van de relevante literatuur en een gedetailleerde analyse van de toonaangevende jurisdicties in de strijd tegen corruptie. Ook worden grote corruptiezaken onderzocht, waarbij belangrijke elementen zoals strafverminderingen, verbeurdverklaringen, het vervolgingsbeleid en het toezicht van de rechterlijke macht worden geïdentificeerd om een theoretisch model te ontwikkelen dat de dynamiek van collusieve corruptie verklaart.

De theoretische analyse richt zich op de besluitvormingsprocessen van actoren die betrokken zijn bij een corruptiespel. De analyse toont aan dat rationele actoren worden afgeschrikt door de aanwezigheid van een beleid voor strafvermindering. Als de straffen echter te mild zijn, kunnen deze beleidsmaatregelen onbedoeld corruptie aanmoedigen, ondanks hun uiteindelijke samenwerking met de autoriteiten bij ontdekking. Dit benadrukt de noodzaak van een evenwichtige aanpak van strafvermindering, waarbij de cruciale rol van de discretionaire bevoegdheid van de openbaar aanklager wordt onderstreept om geloofwaardige dreigingen te bieden om medewerking van de verdachten te verkrijgen. Bovendien onthult de analyse dat zelfmelding van corruptiemisdrijven voordat deze door de autoriteiten worden ontdekt, voor verdachten niet voordelig is, tenzij zij een aanzienlijke toename van de kans op ontdekking of veroordeling voorzien.

Om empirisch te onderzoeken of NTR's effectief kunnen zijn in het bestrijden van corruptie, analyseert deze studie de Braziliaanse casus. Brazilië implementeerde vanaf 2013 anticorruptiehervormingen die overeenkomsten vertonen met de beleidsmaatregelen die in het theoretische gedeelte worden besproken. Aan de hand van een semi-structureel model wijst de analyse erop dat deze hervormingen mogelijk een verstorend effect op corruptie hebben gehad en wellicht verdere criminele activiteiten hebben ontmoedigd. Hoewel deze resultaten positief zijn, is verder onderzoek nodig om definitieve conclusies te kunnen trekken.

Ten slotte monitort dit onderzoek de toepassing van deze beleidsmaatregelen in de praktijk in de Braziliaanse operatie Lava Jato (Operatie Car Wash), waarbij de praktische gevolgen van de implementatie van deze beleidsmaatregelen worden geëvalueerd. De bevindingen tonen aan dat, hoewel deze beleidsmaatregelen theoretisch gezien effectieve prikkels zouden moeten bieden en de operatie Lava Jato ogenschijnlijk succesvol was, zij controversieel blijven vanwege de complexe interactie van sociale en politieke factoren die invloed hebben op de handhaving van anti-corruptiemaatregelen.

Lucas A. Chacha

chacha.lucasalves@gmail.com
(+67) 99699 6672

PROFILE

Data scientist and PhD candidate in the European Doctorate in Law and Economics, with strong experience in quantitative research, applied machine learning, and full-stack software development. Founder of *aisol.cloud*, an AI solutions software platform.

EDUCATION

Doctorate, Law and Economics
European Doctorate in Law and Economics (EDLE)
University of Bologna, Hamburg University, Erasmus University Rotterdam
September 2018 – Expected March 2026

Master of Science, Quantitative Economics and Econometrics
University of Santa Catarina, Brazil
March 2009 – October 2011

Bachelor of Science, Economics
University of Mato Grosso do Sul, Brazil
March 2005 – February 2009

EXPERIENCE

Founder & CEO – aisol.cloud (AI Solutions Software)	Dec 2024 – Present
Machine Learning Engineer – Turing Enterprises Inc.	May 2023 – Dec 2024
Data Scientist – Confirmatória	Nov 2022 – Feb 2023
Economist – Santa Catarina Attorney General's Office	Jan 2015 – Nov 2022
Economist – Mato Grosso do Sul Sanitation Company	Jan 2014 – Dec 2014
Substitute Professor – University of Santa Catarina	Feb 2012 – Jul 2013

OWNED SAAS

aisol.cloud — AI solutions software for solar asset analysis and reporting
Launched Feb 2025
hora-hora.com — SaaS platform for appointment scheduling and automated client interaction using WhatsApp
Launched Jul 2025

INTERNSHIP

Financial Intern – Banco do Brasil S.A. Feb 2007 – Dec 2008

MAIN SKILLS

Quantitative research and econometrics; statistical modeling of structured and unstructured data; applied machine learning and AI; cloud-based software infrastructure (AWS); scalable systems architecture; backend and frontend development; data pipelines, MLOps, and production AI deployment.

SOCIAL PROFILES

LinkedIn: `linkedin.com/in/lucas-chacha-bb858221`
GitHub: `github.com/caxaxa`
Kaggle: `kaggle.com/lucaschacha`

LANGUAGES

Fluent: English, Portuguese

Portfolio items	Date achieved	Assessment	EC
Basic Math course for lawyers	01-09-2018	Approved	2,00
Either Advanced statistics or Econometrics	01-09-2018	Approved	2,00
Introduction to Statistics	01-09-2018	Approved	3,00
Introduction to European Competition Law (De Pra)	01-09-2018	Approved	2,00
Game Theory and the Law/Behavioural Game Theory (Carbonara)	01-09-2018	Approved	2,00
Modelling (European) Private Law (Parisi)	01-09-2018	Approved	4,00
Experimental Economics (Casari)	01-09-2018	Approved	2,00
Behavioural Economics (Vanin)	01-09-2018	Approved	2,00
Law and Economic Development (Guerriero)	01-09-2018	Approved	2,00
Introduction ELS	01-09-2018	Approved	2,00
EDLE - EDLE HAMBURG International Summer School	01-09-2018	Approved	6,00
Experimental Law and Economics (Engel)	01-09-2018	Approved	2,00
Advanced ELS Research Design - Theory & Practice	01-09-2018	Approved	2,00
Workshop Crossroads of Law and Economics	01-09-2018	Approved	0,00
Academic Writing	01-09-2018	Approved	4,00
EGSL EXTERNAL - DIGITAL COURSE RESEARCH DESIGN, PART RESEARCH PROPOSAL	01-09-2018	Approved	3,00
EGSL EXTERNAL - DIGITAL COURSE RESEARCH DESIGN, INTRO TO RESEARCH METHODS	01-09-2018	Approved	3,00
EGSL EXTERNAL - DIGITAL COURSE RESEARCH DESIGN, WRITING PROCESS	01-09-2018	Approved	3,00
Academic Integrity	01-09-2018	Approved	1,00
EGSL - Communicate your PhD Research	01-09-2018	Approved	2,00
EDLE - EDLE ROTTERDAM Managing your PhD	01-09-2018	Approved	3,00
EDLE - EDLE BOLOGNA attendance 3rd year presentations	01-11-2018	Approved	0,00
EDLE - EDLE BOLOGNA present final research proposal	01-03-2019	Approved	0,00
EDLE - EDLE HAMBURG presentation introduction chapter	01-06-2019	Approved	0,00
EDLE – EDLE EUR ESL Two presentations of a content chapter at EDLE seminars	01-10-2019	Approved	0,00
EDLE – EDLE EUR ESL attendance BACT seminar series	01-10-2019	Approved	0,00
EDLE – EDLE EUR ESL attendance EDLE seminar series	01-10-2019	Approved	0,00
EDLE – EDLE EUR EGSL lunch lectures	01-10-2019	Approved	0,00
EDLE – EDLE EUR ESL Written peer feedback on peer content chapter 1	01-10-2019	Approved	0,00
EDLE – EDLE EUR ESL Written peer feedback on peer content chapter 2	01-10-2019	Approved	0,00
EDLE – EDLE BOLOGNA presentation of a content chapter	01-11-2020	Approved	0,00
EDLE – EDLE EUR ESL attending Joint Seminar 'The Future of Law and Economics'	01-03-2021	Approved	0,00
EDLE – EDLE EUR ESL presentation of a content chapter in the Seminar 'The Future of Law and Economics'	01-03-2021	Approved	0,00
Total number of EC credits			**52,00**

Table B.13: Portfolio Items