A State Capacity Results-based Approach to Reduce Tax Evasion

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Abstract:

The capacity of the government to reduce tax evasion is critical to promote growth and equality. The objective of this discussion paper is to propose a Results Based Framework for programs which aim to increase tax compliance. We pose setting state capacity as a specific project result, as opposed to tax evasion, may enhance monitoring and promote effectiveness. We pose such focus may allow managers to demonstrate results in shorter periods of time. We apply the framework to the tax evasion literature to find most studies focus on understanding tax evasion assuming the state can carry out all its functions without limitations. Our review suggests a stronger focus on state capacity may benefit the many states faced by tax evasion.

JEL: C93, D02, D04 H11, H26, H30, H43

Keywords: Results based management, state capacity, tax evasion, fiscal fraud, evaluation, monitoring.

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Introduction

Tax revenue capacity is critical for most states to finance the delivery of public goods and to prevent unintended distortions in the economy. However, many countries worldwide face challenges to provide high quality tax administration services. For example, tax revenue in Latin America and the Caribbean (LAC) was 23 percent of the PIB compared to 34 percent among the OCDE countries in 2017 (OCDE et al., 2019). Governments typically invest in projects which aim to strengthen its capacity. However, identifying effective and efficient approaches to reduce tax evasion has proven to be difficult.

An important tool to promote effectiveness and efficiency of public projects is results-based management (RBM). Results based management is defined as a strategy for the achievement of organizational results by integrating evidence and lessons learned from past performance into management decision-making (ONU, 2017).[2] However, a common challenge to implement an effective results-based management approach is the complexity to set appropriate objectives. Budget and political pressures coupled with political cycles may push governments to set ambitious goals in scope and time. Setting unrealistic objectives undermines the ability of RBM to promote effectiveness and efficiency.

For example, consider a project which provides software to detect fiscal fraud. The decision of an individual or firm to comply depends on multiple factors which include the tax rate, the cost to file, the probability of being detected, the penalty rate, and many others. A project which targets a subset of factors will not guarantee impact on tax revenue. In addition, the time it takes auditors and taxpayers to adapt to new processes may prevent changes to fully provide benefits in the first couple of years. In such scenario, a manager may deem RBM inappropriate or too risky, and forego its adoption and associated potential benefits.

In this discussion paper, we propose a results-based framework which focuses on state capacity. We describe the process to define the framework in three steps. On a first step, the manager prioritizes the determinants which influence the decision of the taxpayer to evade taxes. On a second step, the manager identifies weaknesses on state capacities which influence tax evasion. The manager then connects capacities to determinants of tax evasion to identify potential mechanisms. On a third step, the manager matches a given project with the identified mechanisms. Such pairing will help the manager narrow down the objectives of the project by prioritizing both capacities and problem determinants to impact.

We pose a results-based approach with a focus on capacity may allow managers to target more specific problems and demonstrate results in the shorter run, when compared to the traditional approach that focuses on results that should materialize later. We review the literature on tax evasion and apply the framework to the projects described in the studies[3]. We identify key framework elements based on both the economics literature and the fiscal assessment tools available. We apply the framework to evaluation of programs with rigorous

[2] The full definition is: "management strategies in individual organizations of the United Nations system based on managing for the achievement of intended organizational results by integrating a results philosophy and principles into all aspects of management and, most significantly, by integrating evidence and lessons learned from past performance into management decision-making." ONU (2017) Page iv.
[3] We focus on corporate and personal income tax of the self-employed, employer, and other withholding taxes, and value-added tax.

evaluations. We find studies and fiscal assessment tools focus on areas which do not trivially align. We also identify gaps in the literature to inform the design of evidence-based policies to increase state capacity.

The tax evasion problem

The first step for a manager to adopt a state capacity results-based framework is to list the determinants which influence the decision of the taxpayer to evade taxes. In this section, we summarize the main determinants of tax evasion listed in the economics literature.

The taxpayer decision to evade paying taxes has long been modeled by the canonical model of Allingham and Sandmo (1981) and modified by Yizhatki (1991). In the model, a taxpayer decides how much to evade by comparing the marginal benefits to the marginal costs of evading. Limitations of the model to predict empirical observations led future work to add more features to the model. **Appendix A** includes a brief description of the model and later adaptations. To date, the main determinants of tax evasion discussed in the literature are:

(i) **The tax rate** influenced by congress members. The effect of a higher tax rate on evasion is ambiguous. There is some evidence an increase on marginal tax rates leads to a modest increase in evasion (Kleven et al., 2011).[4] Several papers aim to estimate tax elasticity including Chetty et al., (2013) on EITC on wage earning in the USA; Devereux et al., (2014) for corporate income elasticity in the UK, and Boonzaaier et al., (forthcoming) in South Africa. Tax enforcement mediates how tax rates impact evasion (Kleven et al., 2015).

(ii) **The cost to comply** influenced by client support bureaucrats. This cost includes the investment of time and money that an individual or firm must commit to comply with filing and paying taxes. Filkenstein (2009) found evidence a lower cost to comply may reduce evasion. Naritomi (2015) found rewards for reporting sales, which may be interpreted as a reduction in cost, reduced tax evasion. Okunogbe and Puliquen (2018) found providing electronic filing did not affect tax evasion.

(iii) **The probability of detection:**
   a. Influenced by auditors. An increase in fraud detection should reduce evasion efforts. This relationship is supported by empirical evidence of the effect of sending letters or emails threatening with audits (Dwenger et al., 2016; Bergolo et al., 2017; Shimeles et al., 2017; Carrillo et al., 2017); of increased monitoring (Alumnia and Lopez-Rodriguez, 2018).
   b. Influenced by business partners or neighbours. An increase in information available to the tax administration office provided by third parties reduced tax evasion (Kleven et al., 2014; Pomeranz, 2015; Naritomi, 2019). Having a neighbor being audited reduced taxpayer evasion (Rincke and Traxler, 2011).

[4] For an in-depth discussion on the relationship between tax rates and compliance, please see Piolatto and Rablen (2017).

(iv) **The expected penalty rate** influenced by tax enforcement officers. An increase on the penalty rate should reduce evasion efforts. This relationship is supported by evidence produced in laboratory experiments (Alm, Jackson and McKee, 1992). Audits decrease tax evasion (DeBacker et al., 2018; Kleven et al., 2011; Khan et al., 2019).

(v) **The taxable income** influenced by the taxpayer. Studies on the relationship between income and tax evasion are not conclusive. The interested reader may find the discussion by Slemrod (2017) insightful.

(vi) **Preferences and peer influence** on the taxpayer. Intrinsic motivation, reciprocity, social norms, and loss aversion influence the decision of taxpayers to evade (Luttmer and Singhal, 2014). Peer effects have heterogenous findings (Luttmer and Singhal, 2014).

Tax administration capacities

A second step to define the setup of the framework requires the manager to identify relevant state capacities which influence tax evasion.[5] Some managers rely on assessment tools. The goal of such tools is to identify relative strengths and weaknesses both in key office functions, systems, processes, and institutional operations. Within the domains listed in each tool, a manager may prioritize competing needs and allocate resources.

A manager should be careful to discriminate those capacities which will lead to a reduction in tax evasion from gains in other areas. To illustrate this point, consider a project which implements a system to collect taxes electronically. A primary goal may be to decrease the cost to taxpayers to file and pay taxes. Such decrease may lead to a reduction in tax evasion. A secondary goal may be to reduce the cost to government to collect taxes, which may not necessarily affect tax evasion. While both objectives are important, it may be useful to ensure each goal has monitoring tools which aim to inform on its achievement.

Table 1 maps determinants of fiscal fraud to tax administration performance assessment areas. Column (1) lists the determinants identified by the model. Column (2) lists the associated state capacities. Columns (3), (4), and (5) list related performance assessment areas according to the Tax Administration Diagnostic Assessment Tool (TADAT), the Public Expenditure and Fiscal Accountability (PEFA), and the Maturity and Performance of Fiscal Management (*Maturidade e Desempenho Da Gestão Fiscal*, MDGEFIS).[6] The table shows the alignment of determinants and performance areas is possible. However, performance areas are defined based on operational principles and not by its relationship to the problems they aim to address. As a result, some performance areas may not be aligned to a determinant of a problem.

[5] There is no consensus on the definition of state capacity. We adopt the definition of state capacity by Acemoglú et al. (2015): State capacity is the ability of the State to enforce law and order, regulate economic activity, and provide public goods and services.

[6] TADAT has been used for the diagnosis of about 67 countries and about 9 times at the subnational level (http://www.tadat.org consulted September 1st, 2019). PEFA has been used for over 620 diagnosis worldwide (https://www.pefa.org consulted September 1st, 2019). MDGEFIS has been used for the diagnosis at the State and Municipality level in Brazil (Mac Dowell et al., 2017).

Table 1: Example of linkages across performance areas, state capacities and tax evasion determinants

Determinant of tax evasion (1)	Related State capacity (2)	Related Performance Areas: TADAT (3)	PEFA (4)	MDGEFIS (5)
The tax rate	Set tax codes and rates	- Not assessed	- Fiscal strategy adoption	- Generates information to define fiscal policy and tax revenue, including exemptions and expenditure
The cost to the taxpayer to comply	Provide filing and payment services	- Providing services to support voluntary compliance - Encouraging timely filling of tax declarations	- Rights and obligations for revenue measures	- Provides accessible and resolute services and prioritizes the relationship with the taxpayer
The probability of detection	Detect and report fraud	- Having an accurate knowledge of taxpayer base - Encouraging accurate reporting in declarations	- Revenue audit and investigation	- Maintains records updated and segmented by taxpayer type and compliance controls - Plans and executes tax action based on risks and evidence of irregularities
Penalty rate	Enforce penalties	- Having a transparent and effective tax dispute resolution	- Revenue arrears monitoring	-Analyzes and appeals against tax lawsuits based on objective and transparent criteria, and executes debt collection based on debtor´s profile - Controls the collection and refund based on information and collects credit and installments based on debtor´s profile

Source: Elaborated by the authors.

Specific and general results

The third step to set up the framework is for the manager to define project-specific results and its contribution to tax evasion. The manager must match the project outputs with the relevant state capacity dimension. In addition, the manager should identify the relevant users of the outputs provided by the project. The impact of a project on state capacity will rely on the appropriate use of the goods and services it finances. Identifying such users will allow managers to focus on restrictions users may face to carry out the functions key to increase state capacity. Once these elements are identified, the manager can set the increase on the relevant state capacity as a specific objective, which will aim to contribute to reduce tax evasion.

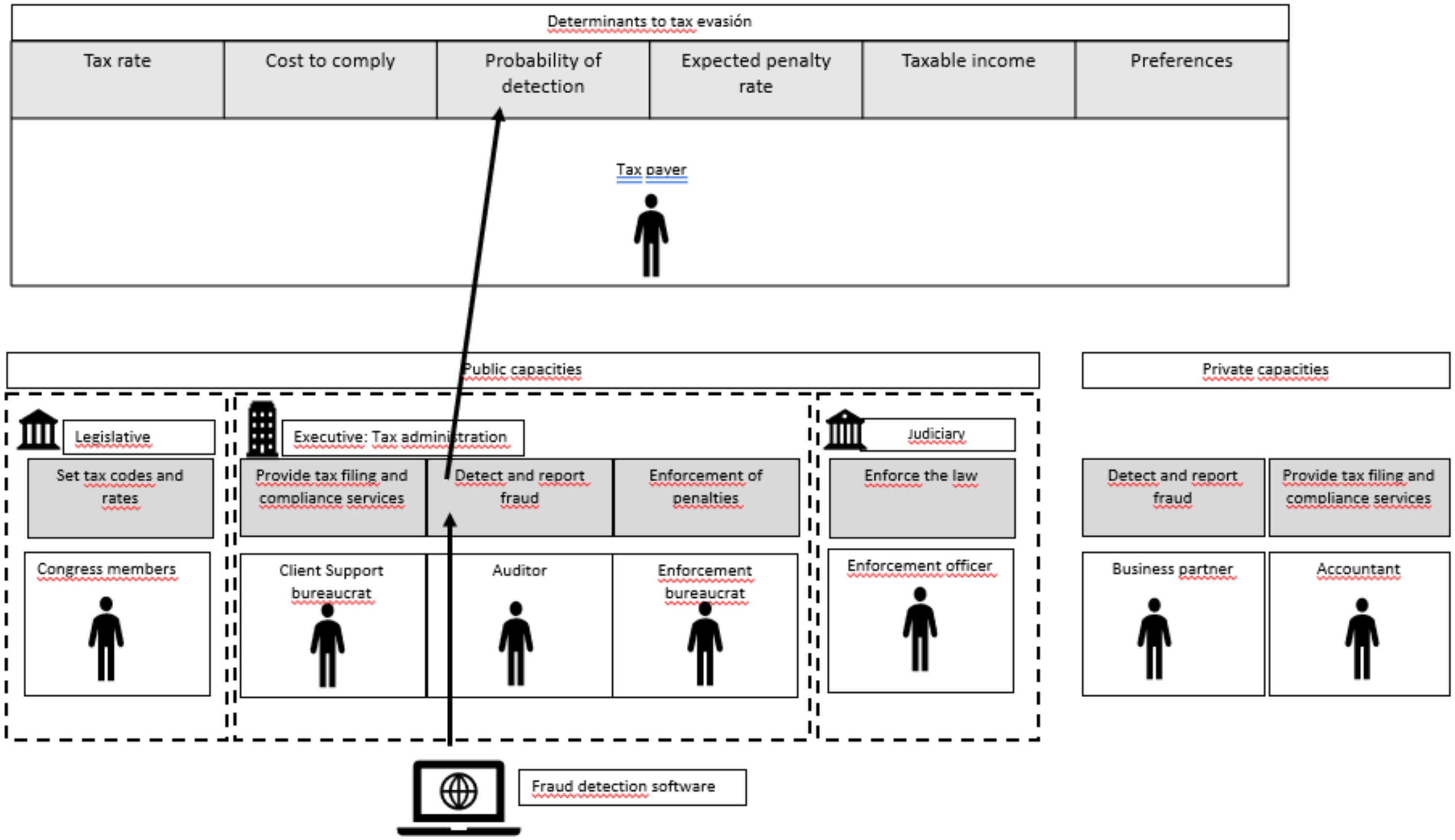
To exemplify the exercise, suppose the manager aims to implement a fraud detection software. The software will impact fraud detection only if the auditors use it appropriately. The software should aid auditors to improve the capacity of the state to detect fraud. In turn, an improved capacity to detect fraud should lead taxpayers to perceive a higher probability of detection and thus reduce tax evasion.[7] Thus, the manager may set improvements in fraud detection as a goal. The manager should also note the project aims to contribute to reduce tax evasion.

Figure 1 makes a graphical representation of the framework. The upper half of the figure illustrates the determinants of the taxpayer decision problem identified in the literature. The lower half left side of the figure illustrates the state capacity areas identified by the assessment tools in a dotted box. To provide a broad visualization of the tax evasion problem, we added the private capacities identified in the literature review in the lower right side of the figure. The arrows show how software provision may change the way auditors detect fraud. In turn, fraud detection should make the taxpayer more likely to comply.

Once the framework is established, a manager should set monitoring and evaluation mechanisms accordingly. When monitoring, a manager may be able to observe changes in fraud detection in a shorter period of time when compared to the time it takes to impact tax evasion. In addition, If the project fails to impact fraud detection, then the manager will be informed of the need to focus on better understanding auditors. Evaluating fraud detection will provide evidence on the assumptions on how the software will support auditors.

[7] Examples of results indicators under our RBM framework are: (i) Average evasion detected among audited firms, which reflects an increase in fraud detection precision. (ii) Number of identified firms with a tax irregularity, which reflects an increase in fraud detection efficacy.

Figure 1. Key determinants to tax compliance, key public and private functions, and associated roles.



Source: Elaborated by the authors.

A review of the tax evasion literature

We apply the proposed state-capacity results-based framework to the literature. We focus on evaluations with rigorous analysis published in peer reviewed journals in the last 10 years.[8] The design of a project should be informed by the lessons derived from evaluations of other programs to favor effectiveness. Learning from experience may help policy makers avoid mistakes in design.

Tables 2 and 3 list key framework elements for the 17 studies identified. **Table 2** list studies associated to interventions which focus on providing filing and complying services to taxpayers. **Table 3** list studies associated to interventions which aim to detect and report fraud. In the panels in tables 2 and 3 we indicate the main determinant to tax evasion discussed in the study, albeit not always the only one discussed. In both tables, column (1) lists the reference to the study and column (2) lists the country in which the study took place. Column (3) lists whether the study discussed the specific investments to strengthen capacity and the primary users of the goods and services acquired by such investments. Column (4) list the strengthened function of the state. Column (5) lists the determinant feature discussed in the study, if it was empirically assessed. Column (6) lists the role of the target population. Column (7) list the impact of the strengthening of the function on the determinant of tax evasion. Finally, column (8) list the direction in which the intervention impacted tax evasion. **Appendix B** includes a brief description and discussion of the studies.

The categorization of studies led us to three observations. First, we find most evaluations did not focus on the mechanisms which would have led to increases in state capacity. Out of the 17 studies, only six discuss state capacity and users. The main discussion of the other eleven studies focuses directly on changes induced by the intervention in taxpayer behavior. In this regard, the existing literature does not explore the fulfillment of the administration functions and assumes full State Capacity. Consider a study which focus on effects of deterrence messages and assumes the state is fully capable to write letters and reach taxpayers. While this capacity may be obviated in some contexts, it may not always be the case. A framework to monitor and evaluate such outcomes would inform about process compliance. It would show to which extent the administration has set structures and built capacity to communicate with taxpayers at risk.[9] Second, we found the studies did not always empirically verify which determinants of tax evasion were changing the taxpayer decision. Third, to keep a parsimonious message we have focused on studies paying attention to the capacity of the state at the executive branch of the government, leaving out legislative and judiciary policies that may also affect the citizens' choice of evading taxes.

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[8] We include three working papers which have a rigorous analysis and feature evidence on determinants or implementation not previously documented. The exceptions are: Bergolo et al., 2017; Boning et al., 2018; and Okunogbe and Pouliquen, 2018.

[9] It is important to note that even though the proposed approach focuses on tax administration processes carried out by civil servants, public servants themselves are not the target of evaluation. Evaluation should not be set as a threatening activity for civil servants employed at the administration. Rather, it should be set as a tool for identification of relative strength and weakness in tax administration functions.

Table 2. Studies on the effects of increasing the capacity of the state to provide filing and complying services to taxpayers, specific functions, related determinants of tax evasion, and impacts

Study (1)	Country (2)	Specifies good, service, or regulation, and user (3)	Strengthened function within capacity to provide filing and complying services (4)	Specifies determinant feature (5)	Role of target population (6)	Impact on determinant (7)	Impact on tax evasion (8)
Panel A. Studies with a focus on taxpayer preferences and risk aversion as a determinant							
Bergolo et al., 2017	Uruguay	no	Send letter stating social cost of evasion	n.a.	firms		null
Shimeles et al., 2017	Ethiopia	no	Send letter appealing to morale	n.a.	firms		decrease
Panel B. Studies with a focus on the taxpayer individual cost to comply as a determinant.							
Dwenger et al., 2016	Germany	yes	Send letter offering entering cash lottery if complying on time	n.a.	taxpayer		decrease
Filkenstein 2019	USA	yes[a]	Provide services to pay road tolls	Individual cost to comply	drivers	decrease	decrease
Naritomi 2019	Brasil	no	Offer exchange tax rebates and lottery tickets for receipt registration	n.a.	taxpayer		decrease
Okunogbe and Pouliquen, 2018	Tajikistan	Yes[b]	Provide services for filing monthly tax declarations	Time spent complying with obligations	taxpayer	decrease	null

continues…

Table 2. Studies on the effects of increasing the capacity of the state to provide filing and complying services to taxpayers, specific functions, related determinants of tax evasion, and impacts (continued).

Study (1)	Country (2)	Specifies good, service, or regulation, and user (3)	Strengthened function within capacity to provide filing and complying services (4)	Determinant feature (5)	Role of target population (6)	Impact on determinant (7)	Impact on tax evasion (8)
Panel C. Studies with a focus on the taxpayer's perceived probability of evasion detection as a determinant							
Carillo et al., 2017	Ecuador	no	Send email notifications of detected irregularities	Filing of amended returns	firms	null	null
Bergolo et al., 2017	Uruguay	no	Send letter with audit threats and reminding penalty rates	Perceived probability of audit	firms	decrease	decrease
Dwenger et al., 2016	Germany	no	Send letter with audit threat	n.a.	taxpayer		decrease
OECD 2010	Mexico	no	Send letter stating probability of audit	n.a.	firms		decrease
Pomeranz 2015	Chile	no	Send letter announcing increased audit probability	n.a.	firms		decrease
Pomeranz 2015	Chile	no	Send announcement to firm's trading partners of upcoming audit	n.a.	firms		decrease
Shimeles et al., 2017	Ethiopia	no	Send letter with audit threat	n.a.	firms		decrease

Source: Elaborated by the authors. Notes: [a] The study estimates the effects of the provision of an electronic toll pay system to drivers. [b] The study estimates the effects of providing an electronic filing system to taxpayers.

Table 3. Studies on the capacity of the state to detect and report fraud, specific functions, related determinants of tax evasion, and impacts.

Study	Country	Specifies good, service, or regulation, and user	Strengthened function within capacity to provide filing and complying services	Determinant feature	Role of target population	Impact on determinant	Impact on tax evasion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Studies with a focus on the taxpayer's perceived probability of evasion detection as a determinant							
Alumnia and Lopez-Rodriguez 2018	Spain	no	Monitor	Self-reported income	firms	decrease	increase
Naritomi 2015	Brazil	yes[a]	Record sales transactions	Third party reporting	firms	increase	decrease
Pomeranz 2015	Chile	yes[b]	Provide public incentives to report transactions with third parties	Third party reporting	firms	increase	decrease
Rincke and Traxler, 2011	Austria	no	Audit taxpayer neighbor to verify payment of broadcast tax	n.a.	taxpayer		decrease
Panel B. Studies with a focus on the expected penalty rate to the taxpayer as a determinant							
Boning et al. 2018	USA	no	Audit/ threat-of audit	n.a.	accountant		decrease
DeBacker et al, 2018	USA	no	Audit	n.a.	firms		decrease
Khan et al., 2015	Pakistan	yes[c]	Tax collectors pay-for-performance	Tax collector bargaining p.	firms	increase[d]	decrease
Kleven et al. 2011	Denmark	no	Audit / threat-of audit	Self-reported income	Firms	decrease	decrease
Kleven et al. 2011	Denmark	no	Audit / threat-of audit	Third-party reporting	Firms	null	null

Source: Elaborated by the authors. Notes: [a] The study analyzes the effect of providing monetary rewards to report unrecorded transactions to the public. [b] The study analyzes the effect of implementing an electronic filing system provided to the taxpayers. [C] The study analyzes the effect of providing a pay for performance scheme to auditors. [d] Results are consistent with an increase in tax collectors/auditors bargaining power, but it is not directly measured.

Discussion

The approaches to evaluate policies to reduce tax evasion across researchers, institutions, and governments is diverse. While we have tried to align tax assessment tools with the tax compliance literature, we recognize such alignment is not perfect. The definition in one study will hardly fully align with the definition of an assessment tool. In addition, such alignment will not substitute for a deeper understanding of processes, capacities, and taxpayers. However, information by the authors of the respective products on how these two resources may align may be a powerful tool for managers to interpret, communicate, and derive valuable effectiveness lessons.

For example, a program which provides software to detect fraud may set fraud detection as a result which may contribute to reduce tax evasion. Fraud detection is an attribute to the tax revenue office capacity, and it is linked to the decision of the taxpayer to evade taxes. A focus on fraud detection should allow managers to use monitoring data as soon as the software is enabled. It may also allow managers to identify auditors as key contributors to project success. As a result, monitoring data should allow managers to identify auditors' unmet needs and detect unexpected challenges. Managers may continue to align results to contribute to comprehensive objectives such as tax compliance and thus remain relevant.

We observe that most of the literature on taxation obviates assumes that the State has full capacity to carry out its functions. We argue that more effort is needed to generate rigorous evidence evaluating effects of interventions on administrative processes.[10] More research should be done to explore the mechanisms of interventions, with specific focus on how they affect tax administration functions. This approach will bring closer the literature on taxation to immediate challenges facing tax administrations. In this manner, the evidence will be more accessible to inform how to set up a results-based framework regarding areas such as the selection of outcome indicators, identification of gaps and selection of effective interventions to close the identified gaps. In parallel, assessments tools may provide more clarification as the intent of strengthening each area of focus.

The document proposes a concise framework to a results-based approach with a focus on State Capacity. The proposed framework may allow policy makers working on tax compliance to identify key elements to set specific and comprehensive project objectives. However, the proposed approach is limited in scope. First, we do not have evidence to demonstrate the proposed framework is more effective than a traditional one. Our future work should aim to rigorously assess the relative benefits of the proposed approach when compared to a traditional one. Second, the proposed approach should not be interpreted a substitute for a careful lecture of the specialized literature and a deep understanding of tax administration processes. Indeed, favoring the design of successful projects requires an understanding of the

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[10] Public employees may face challenges to effectively comply with their functions. Those can be related to human capital, technology or institutional restrictions. Additionally, bureaucrat's supervisors-public employee relationships are exposed to significant information asymmetries. Therefore, increasing the effectiveness of government functionalities also require generating innovative monitoring mechanisms and creative incentive structures. In fact, a new body of academic research is currently focusing on the personnel economics of the state (Finan, Olken and Pande, 2017).

context and the diverse pathways through which a specific investment will impact tax evasion.[11] Rather, the proposed approach may be useful for those prioritizing investments as shortcuts to identify the main ideas of what others have done to address similar problems. Third, the proposed approach is broad. Taxation is a complex topic. There is diversity across States in structures and capacities, tax rates, tax bases, and markets. The framework proposed relies on broad areas as identified by tax assessment tools and the literature. The application of the framework to a specific project should be tailored according to the specific problem to address.

[11] Examples of analysis of the literature are the insightful works of Pomeranz and Vila-Belda (2019) and Slemrod (2018).

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Appendix A. A brief description of the evolution of tax evasion models

In the Allingham and Sandmo (1981) model later modified by Yizhatki (1991), a taxpayer decides how much of their taxable income to report and how much to evade. This choice takes place after the government has determined the tax rate *t*, the cost to pay taxes *c*, the audit capacity which sets a probability *p* that an evasion will be detected, and a penalty rate *F* that will be charged over the evaded taxes. Given those parameters (*t, c, p, F)*, the taxpayer decides how much of their taxable income (*y*) to evade (*x)*. Therefore, the taxpayer should pay (*t+c)(y-x)*. In case evasion is not detected, the taxpayer welfare is *U[y-(t+c)(y-x)+x]*. However, in case the evasion is detected, the taxpayer welfare is *U[y-(t+c)y-Ftx]*. Thus, the optimal evasion amount (*x*) is a lottery choice where the taxpayer, knowing his/her level of risk aversion, maximizes the following lottery [*(1-p)U[y-(t+c)(y-x)+x]+ pU[y-(t+c)y-Ftx]].*

The modified Yizhatki (1991) model predicted tax evasion should decrease as the probability of detection increases, individuals are more risk adverse, and as penalties increase. The relationship between the probability of detection and penalties has been confirmed empirically by Dwenger et al. (2016) and Bergolo et al. (2017). The model proposes the tax rate as a determinant but its effect on evasion is ambiguous. However, the model failed to explain why tax evasion in Organization for Economic Cooperation and Development (OECD) countries was lower than predicted. This finding puzzled economists for many years. Economists later explored the role of other state capacities. For example, Filkenstein (2009) found reducing the cognitive load and cost of complying faced by taxpayers reduced evasion.

Studies on tax evasion also started exploring functions beyond those carried out by the state. For example, Blumenthal, Christian and Slemrod (2001) explored the effects of social norms on tax evasion. They assessed the effect of the Minnesota department of tax revenue submitting letters to taxpayers encouraging compliance based on normative grounds. The authors found no effects on compliance. A later study by Kleven, Kreiner, and Saez found explored the role of third parties reporting individual income. The authors found reporting by third parties decreased tax evasion (Kleven et al., 2016).[12] Reporting by third parties remains one of the most effective ways to reduce tax evasion.

Appendix B. A discussion on the evaluation of tax evasion policies

We derive three lessons regarding effectiveness. First, deterrence messages improve tax compliance. However, the usual mechanism of an increase in the perceived probability of audit may not be relevant if deterrence massages generate fear and induce audit probability neglect. Second, third-party information and stricter monitoring increase self-reporting and tax compliance. However, the effectiveness of third-party reporting can be limited if legal institutions do not provide credible enforcement, or when taxpayers can make offsetting

[12] Other studies in progress explore functions not traditionally listed among the attributions of most tax administrations. For example, Gonzalez-Navarro and Quintana-Domeque (2013) and Hallsworth et al, (2017) found that better informing the public on the use of tax revenue by the state reduced evasion. Koessler et al., (2016) found offering prizes in lotteries among complying taxpayers reduced evasion.

adjustments in reporting which is less verifiable. Third, performance payments to auditors are effective in increasing tax revenue.

Among demand-side interventions, we review three studies evaluating the effectiveness of deterrence letters on tax revenue (Bergolo et al., 2017; Dwengler et al., 2016; Shimeles et al., 2017). The common denominator of these interventions is that they make tax obligation salient and inform taxpayers about likelihood of detection and consequences of tax evasion. The intermediate outcomes in these interventions are related to taxpayers' perceived probability of audit and the probability of tax evasion. The studies do not explore outcomes measuring state capacity. The evidence from these studies shows that deterrence messages increase tax revenue. However, the usual mechanism of an increase in the perceived probability of audit may not be relevant if deterrence massages generate fear and induce audit probability neglect[13] (Bergolo et al., 2017).

The next set of studies evaluate demand-side interventions based on third-party reporting and paper-trials (Carillo et al., 2017; Naritomi, 2019; Pomeranz, 2015) and stricter monitoring (Alumnia and Lopez-Rodriguez, 2018). The logic behind these interventions is that third-party reporting, verifiable paper trials and stricter monitoring make taxable transactions observable to authorities facilitating tax enforcement and improving tax compliance. We also review the evidence from the study evaluating tax withholdings as a tax compliance mechanism (Brockmeyer and Hernandez, 2016). The intermediate outcomes that these interventions aim to affect are focused on taxpayers: more accurate tax declarations and tax-bases self-reporting. These studies do not explore the effects on state capacity either. The evidence shows that, generally, third-party information and stricter monitoring increase self-reporting and tax revenue. However, the effectiveness of third-party reporting can be limited if legal institutions do not provide credible legal enforcement, or when taxpayers can make offsetting adjustments in reporting which is less verifiable (Carillo et al., 2017).

For supply-side interventions we identified two studies evaluating effectiveness of performance payments to auditors (Amodio et al., 2018; Khan et al., (2015). The mechanism underlying these interventions is based on debilitating informal relationship between taxpayers and auditors and generating substitution of informal payments to auditors for formal tax collection. The evidence from the reviewed studies shows that performance payments to auditors are effective in increasing tax revenue. These studies also explore changes in some supply-side outcomes. For example, Amodio et al. (2018) find that incentives did not increase the number of audits. Instead, they find that incentives changed the composition of the inspected firms, increasing the probability of inspection for firms facing low demand elasticities. On the other hand, Khan et al. (2015) find that performance payments boosted activity of auditors increasing the number of reassessments.

[13] Probability neglect occurs when fear makes individuals focus on the downside of outcomes and ignore real likelihood of risk. This behavior is explained in "risk-as-feelings model" (Loewenstein et al., 2001), which suggests that fearsome situations induce quick and intuitive responses that ignore risk probability. Deterrence messages generate audit probability neglect if they induce the same effect regardless of the audit probability communicated in the message. In this manner, the deterrence message by itself generates enough fear of audit to induce taxpayers into tax compliance (Bergolo et al., 2017).