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Going with the flow: corruption in tax agencies

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Abstract. Corruption is a widespread “wicked” problem in the world, whose roots are still poorly understood by policy makers. The paper summarized the findings from the behavioral ethics literature, assembling a model to explain the creation and solidification of a culture of corruption in tax agencies in Brazil. The model represents the conversion of honest tax auditors into corrupt ones based on a process of rationalization that responds to social norms, the magnitude of illegal rewards, perceived risk and job quality. Four policies are simulated and only a policy that combines multiple interventions produces positive results. Overall, the model shows that a culture of corruption can be created and disseminated in few years, becoming resistant to change inasmuch as corrupt auditors occupy management positions and create alliances with politicians.

10% of fresh tax auditors are willing to be corrupt; 10% are incorruptible; 80% go with the flow. – Anonymous old saying in Brazilian tax agencies

One percent of people will always be honest and never steal. Another one percent will always be dishonest and always try to pick your lock and steal your television. And the rest will be honest as long as the conditions are right – but if they are tempted enough, they will be dishonest too. – A locksmith anecdote reproduced by Dan Ariely

A universal problem

Corruption in Brazil is endemic. According to Queiroz (2015), the country loses 2.5% of its GDP to corruption. Losses from corruption account for over 5% of the global GDP (OECD, 2014). The Corruption Perception Index lists 175 countries in order of perceived corruption in the public sector, with Denmark being the least corrupt in 2014 and Somalia, the most one (Transparency International, 2015). Brazil ranks 69th, behind countries like Rwanda, Oman and Cuba. Not only does corruption produce a huge financial impact, but also, by weakening the quality of institutions and diminishing trust in government, it difficulties the process of socio-economic development and negatively affects societal well-being.

Why is corruption so pervasive in our societies? Is corruption only a matter of character, a problem whose solution lies on identifying and purging *bad apples* from social systems? A sample of this view came from former São Paulo mayor Gilberto Kassab. Questioned about a recent corruption scandal in the municipal tax agency, he declared that improved selection mechanisms of civil servants could avert the problem (Agostine & Camaroto, 2013). However, this mental model of corruption assumes that people are inherently corrupt or honest and is divorced from a large body of evidence on behavioral ethics (to be reviewed below). Notwithstanding the influence of dispositional (individual) factors, the literature on unethical behavior has been showing that most of the variance in dishonesty comes from systemic factors, such as misaligned incentives, social norms and internal cultures.

An especially sensitive context for the propagation of corruption is the relationship between citizens and public servants. Tax agencies are a usual hotbed for corruption throughout the world. According to Bridi (2010, p.1),

This sector is very important to a state's development and economic health as it significantly affects its capacity to spend on public projects and programs, thus making problems of inefficiency and revenue leaking especially damaging. Corruption in tax administration also dissuades honest taxpayers by rendering them less competitive and making the black-market a more attractive alternative. Tax administration is an attractive sector for corruption to take place as the opportunities and incentives to engage in illicit

activity are numerous. The complexity of tax laws, the high discretionary powers of tax officials, the low cost of punishment are only some factors creating opportunities for corruption in revenue administration.

Using system dynamics, the phenomenon of corruption in tax agencies in Brazil is modeled in this paper. The choice of the context is justified both by the occurrence of recent scandals that culminated in the arrest of tax auditors in the city of São Paulo and in the states of São Paulo and Parana as well as the deep incomprehension of the phenomenon manifested by policy makers.

The paper has the following structure. First, we describe common misunderstandings associated with the phenomenon. Then, we condense the main findings from the behavioral ethics literature. The model is presented in the sequence along with the results of its simulation. We conclude by discussing findings and limitations.

Common misunderstandings and the emergence of behavioral ethics

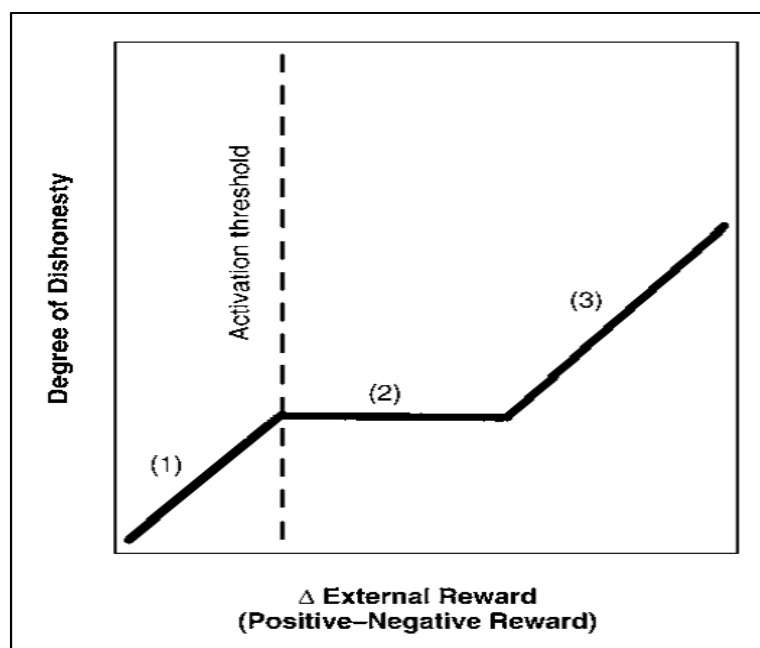
The belief that corruption is a matter of defective personal characters is probably the most pervasive account of the phenomenon among laypeople, including politicians. Other popular accounts include the materialism of our society, as verbalized recently by a prominent Brazilian legislator, and a pure rational perspective, according to which people act unethically as long as the benefits surpass the costs. Usual approaches to tackle corruption involve an appeal to the rational criminal behavior model (Becker, 1968): Increase the certainty and amount of punishment. The same mental model, it is worth noting, integrates the conceptual framework for taxpayer behavior used in tax agencies throughout the world, giving rise to a criticized *cops and robbers* approach (Kirchler, 2007).

While cases of corruption keep making daily news and represent a topic of public interest (given its social consequences), there seems to exist among relevant social actors a lack of understanding about the real causes of the phenomenon. Flawed or incomplete mental models lead to false solutions. If the problem boils down to people, these models would call for the removal of *bad apples* from the system as a safe solution. Alternatively, if people give a low weight to costs, just increase them by setting a higher probability of detection or increase the expected punishment.

However, the emergence of behavioral ethics literature over the last two decades has shown deeply counterintuitive causes for corruption or dishonest behavior. This literature is clear in the conclusion that dishonesty is not a product of a simple cost-benefit analysis (Ariely, 2012). Research from this field confirms that most individuals, when thinking about causes of corruption, tend to commit the so-called *fundamental attribution error* (Jones and Harris, 1967). People blame character flaws while ignoring the usually dominant roles played by situational forces. Moreover, there is a tendency to think that one is immune to the same contextual influences.

Dishonest behavior arises in response to a combination of powerful contextual forces. Consider the role of incentives. As stated before, traditional economic analysis posits that people will behave unethically whenever the size of rewards (linearly) exceeds the risk and size of punishment. However, this prediction stands in contrast with actual research findings. Mazar, Amir and Ariely (2005) propose a three-stage process to account for the effect of the size of rewards on the level of dishonesty (figure 1). Central to the model is the activation of an internal mechanism of control in human beings. This mechanism balances the size and attraction of unethical rewards against internal feelings of pleasure that arise when one acts consistently with his/her social identity. In the first stage, small rewards produce dishonest behavior that does not activate this mechanism. A pen accidentally taken from the office does not feel like cheating to most people. However, when the magnitude of rewards increases and reaches a given threshold, it tends to drive the attention from the self (the “activation threshold” in the figure), engaging the internal mechanism to keep the behavior in line with one’s identity. Few people would take cash from the office (“I am not a thief!”) This consistency between behavior and identity holds for a certain range of increase in the size of rewards. A second transition of phase may occur when rewards from unethical behavior become too large to resist and a powerful psychological mechanism (rationalization – see discussion below) can be recruited. At this stage, the behavior of most people changes and dishonesty prevails (segment 3 in the figure).

Figure 1. Dishonesty levels in response to the size of rewards



Source: Mazar, Amir and Ariely (2005)

The importance of these findings is clear when one considers the huge figures usually involved in a tax audit in Brazil. A single case of tax evasion can easily reach millions of dollars. The problem is compounded by the fact that a sizable share of taxpayers may be willing to evade taxes and corrupt tax auditors (Kirchler, 2007). Moreover, lengthy, confusing tax regulations – commonplace in developing countries – usually create several gray zones. Temptation to cheat then lurks in the background when tax auditors have the possibility of making decisions with different financial consequences to unethical taxpayers. A “perfect storm” of factors favoring corruption can result, helping to disseminate an unethical culture.

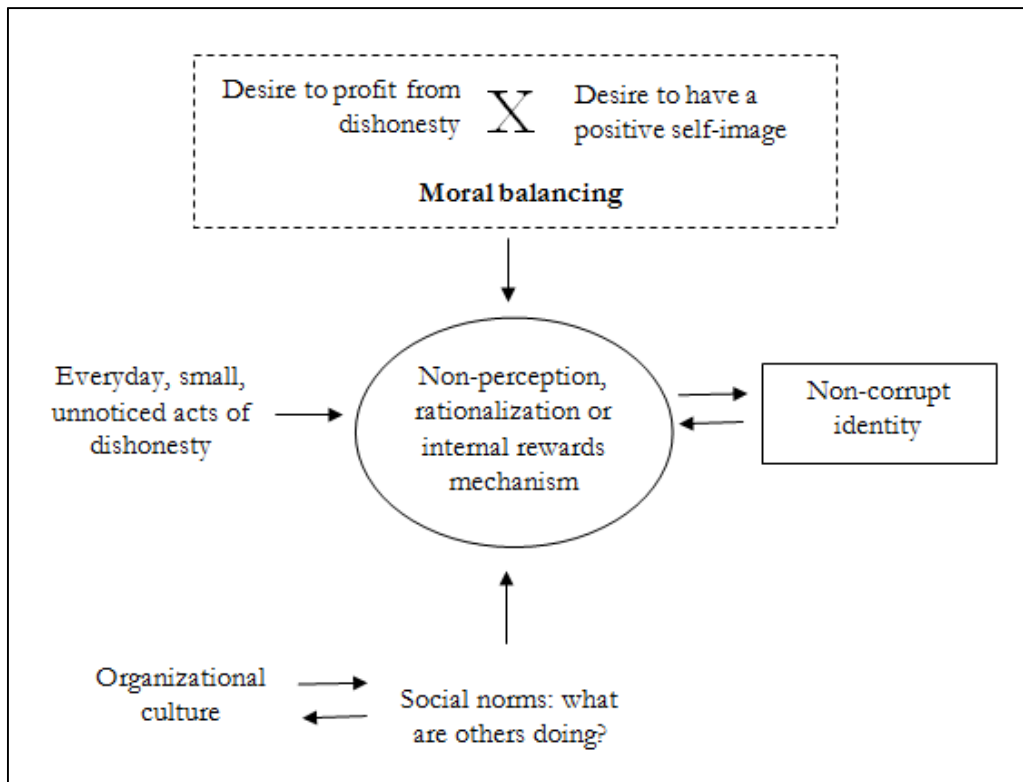
Thus, drawing from the literature on behavioral ethics, we identify two potential main phases of dishonest behavior within a tax agency (or within any organization). The first phase (the “I am not a nun” phase¹) is in fact a stage of pre-dishonesty, similar to the state of affairs in any organization or social group. What characterizes this phase is the prevalence of small, everyday, undetected acts of cheating. A telephone call from a corporate number to solve a private problem. A job finished without the proper requirements. The purchase of counterfeit merchandise. Nevertheless, while people have an intrinsic desire to benefit from dishonesty, they have a competing drive to maintain a positive self-image and act consistently. This delicate equilibrium, named moral balancing (Nisan & Horenczyk, 1990), is easier to strike at this stage.

Dishonesty is also held in check by influence of peers. Social norms and conformity are a powerful force shaping behavior in any social context: according to the *sociometer hypothesis*, human beings are constantly monitoring their social environment and searching acceptance cues in order to feel esteemed (Leary *et al*, 1995).

Figure 2 display the “I am not a nun” phase. In the absence of other drivers (discussed next) and with proper controls and internal culture in place, this is probably an equilibrium phase.

¹ “I am not a nun” is an appeal to an untenable perfection that the first author heard as justification for unethical behaviors in tax agencies. It is the unequivocal result from a rationalization process.

Figure 2. First stage (pre-dishonesty): “I am not a nun”



Phase 2 of dishonesty follows a transition of state. A combination of particular elements is responsible for such transition. Ariely (2012) and Bazerman & Tenbrusel (2011) discuss these elements at length. From their work and related research, we distill the following set of elements:

- Presence of *bad apples*. According to the research of Gino, Ayal and Ariely (2009), a person willing to behave unethically can contaminate a social group when he/she is perceived as an in-group peer. In other words, corruption can spread as a reflection of the social norms that govern in-group relationships.
- Presence of large incentives coupled with loose controls. These effects can make a temptation too irresistible to many individuals, a concern especially relevant in the tax context, in which an illegal tax deal can represent figures worth several years of an auditor’s salary. Moreover, the salience of incentives can be larger when the salary is perceived as being insufficient. Perception of financial deprivation, as manifested in the belief that one’s salary is below a fair level, can compromise moral behavior (Sharma *et al.*, 2014). Kirchler (2007) cites evidence from developing countries suggesting that this perception can be a driver of corruption in tax agencies.
- Conflicts of interest. Tempting incentives and emerging social relationships can facilitate unethical acts. Webs of reciprocity can emerge in the tax context out of

the relationships between tax auditors and firms' representatives. Moreover, conflicts of interest can activate a process of *motivated blindness*, whereby there is no awareness of the ethical implications of one's behavior. As Bazerman & Tenbrunsel (2011) note, the well-known phenomenon of groupthink – the tendency of cohesive groups to maintain unanimity, avoiding the evaluation of alternative information – can also lead to quick acceptance of questionable decisions.

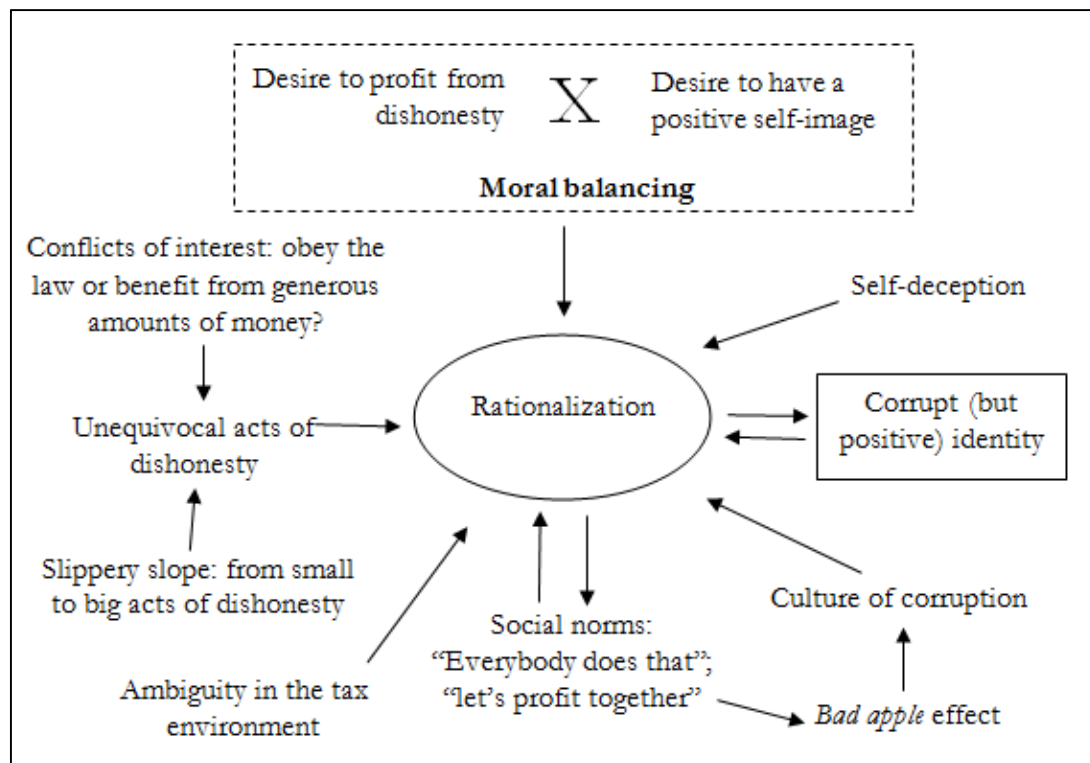
- Actual distance from money. The greater the distance from actual cash the more one can compartmentalize or rationalize unethical acts (Mazar, Amir & Ariely, 2008). Consider that a tax auditor often deals with financial data in electronic format.
- The nature of the tax system, involving the complexity of tax rules, tax burden and perceptions of justice and corruption in the system. A classic approach to segmentation in the tax field, the pyramid model (Kirchler, 2007), considers the existence of evaders, resistant, uncertain and willing to comply taxpayers. The probability of full compliance diminishes as long as the elements of the tax system deviate from normative standards, increasing the tendency of resistant and other segments to dodge taxes by seeking illegal shortcuts.
- Ego depletion. According to a large amount of evidence (e.g. Baumeister & Vohs, 2007), self-control is like a muscle (or a reservoir, as a system dynamicist would see it). It is depleted by choices, temptations and mishaps, opening the door to impulsivity and dishonesty. In the Brazilian bureaucracy context where tax agencies operate, the profusion of norms and intricate regulations can accelerate the process of depletion. Perceptions of injustice can play a role in the process: the more one is irritated by unfair treatment, the easier the justification of one's dishonest behavior. It is dishonesty as "retribution".
- A slippery slope sequence of immoral acts. Unethical behaviors can progressively escalate in any organization by a *slippery slope* process. Social reality is naturally ambiguous. Conspicuous dishonest acts can be a consequence of what started as small transgressions. There is a point, however, where one reaches a "dishonesty threshold". Over that point, cheating occurs at full throttle and there is full awareness of violation of ethical standards.
- The opportunity to benefit others. Cheating increases when it benefits people that are important to the person cheating (e.g., colleagues at work). Informal systems are often the key to understand the nature of behaviors prevalent in any organization. Group influences and the intrinsic desire to belong can be powerful drivers of unethical behaviors.
- The clash between hot and cold affective states (Loewenstein, 2000). When there is cold reasoning about future behavior or reflection on past behaviors, being physically and temporally distant from the actual situation makes it easier to think that unethical behaviors will not or have not occurred. However, the evidence is clear: when the actual situation is playing out, visceral influences (hot states) – such as the possibility of big rewards or the intrinsic need to please the group – make a disproportionate influence on decisions and behaviors. This factor is as

powerful as its influence is unrecognized by both novice tax auditors and public management system designers.

- A powerful psychological process – rationalization. This is a central element of our psyche and the main force in the process of corruption. It catalyzes the effects of all the influences listed above. Rationalization is like an internal lawyer arguing the case of a guilty client to a friendly, willing to forgive judge or a political marketer spinning the news to help his/her candidate. When fully recognized by the self, most immoral acts still leave room for positive interpretation. A questionable decision in a tax audit is not the same as a clear-cut act of immorality (like a burglary). Traditional ethics trainings fail because they have a false assumption: That individuals recognize an ethical dilemma when it is presented to them. From the point of view of a corrupt tax auditor, an illegal tax deal can be easily rationalized away as a heroic act to secure a business' survival while collaborating to lofty goals such as keeping a healthy economy and the future generation of taxes (“who could object to such win-win-win deal?”). The literature shows that rationalization has its allies: egocentrism, overclaiming (the tendency to see one as deserving more than other people), one-sidedness of moral judgments (the evocation of benevolent rules for themselves and stringent ones for others), self-serving bias and moral disengagement (the activation of moral standards at will). It is possible to act dishonestly at work while doing good deeds in other domains of life. Rationalization is also easier when peers do the same dishonest acts, helping cheating to become infective in a social group. A shocking consequence of rationalization is a change in perception: over time, the dishonest individual perceives everybody else as equally corrupt.

The concurrent influence of such elements creates a “perfect storm” for corruption. We name this phase “The world is corrupt” (figure 3).

Figure 3. Second stage: “The World is corrupt”



Reference mode

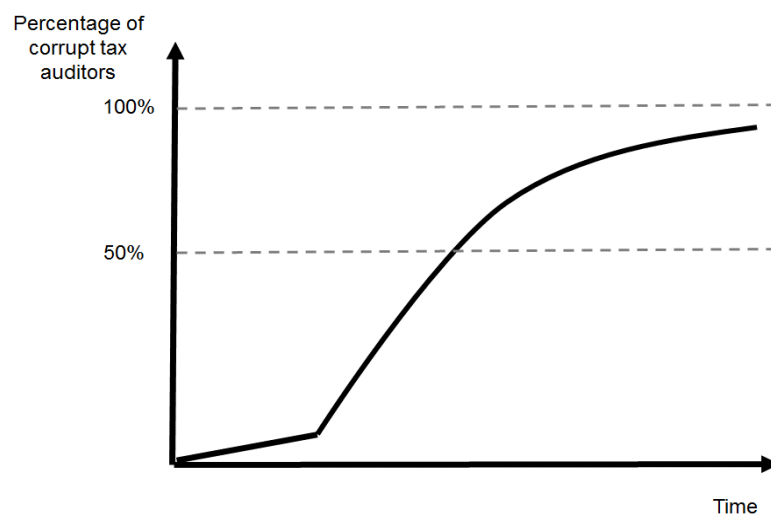
In 2015, a bribery scandal was uncovered in the Parana state tax agency (Parana is one of the 26 states in Brazil and the fourth economy in the country). The investigation revealed a widespread bribery scheme, with political ramifications suggesting a connection to the governor’s office. According to the main informer in the case, “corruption in the tax agency is institutionalized. It encompasses from 80% to 90% of the agency. And everybody knows who does and who doesn’t do it” (G1, 2016). According to the informer, corrupt tax auditors share the bribes with their regional supervisors and with the top management team, who gets 10% from the local branches. According to him, corrupt auditors felt protected because a governor’s relative was responsible for appointing managers in the agency as well as warning them about possible enforcements against the group.

Bridi (2010, p.2) remarks that

A state’s revenue processes involve several major stakeholders and make the opportunities for and motivations to engage in corruption both numerous and widespread. These stakeholders include the tax officials, politicians, patrimonial networks and the taxpayers themselves.”

Against this backdrop, we posit the reference mode depicted in figure 4. It considers a tax administration agency that starts operating from the scratch. In developing countries, new organizational structures were developed as the bureaucracies matured in the last century. For instance, Brazilian federal tax agency was created in 1968 and its Argentinian counterpart, in its current version, in 1996. Considering that most of the theoretical drivers for unethical behavior are present in the context of tax management, the reference mode reflects a situation in which most of tax auditors can be infected by the *virus* of corruption in a short time horizon, as it seems to have happened in the Parana state tax agency. Of course, the state of a system like this is dependent on the interplay of several variables and seems to be path-dependent. It is easy to conceive a situation in which strong internal norms and a certain degree of protection against political interference can foster a culture hostile to corruption. In other words, we are cautions about generalizing the same process to all or to the majority of tax agencies in Brazil or other developing countries. Nonetheless, what the reference mode and the model suggest is a possible evolution for a system where the drivers for corruption are left unchecked.

Figure 4. Reference mode



Dynamic hypothesis

The dynamic hypothesis states that a small (and decreasing) percentage of dishonest people enters the system as tax auditors, along with honest ones. Initially, the dishonest auditors are the minority but the picture changes when honest auditors are exposed to the *hot states* in the system, which can be easily rationalized. These states are:

- The magnitude of rewards from potential illegal deals with taxpayers (rewards that increase in proportion to the tax burden);
- The perception of low risk that flourishes in a context of deficient management and high interest of taxpayers in evading taxes;
- The pressure of bureaucratic jobs that drain willpower and lead to ego depletion;
- Especially, the social norms that help to establish a culture of corruption in a self-reinforcing pattern (the more prevalent the perception that corruption is *business as usual*, the more conversion one can expect from people naturally inclined to fit in).

Overtime, the presence of such *hot states* will make a substantial share of former honest tax auditors cross the ethical line, helping to create and sustain a culture of corruption within a tax agency. The increase in the number of corrupt tax auditors then spreads to management positions, strengthening the culture. Management positions grant control over the entire system so corrupt auditors will struggle to be appointed to them. At the same time, the sheer amount of resources involved in illegal tax deals attract the interest of politicians who, in the absence of strong institutions, will become part of the system, influencing especially the appointment of managers.

Model

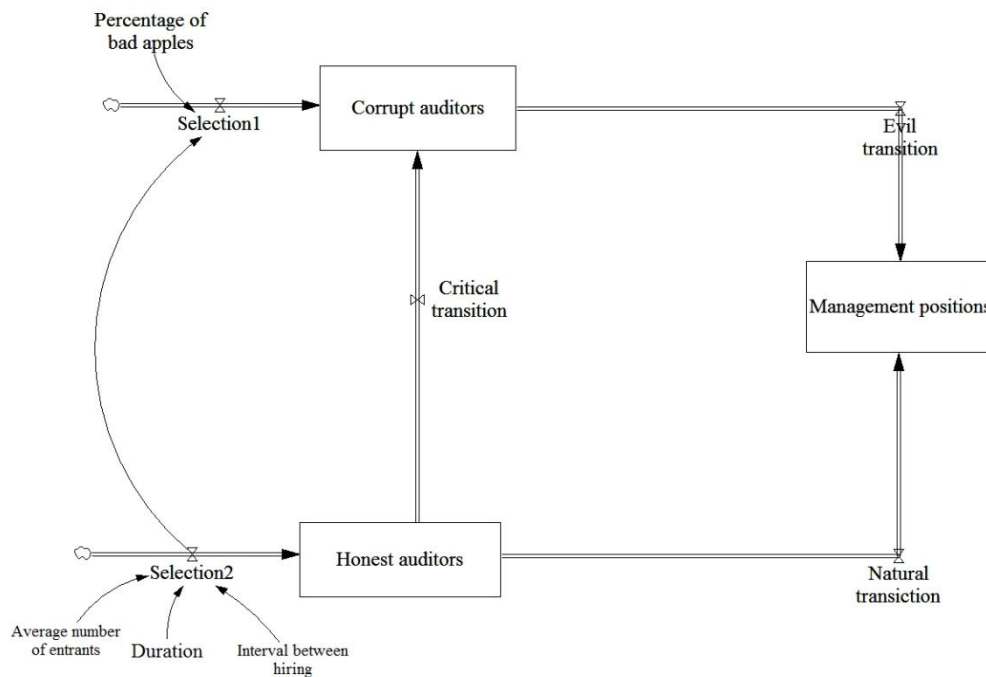
The myriad of potential factors influencing the birth and spread of a culture of corruption within a tax agency presents a challenge for the modeling process. With this caveat in mind, we present the first draft of a “small model” (Ghaffarzadegan, Lyneis, & Richardson, 2011) that intends to aggregate some of the conceptual elements discussed above while trying to capture the main dynamics of the system.

We considered a time horizon of 30 years and a tax agency that has an initial stock of 200 (honest) tax auditors, no dishonest auditors and 50 auditors in the management positions. After each three years, 100 previously honest auditors and a certain number of *bad apples* join the agency. For simplification purposes, there is no outflow due to retirement or other reasons. As said above, the goal is to reproduce what could have happened when tax agencies were created some decades ago at several levels of government (federal, state and municipal levels) in Brazil and similar countries. We modelled the number of *bad apples* after a linearly decreasing series, starting at 20% of honest auditors and ending at 2%. The reason reflects a widespread belief among seasoned Brazilian tax auditors who point to a change in the profile of novice tax officers, especially after the decade of 1990.

According to figure 5, the physical stocks in the system are the number of honest and corrupt tax auditors as well as auditors in management positions. The model represents the transition from honest to corrupt status while accounting for the upgrade in the career of both types of auditors. There is no significant inflow from corrupt to honest tax officers, hence the one-sided flow. As said above, the model assumes that a small percentage of novice tax auditors is composed by *bad apples* – people entering the system with the goal of profiting from illegal deals with taxpayers. Two transitions are relevant for our

purposes: The *critical transition* from honest auditors to corrupt auditors, and the *evil transition*, from corrupt auditors to management positions. The latter is called “evil” because it is key for controlling resources in a tax agency, fostering the solidification of a culture of corruption over time.

Figure 5. Stocks and flows of tax auditors.



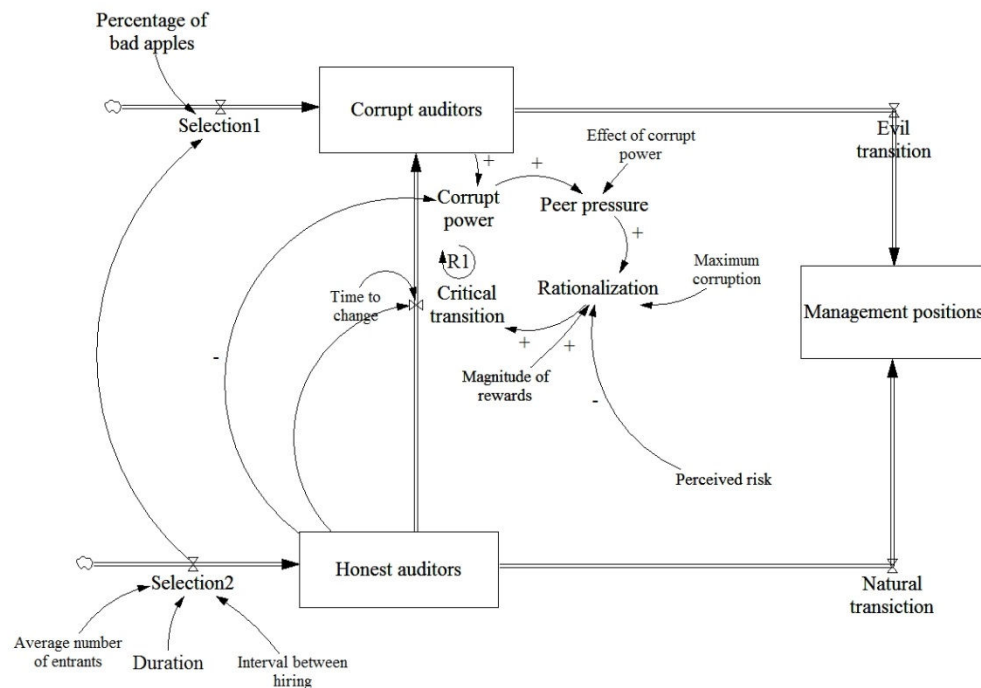
It is very unlikely that any external control in the selective process can prevent *bad apples* from entering into the system. First, only formal records of previous misbehavior can prevent the selection of a *bad apple*. Secondly, no control at this point can predict how individuals will react to the *hot states* present in the system. On the other hand, internal control could remove dishonest auditors from the system, but the model assumes that control in Brazilian bureaucracy is focused only on formal aspects of an auditor’s job and easily gamed. Moreover, considering that the digitization of tax records is a recent phenomenon in the country, being fully effective only in this millennium, it was extremely difficult to uncover corruption among tax auditors working with records in paper.

The first critical transition – from honest auditors to corrupt ones – depends on the strength of the rationalization process. Peer pressure (social norms), the magnitude of rewards, the quality of one’s job (through its influence on ego depletion) and perceived risk are hypothesized as the main drivers of rationalization. Peer pressure, named *corrupt power* in the model, is a function of the percentage of corrupt auditors in the system (figure 6). The model assumes this pressure reaches a tipping point when by 30% of total auditors are corrupt. Above this threshold, the perceived prevalence of corruption is

widespread and the influence on the conversion is the strongest. Similar to the conclusion reached by Queiroz (2015), this is a fast and reinforcing loop that facilitates the spread of corruption. Corrupt tax officers put pressure on honest officers to conform – sparking the process of rationalization. On the other hand, as illustrated by the vignette in the beginning of the paper, there is a small percentage of people who will never cross the ethical line. This percentage is estimated at 10% of honest tax auditors. The variable *maximum corruption* thus is set at 0.9.

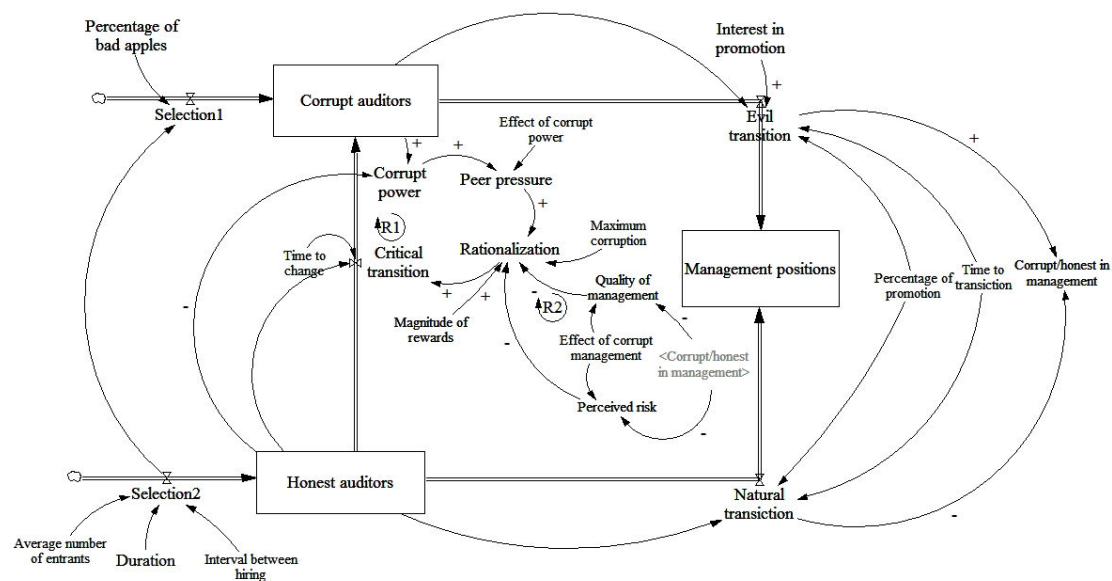
The values involved in tax auditing can be very high. Typically, such audits cover the previous five years of an enterprise's economic activity. As illegal deals can present auditors with figures worthy years of their regular salaries, the magnitude of rewards is set to represent a strong source of temptation for tax auditors. Figure 6 also presents the effect of the perceived risk in engaging in such deals. Considering cultural and institutional contexts, marked by very rare cases of formal accusations of bribery, this risk is set to be low.

Figure 6. Critical transition



As corrupt auditors perceive they are free to set the norms and practically immune to the prevalent control mechanisms, they start aiming at higher positions in the hierarchy, where they can control more resources and influence procedures and the auditing processes. Thus, their interest in promotion is stronger than the regular interest of honest auditors (moreover, typically there is a small improvement in salaries in such positions so there is little competition for them). As corrupt auditors start occupying management positions and becoming the majority, they change the internal systems of incentives,

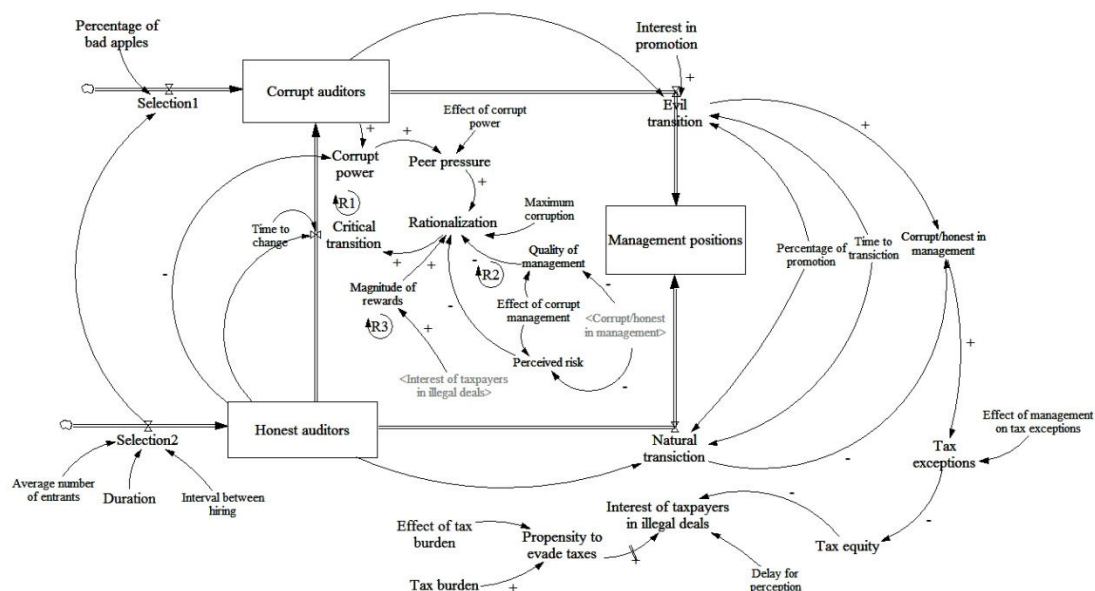
creating social benefits for those that play by their rules while decreasing the quality of management. Bureaucratic, exhausting and time-consuming jobs add another layer of justification to facilitate the rationalization process. It is moral balancing *per se*: the individual can easily justify his/her illegal deals (which are always treated euphemistically) by contrasting them with the sacrifice and effort incurred in his/her regular activities. This process creates another reinforcing loop (figure 7).



where interests converge. The entrepreneur wants to pay less because he has evaded taxes and the auditors want part of the money” (Ayres, 2016). According to one person involved in the scandal, the enterprises were the source of the proposals, but it is reasonable to expect a two-sided flow in such cases.

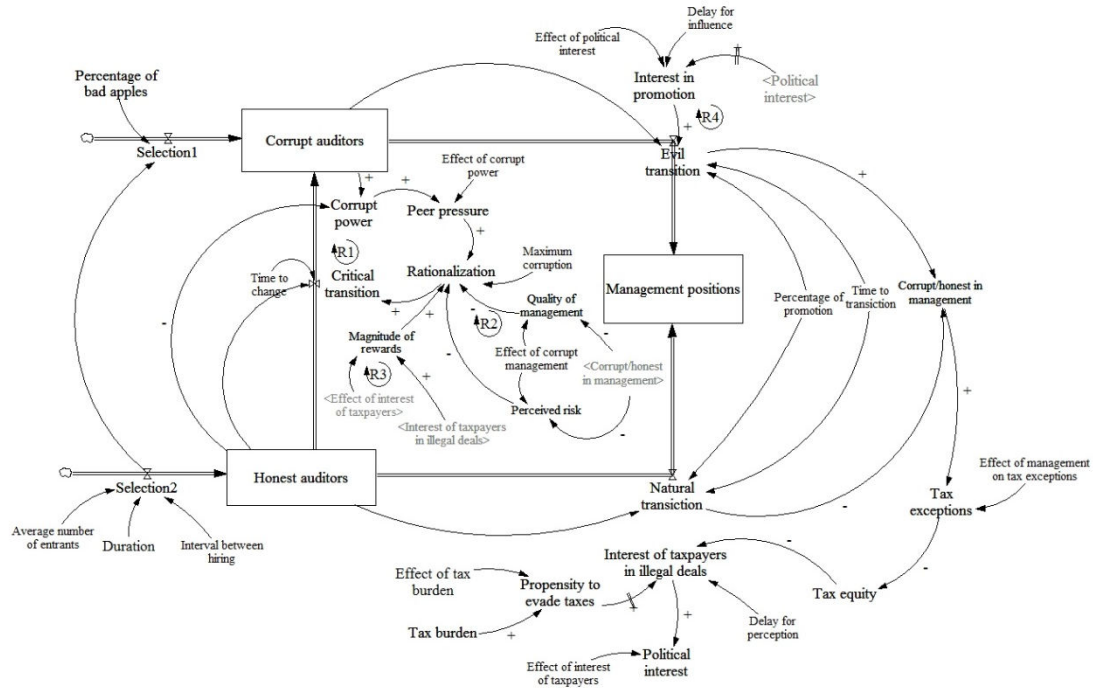
Figure 8 also shows that the prevalence of corrupt managers lead to the creation of tax exceptions, a situation more probable in a context of increasing complexity in the tax law. In turn, the existence of tax exceptions decreases the perception of fairness of the tax burden, increasing the willingness of firms to dodge taxes (Kirchler, 2007). Another reinforcing loop (“R3” in the figure) greases the wheel of corruption. As Bridi (2010, p.3) stresses, “as a consequence of rampant corruption in revenue administration more generally and the competitive disadvantage this causes specifically, the distributive function of tax collecting is itself undermined”.

Figure 8. Propensity to evade taxes



Finally, the existence of an increasing amount of evaded taxes and the increased interest of taxpayers in illegal deals make this system more permeable to political influence. Politicians can perceive a source of funding for their campaigns as well as for personal exploitation. Figure 9 shows that this interface is set mainly at the appointment of tax auditors to management positions. Typically, tax agencies in Brazil are not autonomous and their managers are chosen from the pool of regular auditors. This process is amenable to political interference.

Figure 9. The complete model: The influence of politicians



Simulations

Figures 10 and 11 present the base run of the model, encompassing the proportion of corrupt officers in auditing (“corrupt power”) and management as well as the evolution of the number of each category of auditors.

Figure 10. Proportion of corrupt officers in auditing and management

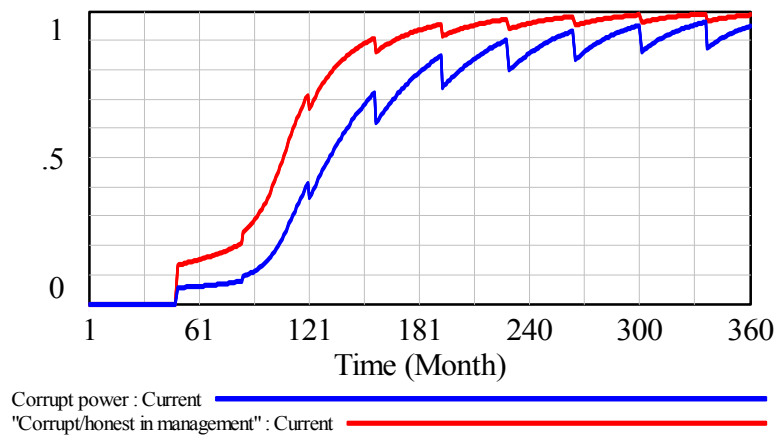


Figure 11. Number of honest and corrupt officers in auditing

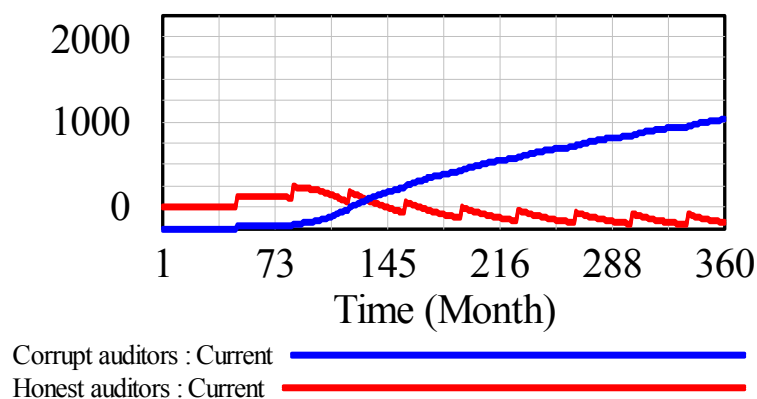


Figure 11 shows that it takes about 11 years to the number of corrupt auditors surpass the number of honest ones. About the same time is required to most of management positions be filled by corrupt auditors. The progression is then very rapid and in 20 years most officers, both in auditing or management positions, are espousing corruption practices.

What then can public policy makers intent on fostering a clean organization do? According to Bridi (2010), efforts to fight corruption in tax agencies have relied on measures such as employment practices, increased transparency, strong management and semi-autonomous revenue authorities. In fact, any serious effort to tackle effectively the problem probably needs to rely on a combination of measures. One of the promising courses of action comprises measures to make the illegal rewards less attractive. This can

be achieved, for instance, through more frequent audits on enterprises (increasing the perception of risk and decreasing the amount due in the case of fines) and reviews on the work of corrupt auditors. Other courses of action, according to the author, include reducing contacts between auditors and taxpayers, reducing auditors' discretion, creating channels for anonymous denounces, rotating auditors, providing sufficient remuneration to tax officers and fostering strong management bodies and organizational cultures. Regarding personnel policies, the author stresses that they should be accompanied by a policy of attracting, retaining and motivating highly qualified staff, using quality of work as the criteria for promotion.

Diminished magnitude of rewards. Thus, we test the effects of reduced magnitude of illegal rewards, which could be achieved through a combination of better salaries, more frequent audits and other organizational measures. We considered a situation in which rewards from illegal deals are set to be a fraction (0.25) of their regular magnitude.

Figures 12 and 13 show that this policy retards the evolution shown in the base run scenario. However, corruption still spreads in the agency.

Figure 12. Proportion of corrupt officers: Diminished attractiveness of illegal rewards

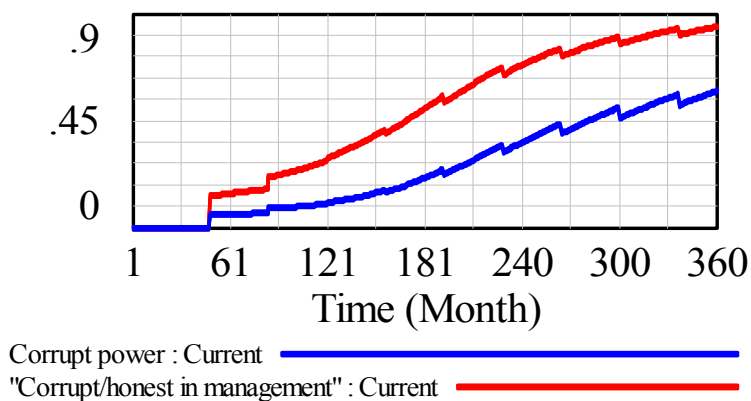
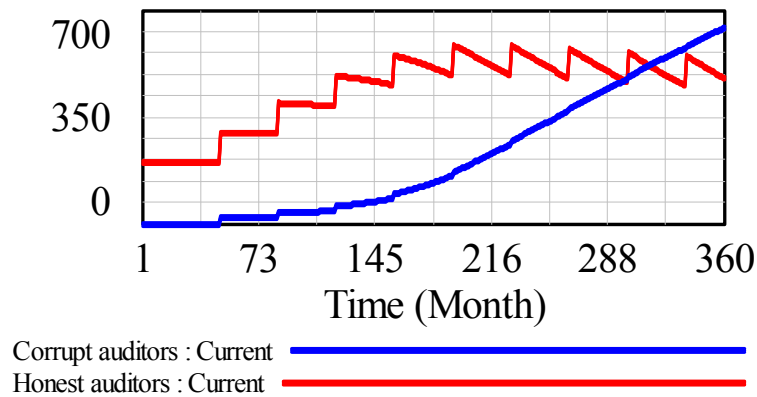


Figure 13. Number of tax auditors: Diminished attractiveness of illegal rewards



Attractive career for management. A second type of policy creates an attractive career that equates the interest of corrupt and honest auditors in occupying management positions, without changing the effects of political influence. Salaries that are more attractive for managers and other financial and social rewards are examples of such policy. Figures 14 and 15 show that the effect of this policy is very limited. The system basically converges to its attractor range, albeit slowly than in the base run scenario.

Figure 14. Proportion of corrupt officers: Attractive career in management for honest tax auditors

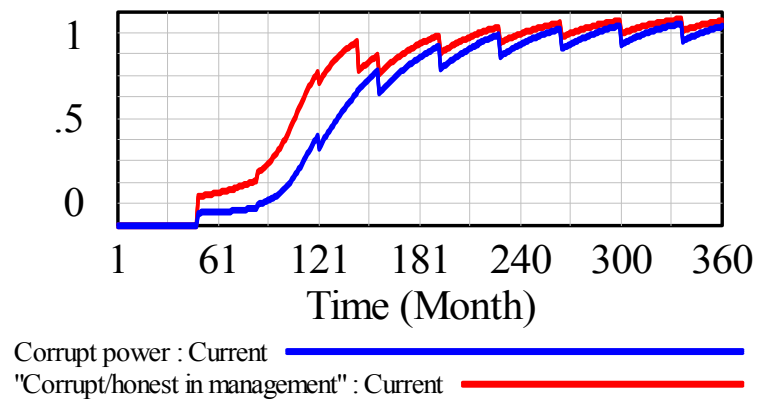
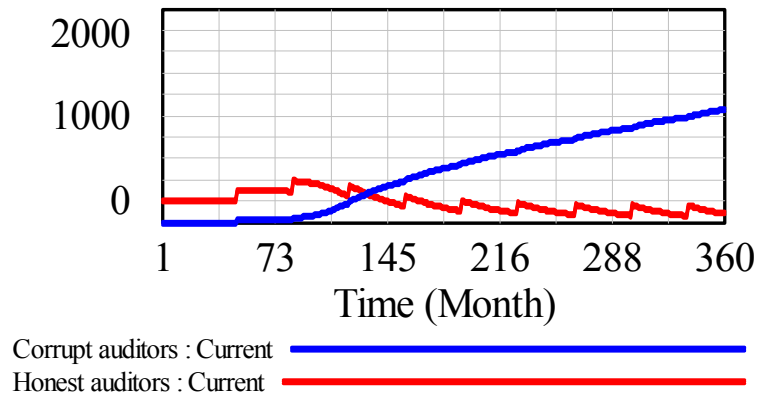


Figure 15. Number of tax auditors: Attractive career in management for honest tax auditors



Combination of previous policies. We then tested the combination of the two previous policies (better management career and diminished magnitude of illegal rewards). Interestingly, this combination can avert the dissemination of a culture of corruption if they are in place since the beginning of the agency, at least for the time horizon considered in the simulation. However, assuming a more practical perspective, which requires the test of policies for agencies already contaminated by corruption, we test the combination of both policies starting in year 13, when most of auditors are already corrupt, according to the base run scenario. The result is that the combination of the previous policies is useless to revert the process at that point (figures 16 and 17).

Figure 16. Proportion of corrupt officers: The combination of two policies starting in the 13th year

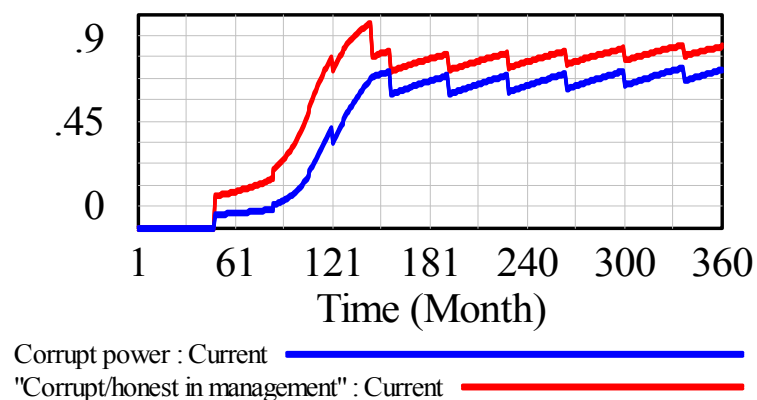
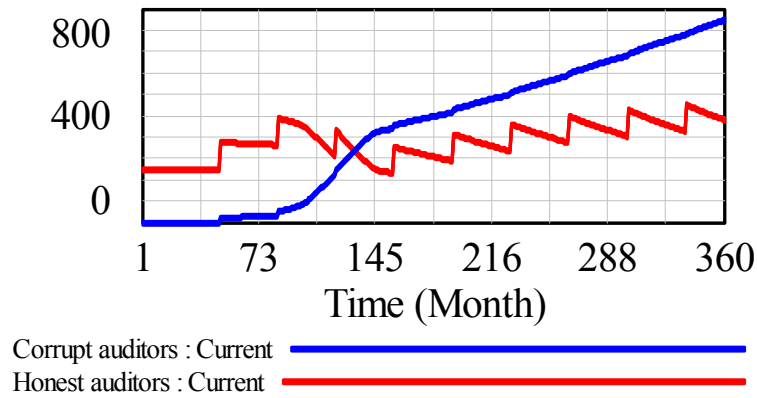


Figure 17. Number of tax officers: The combination of two policies starting in the 13th year



Combination of three policies. After corrupt officers became the majority, corruption spreads and creates roots, making its eradication a very tough job. Considering real world scenarios, in which corruption can be prevalent especially in agencies in developing countries, it makes sense to look for a combination of measures capable of reverting or at least stopping the process of its dissemination. Adopting isolated measures to combat widespread corruption in an organization seems to be a recipe for failure. We simulated the combination of three policies. Before it, we considered a scenario of autonomy, in which there was no political interference, but it did not prevent the trend depicted in the base run scenario. We then combined it with the policy to reduce the magnitude of illegal rewards but the results were also disappointing. Then we tested the three-policy scenario: autonomy of the agency, small magnitude of illegal rewards and a stronger management career (stronger than the isolated policy tested before). It was assumed the interest of honest auditors would be four times stronger than the interest of corrupt officers in such scenario, a plausible assumption when one considers that the agency is free from political interference and managers can implement their strategies freely. Under such assumptions, the dissemination of corruption could then be averted and the agency would gravitate towards a clean culture. Figures 18 and 19 present the results. It is worth noting that the model has no outflow for dishonest auditors (either by firing or by retirement). Such addition, with the improvement of internal controls, could accelerate the process towards a cleaner agency. However, this only can happen when honest auditors occupy the majority of management positions.

Figure 18. Proportion of corrupt officers: Combination of three policies starting in the 13th year

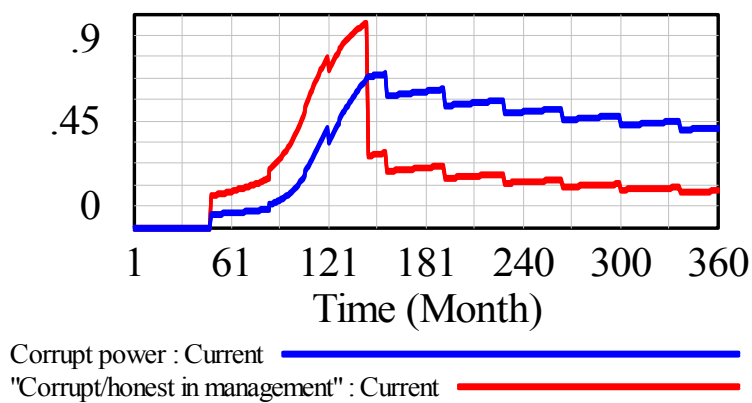
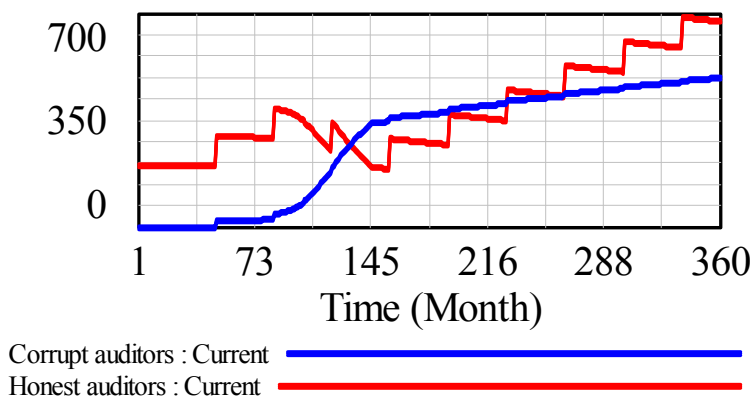


Figure 19. Number of tax auditors: Combination of three policies starting in the 13th year



General discussion and conclusion

The results from the last simulation suggest that it is very difficult to eradicate corruption in a tax agency once it has been disseminated. It takes more than ten years to a new culture create roots. Nevertheless, as corrupt officers retire or are fired (a scenario not shown in

the simulation), new virtuous cycles can ensue, spreading its effects to society (via a more equitable taxation policy, for instance).

In summary, the model presented in this paper intends to explain how corruption spreads within a tax agency, given certain conditions. Understanding the phenomenon is essential to policy development. Traditional approaches to the study of corruption emphasize the role of macro factors, such as the size of public sector, levels of social inequality, levels of government regulation and other economic variables. The model also contributes to the system dynamics literature by shifting the focus towards the role of psychological and social variables and their interplay in a delimited social context. As Max Bazerman and Francesca Gino (2012) state, shifting the modes of thought about how ethics and dishonest behavior actually play out can have profound societal implications.

A note of caution is warranted. The model is a first draft. While we took care to interview seasoned tax auditors in the process of creating and validating the model, it is challenging to model the concurrent influence of several psychological variables on the process of rationalization that is key in the conversion of former honest tax auditors. Some of the elements from the behavioral ethics literature could be included in future versions of the model. For instance, the conflict of interests and the network of relationships that develop within the taxation “ecosystem” (involving representatives from enterprises, accountants and other professionals) can play a role in the manifestation of the phenomenon. The wide fluctuation in salaries of tax auditors in Brazil over the last decades may have also accelerated the spread of corruption in some cases. Kirchler (2007) points to the fact that low salaries of tax auditors in Russia are clearly associated with corruption in the tax administration in that country. This is a point of leverage easily forgotten by policy makers, especially in times of economic crisis. Other suggestions for further improvement include the addition of outflows to represent the firing of corrupt auditors and its effects on the system as well as the possible flow of former corrupt auditors into the stock of clean auditors².

Corruption is a multifaceted problem. In a broader perspective, it is an emergent property of a social system that reflects a myriad of social interactions occurring at the micro level. Future research could also develop models that integrate system dynamics with agent-based modelling to capture the effects of interactions at the individual level and their emergent properties in the taxation “ecosystem”.

We end by recurring to Kirchler (2007):

The instrumental value of reducing corruption goes far beyond its effects on tax evasion and tax revenues. Accepting corruption (...) may undermine values of democracy and good governance. (...) Eliminating corruption should be considered an end in itself.

² Do they face opposition from the rest of the (corrupt) system? We thank one of the reviewers for this insightful suggestion.

It is time for governments to make a serious effort to tackle the problem of corruption in tax agencies. This requires pulling the right levers with the aid of behavioral science and a systemic perspective.

References

Afonso, J. R. 2011. Vencer a fronteira da má tributação. Retrieved October 10, 2015, from: <http://www.ipea.gov.br/desafios/index.php>.

Agostine, C. & Camarotto, M. 2013. Aliado de Serra indicou líder do esquema de corrupção, diz Kassab. Retrieved November 10, 2015, from: <http://www.valor.com.br/politica/3325190/aliado-de-serra-indicou-lider-do-esquema-de-corrupcao-diz-kassab>.

Ariely, D. 2012. *The (Honest) Truth about Dishonesty*. Harper Collins, New York.

Ayres, M., 2016. Auditora da Receita afirma que empresários ofereciam propina. Retrieved March 1, 2016, from: <http://www.gazetadopovo.com.br/vida-publica/auditora-da-receita-afirma-que-empresarios-ofereciam-propina-62u8nervw8tli06rju4w05yb>.

Baumeister, R. F., & Vohs, K. D. 2007. Self-Regulation, ego depletion, and motivation. *Social and Personality Psychology Compass* 1(1): 115-128.

Bazerman, M. H., & Tenbrunsel, A. E. 2011. *Blind Spots: Why We Fail to Do What's Right and What to Do About It*. Princeton University Press, New Jersey.

Bazerman, M. H., & Gino, F. 2012. Behavioral ethics: Toward a deeper understanding of moral judgment and dishonesty. *Annual Review of Law and Social Science* 8: 85-104.

Becker, G. S. 1968. Crime and punishment: An economic approach. *Journal of Political Economy* 76: 169-217.

Bridi, A. 2010. Corruption in tax administration. Retrieved November, 10, 2015, from: <http://www.u4.no/publications/corruption-in-tax-administration/>.

G1. 2016. 'Corrupção é institucionalizada na Receita', diz delator da Publicano. Retrieved March 7, 2016, from: <http://g1.globo.com/pr/parana/operacao-publicano/noticia/2016/03/corrupcao-e-institucionalizada-na-receita-afirma-delator-da-publicano.html>.

Ghaffarzadegan, N., Lyneis, J., & Richardson, G.P. 2011. How small system dynamics models can help the public policy process. *System Dynamics Review* 27(1): 22-44.

Gino, F., Ayal, S., & Ariely, D. 2009. Contagion and differentiation in unethical behavior the effect of one bad apple on the barrel. *Psychological Science* 20(3): 393-398.

Gino, F., Ayal, S., & Ariely, D. 2013. Self-serving altruism? The lure of unethical actions that benefit others. *Journal of Economic Behavior & Organization* 93: 285-292.

Kirchler, E. 2007. *The Economic Psychology of Tax Behaviour*. Cambridge University Press, Cambridge.

Jones, E. E., & Harris, V. A. 1967. The attribution of attitudes. *Journal of Experimental Social Psychology* 3(1): 1-24.

Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. 1995. Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology* 68(3): 518.

Loewenstein, G. 2000. Emotions in economic theory and economic behavior. *American economic review* 90(2): 426-432.

Mazar, N., Amir, O., & Ariely, D. 2005. (Dis)honesty: A combination of internal and external rewards. Working paper, Sloan School of Management, Massachusetts Institute of Technology.

Mazar, N., & Ariely, D. 2006. Dishonesty in everyday life and its policy implications. *Journal of Public Policy & Marketing* 25(1): 117-126.

Mead, N. L., Baumeister, R. F., Gino, F., Schweitzer, M. E., & Ariely, D. 2009. Too tired to tell the truth: Self-control resource depletion and dishonesty. *Journal of Experimental Social Psychology* 45(3): 594-597.

Nisan, M., & Horenczyk, G. 1990. Moral balance: The effect of prior behaviour on decision in moral conflict. *British Journal of Social Psychology* 29(1): 29-42.

OECD – Organisation for Economic Co-operation and Development. 2014. The rationale for fighting corruption. Retrieved October 15, 2015, from: <http://www.oecd.org/cleangovbiz/49693613.pdf>.

Queiroz, J. 2015. Corruption – can Brazil win this war? Masters Thesis, University of Bergen, Bergen, Norway.

Sharma, E., Mazar, N., Alter, A. L., & Ariely, D. 2014. Financial deprivation selectively shifts moral standards and compromises moral decisions. *Organizational Behavior and Human Decision Processes* 123(2): 90-100.

The Economist. 2013. Why is Brazil so expensive? Retrieved December 4, 2015, from: <http://www.economist.com/blogs/economist-explains/2013/09/economist-explains-15>.

Transparency International. 2015. Corruption Perception Index 2014: Results. Retrieved December 4, 2015, from: <http://www.transparency.org/cpi2014/results>.