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CITIZEN VISIBLE AUDITS ON THE EXECUTION OF DEVELOPMENT PROJECTS IN COLOMBIA: Do they make a difference?

Dissertation submitted by

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LIST OF ACRONYMS

CMI	Community Monitoring Interventions
CONPES	National Council for Economic and Social Policy
CVA	Citizen Visible Audits
DNP	National Planning Department
EITI	Extractive Industries Transparency Initiative
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NGOs	Non-Governmental Organizations
OGP	Open Government Partnership
OLS	Ordinary Less Square
OPP	Overall Project Performance
PETS	Public Expenditure Tracking Surveys
SATPMI	Social Accountability, Transparency Participatory and Monitoring Initiatives
SDGs	Sustainable Development Goals
SGR	Royalties General System
SMSCE	Monitoring, Follow-up, Control and Evaluation System
ToC	Theory of Change
WDR	World Development Report

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ABSTRACT

Promotion of Citizen participation, accountability and transparency has become a significant concept in the development world. It is generally accepted that Social Accountability, Transparency, Participatory, and Monitoring Initiatives (SATPMI) can improve transparency and governance and work as a significant vehicle for decentralization. In fact, accountability measures are often proposed as a solution to deal with failures in service delivery (understood as the process through which basic services, such as education, health, and security, are delivered to communities) yet its relationship with SATPMI remains unclear with mixed results being found in the literature. The evidence of impact and effectiveness is limited, and it is frequently assumed instead of empirically demonstrated.

This study looks at the case of the Colombian Citizen Visible Audits (CVA), a mechanism that allows citizen participation and community monitoring in development projects, to investigate whether this mechanism can improve service delivery by producing a positive effect on the project execution process. To do so, this research uses a unique dataset and performs a regression analysis finding mixed results. While the CVA effectively engages communities, builds citizen capacity, and increases transparency, the initial findings suggest that the application of CVA have an overall significant and negative effect on project performance. However, after the introduction of control variables, the effect of the CVA changes, becoming clear that its potential impact may not be reflected in the initial general results, suggesting that its effectiveness is highly context dependent.

KEYWORDS:

Service delivery, Social accountability, Transparency, Participatory Monitoring, Social Audits, Development projects, Project performance, Citizen Visible Audits, Colombia.

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1. INTRODUCTION

Citizen participation has become a significant concept in the development arena in recent decades. Starting in the late 1980s, both government bodies and Non-Governmental Organizations (NGOs) have promoted engagement and accountability mechanisms as powerful and innovative tools for improving public administration and governance (Gaventa & Estrella, 1998). Social participation and transparency have influenced the implementation of development programs, but their actual contributions to improving outcomes is yet to be analyzed (Vij, 2011). These mechanisms of citizen engagement belong to a set of collaborative governance models aimed at empowering communities in developing regions. Public agencies usually need to integrate non-state stakeholders directly into the decision-making process to pursue such initiatives (Ansell and Gash, 2008), cited by Vij.

The social audits mechanism, among others, empowers communities through local participatory interventions, allowing for the monitoring of public expenditures. Such measures fall under the umbrella of Social Accountability, a series of bottom-up accountability initiatives (Ringold et al., 2011); it comprises citizen monitoring, user-based public information systems, access to citizen services, ability to file public complaints, participation in policymaking, budgeting, resource allocation, and more. The field is in a state of ongoing institutional experimentation on large and small scales, employing top-down in addition to bottom-up approaches (Fox, 2015). Social audits have made notable improvements in transparency, accountability, and community participation. As a significant vehicle for decentralization, they can strengthen democratic institutions Molina (2014) found evidence for social audits affects citizens' satisfaction with infrastructure projects and the efficiency of the execution process.

The Colombian government promotes and defines accountability as the duty and the right of its citizens to monitor public management, viewing active participation from its citizenry as necessary for ensuring the proper investment of public resources in development projects. In this vein, Colombia created the Citizen Visible Audits (CVAs) in 2008 as a part of its fight against corruption (PPLCC, 2008). CVAs call for a series of forums and technical field visits to oversee development projects and push for the adoption of commitments aimed at improving project execution. These activities occur before, during, and after a project's implementation. They involve the National Planning Department (DNP), a central government agency, and require the participation of the beneficiary communities, local governments, and project contractors.

Scholars have found mixed evidence on the effectiveness of such measures (Ayliffe et al., 2017; Fox, 2015; Grandvoinnet et al., 2015; Joshi, 2013). They acknowledge substantial differences in the limited tools that societies possess to perform monitoring functions and public interest advocacy. A challenge in measuring accountability's effectiveness is how to establish if it really works (i.e, identifying causal links), and, if so, how it does work. It is generally accepted that Social Accountability, Transparency Participatory and Monitoring Initiatives (SATPMI) can impact transparency and governance; nevertheless, the relation between these initiatives and service delivery remains unclear. Do such tools influence the way public officials and contractors perform? A recent assessment of CVAs measured the effect, from the citizens' perspective, of civil oversight on the efficiency of the execution process. It found a positive impact, albeit with sometimes mixed results in similar environments (Molina, 2013).

The relevant body of literature struggles to identify a clear causal relationship between SATPMI and project performance, leading to the following research question: Do CVA have an effect on the execution process of development projects in Colombia? The focus is on project performance as a measure for service delivery. This work will add to the existing literature by shedding light on how SATPMI can improve the project execution process performance, establishing if the mechanism is correlated to positive outcomes.

This dissertation begins with a review of the literature on Social Accountability, Transparency, Participatory, and Monitoring Initiatives—particularly social audits and service delivery—followed by a description of the Colombian CVA mechanism and the main hypothesis. Chapter Three presents information on the CVAs context and its principal results, then describes the research design, together with data collection, treatment, and this study's limitations. Chapter four presents the results and analysis. Chapter five offers the conclusions and suggestions for further areas of inquiry into SATPMI.

2. 'SOCIAL ACCOUNTABILITY' A THEORETICAL BACKGROUND AND ITS RELATION TO SERVICE DELIVERY.

This chapter begins with an overview of the 'Social Accountability' theoretical framework, its origins, principal characteristics, how is related and could have impact on service delivery. Reviewing a set of approaches and theories of change. Later a description of social audits and principal project execution problems is introduced, to finish with a theoretical approach of the Colombian CVA and the presentation of the dissertation hypothesis.

There are many reasons to expect that citizen participation in projects is beneficial, as stakeholders should be aware of the circumstances surrounding a project before, during, and after its implementation. Public participation could mobilize greater resources and accomplish more with the same budget. Input during projects' initial stages could lead to better design, ensuring public needs are met. Moreover, oversight roles offer citizens the opportunity to directly engage with projects and assess whether goals and objectives are met. This, in turn, can provide insights and create pressure to achieve better outcomes.

These initiatives recognize that stakeholders should not only be involved in defining the problem but also in collecting, analyzing and interpreting information for project development and evaluation. (Finsterbusch & Van Wicklin, 1987; Matsiliza, 2012). Included on the global development agenda since the adoption of the Sustainable Development Goals (SDGs), Goal 16 emphasizes the need to promote peaceful and inclusive societies for sustainable development; as well as to provide access to justice for all and build effective, accountable transparent and inclusive institutions at all levels (Sustainable Development, 2015).

For the purposes of this dissertation, all initiatives that fall under the umbrella of social accountability, (social) participatory monitoring and evaluation, inclusion, and transparency are referred to as *Social Accountability, Transparency, Participatory, and Monitoring Initiatives*, or *SATPMI*. These initiatives put project beneficiaries into monitoring roles to evaluate donors and governmental institutions. Numerous sub-fields have evolved with overlapping roots, methods and approaches. The field of service delivery is probably the field in which the SATPMI model has been longest applied (Brinkerhoff & Wetterberg, 2016; Gaventa et al., 2013; Gaventa & Estrella, 1998, p. 12).

The intellectual roots of SATPMI can be traced to two strands of literature that have led to competing approaches (Ayliffe et al., 2017; Grandvoinnet et al., 2015): the principal-agent model highlights the value of participation as an instrumental ingredient for development; whereas the voice and participation model sees citizen participation as an end in and of itself. The field of social accountability has worked towards the integration of participatory approaches into the scopes of governance and accountability. In the late 1980s, development practitioners began to focus specifically on the planning phase, propagating innovative tools. Civic participation has become a valuable instrument to improve accountability, which in turn is seen as an essential ingredient to improving service delivery and alleviating poverty.

Based on public choice theory, the principal-agent model treats social accountability as an extension of new public management and introduces the idea of "client power." The model aims for the reduction of information asymmetries, thus enabling users to hold providers directly accountable. Making accountability one of the principal goals of participatory development has pushed governance and participation into the social accountability agenda. Meanwhile, the voice and participation model takes a different perspective on the development process. In this view, participation is a vital component of development regardless of the outcome, as it emphasizes the value of voice and transparency for their own sake: people's participation is an imperative condition for society. This rights-based approach is influenced by the United Nations Development Program and Amartia Sen's capability approach. Participation, then, becomes a development strategy that allows people access to a broader range of opportunities and can address social exclusion through greater citizen participation.

Accountability measures are frequently proposed as a solution to failures in service delivery in low and middle-income countries (Dewachter et al., 2018; Gaventa et al., 2013; Joshi, 2010; Ringold et al., 2011). Citizens can supposedly help improve service delivery as a result of holding policy makers and service providers accountable. By reducing corruption and inefficiency, aid and public spending could be effectively channeled and used, pushing development projects to produce better results. Participation mechanisms may include public information campaigns, public expenditure tracking surveys (PETS), complaint and grievance redress mechanisms, citizen report cards, community score cards, community monitoring, participatory budgets, public hearings, and social audits (Gaventa, McGee, et al., 2010; Joshi, 2013; Molina, 2014; Ringold et al., 2011).

SATPMI gained prominence when the 2004 World Development Report (WDR) identified failures in service delivery directly stemming from failures in accountability relationships (WorldBank, 2004). The report introduced the accountability triangle—poor people, policy makers, and service providers—which distinguishes between a long and a short accountability route. The long route—in which citizens must influence elected politicians and public officials who, in turn, can influence service providers—is susceptible to error when the connections between different parties along the route breaks down. In turn on the short route, citizens have direct 'client' power over service providers, demanding accountability. The report favors the short route as a means for giving more voice to citizens, increasing transparency, and improving accountability relative to the long route, all of which leads to better outcomes overall. The underlying assumption is that transparency (access to information) combined with citizen participation leads to more accountability, thus improving service delivery (Dewachter et al., 2018).

Fox (2015, p. 347) also identifies different approaches to conceiving SATMPI. Using market metaphors supply-side activities are initiatives aimed at the public sector, including anti-corruption bureaus, open budgeting, legislative oversight, and capacity building. Demand-side efforts promote direct civil society engagement. Fox then provides directional models for accountability. Horizontal accountability introduces mutual oversight between different state institutions, allowing citizens wide access to information. Vertical accountability indicates a political relationship between citizens and elected representatives. Diagonal accountability is a hybrid of horizontal and vertical oversight, and it involves direct citizen engagement among with state institutions.

2.1. Service Delivery

SATPMI respond to five areas of concern: service delivery, budget processes, freedom of information, natural resource governance, and aid transparency (Gaventa, Mcgee, et al., 2010). They aim to deliver on a wide range of outcomes including reduced corruption, more responsive public officials, better policy design and governance, streamlined channels for state-society interaction, stronger democratic institutions, and especially the improved provisioning of public goods (Grandvoinnet et al., 2015).

Service delivery is the process through which basic services, such as education, health, and security, are delivered to communities, and it also includes the construction of the infrastructure needed to

carry out such services. Project performance is a suitable indicator to assess service delivery (Molina et al., 2016), and, for the purposes of this dissertation, project performance is understood as a proxy for service delivery. The impact of SATPMI on service delivery has been a major concern in the literature, and accountability is viewed as a key factor for improving outcomes. When traditional accountability mechanisms fail, advocacy for demand-led bottom-up accountability grows (Joshi, 2010). Despite their increasing presence and donor support, little attention has been paid to their actual effectiveness (Gaventa, McGee, et al., 2010).

The model advocated by the 2004 WDR is not perfect and has been often criticized in recent years; mixed results suggest that the "short route" may not be so short after all. When the problem is due to "government failure," the short route cannot be examined separately from the "traditional" long route; rather, it must be viewed from a broader perspective (Dewachter et al., 2018; Fox, 2015). In this model, transparency and information lead to empowerment, influencing the providers' incentives and behavior as they respond to the possibility of sanctions(Joshi, 2013, p. s40). But this causal chain is rarely analyzed, and many initiatives seek to increase transparency and representation without considering the real-life relationship between actors.

The evidence of the impact that ac SATPMI has on service delivery is limited, and it is frequently assumed rather than demonstrated empirically. In part due to diverse intellectual origins, interpretations and implementation are often marked by different biases. It is not surprising that different observers have used different barometers for success, thus leading to different conclusions about the effectiveness of SATPMI. While the evidence of 'what' social accountability is and 'how' it functions has grown over the last few years, empirical evidence on its impact is still limited and inconclusive (Ayliffe et al., 2017; Grandvoinnet et al., 2015; Joshi, 2013). There is not a single methodology, approach, or focus suitable for all situations. Evidence can be found in a diverse series of papers, meta-analysis, systematic reviews, literature reviews and resource papers on the assessing SATPMI impact and effectiveness on service delivery (Ayliffe et al., 2017; Fox, 2015; Gaventa, Mcgee, et al., 2010; Gaventa et al., 2013; Grandvoinnet et al., 2015; Joshi, 2010; Molina et al., 2016; O'meally, 2013; Ringold et al., 2011; Waddington et al., 2019). There is a large range of studies on SATPMI, from quantitative analyses to qualitative case studies. Some strong quantitative works have found that increasing participation directly causes better project outcomes (Isham et al., 1995; Narayan, 1995). Whereas in others, specific forms of participation are positively associated with positive responses and performance (Halvorsen, 2003, p. 535). Studies focusing on more subjective

measures consider a particular community's response to projects showing that SATPMI have effectively improved public services and exposed corruption (Joshi, 2010). Also that citizens have successfully engaged with state actors to enforce accountability in the health sector, for instance (Björkman & Svensson, 2009). The evidence is mixed, in part because the evaluation of the impact of these measures focus on particular contexts, which hinders generalization. Additionally, researchers have different perspectives and consider different objectives when measuring success (Grandvoinnet et al., 2015).

Frequently, SATPMI make overly optimistic and ambitious promises, overstating their potential to solve development problems. A great part of the uncertainty surrounding the field's research results comes from the success or failure of a project being highly dependent on the context of its implementation. Social accountability is context-sensitive, and considering context is critical in shaping, making, understanding, and analyzing SATPMI (Joshi, 2014; O'meally, 2013). Under some conditions, SATPMI indeed create opportunities for citizens, contributing to the elevation of citizens' voices, better budget management, improved service delivery, better state responsiveness, and the creation of spaces for civic participation (Gaventa et al., 2013, p. s12).

2.2. How SATPMI works

To understand the effects of these initiatives and to show "proof of concept," it is necessary to establish a Theory of Change (ToC) to assess how service delivery is affected, argues Fox (2015). But the field has diverse approaches and mixed results, and many evaluations focus on small scale interventions in diverse contexts, all of which combine to make establishing a ToC difficult task. The most frequent results from impact evaluations suggest the following:

- Transparency alone in insufficient. Information by itself does not activate citizen action nor influence service providers to improve service delivery, increasing transparency is commonly believed to generate accountability, but the exact reasons it does do are often unarticulated, untested, or open to challenge.
- Interaction with other factors must be taken into account. The incentives and limitations of collective action to use this information and the power relations, behaviors and incentives between actors (sates, citizens, civil society, providers) (Gaventa, Mcgee, et al., 2010; Gaventa, McGee, et al., 2010).

- Bottom-up "citizen-led" initiatives lack of teeth, when initiatives don't have the state support, had little impact on reducing corruption (Olken, 2007).

- Official community-driven initiatives are often captured by local elites.

Fox (2015) classifies the mechanisms of SATPMI into two different approaches: tactical and strategic. The tactical approach employs tools to elevate citizen voices in project development and assumes that access to information will translate into mobilization and collective action, which in turn will generate enough power to improve the performance of the public sector. The strategic approach focuses more on institutional reforms to amplify community voices, creating environments more amenable to accountability. Fox concludes that, generally, the tactical approach to service delivery generates mixed results, while the strategic approach correlates with better outcomes. He proposes focusing on what he calls "sandwich strategies", a set of vertical and diagonal accountability mechanisms promoting citizens' "voice" and "teeth. These strategies support a mutually beneficial coalition between community and state actors, one which promotes accountability and could generate virtuous cycles to attack "low accountability traps."

Few initiatives actually articulate theories of change, which makes it difficult to identify possible effects, according to Gaventa, McGee, et al (2010). ToC for SATPMI require some degree of flexibility, but they need to offer possible explanations for how the desired changes will manifest. Special attention must be paid to not assume a causal relationship when in reality there is only a correlation.

Several authors have tried to elucidate pathways of change that could possibly explain how SATPMI work. The relations and interactions between actors, their incentives, and the specific context and environments they operate in are key to understanding the initiatives. Joshi's (2014) approach is based on the complex relationship between information, citizen action, and state response. O'Meally (2013, p. 7) takes a different perspective and identifies contextual variables. He classifies them into six overlapping domains: civil society, political society, inter-elite relations, state-society relations, intra-society relations, and global dimensions. Building on the work of Joshi and O'Meally, Grandvoinnet et al. (2015) frames SATPMI through the relationship of five constitutive elements: citizen action, state action, information, interface, and civic mobilization. Citizen and state action are driven by the other three elements in this framework. Waddington et al. (2019) define a hypothetical causal chain stemming from citizen intervention, starting from citizens' capacity to effect real change,

moving to changes in governmental behavior due to supply and demand-side measures, and finally arriving at better service delivery and improved quality of life for citizens. Molina et al. (2016, 2017) presents a more specific ToC for Community Monitoring Interventions (CMI). This causal chain suggests that the initiatives increase the amount and degree of community engagement in monitoring service providers. Public officials and providers try to improve their performance regarding service delivery in response. The probability of corruption will decrease, and the service provided will improve. See Appendix 1 for a brief review of the stated ToC.

2.3. Social Audits and Community Monitoring Interventions

Corruption and inefficiency in public investment projects can go unnoticed without monitoring tools (Cruz, 2019). Citizens are uniquely motivated to monitor providers and demand better services, so development practitioners suppose that community oversight of providers could, in the short and the long term, help improve service delivery and reduce corruption (Molina, 2014).

Community Monitoring Interventions are social accountability mechanisms through which communities have the ability to monitor service delivery. They function by allowing citizens to observe and review the ongoing performance of providers and the activities of public agencies. The community can then give feedback to providers and politicians (Joshi, 2013; Molina et al., 2016, 2017). CMI have been particularly helpful in identifying instances of corruption or the misuse of public funds (Joshi, 2010). CMI create systems for measuring and analyzing information on projects, followed by proposing actions designed to improve performance, as they seek to facilitate dialogue between project beneficiaries and project authorities. CMI hold government institutions and service providers accountable and produce useful evidence for evaluation and corrective actions. (Grandvoinnet et al., 2015, p. 295). The social audit is a type of CMI that allows beneficiaries of a service to review the performance and confirm the information reported by service providers.

A social audit is a SATPMI intended to increase transparency and accountability regarding the use and management of public resources. The audits are based on a series of related premises: that citizens have the right and desire to know how the government performs and how are they affected by state action; that government has an obligation to be accountable and transparent to its citizenry; and that service providers, public officials and bureaucrats who are monitored feel pressure to respond to

citizen demands and are less incentivized to abuse power. Several aspects of the service delivery process can be reviewed by these SATPMI, such as the allocation of funds, the criteria for social assistance eligibility, and the scheduling and completion of projects, among others. The results of the auditing processes are usually shared at public hearings attended by citizens, public officials, and direct service providers. These hearings allow projects' beneficiaries to make their voices heard with a greatly reduced burden of time and effort compared to traditional channels. Public officials and providers can then take actions addressing the problems identified by citizens (Berthin, 2011; Grandvoinnet et al., 2015; Joshi, 2013; Molina et al., 2016, 2017; Ringold et al., 2011; Waddington et al., 2019).

These initiatives have become a critical component of democratic governance and anti-corruption strategies. The central objective of a social audit is to monitor, track, analyze, and evaluate government performance with a variety of goals in mind, such as enhancing governance, improving Public Policy effectiveness, increasing citizen participation, and empowering the poor (Berthin, 2011; Vij, 2011). In theory, by publicly exposing the problems in programs and confronting the responsible actors, citizens can trigger official investigations, change policies and ensure redress (Joshi, 2013).

The social audits of India's National Rural Employment Guarantee Scheme, known as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), are one of the most oft-cited audit measures in SATPMI literature. As a part of a continuous process of public surveillance to ensure accountability, a mandatory post-implementation exercise monitors, village by village, all the projects under the purview of MGNREGA. The principal results of these initiatives indicate that social audits lead to statistically significant improvements in outcomes and in the exposure of corruption. Social audits, a significant component in building social awareness, have been a key factor in the implementation of programs in India (Joshi, 2010; Shankar, 2010; Singh & Vutukuru, 2010; Vij, 2011; WorldBank, 2012).

It is important to mention that, in order for the citizens to have the skills, capacity, and tools to effectively perform oversight activities, initiatives need to support citizen training. Training is a vital element in the social audit processes, as they give citizens the ability to execute their duties. (Berthin, 2011; Molina et al., 2016, 2017).

2.4. Project performance

Project performance, as a measure for service delivery, is not easy to define. As mentioned earlier, service delivery refers not only to the provision of services but also to the construction of the necessary infrastructure to carry out those services. So project performance could be related to the satisfaction of a project's beneficiaries, the quality of the infrastructure, time savings, and other intrinsically valuable variables (Prokopy, 2005). An overall project effectiveness measure, if determined and valued properly, would be able to objectively assess the success of a project (Finsterbusch & Van Wicklin, 1987; Isham et al., 1995; Narayan, 1995).

The evidence suggests a strong causal connection between increased levels of participation from beneficiaries and improved project outcomes, Narayan and Ishman et al. found in their analysis, after controlling for several variables, that community engagement contributed significantly to overall project effectiveness. Prokopy (2005), meanwhile, found limited evidence that some forms of participation in water supply projects lead to more effective projects. Molina (2014) observed that social audits positively affect subjective measures of the efficiency of the execution process.

Many common problems curb the effectiveness of public infrastructure and construction projects. Corruption and inefficiency are commonly understood as indicators of a government without accountability, and they can be considered forms of waste. Corruption can affect public infrastructure and construction projects at any stage, making public works one of the sectors with the most vulnerability to corruption (Lagunes, 2018). Portocarrero (2017) found that only about 20% of public projects finish on time, stay within the estimated budget, and accomplish all their objectives. The most common issues plaguing the planning and execution of public sector projects are time delays, cost overruns, and inadequate implementation. Bad planning, along with deficient preliminary economic and technical studies, can lead to project goals that do not substantively tackle the real problems of its beneficiaries. Poor communication between the different actors involved with a project can lead to loss of time and resources. Weaknesses of the executing agency and political patronage can also cause problems (CCI, 2010; Gordo et al., 2017; IMF, 2015; Tapella, 2007)

2.5. Colombian Citizen Visible Audits

The Colombian government implemented Citizen Visible Audits (CVA) in 2008. This SATPMI was born amid a presidential anti-corruption campaign and focus on projects assigned to subnational governments that are financed with royalties funds from the extraction of Non-Renewable Natural Resources (PPLCC, 2008). In 2012, upon the arrival of the new Royalties General System (SGR)[1] and the creation[2] of the Monitoring, Follow-up, Control and Evaluation System (SMSCE)[3], a stronger social accountability policy[4] was added to this monitoring system.

The CVA have been a crucial component of royalties system projects, and they have fostered a culture of self-management among subnational government authorities (Villarreal, 2018). CVA are administered directly by the central government through the National Planning Department (DNP)[5] as opposed to by an NGO. Molina (2014, pp. 25–26) was one of the first authors to evaluate this kind of intervention, and he found that the central government's role "*increases the external validity of the results, as NGOs have neither the logistical power nor the mandate to administer a program if scaling it up is necessary*".

The strategy consists of forums before, during, and after projects begin, in addition to the technical field visits necessary for gathering information. All of this is done with the support of the central government agency (the DNP) and the participation of all relevant parties. These initiatives do not affect the initial decision-making process to choose projects; they begin after investment in a project is already approved, with a budget and contractor (executor firm) already determined.

The CVA mechanism is a mixture between social audits and community monitoring intervention. It functions as a tool for citizens to enforce norms regarding the proper delivery of goods and service to the community by the state. It can be classified as a sandwich strategy, as it involves a sort of diagonal accountability approach, promotes bottom-up engagement of citizens, and provides the central government with a set of institutional tools to hold local service providers and public officials accountable.

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[1] Royalties General System - Sistema General de Regalías (in spanish)
[2] https://vimeo.com/78099672
[3] Monitoring, Follow up, Control and Evaluation System – Sistema de Monitoreo, Seguimiento, Control y Evaluación (in spanish) https://vimeo.com/78099672
[4] https://www.youtube.com/watch?v=x8zk0KEGw4o&feature=youtu.be
[5] National Planning Department – Departmento Nacional de Planeación (in spanish)

2.6. Hypothesis

While the literature on SATPMI strongly suggests that participatory interventions will have a positive effect on service delivery, the evidence from specific interventions shows overall impact on project performance is limited, and the results are mixed and inconclusive. Based on these facts, and using the adopted ToC (see chapter 3), the research argues for a theoretical relationship between the use of SATPMI and service delivery through improved project effectiveness. The proposed hypothesis, therefore, is as follows: the use of the CVA improves service delivery and is expected to produce a positive effect on the project execution.

3. EMPIRICAL ANALYSIS

This chapter presents an introduction to the SGR and the CVAs operation, followed by a description of the principal results for both. Then the research design begins with a description of the proposed ToC, the method of analysis, variables definition and limitations.

3.1. Overview of the SGR, SMSC & CVAs

3.1.1. A foreword on context

Since the General Royalties System (SGR) was created in 2012, almost 18.000 projects have been approved and implemented across Colombia in more than 20 sectors and in almost every town and department, a state-like territorial division in Colombia. CVAs have been applied nearly 400 of these projects. The mechanism is administered by the Royalties Monitoring, Follow up, Control, and Evaluation System (SMSCE), which performs integral oversight for investment projects. SMSCE collects and analyzes data, and it has the ability to hold project transfers, impose sanctions, and report any irregularities to the relevant control agencies (Comptroller, Prosecution and fiscal attorney offices).

The CVA does not work in isolation, as citizen participation and accountability measures are supported by a broad support structure that hopes to create a suitable environment for SATPMI success. The most relevant forms of support include the Anticorruption CONPES[6][7], Accountability CONPES[8], Community Action CONPES[9], and other citizen participation strategies[10,11]. Two international strategies, the Open Government Partnership (OGP)[12] from 2011 and the Extractive Industries Transparency Initiative (EITI)[13] from 2014, are also relevant. MapaRegalias[14], a

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[6] Consejo Nacional de Política Económica y Social (in Spanish), it is the highest national planning authority and the principal advisory body to the Colombian government in all aspects related to socioeconomic development, produce documents that contains the general guidelines for public policies.

[7] https://colaboracion.dnp.gov.co/CDT/Conpes/Social/167.pdf

[8] https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=83124

[9] https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%C3%B3micos/3955.pdf

[10] https://colaboracion.dnp.gov.co/CDT/Atencin%20al%20Ciudadano/Estrategia%20de%20Participaci%C3%B3n%20Ciudadana.pdf

[11] https://colaboracion.dnp.gov.co/CDT/Desarrollo%20Territorial/Portal%20Territorial/KIT-OT/25Rutas-Especializadas-Participaci%C3%B3n-Ciudadana.pdf

[12] https://www.opengovpartnership.org/members/colombia/

[13] http://www.eiticolombia.gov.co/es/la-iniciativa/

[14] http://maparegalias.sgr.gov.co/

georeferenced tool that disseminates information about royalties' projects, is even more directly related to the SGR's SMSCE and allows any citizen with internet access to review information of all projects.

The CVA starts by disseminating information about projects in the relevant neighborhoods through local media[15] (peripheral broadcast, radio, newspapers, door-to-door invitations and local television). Then, the first public forum, communicates information about social accountability, the responsibilities of both the executing firm and local authorities, how to monitor projects, and general project information to citizens. Later on, a group of interested beneficiaries is formed and trained to perform oversight activities. One or more forums can take place during the execution of the project. These forums can interrogate the ongoing status of projects, allowing citizens a voice to express observations, suggestions and recommendations. The citizen group and SMSCE team monitors the commitments agreed to by firms and local governments. If a commitment is not fulfilled or problems are not solved, the local government is involved and, if necessary, the relevant control agencies. After a project's completion but before final payment to the executing firm, a final public forum takes place in which citizens have a final opportunity to participate and get information on the project outcome.

The annual selection of projects for CVAs is determined by the SMSCE and is not randomized, as projects must meet the following criteria:

1) Suitable financial size (only projects over USD $45.000 are eligible).

2) Multi-sectoral selection.

3) The project must be at the investment stage (The SGR allows financing of pre-investment projects).

4) It must have a physical execution.

5) A project can be chosen if specifically requested or if there are already public complaints.

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[15] SMSCE also has a social media campaign called "Ponte abeja" promoting citizen participation and accountability.
Ponte abeja it's a colombian colloquialism "Be aware" Abeja (Bee in Spanish) means: sneaky, fast, aware
https://www.eltiempo.com/archivo/documento/MAM-744723

3.1.2. General results for SGR & CVA

From its creation in 2012 to May 2020, the SGR has approved 17.858 projects for $58,2 billion COP[16] ($17,7 billion USD[17]), $47,2 billion COP ($14,4 billion USD) of which come directly from SGR funds, while about 19% percent of the total investment funds come from leveraged sources. 75% of the projects for 35% of the money are directly executed by 990 municipalities (90%), while 17% of the projects for 44% are executed by the 32 Departments see Table 1[18].

The projects range across 22 public investment sectors, the first six of which constitute 69% of the projects and account for 79% of the funds: Transport Infrastructure comprises 6.406 (36%) projects and uses $24,5 billion COP ($7,5 billion USD) (42%); Education 1.911 projects (11%) and $7 billion COP ($2,1 billion USD) (12%); Science, Technology and Innovation (including human capital formation) 501 projects (3%) and $4,6 billion COP ($1,4 billion USD) (7,8%); Water and Sanitation 1.470 projects (8,2%) and $4 billion COP ($1,2 billion USD) (6,8%); Housing 1.224 projects (7%) and $3,3 billion COP ($1 billion USD) (5,7%); and Agriculture 748 projects (4,2%) and $2,7 billion COP billions ($0,8 billion USD) (4,6%), as found in Table 2. Figure 2 illustrates the distribution at the municipal[19] level for SGR approved projects, projects with SMSCE follow-up action, and projects with CVAs.

Table 1 SGR project executors 2012-2020

Public execution entity	# Projects	$ SGR (COP billions)	$ Total (COP billions)	$ SGR (USD billions)	$ Total (USD billions)	% Projects	% $SGR	% $Total
Departments	2.987	$ 21,0	$ 25,0	$ 6,4	$ 7,6	17%	44%	43%
Municipalities	13.412	$ 18,5	$ 20,2	$ 5,6	$ 6,1	75%	39%	35%
Other entities	1.459	$ 7,8	$ 13,0	$ 2,4	$ 4,0	8%	17%	22%
Total	17.858	$ 47,3	$ 58,2	$ 14,4	$ 17,7	100%	100%	100%

Source: Own elaboration – based on DNP-SGR-SMSCE data.

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[16] Colombian COP "billones de pesos" refer to a million of millions, while a billion dollars USD refer to a thousand of millions.

[17] Using a exchange rate for 2019 of COP $ 3,281.09 = $1 USD

[18] Other entities reefers to universities and a set of national and local public entities different than Mayor´s and Governor´s Offices.

[19] Only shows the municipalities level, due in all three categories on the Departments level exists projects.

Table 2 SGR sectorial classification 2012-2020

Sector	# Projects	$ SGR (COP thousands of millions)	$ Total (COP thousands of millions)	$ SGR (USD millions)	$ Total (USD millions)	% Projects	% $SGR	% $Total
Transport infraestructure	6.406	$ 19.563	$ 24.495	$ 5.962	$ 7.466	35,9%	41,4%	42,1%
Education	1.911	$ 6.088	$ 7.027	$ 1.856	$ 2.142	10,7%	12,9%	12,1%
Science, technology and innovation	501	$ 3.852	$ 4.555	$ 1.174	$ 1.388	2,8%	8,2%	7,8%
Water and sanitation	1.470	$ 3.476	$ 3.955	$ 1.059	$ 1.205	8,2%	7,4%	6,8%
Housing	1.224	$ 2.202	$ 3.314	$ 671	$ 1.010	6,9%	4,7%	5,7%
Agriculture	748	$ 1.550	$ 2.651	$ 472	$ 808	4,2%	3,3%	4,6%
Sports and recreation	1.732	$ 2.237	$ 2.419	$ 682	$ 737	9,7%	4,7%	4,2%
Enviroment and sustainable development	765	$ 2.265	$ 2.389	$ 690	$ 728	4,3%	4,8%	4,1%
Health	490	$ 1.231	$ 1.764	$ 375	$ 538	2,7%	2,6%	3,0%
Energy	562	$ 1.300	$ 1.679	$ 396	$ 512	3,1%	2,7%	2,9%
Planning	849	$ 1.334	$ 1.494	$ 407	$ 455	4,8%	2,8%	2,6%
Social inclusion and reconciliation	529	$ 825	$ 956	$ 251	$ 291	3,0%	1,7%	1,6%
Culture	331	$ 517	$ 550	$ 158	$ 168	1,9%	1,1%	0,9%
Commerce, Industry and Tourism	126	$ 436	$ 497	$ 133	$ 151	0,7%	0,9%	0,9%
IT and comunnications	53	$ 163	$ 204	$ 50	$ 62	0,3%	0,3%	0,4%
Interior	42	$ 73	$ 75	$ 22	$ 23	0,2%	0,2%	0,1%
Justice	17	$ 41	$ 60	$ 12	$ 18	0,1%	0,1%	0,1%
Defense	32	$ 49	$ 51	$ 15	$ 15	0,2%	0,1%	0,1%
Employment	18	$ 18	$ 27	$ 6	$ 8	0,1%	0,0%	0,0%
Statistical information	18	$ 21	$ 24	$ 6	$ 7	0,1%	0,0%	0,0%
Local government	33	$ 19	$ 19	$ 6	$ 6	0,2%	0,0%	0,0%
Exterior relations	1	$ 0,9	$ 1,4	$ 0	$ 0	0,0%	0,0%	0,0%
Total	**17.858**	**$ 47.262**	**$ 58.205**	**$ 14.404**	**$ 17.740**	**100%**	**100%**	**100%**

Source: Own elaboration – based on DNP-SGR-SMSCE data

Figure 1 Municipalities with projects, SMSCE action and CVA 2012-2020
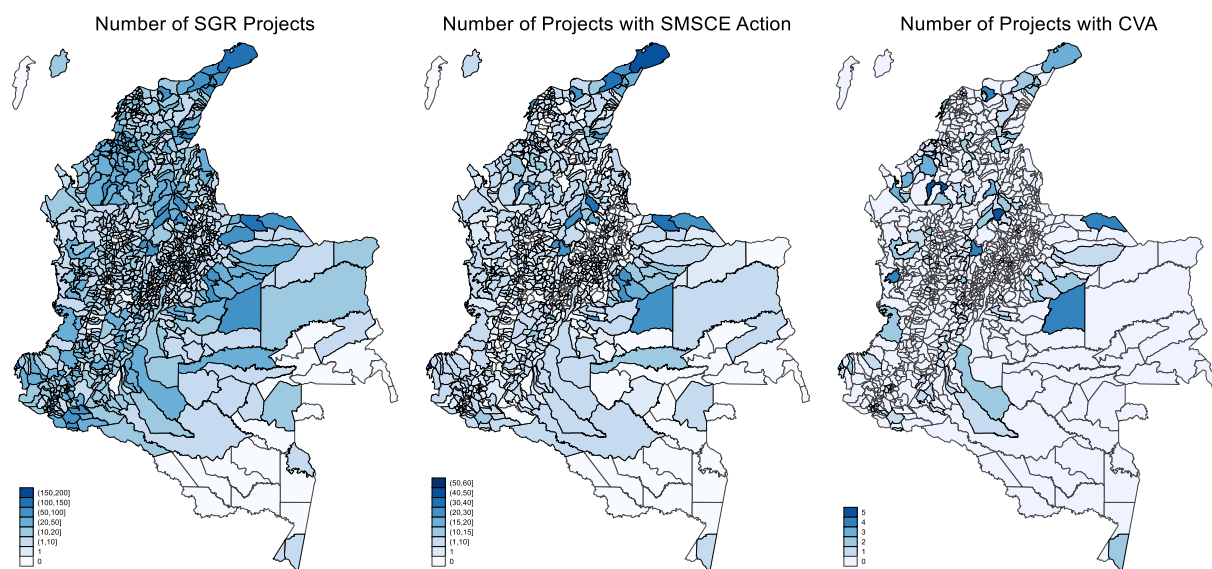
Source: Own elaboration – based on DNP-SGR-SMSCE data

The SMSCE, the administrator of the SGR's SATPMI monitors all projects and performs a periodic verification of execution results for selected projects. It has conducted a detailed follow-up process, including field and technical visits, on 4.560 projects using 55% of the total resources to identify

problems and formulate improvement plans to refocus ongoing projects. As a result of its investigations, the SMSCE has reported more than 14.000 alleged irregularities to control agencies from 4.002 of the projects[20]. Since 2012, the CVA has been applied to 417 projects, which account for $7 billion COP ($2,1 billion USD), in 16 of the 22 sectors financed by SGR funds. Transport Infrastructure make up 33% of the relevant projects and contain 44% of the funds, Education 23,5% and 19%, and Water and sanitation 7,7% and 10% (see Table 3). The CVA mechanism has been applied to 186 projects executed by the 32 Governor offices (Departments), 177 projects executed by 114 Mayor's offices in 24 Departments, and 47 projects executed by other public entities, such as universities, municipal associations, local official water and sanitation bodies, along with energy, health, and development companies, among others).

Table 3 Executors of projects with CVA 2012-2020

Public execution entity	# Projects	$ SGR (COP billions)	$ Total (COP billions)	$ SGR (USD billions)	$ Total (USD billions)	% Projects	% $SGR	% $Total
Departments	186	$ 3,8	$ 4,7	$ 1,1	$ 1,4	45%	66%	66%
Municipalities	177	$ 1,2	$ 1,3	$ 0,4	$ 0,4	42%	21%	19%
Other entities	54	$ 0,7	$ 1,1	$ 0,2	$ 0,3	13%	13%	15%
Total general	417	$ 5,8	$ 7,0	$ 1,8	$ 2,1	100%	100%	100%

Source: Own elaboration – based on DNP-SGR-SMSCE data

Table 4 CVA projects sectorial clasification 2012-2020

Sector	# Projects	$ SGR (COP thousands of millions)	$ Total (COP thousands of millions)	$ SGR (USD millions)	$ Total (USD millions)	% Projects	% $SGR	% $Total
Transport infraestructure	138	$ 2.525	$ 2.997	$ 769	$ 913	33%	44%	43%
Education	98	$ 1.090	$ 1.331	$ 332	$ 406	24%	19%	19%
Water and sanitation	32	$ 454	$ 691	$ 138	$ 211	8%	8%	10%
Housing	25	$ 329	$ 445	$ 100	$ 136	6%	6%	6%
Science, technology and innovation	22	$ 271	$ 299	$ 83	$ 91	5%	5%	4%
Sports and recreation	23	$ 242	$ 262	$ 74	$ 80	6%	4%	4%
Health	16	$ 188	$ 220	$ 57	$ 67	4%	3%	3%
Agriculture	14	$ 154	$ 158	$ 47	$ 48	3%	3%	2%
Enviroment and sustainable development	14	$ 153	$ 158	$ 47	$ 48	3%	3%	2%
Planning	11	$ 98	$ 124	$ 30	$ 38	3%	2%	2%
Culture	6	$ 101	$ 108	$ 31	$ 33	1%	2%	2%
Energy and mining	9	$ 55	$ 66	$ 17	$ 20	2%	1%	1%
Commerce, Industry and Tourism	3	$ 30	$ 36	$ 9	$ 11	1%	1%	1%
Social inclusion and reconciliation	3	$ 35	$ 35	$ 11	$ 11	1%	1%	1%
Justice	2	$ 13	$ 19	$ 4	$ 6	0%	0%	0%
IT and comunnications	1	$ 13	$ 13	$ 4	$ 4	0%	0%	0%
Total	**417**	**$ 5.751**	**$ 6.961**	**$ 1.753**	**$ 2.122**	**100%**	**100%**	**100%**

Source: Own elaboration – based on DNP-SGR-SMSCE data

Five projects that had been assigned CVAs were disapproved before the execution process began and their funds were released for new projects, according to the data. Therefore, the number of projects for analysis drops from 417 to 412. One of the disapproved projects, a park in Mocoa, was rejected

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[20] http://www.sgr.gov.co/SMSCE.aspx

after the Mayor's Office denied a construction license in response to community opposition. Table 5 presents data on the number of forums, how many participants they had, and the commitments they pursued.

Table 5 CVA in numbers 2012-2020

Execution stage	Number of projects	Total forums	Average forums	Average follow-up forums	Average total participants	Average participants per forum	Average participants initial forum	Average participants Follow-up forums	Average participants closing forum
Finished	230	551	2,4	1	125,5	47,3	51,6	37,4	46,5
On execution	182	376	2,1	1	104,9	46,1	49,2	43,4	-
Total general	**412**	**927**	**2,3**	**1**	**116,4**	**46,8**	**50,6**	**40,0**	**46,5**

Execution stage	Number of projects	Total Commitments	Average Commitments	Fulfilled commitments	Average Fulfilled commitments	Unfulfilled commitments	Average Unfulfilled commitments	Insuperable commitments	Average Insuperable commitments
Finished	230	1.391	6,0	1.220	5,3	118	0,5	28	0,1
On execution	182	956	5,3	683	3,8	129	0,7	24	0,1
Total general	**412**	**2.347**	**5,7**	**1.903**	**4,6**	**247**	**0,6**	**52**	**0,1**

Source: Own elaboration – based on DNP-SGR-SMSCE data

Almost 56% of the projects have been completed by 2020, but that does not mean their CVA processes are over. The final forum takes place before the final payment, but 75 of the concluded projects are missing this final stage of the CVA. The number of participants in the forums usually remains consistent from beginning to end, with an average of around 50 people. Only 2% of the commitments pursued are considered insuperable, and only 7% of the unfulfilled commitments correspond to already completed projects. 81% of commitments have been accomplished, showing an overall good response to community engagement.

3.2. Research design

3.2.1. A ToC for the CVA

Molina et al. (2013, 2014; 2016, 2017) analyzed the CVA for the royalties regime before the SGR's creation and looked at the mechanism from a citizen perspective[21]. He proposed a fitted Theory of Change for CVAs (Figure 1) based on his previously established ToC for Community Monitoring Interventions. He clarified the mechanisms through which the CVA program is expected to impact project execution, analyzing four different theoretical approaches to measuring if the program reaches its expected outcomes (for detailed explanation of the ToC, see Appendix 1). This research builds on

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[21] In which project effectiveness was a measure of beneficiary perception.

the existing CVA analysis based on quantitative project execution performance. It is relevant to mention that to-date, no official program evaluation has been performed on CVAs.

Figure 2 Molina's adjusted ToC for the Colombian CVA
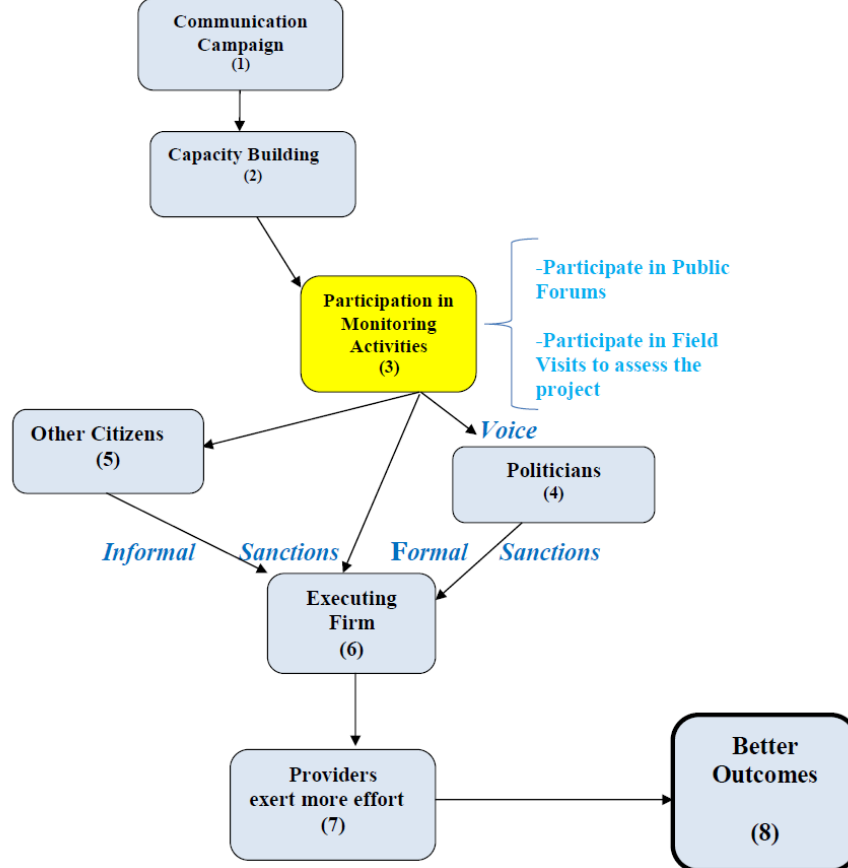
Source: (Molina, 2013)

3.2.2.   Method of analysis

To test the hypothesis, this dissertation analyses CVA general results and looks for the link between the use of a CVA and overall project performance (OPP) using an Ordinary Less Squares (OLS) regression analysis. Considering the application of the CVA as the "treatment" to assess the effect on project performance.

The dependent variable, the OPP, is a measure of project execution. It is a constructed proxy indicator that includes total runtime, budget performance, project alerts and control reports. The independent variables for the analysis incorporate the CVA application as treatment and the main explanatory variable, as well size of the project (value), the type of procurement, the type of firm, perception of corruption and SGR budget. Variables such as the investment classification, location, and performance indicators were also controlled for.

3.2.3. Variable definition, and Information

Access to information comes from the SGR. The SMSCE collects monthly execution information, produces indicators for SGR performance, and provides information regarding CVA project alerts and control procedures. Other information was collected from DNP and the Colombian chapter of International Transparency.

The proposed OLS model for a multivariate linear regression is:

$$Y = \beta_0 + \beta_1 W + \beta_2 X + \beta_3 Z_1 + \cdots + \varepsilon$$

In which Y represents the OPP score for each project.

W is a 0-1 dummy variable. W=1 indicates that the project has the CVA mechanism.

X represent the size of the project in terms of SGR funds.

Z_1 stands for the accumulated SGR budget for the subnational entity who approved the project. Z_2 is the type of execution entity (Department, Municipality, Other public entities)

Z_3 is the type of public procurement applied to the biggest contract of the project (public biddings merit contest, inter-administrative, direct procurement, etc.)

Z_4 shows the number of signed contracts used for each project execution.

Other variables control for the location, the classification of the public investment sector; institutional capacity indicators for public entities such as the development environment, the SGR execution index, municipal performance, fiscal performance. And finally, the transparency index perception is used as a corruption measure.

3.2.4. Limitations

As stated above, CVA project selection is not randomized. Moreover, it is heavily dependent on the SMSCE director's criteria, which could generate selection bias even though the director was the same person throughout the analysis period. Regarding information of some of the variables that affect assessing public entities' execution performance or institutional capacity, in some cases is not complete, available or uniform for all observations. Additionally, the corruption variable is only available for less than 100 executors, for instance.

4. MODEL FINDNGS

4.1. Results and Outcomes

A sample of 12.680 SGR projects were suitable for the application of a CVA, after debugging[22] and adjusting the data; of these, 412 projects received the "CVA" treatment, while the remaining 12.268 serve as a control group for the analysis. The Overall Project Performance (OPP), a measure of project execution performance, is the dependent variable.

The OPP is an index composed of four performance dimensions:

- Transparency, which estimates the amount and quality of the information reported to the SMSCE.
- Efficiency, which estimates performance relative to the budget and schedule.
- Efficacy, which estimates the quality of outcomes.
- And, finally, the frequency of reports of irregularities to the SMSCE.

The score can fall between 0 and 100, and each score is categorized into one of four performance quality groupings: Deficient, Low, Medium, and High. Each level is calculated using the mean and standard deviations: the mean is used as the dividing point between the Medium and Low performance ranks, while the Deficient and High ranks are used for scores one or more standard deviations below or above the mean, respectively. Table 6 presents the score distributions for three different baskets of data, each with a similar distribution.

Table 6 OPP Scores distribution

Rank	Total sample				SMCE Follow-up				With CVA			
	Range	Freq	%	acc %	Range	Freq	%	acc %	Range	Freq	%	acc %
Deficient	0 to 51	119	1%	16%	0 to 45	14	0%	16%	0 to 39	0	0%	18%
Deficient	51 to 56	236	2%		45 to 50	70	2%		39 to 45	5	1%	
Deficient	56 to 62	573	5%		50 to 56	200	5%		45 to 52	20	5%	
Deficient	62 to 67	1158	9%		56 to 61	410	10%		52 to 58	47	11%	
Low	67 to 72	1825	14%	33%	61 to 67	681	16%	34%	58 to 64	74	18%	35%
Low	72 to 78	2339	18%		67 to 73	753	18%		64 to 71	69	17%	
Medium	78 to 83	2224	18%	33%	73 to 78	755	18%	32%	71 to 77	59	14%	29%
Medium	83 to 88	1943	15%		78 to 84	590	14%		77 to 83	59	14%	
High	88 to 94	1529	12%	18%	84 to 90	434	10%	18%	83 to 90	43	10%	19%
High	94 to 99	662	5%		90 to 95	256	6%		90 to 96	31	8%	
High	and over	70	1%		and over	61	1%		and over	3	1%	
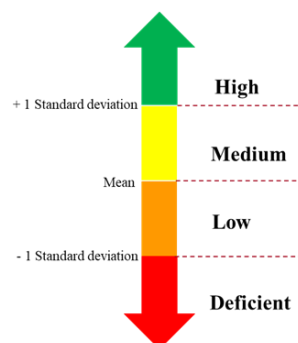
Source: Own elaboration – based on DNP-SGR-SMSCE data

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[22] Projects outside the value range, on sector with no CVA projects, with no execution, on pre investment phases or approved after Dec 31, 2019 and those who don't possess information for the OPP variable were dismissed, because they are not comparable for the model. The information provided by the SGR and SMSCE is updated to May 2020.

Figure 3 Mean comparison between control and treatment group

Source: Own elaboration – based on DNP-SGR-SMSCE data

The OLS model was constructed by an iterative process, including each independent variable at the time, Model 1:

$$Y = \beta_0 + \beta_1 W + \varepsilon$$

Starts with only the intended explanatory variable "CVA", and then for the next models considering each independent variable, for instance Model 4:

$$Y = \beta_0 + \beta_1 W + \beta_2 X + \beta_3 Z_1 + \beta_4 Z_2 + \varepsilon$$

Includes explanatory CVA variable, size of the project, SGR budget and type of execution entity. An initial look for the OPP scores distribution for different samples (Table 6) led to infer a similar behavior for the result variable, however the first iteration (Model 1) revealed a statistically significant negative effect, Figure 3 shows a mean comparison for OPP scores for projects with and without CVA, reflecting a worse performance for those projects with the treatment. Table 7 shows the OLS regression outcomes for model 1 to 12.

Table 7 OLS Models outcome[23]

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
VARIABLE CVA	-7.236***	-5.094***	-5.089***	-4.960***	-5.067***	-5.069***	-5.056***	-5.022***	-4.990***	-6.300**	-7.564***	4.909
	(0.528)	(0.545)	(0.545)	(0.542)	(0.546)	(0.547)	(0.547)	(0.545)	(0.546)	(2.790)	(1.075)	(10.26)
SGR resource		-1.067***	-1.070***	-0.773***	-0.869***	-0.845***	-0.839***	-0.892***	-0.923***	-0.900***	-0.926***	-0.907***
		(0.0735)	(0.0735)	(0.0848)	(0.0851)	(0.0878)	(0.0881)	(0.0892)	(0.0907)	(0.0907)	(0.0906)	(0.0914)
SGR Historic budget			0.0212	0.231***	0.294***	0.320***	0.318***	0.257***	0.280***	0.279***	0.285***	0.286***
			(0.0141)	(0.0651)	(0.0653)	(0.0657)	(0.0657)	(0.0668)	(0.0713)	(0.0713)	(0.0713)	(0.0729)
executor_type==3				-1.912	-1.857	-1.993*	-2.014*	0.103	-0.270	-0.261	-0.220	0.267
				(1.210)	(1.205)	(1.207)	(1.207)	(1.296)	(1.327)	(1.326)	(1.326)	(1.370)
executor_type==4				1.625	1.264	1.096	1.070	2.827**	2.515**	2.507**	2.542**	2.976**
				(1.133)	(1.129)	(1.131)	(1.131)	(1.221)	(1.234)	(1.233)	(1.234)	(1.274)
executor_type==5				5.225***	7.478***	7.837***	7.782***	8.361***	8.680***	8.679***	8.825***	9.135***
				(1.819)	(1.830)	(1.840)	(1.840)	(1.892)	(1.963)	(1.962)	(1.962)	(2.006)
executor_type==6				6.231***	8.880***	9.005***	9.386***	10.56***	10.99***	11.02***	11.46***	11.95***
				(2.124)	(2.141)	(2.156)	(2.192)	(2.232)	(2.271)	(2.271)	(2.274)	(2.337)
Type of proccurement					2.171***	1.992***	1.978***	1.505***	1.493***	1.461***	1.474***	1.398***
					(0.248)	(0.350)	(0.350)	(0.359)	(0.359)	(0.359)	(0.359)	(0.366)
.						.	.	.	.	.	.	.
.						.	.	.	.	.	.	.
.						.	.	.	.	.	.	.
Constant	77.90***	99.96***	99.54***	87.39***	86.32***	86.47***	86.42***	87.90***	88.21***	87.82***	88.14***	87.36***
	(0.0950)	(1.523)	(1.549)	(2.244)	(2.244)	(2.373)	(2.374)	(2.415)	(2.535)	(2.534)	(2.534)	(2.573)
Observations	12,678	12,678	12,678	12,678	12,636	12,628	12,628	12,628	12,628	12,628	12,628	12,628
R-squared	0.015	0.031	0.031	0.040	0.047	0.050	0.050	0.063	0.065	0.068	0.067	0.090
Dummy Sector	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Dummy region	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Interaction Sector CVA	No	No	No	No	No	No	No	No	No	Yes	No	Yes
Interaction Region CVA	No	No	No	No	No	No	No	No	No	No	Yes	Yes
Interaction Sector Region CVA	No	No	No	No	No	No	No	No	No	No	No	Yes

Standard errors in parentheses   *** p<0.01, ** p<0.05, * p<0.1

Almost all iterations show that the CVA has a significant negative effect on the performance score. However on Model 12, when interactions between the CVA, Region, and Sector were included as control, was able to assess the effect of the treatment in the context of these variables. The final outcome reveals a positive coefficient for the CVA variable, and, while not statistically significant, allow us to find how different interactions between variables lead to different effects. The implications of these results will be analyzed on the next section.

It should be pointed out that not all the intended variables were used in the regression analysis. For instance, the variables considered to measure public institutional capacity indicators:

- SGR execution index (available for all entities in the sample),
- Fiscal performance index
- Development environment (relevant territorial entities),

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[23] From model 6 onwards the table continues for more than 400 rows, view Appendix 2 for the full table and a variable dictionary.

- Municipal performance measurement.

Were not included on the models; the SGR execution index presented an extreme correlation with the OPP, since one component of the OPP is also used in the index's construction. Regarding the remaining three, information was not available for all projects and when included did not contribute to the model and reduced the observations number.

Lastly, the transparency index, a measure for corruption, only applied to a few executors, leaving a considerable number of cases unexamined when included.

4.2. Analysis

The CVA effectively engages communities, builds citizen capacity, and increases transparency. The results indicate that the CVAs are a good mechanism for increasing beneficiary participation and the fulfillment of commitments, they encourage an informed and active citizenry that will continue to make their voice heard. While this research looked for a direct effect on the execution process through the lens of service delivery outcomes, it is important to keep in mind that CVAs were originally conceived to fight against corruption and bring transparency to SGR projects. Joshi (2014) argues that if a SATPMI fails to improve services but has effectively empowers citizens, it can't be considered either a total failure nor a total success. Either way, future interventions will have improved prospects and a more well-defined entry point.

Overall, the selected variables used for the model construction, seems reasonably able to explain the OPP scores; almost all independent variables were statistically significant through the different iterations of the regression analysis, and significant in the expected manner. For instance, larger projects (with a higher "SGR Resource" rating) and those with multiple contracts (with a higher "Number of Contracts" score) could be prone to more risk, so a low OPP score can be expected. Projects from subnational entities with larger budgets such as departments have more execution capacity in comparison with municipalities; hence, they can be expected to have a higher OPP score. Similarly, entities with more institutional capacity (depending on the "Executor Type") had strong statistically significant coefficients. When the "Type of Procurement" was most transparent, like with public biddings and merit contests, projects achieved better outcomes than projects using direct procurement or other legal but fast not so competitive mechanisms.

"CVA" the treatment variable had a negative effect on project performance as measured by OPP from the beginning of the regression. The treatment group, "projects with CVA" had a mean OPP more than seven points below the control group's OPP, a large enough difference to take seriously. Indeed, the initial results of the regression model were unexpected, as the design and setting of the Colombian CVAs seem promising, but not totally shocking; the literature agrees that SATPMIs, while promising tools to solve development problems, can be overly optimistic.

From Model 1 to Model 11, the treatment variable's overall effect on OPP is significant and negative. Several possible interpretations could explain this finding. The CVA mechanism was originally conceived as an anti-corruption tool, and it has been administrated by a national agency focused on finding and fixing problematic projects. Indeed, the selection process for CVAs purposefully considers potentially risky projects, projects already facing difficulty, and those with citizen concerns. All projects with a CVA also receive the SMSCEs Follow-up investigations, which could lead to the identification of more troublesome situations compared to projects that are not exhaustively reviewed.

Regarding the proposed ToC, Molina et al. (2013, 2014; 2016) have explored alternative explanations for why a CVA might not have its expected outcome. One rationale considers bottlenecks that prevent citizens from participating in the monitoring process. Another possibility is that governments might be effectively unaccountable regardless of citizen participation. Molina also points to what he views as a self-fulfilling prophecy, where both the state and the citizenry worry the other side is acting in bad faith: states might question a communities willingness to participate, and citizens might question the state's commitment to actually facilitate engagement and accept accountability. These concerns could curb enthusiastic and honest engagement on both sides, which further fuels these very suspicions. The active involvement of beneficiaries in the treatment projects points to the second theory as a possible interpretation of this model's findings, as it would help explain the heterogeneous results. In certain contexts, SATPMIs conducted by a national agency saw no change in the behavior of local governments and execution firms.

While analyzing the quantitative evidence, initially, the proposed hypothesis, "the use of the CVA improves service delivery and is expected to produce a positive effect on the project execution" was refuted. However, after introducing controlling variables and their interactions, a positive coefficient for the CVA variable, and, while not statistically significant was found, it became clear that the

potential effect of CVAs may not be reflected in the initial results. Rather, those results could imply a fundamentally biased analysis. Results of Model 12 helps to explain the initial negative effect, while the actual effect of CVAs might be hidden by other variables effect. The necessary controls also reveal the heterogeneous effects of the treatment variable, showing that CVAs works differently in different contexts. In at least seven of the twenty-two sectors and four of the seven regions, the presence of the CVA mechanism led to positive and statistically significant results.

Model 12 results are in great measure relatable to the previously body of literature analyzed, finding mixed results and that on different contexts, SATPMI could work differently. Context is key and often shapes SATPMI in unpredictable and complex ways not always working everywhere (Ayliffe et al., 2017; O'meally, 2013). Including regional controls is in line what is exposed by Fox (2015), because of context, to asses variation, methods for subnational comparations are necessary.

Even though, in general, CVAs did not directly affect the scores for project performance, they might still be useful. If a project suffers a poor execution process, the SMSCE can begin an investigation into any problems found after the fact. 44% of the projects in the CVA sample are still in the execution process, so the final OPP scores are subject to change. Further analysis should be conducted which could revise the final results.

5. CONCLUSION

SATPMIs are key elements for good governance in countries that produce nonrenewable natural resources. Access to information concerning the use of such revenues is vital to assessing the performance of the public sector (Quiroz, 2014). SATPMIs can curb corruption by activating and improving inter-institutional controls and sanctions, creating a cycle that reinforces good behavior (Arisi & Gonzaléz Espinosa, 2014).

Prior to the introduction of the SGR, an administrative and financial audit system performed accountability functions. This system focused heavily on after-the-fact analysis of contracts (procurement) and payments. Since SGR's creation and the implementation of the SMSCE, who directly monitors and evaluates a significant amount of information on project execution that it makes available for all interested stakeholders on the SGR website and Maparegalias. For the first time this work uses this information to analyze the impact of the inclusion of CVA in the execution process of development projects from a quantitative perspective.

The mechanism was conceived as a way to counter corruption, but a potential impact on service delivery was theorized. CVA can be categorized as a "sandwich approach" SATPMI, as it uses bottom-up, horizontal, and diagonal tactics to promote accountability. Its supported by institutional reforms, public policies, laws, strategies and mechanisms creating a suitable environment for success. And despite its twelve-year implementation, still remains as a small-scale initiative applied to the only 2,3% of all SGR projects.

There exists a theoretical framework for how SATPMIs could impact service delivery, while the use of these initiatives is becoming more widespread with diverse approaches and across contexts. The evidence is inconclusive as to its effects in the development arena. SATPMIs have their greatest impact when they initiate traditional mechanisms like investigations and inspections (Joshi, 2013), thus, in theory CVAs have good design and a supportive approach. The analysis of the CVAs, lead to more obvious outcomes concerning citizen voice, engagement, and accountability. They show good indicators for beneficiary participation and commitment fulfillment, and they empower and project stakeholders and build their capacity to participate.

This dissertation sought to answer the question: Do CVAs have an effect on the execution process of development projects in Colombia? The findings do not provide a conclusive answer to the question.

The mixed results of SATMPIs, in this case CVAs, suggest that their effectiveness is highly context dependent. Controlling for regional and sectorial variables showed how the effect of the treatment might not be evident in a general analysis. Particular settings and institutional capacity play an important role in how these kinds of mechanism can impact service delivery.

The proposed hypothesis was refuted in all regression models, from model 1 to 11 CVAs have a negative and quite statistically significant effect. In model 12 the CVAs coefficient was positive, but not statistically significant, allowing to interpret that the variable did not have a significant and direct effect— on the project execution thus neither on improving service delivery. Nevertheless after analyzing in detail, the interaction between control variables, the effects of CVAs on project performance are not necessarily negative or negligible; the CVA might have an effect if context is examined.

Opposite results to the findings of this dissertation could be found on Molina et al. (2013, 2014; 2016), they results shows that in general CVAs could potentially increases project performance between 7% and 15%. However, when the effect for particular municipalities was estimated discouraging results were found, even for projects in the same municipality but in different sectors, the results differed considerably. Albeit the results of both studies are different, when a context variable as localization or sector is included, the mixed results emerge, validating the heavily context influenced results. The findings of this research will help to a better understanding on the context where CVA are more effective and what should be examined where not.

Although the findings of this dissertation are in line with previous studies, it is the first time that a quantitative analysis is performed based on project performance indicators. The results should not discourage CVA use, as further research is needed to study why different approaches work in certain settings but not in others. The use of additional tools outside of the standard SATPMI playbook could eventually trigger behavioral change on local governments and execution firms. A deeper assessment on the effectiveness, examining its operational strategies is needed for better outcomes and if eventually the CVA program is going to be scaled up.

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APPENDIX 1 - Relevant Theories of Change

The present appendix contains a brief description of few proposed Theories of Change, concerning impact of SATPMI on service delivery, as is not part of the dissertation to evaluate these models, they are important to understand how the change could occur.

In recent years several authors have approached to enlighten tentative pathways of change that could explain how SATPMI work. The analysis of relations, interactions and drivers between actors, context and environments are key ingredients to understand the initiatives. Joshi (2014), differentiates how to approach the frameworks, on one hand common SATMPI as community scorecards, social audits among others, could have independent ToC for each initiative. On the other hand, starts from a more general perspective underlying concepts common for all kind of SATMPI, combining different aspects as demand for better governance and bottom-up accountability. Identifies the potential dynamics for establish a ToC[24]. The most common implicit causal chain that support SATMPI, is the unidirectional assumption that transparency (information) will activate citizen action and in turn lead to state response (Figure 1)

Figure 1. Joshi´s Assumed link
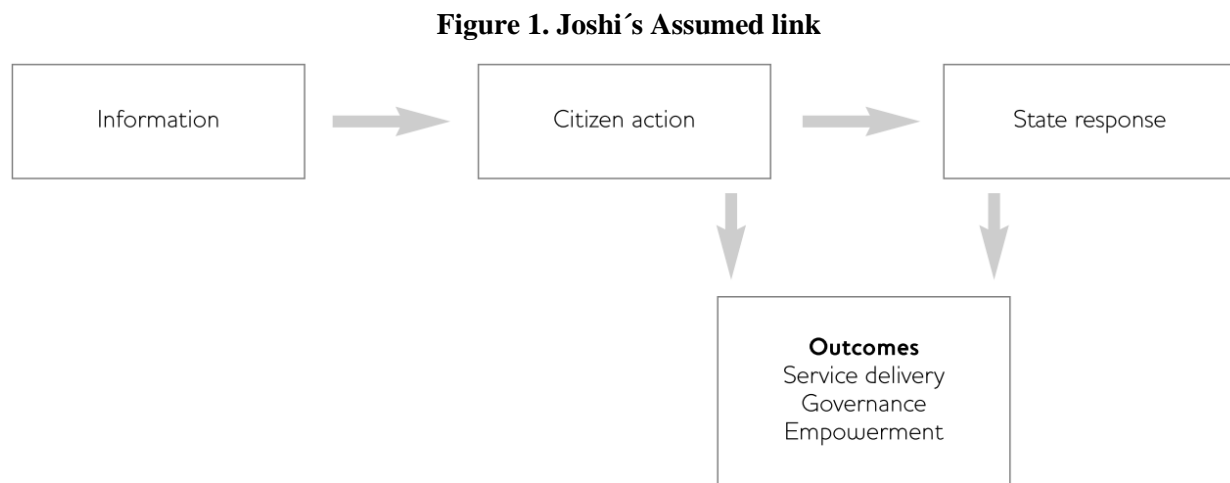
Source: (Joshi, 2014)

Nevertheless, the links between the components is not that simple, the relationship between from information, to citizen action to state response could work in each way (Figure. 2) with opposite results than expected. "*For example, citizen action through mobilisation could lead to the generation or exposure of relevant information. State responses may encourage or restrain citizen action. State*

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[24] This is a brief mention of the construction of the evaluation framework, for the complete analysis review (Joshi, 2014)

responses can also take the form of making previously opaque information public". (2014, p. 27). Then the ToC trace the causal chains, assuming rational, self-interested individuals using the commonly accepted pathway, action from information to state response.

Figure 2. Potential dynamic links between actors

Information can lead directly to change
State response can take the form of information disclosure

Information

Information catalyzes citizen action
Citizen action to generate information

Accountability

State response

Citizen action

Citizen action triggers state response
State responses shape citizen action
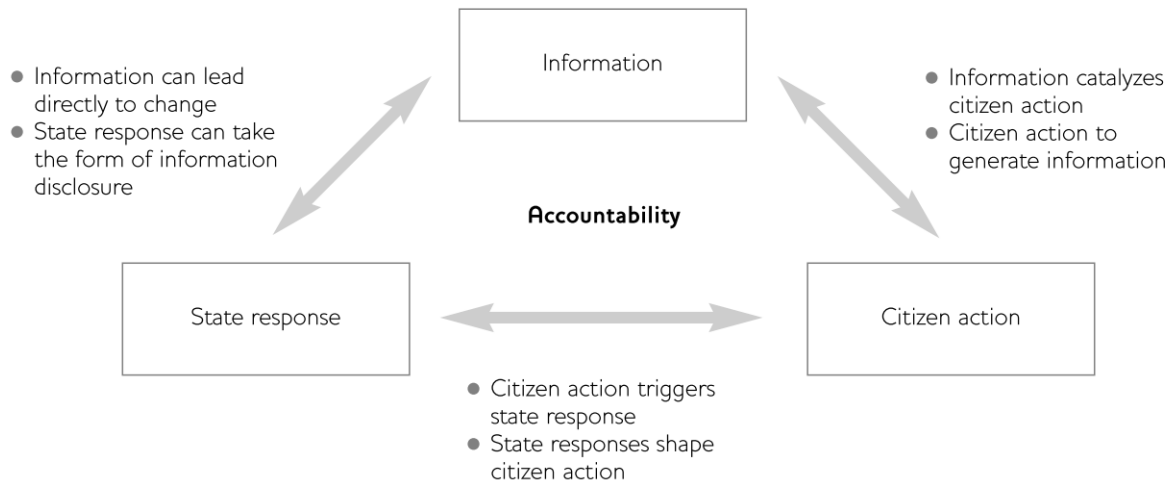
Source: (Joshi, 2014)

In Figure 3. Joshi presents a series of steps that are required for information to lead to positive state responses. Identifying bottlenecks when the answer to each question is negative, and when is positive a positive outcome related to service delivery is expected. The analysis lies on the causal pathways between specific components of social accountability using the evidence available and provides a useful tool to consider or evaluate the implementation of SATPMI.

Figure 3. Preliminary causal chain

Information quality
(Characteristics of the information type)
Is the information new and unexpected?
↓
Is the information understandable?
↓
Does the information highlight gaps in performance?
(As compared to standards, expectations or comparators)
↓
Is the information widely publicised?
↓
Is the information credible?
(Who has provided information, is it legitimate due to processes of generation?)

Citizen action
(Unpack motivations)
Did I receive the information?
↓
Do I understand the information?
↓
Is the situation worse than expected?
↓
Do I care?
↓
Can I do anything about it?
↓
Do I think my actions will have impact?
↓
If I need others will they join?

Collective action/strategy
(Substantive characteristics of citizen demands)
Who is likely to be responsive?
↓
What framing are they likely to listen to? (Moral appeals, legal obligations, humanitarian grounds, political stability)
↓
Are there official channels where I/we could target my demands and complaints?
↓
Is going to the courts likely to have an effect?
↓
Do I/we have the time and resources?
↓
Are there other actors I could take joint action with?

State response
(Substance of response types)
Do I think citizens have legitimate grievances?
↓
Do I hold responsibility for the particular public good?
↓
Am I likely to be officially sanctioned due to citizen action?
↓
Do I care about my reputation?
(If not, possibility of reprisal)
↓
Do I care about the service?
↓
Do I think I can do something about the situation?
(If not, then could lead to helplessness)
↓
Do I have the capacity and resources to take action?
(If not, then could lead to frustration)
↓
Do I need others to contribute in terms of resources/reforms?
↓
Can I motivate others? Are others likely to collaborate?
Do I have access to higher levels?
(Depends upon whether resources, reformists are identifiable within the system)
↓
Reforms/increased resources

Improved services

Additional potential outcomes
Empowered communities
Increased trust between citizens and state actors
Reduced corruption
Institutionalised channels for interaction
Responsive public officials
Increased legitimacy of the state

Source: (Joshi, 2014)

O'meally (2013, p. 7) takes another perspective and identifies contextual variables, and classified them into six domains that overlap and interlock: civil society; political society; inter-elite relations; state-society relations; intra-society relations; and global dimensions. Establishing the relevance of power and political relationships affecting SATPMI processes and outcomes. This ToC approach tries to enhance accountability by confronting the existing political settlement. Acknowledging an oversimplification of the problem the three main identified outcomes would be coercion, cooptation and a change on the existing coalitions. (Figure 4) shows how intervention shapes and is shaped by

the context, with an emphasizes on the pro- and anti-accountability forces and networks in enabling or obstructing expected change (2013, p. 31)

Figure 4. Context-sensitive understanding of SATPMI and change
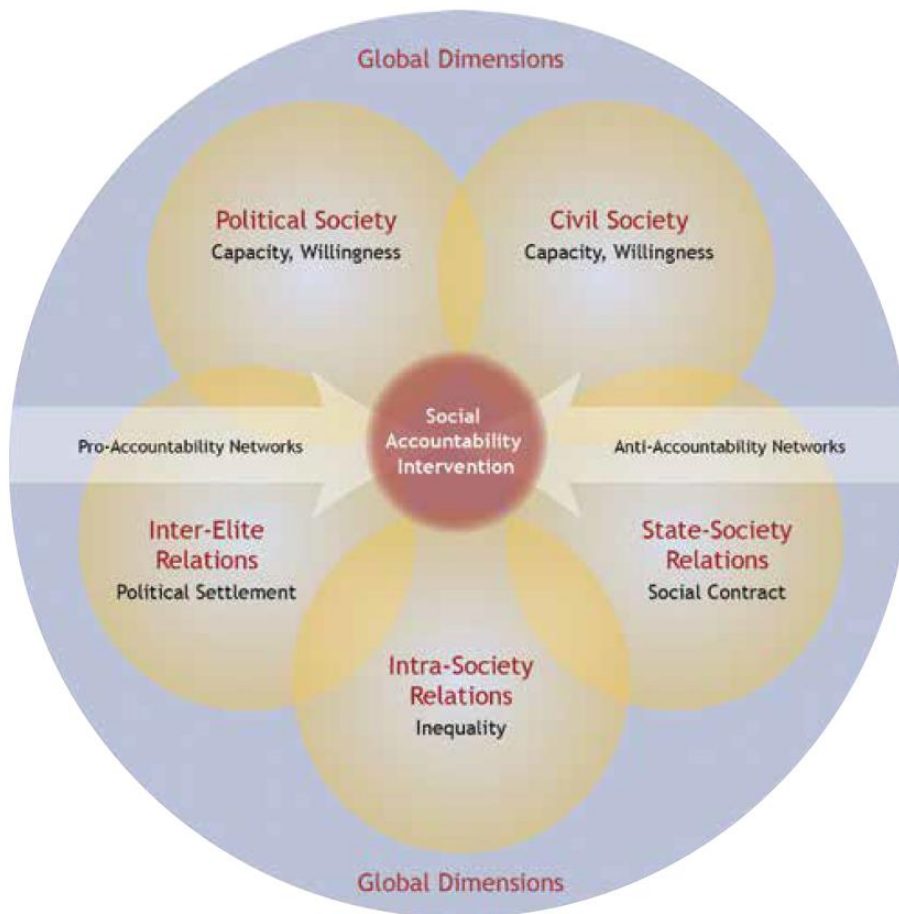
Source: (O'meally, 2013)

According to the proposed ToC, to produce the expected results a SATPMI need to influence its context, O'meally identifies some key elements for a "demand-driven" change as follow: The processes of change are politically complex and nor straightforward. Interventions tend to success when implementing actors are seen as legitimate, and credible by participants, when look for a change across supply and demand and when are based on legitimate mechanisms. The strength and quality of pro-accountability networks usually account for success, instead of individual actors. The use of information is crucial, but information by itself is not enough for change, action and sanctions are required. Initiatives are more appealing when are recognized as relevant by all actors. Processes generates sustainable change when support general local initiatives and stresses for change.

Interventions with multiple approaches been found to be more effective. And SATPMI could take long time to generate change (2013, p. 30).

Building on the work of Joshi and O'meally, Grandvoinnet et al.(2015) Frames the SATPMI analytical framework on the relationship of five constitutive elements: citizen action, state action, information, interface, and civic mobilization. In which citizen and state action are driven by the other three elements. According to the ToC state and citizens categories are not homogeneous or exclusive and due its iterative processes, for SATPMI to be effective the approaches must evaluate access points and trajectories frequently, building knowledge for future interventions assessing risks and trade-offs (2015, p. 48).

Figure 5 emphasize the importance of the intrinsic relationship between state and citizens in all SATPMI approaches, expose a "power imbalance" putting the state and its institutions over the citizens. The links between the five elements are not straightforward, and there is no standardized trail among them, the complexity of the diverse interrelations and the multiple contextual driver factors are key to stablish a framework for change.

**Figure 5. Interplay of the five elements of SATPMI**
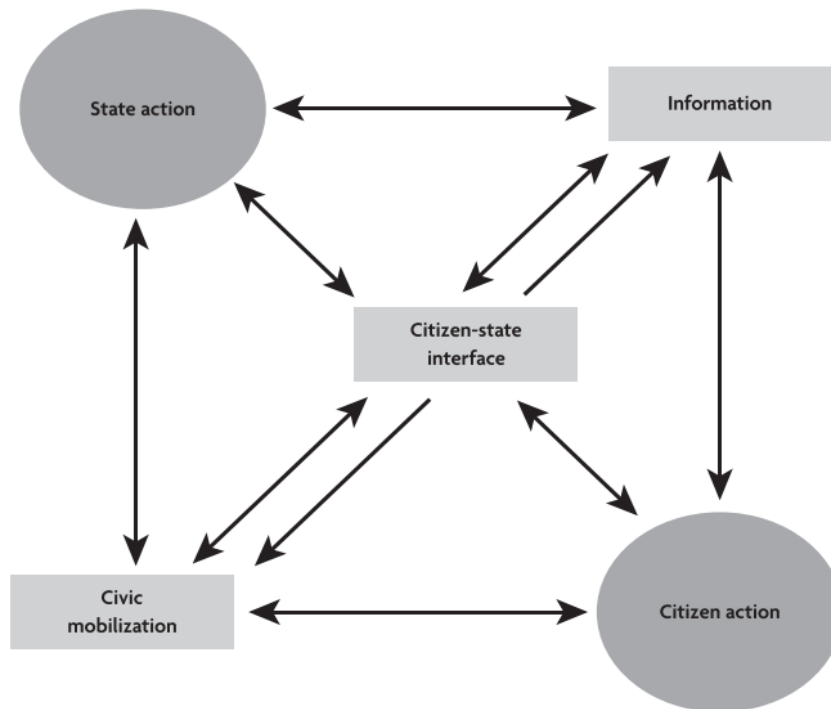
Source: (Grandvoinnet et al., 2015)

The proposed ToC acknowledges that "context matters", therefore builds a comprehensive examination of all the possible relations between the different spheres of actors and relations that impacts SATPMI, establishing an analytical framework in a systematic way for operationalizing social accountability and unpacking the contextual drivers that will support or hinder the effectiveness of initiatives to guide development practitioners and scholars analysis (Grandvoinnet et al., 2015, p. 287).

The state action is a key factor, for its responsive capacity establishing outcomes, because could provide or hinder suitable environments for information and could also help or start SATPMI. Although relationship between Administrative, political, and social accountability could be complex Successful approaches establishes synergies among traditional institutions of administrative accountability and citizen action by complementing not displacing its objectives.

The ToC proposed in Waddington et al (2019) define an hypothetical causal chain for citizen interventions, with a focus on capacities and change opportunities for citizen, analyzing governance behavioral change from supply and demand side, to finally driving better service delivery and improved quality of life for citizens. (2019, pp. 11–14). although the authors recognize that change is not always linear and may be multi-directional, represented on (Figure 6) the proposed ToC consist on a set of blocks diagram showing a theorized sequence allowing to identify the main phases of "change" process.

Figure 6. Indicative theory of change[25]
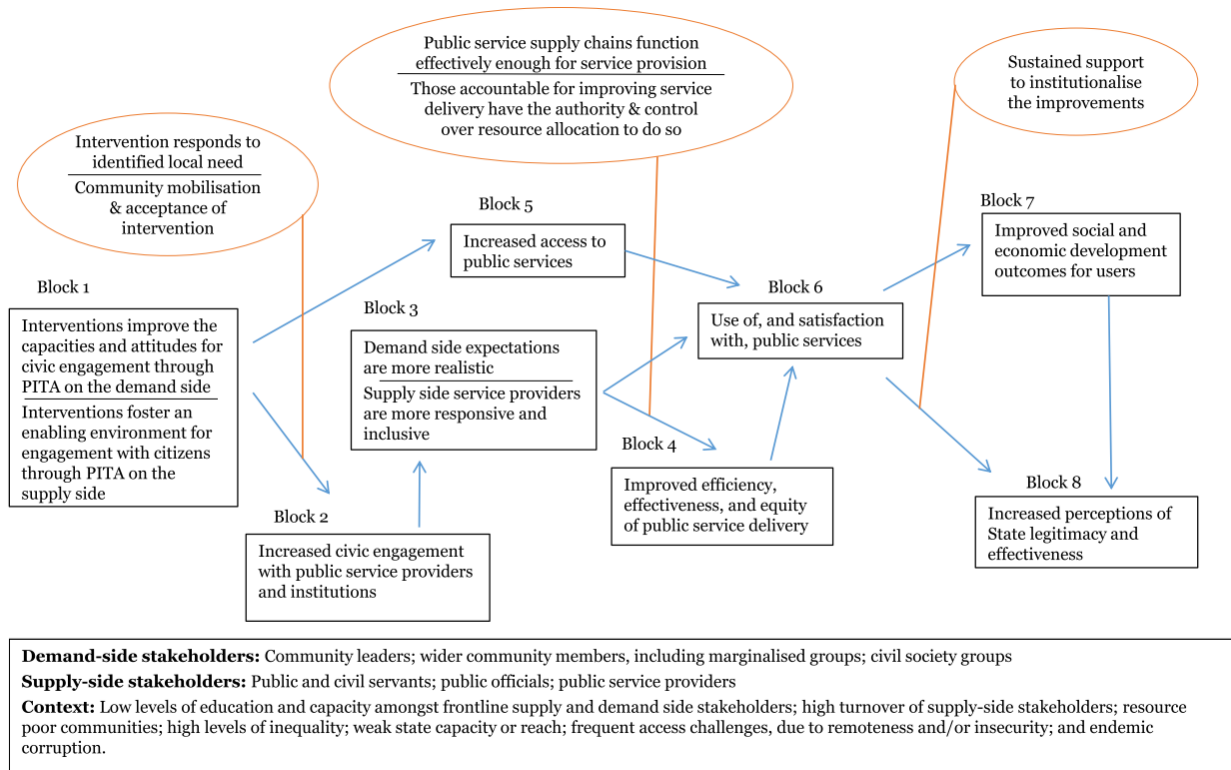
Source: (Waddington et al., 2019)

the principal pathways for interventions addressing external engagement with citizens from public services and institutions that could generate improved development and service delivery outcomes are articulated on the proposed causal chain. Acknowledging that in some cases some interventions could contribute to several pathways, while others may only contribute to specific ones, and proposes specific ToC for different groups of SATPMI (2019, pp. 11–14).

For the design, initiation and implementation stages the ToC start with some fundamental assumptions. First, the design of the intervention is pertinent and tackle local needs; second, during initiation a broad community and key local actors' approval has been sought; and finally, during implementation community mobilization activities be carried out. Therefore, SATPMI strength and quality characteristics by itself should contribute to the effectiveness, similarly on how the initiative

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[25] (PITA) mechanisms refers to interventions promoting citizen engagement in public service management involve participation, inclusion, transparency, and accountability.

characteristics in public planning and service delivery fields contributes to enhance development outcomes.

A more specific ToC for Community Monitoring Interventions (CMIs), social accountability mechanisms in which the community have the opportunity to engage on monitoring of service delivery by observe and review providers performance and give feedback is presented on Molina et al.(2016, 2017). A schematic of the causal chain (Figure 7), shows the processes of a standard CMI and the pathways for the initiative is expected to have an impact on service delivery outcomes and corruption.

Figure 7. Causal chain for CMI
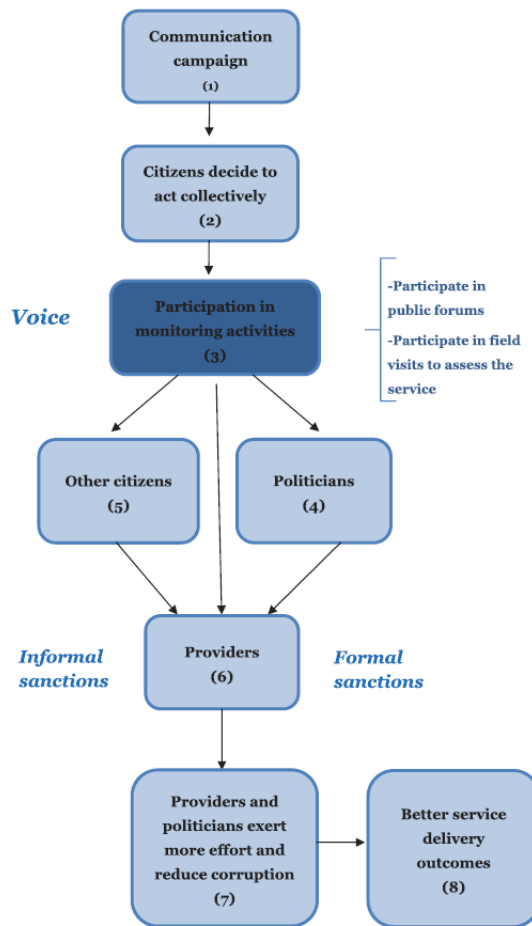
Source: (Molina et al., 2016)

In this ToC the causal chain suggests that the CMIs will have a positive effect on quantity and degree on how communities involve on monitoring service providers; the public official and providers will

try to improve their performance regarding service delivery; probability of corruption will be diminished; and the service provided will be improved.

Figure 8. **Molina's adjusted ToC for the Colombian CVA**
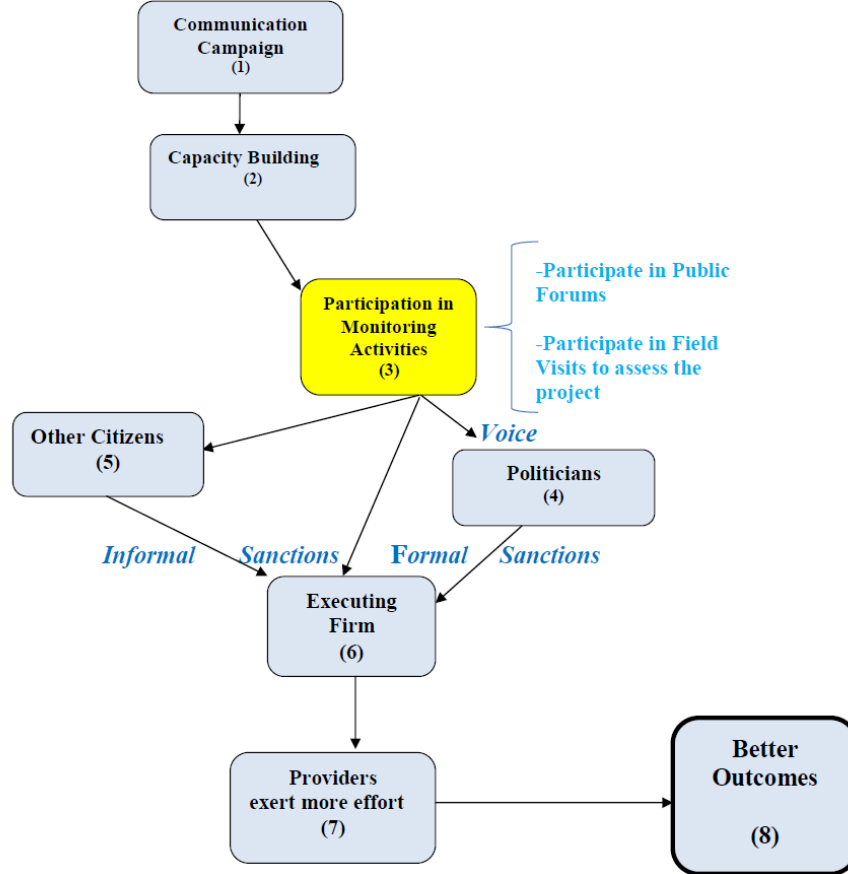
Source: (Molina, 2013)

On Figure 8, the adjusted ToC for the Colombian CVA is presented, the model consists on a series of building blocks and its relations according to the activities of the CVA interventions.

The first step for the CVA is a communication campaign to spread information about the project and the intervention, using local media the activity tries to increase citizen participation on the opening forum (Building block 1).

Capacity building occurs after the first contact. CVA facilitators gave citizens information regarding the project objectives, execution firm, schedule. In parallel information on how to monitor a project, where to address complaints and observations is also given. (Building block 2)

With access to information, the beneficiaries are expected to engage on monitoring activities (building block 3). such as visits to the construction sites, collect information on problems and talk to project supervisor establishing a direct link with the execution firm (building block 6), contact public official or elected officials for complaining about project outcomes(building block 4). Additionally, citizens could involve neighbors (building block 5) who don't participate on the community monitoring activities sharing the information they obtained, generating more visibility of the execution process of the project.

On the public forums the citizens met directly with project supervisors, local government officials, executing firm, and the central government agency, and could use their voice regarding the project execution. With major visibility and participation, a change in behavior is expected. If the right conditions are established, incentives for elective officials to put pressure on executions firms if they perform bad are expected. And in turn for providers facing citizen pressure and official sanctions are more likely to exert effort on improve their behavior (building block 7). and therefore the CVA could improve service delivery (building block 8) (Molina, 2013).

APPENDIX 2 – OLS Models outcomes

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
VARIABLE CAV	-7.236***	-5.094***	-5.089***	-4.960***	-5.067***	-5.069***	-5.056***	-5.022***	-4.990***	-6.300**	-7.564***	4.909
	(0.528)	(0.545)	(0.545)	(0.542)	(0.546)	(0.547)	(0.547)	(0.545)	(0.546)	(2.790)	(1.075)	(10.26)
SGR resource		-1.067***	-1.070***	-0.773***	-0.869***	-0.845***	-0.839***	-0.892***	-0.923***	-0.900***	-0.926***	-0.907***
		(0.0735)	(0.0735)	(0.0848)	(0.0851)	(0.0878)	(0.0881)	(0.0892)	(0.0907)	(0.0907)	(0.0906)	(0.0914)
SGR Historic budget			0.0212	0.231***	0.294***	0.320***	0.318***	0.257***	0.280***	0.279***	0.285***	0.286***
			(0.0141)	(0.0651)	(0.0653)	(0.0657)	(0.0657)	(0.0668)	(0.0713)	(0.0713)	(0.0713)	(0.0729)
executor_type==3				-1.912	-1.857	-1.993*	-2.014*	0.103	-0.270	-0.261	-0.220	0.267
				(1.210)	(1.205)	(1.207)	(1.207)	(1.296)	(1.327)	(1.326)	(1.326)	(1.370)
executor_type==4				1.625	1.264	1.096	1.070	2.827**	2.515**	2.507**	2.542**	2.976**
				(1.133)	(1.129)	(1.131)	(1.131)	(1.221)	(1.234)	(1.233)	(1.234)	(1.274)
executor_type==5				5.225***	7.478***	7.837***	7.782***	8.361***	8.680***	8.679***	8.825***	9.135***
				(1.819)	(1.830)	(1.840)	(1.840)	(1.892)	(1.963)	(1.962)	(1.962)	(2.006)
executor_type==6				6.231***	8.880***	9.005***	9.386***	10.56***	10.99***	11.02***	11.46***	11.95***
				(2.124)	(2.141)	(2.156)	(2.192)	(2.232)	(2.271)	(2.271)	(2.274)	(2.337)
Type of proccurement					2.171***	1.992***	1.978***	1.505***	1.493***	1.461***	1.474***	1.398***
					(0.248)	(0.350)	(0.350)	(0.359)	(0.359)	(0.359)	(0.359)	(0.366)
variablefirmtypecode==2						-1.244*	-1.239*	-0.881	-0.826	-0.788	-0.769	-0.713
						(0.648)	(0.648)	(0.647)	(0.657)	(0.656)	(0.656)	(0.660)
variablefirmtypecode==3						-0.535	-0.525	-0.294	-0.195	-0.387	-0.0301	-0.0288
						(1.105)	(1.105)	(1.110)	(1.117)	(1.117)	(1.117)	(1.120)
variablefirmtypecode==4						-2.800***	-2.804***	-2.666***	-2.662***	-2.718***	-2.576***	-2.765***
						(0.894)	(0.894)	(0.923)	(0.930)	(0.929)	(0.930)	(0.934)
variablefirmtypecode==5						-2.866	-2.869	-1.946	-2.282	-2.261	-2.284	-2.326
						(2.229)	(2.229)	(2.222)	(2.225)	(2.242)	(2.224)	(2.267)
variablefirmtypecode==6						-0.687	-0.675	-0.373	-0.374	-0.336	-0.299	-0.218
						(0.793)	(0.793)	(0.795)	(0.804)	(0.803)	(0.803)	(0.807)
variablefirmtypecode==7						-1.721	-1.713	-1.440	-1.369	-1.350	-1.312	-1.009
						(1.568)	(1.568)	(1.562)	(1.568)	(1.567)	(1.567)	(1.569)
variablefirmtypecode==8						-1.255*	-1.239*	-0.818	-0.774	-0.697	-0.674	-0.603
						(0.720)	(0.720)	(0.725)	(0.733)	(0.733)	(0.733)	(0.737)
variablefirmtypecode==9						-1.358*	-1.338*	-0.945	-0.922	-0.944	-0.906	-1.047
						(0.749)	(0.750)	(0.757)	(0.767)	(0.767)	(0.767)	(0.777)
variablefirmtypecode==10						-1.364**	-1.352**	-0.566	-0.347	-0.361	-0.277	-0.308
						(0.667)	(0.667)	(0.679)	(0.689)	(0.689)	(0.689)	(0.699)
variablefirmtypecode==11						-1.825	-1.758	-1.764	-1.742	-1.935	-1.626	-1.785
						(1.426)	(1.428)	(1.424)	(1.426)	(1.425)	(1.426)	(1.427)
variablefirmtypecode==12						0.627	0.613	2.444	2.412	2.545	2.581	1.738
						(1.758)	(1.758)	(1.773)	(1.778)	(1.780)	(1.778)	(1.824)
variablefirmtypecode==13						-4.152	-4.144	-3.182	-2.709	-2.497	-2.585	-3.956
						(3.954)	(3.954)	(3.945)	(3.948)	(3.944)	(3.944)	(3.950)
variablefirmtypecode==14						-0.953	-0.938	-0.564	-0.411	-0.388	-0.378	-0.310
						(0.638)	(0.638)	(0.638)	(0.650)	(0.650)	(0.650)	(0.654)
variablefirmtypecode==15						-1.861	-1.858	-1.738	-1.402	-1.418	-1.430	-1.889
						(2.570)	(2.570)	(2.559)	(2.566)	(2.563)	(2.564)	(2.558)
variablefirmtypecode==16						-0.139	-0.116	0.174	0.201	0.236	0.246	0.383
						(0.893)	(0.893)	(0.892)	(0.900)	(0.899)	(0.899)	(0.906)
variablefirmtypecode==17						0.253	0.264	0.495	0.475	0.473	0.530	0.513
						(0.679)	(0.679)	(0.680)	(0.690)	(0.690)	(0.690)	(0.694)
variablefirmtypecode==18						-1.738	-1.724	-1.000	-0.912	-0.885	-0.893	-0.832
						(2.582)	(2.582)	(2.570)	(2.570)	(2.567)	(2.567)	(2.561)
variablefirmtypecode==19						-1.120*	-1.114*	-0.763	-0.790	-0.784	-0.733	-0.645
						(0.665)	(0.665)	(0.678)	(0.677)	(0.678)	(0.677)	(0.683)
# of contracts							-0.00261	-0.00137	-0.000821	-0.00172	-0.00249	-0.00687**
							(0.00270)	(0.00272)	(0.00275)	(0.00276)	(0.00284)	(0.00325)
sector==1								-1.982***	-1.998***	-1.985***	-1.964***	-3.540***
								(0.502)	(0.503)	(0.509)	(0.503)	(1.142)
sector==2								-3.222***	-3.169***	-2.876**	-3.268***	-6.276***

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OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
								(1.108)	(1.108)	(1.126)	(1.108)	(1.804)
sector==3								-2.704***	-2.708***	-2.523***	-2.667***	-3.425**
								(0.747)	(0.746)	(0.757)	(0.746)	(1.445)
sector==5								0.0270	0.0229	-0.305	0.000967	-0.290
								(0.325)	(0.326)	(0.333)	(0.326)	(0.585)
sector==8								-0.260	-0.354	-0.299	-0.317	0.0139
								(0.571)	(0.576)	(0.581)	(0.575)	(1.037)
sector==9								1.313**	1.305**	1.322**	1.316**	1.968**
								(0.561)	(0.562)	(0.570)	(0.561)	(0.854)
sector==11								-1.386**	-1.480**	-1.371**	-1.468**	0.915
								(0.600)	(0.601)	(0.614)	(0.600)	(1.143)
sector==13								-3.666***	-3.656***	-3.661***	-3.610***	-3.154***
								(0.383)	(0.390)	(0.395)	(0.390)	(1.074)
sector==15								2.451	2.412	2.357	2.492	3.574
								(1.620)	(1.619)	(1.637)	(1.618)	(3.091)
sector==17								-9.935***	-9.956***	-10.10***	-10.16***	0.401
								(2.863)	(2.862)	(3.101)	(2.862)	(5.113)
sector==19								-1.514***	-1.517***	-1.511***	-1.538***	-1.078
								(0.439)	(0.439)	(0.442)	(0.439)	(0.689)
sector==20								-2.944***	-2.930***	-3.309***	-2.988***	-6.632***
								(0.703)	(0.703)	(0.718)	(0.703)	(1.446)
sector==21								0.759	0.675	0.566	0.660	2.123**
								(0.589)	(0.590)	(0.592)	(0.590)	(1.032)
sector==22								-1.009***	-0.956***	-0.901***	-0.943***	-0.985
								(0.334)	(0.336)	(0.339)	(0.336)	(0.637)
sector==25								-0.969***	-1.022***	-0.952**	-1.033***	-1.851***
								(0.375)	(0.377)	(0.381)	(0.377)	(0.633)
region==2									0.368	0.349	0.291	2.305
									(0.309)	(0.309)	(0.313)	(1.544)
region==3									-0.630**	-0.636**	-0.743**	2.034
									(0.315)	(0.315)	(0.319)	(1.539)
region==4									-8.535	-8.633	-8.580	-8.227
									(10.35)	(10.34)	(10.34)	(10.28)
region==5									0.519	0.457	0.328	3.329**
									(0.319)	(0.319)	(0.324)	(1.647)
region==6									0.720**	0.722**	0.552	-0.202
									(0.358)	(0.357)	(0.363)	(1.763)
region==8									-1.888*	-1.743	-2.546**	0.143
									(1.135)	(1.137)	(1.166)	(10.23)
region==9									-0.408	-0.395	-0.345	1.077
									(0.314)	(0.314)	(0.318)	(1.456)
1.variablecav#2.sector										-8.569		4.854
										(6.649)		(11.13)
1.variablecav#3.sector										-5.680		-14.76
										(5.088)		(11.55)
1.variablecav#5.sector										6.321**		-11.01
										(3.006)		(10.55)
1.variablecav#8.sector										-2.358		-18.77
										(4.607)		(14.51)
1.variablecav#9.sector										-0.360		-24.45**
										(3.944)		(11.10)
1.variablecav#11.sector										-1.600		-23.32**
										(3.832)		(11.28)
1.variablecav#13.sector										0.304		-13.55
										(3.505)		(11.89)
1.variablecav#15.sector										2.295		12.38
										(10.77)		(11.46)

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
1.variablecav#17.sector										1.877		8.327
										(8.438)		(13.87)
1.variablecav#19.sector										-0.812		-9.092
										(4.300)		(11.85)
1.variablecav#20.sector										6.457*		-12.06
										(3.639)		(14.53)
1.variablecav#21.sector										17.00**		7.425
										(7.799)		(14.50)
1.variablecav#22.sector										-2.750		-14.93
										(3.525)		(10.89)
1.variablecav#24.sector										0.272		-10.33
										(2.923)		(10.40)
1.variablecav#25.sector										-2.104		-11.26
										(3.338)		(10.82)
1.variablecav#2.region											2.879*	-7.946
											(1.738)	(14.50)
1.variablecav#3.region											3.802**	-8.286
											(1.736)	(14.51)
1.variablecav#5.region											5.579***	5.915
											(1.673)	(12.60)
1.variablecav#6.region											4.889***	-23.02**
											(1.739)	(10.81)
1.variablecav#8.region											11.60***	7.664
											(4.058)	(12.96)
1.variablecav#9.region											-1.681	-17.34
											(1.756)	(10.85)
2.sector#2.region												3.497
												(4.796)
2.sector#3.region												0.514
												(3.600)
2.sector#5.region												3.250
												(3.653)
2.sector#6.region												10.25**
												(5.209)
2.sector#8.region												-23.86
												(20.00)
2.sector#9.region												4.044
												(3.566)
3.sector#2.region												1.542
												(2.872)
3.sector#3.region												-1.188
												(3.056)
3.sector#5.region												-2.553
												(2.931)
3.sector#6.region												0.351
												(3.173)
3.sector#8.region												3.131
												(12.60)
3.sector#9.region												-0.770
												(2.559)
5.sector#2.region												-2.274
												(1.761)
5.sector#3.region												-2.399
												(1.761)
5.sector#5.region												-1.326
												(1.855)
5.sector#6.region												1.843

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
												(2.135)
5.sector#8.region												-10.45
												(11.46)
5.sector#9.region												-4.672***
												(1.745)
8.sector#2.region												-2.432
												(2.332)
8.sector#3.region												-3.224
												(2.300)
8.sector#5.region												-2.933
												(2.135)
8.sector#6.region												12.98*
												(7.504)
8.sector#8.region												-1.605
												(14.60)
8.sector#9.region												-5.717**
												(2.842)
9.sector#2.region												-4.370*
												(2.450)
9.sector#3.region												-4.538**
												(2.058)
9.sector#5.region												-2.201
												(2.289)
9.sector#6.region												0.573
												(2.684)
9.sector#8.region												-21.71*
												(12.54)
9.sector#9.region												-2.054
												(2.447)
11.sector#2.region												-5.204**
												(2.451)
11.sector#3.region												-5.333**
												(2.441)
11.sector#5.region												-5.973***
												(2.308)
11.sector#6.region												-0.931
												(2.715)
11.sector#9.region												-6.635***
												(2.448)
13.sector#2.region												-2.373
												(1.989)
13.sector#3.region												-3.498*
												(2.062)
13.sector#5.region												-4.495**
												(2.120)
13.sector#6.region												0.984
												(2.222)
13.sector#8.region												-4.309
												(10.33)
13.sector#9.region												-0.176
												(2.081)
15.sector#2.region												0.603
												(4.838)
15.sector#3.region												-9.649
												(6.847)
15.sector#5.region												-3.958
												(5.199)

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
15.sector#6.region												-2.511
												(6.893)
15.sector#9.region												-6.431
												(5.150)
17.sector#2.region												-10.72
												(11.51)
17.sector#5.region												-30.29***
												(7.969)
17.sector#6.region												-15.60
												(11.55)
17.sector#8.region												8.806
												(15.32)
17.sector#9.region												-20.63*
												(11.50)
19.sector#2.region												-2.308
												(1.995)
19.sector#3.region												-6.185***
												(2.254)
19.sector#5.region												-4.858**
												(2.239)
19.sector#6.region												0.167
												(2.282)
19.sector#9.region												-1.136
												(1.865)
20.sector#2.region												2.822
												(2.571)
20.sector#3.region												2.551
												(2.508)
20.sector#5.region												-4.582
												(2.963)
20.sector#6.region												5.810**
												(2.660)
20.sector#8.region												7.031
												(10.69)
20.sector#9.region												2.724
												(2.456)
21.sector#2.region												-8.345***
												(2.577)
21.sector#3.region												-4.413*
												(2.511)
21.sector#5.region												-1.701
												(2.246)
21.sector#6.region												-3.943
												(2.767)
21.sector#8.region												-0.104
												(14.48)
21.sector#9.region												-5.597**
												(2.198)
22.sector#2.region												-2.085
												(1.861)
22.sector#3.region												-3.882**
												(1.828)
22.sector#5.region												-3.895*
												(1.989)
22.sector#6.region												0.935
												(2.050)
22.sector#9.region												-0.331

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
												(1.666)
24.sector#2.region												-1.920
												(1.601)
24.sector#3.region												-3.185**
												(1.622)
24.sector#5.region												-3.734**
												(1.741)
24.sector#6.region												0.433
												(1.848)
24.sector#8.region												11.68
												(11.43)
24.sector#9.region												-0.759
												(1.531)
25.sector#2.region												-1.164
												(1.881)
25.sector#3.region												0.253
												(1.797)
25.sector#5.region												-2.049
												(1.875)
25.sector#6.region												2.282
												(2.091)
25.sector#9.region												-2.669
												(1.966)
1.variablecav#2.sector#6.region												-23.99
												(21.70)
1.variablecav#3.sector#2.region												-1.202
												(18.61)
1.variablecav#3.sector#3.region												4.841
												(18.64)
1.variablecav#5.sector#2.region												15.54
												(14.94)
1.variablecav#5.sector#3.region												15.15
												(14.96)
1.variablecav#5.sector#5.region												2.584
												(13.04)
1.variablecav#5.sector#6.region												28.35**
												(11.80)
1.variablecav#5.sector#9.region												24.48**
												(11.67)
1.variablecav#8.sector#3.region												14.94
												(20.54)
1.variablecav#8.sector#5.region												3.307
												(17.80)
1.variablecav#8.sector#6.region												30.92
												(19.46)
1.variablecav#8.sector#9.region												19.62
												(16.20)
1.variablecav#9.sector#2.region												29.88*
												(16.32)
1.variablecav#9.sector#3.region												30.24*
												(16.78)
1.variablecav#9.sector#6.region												58.06***
												(15.70)
1.variablecav#9.sector#8.region												35.06*
												(18.58)
1.variablecav#9.sector#9.region												35.74**
												(15.59)

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
1.variablecav#11.sector#2.region												33.23**
												(16.94)
1.variablecav#11.sector#3.region												19.86
												(18.42)
1.variablecav#11.sector#5.region												26.40
												(16.94)
1.variablecav#11.sector#6.region												36.57***
												(12.77)
1.variablecav#11.sector#9.region												17.81
												(13.95)
1.variablecav#13.sector#2.region												15.66
												(16.78)
1.variablecav#13.sector#3.region												8.022
												(16.38)
1.variablecav#13.sector#5.region												0.167
												(14.89)
1.variablecav#13.sector#6.region												19.89
												(13.09)
1.variablecav#13.sector#8.region												1.283
												(17.59)
1.variablecav#13.sector#9.region												30.69**
												(14.40)
1.variablecav#17.sector#2.region												-18.34
												(22.59)
1.variablecav#19.sector#2.region												3.515
												(17.29)
1.variablecav#19.sector#3.region												6.315
												(16.81)
1.variablecav#19.sector#6.region												19.62
												(14.35)
1.variablecav#20.sector#2.region												12.49
												(18.26)
1.variablecav#20.sector#3.region												7.098
												(19.25)
1.variablecav#20.sector#5.region												0.713
												(17.17)
1.variablecav#20.sector#6.region												39.60**
												(15.84)
1.variablecav#20.sector#8.region												9.654
												(18.61)
1.variablecav#20.sector#9.region												20.29
												(18.16)
1.variablecav#21.sector#6.region												21.31
												(18.16)
1.variablecav#22.sector#2.region												-1.370
												(15.82)
1.variablecav#22.sector#3.region												9.746
												(16.10)
1.variablecav#22.sector#6.region												26.63**
												(12.87)
1.variablecav#22.sector#9.region												26.06**
												(12.34)
1.variablecav#24.sector#2.region												3.504
												(14.83)
1.variablecav#24.sector#3.region												12.11
												(14.79)
1.variablecav#24.sector#5.region												-7.989

OPP	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
												(12.95)
1.variablecav#24.sector#6.region												26.99**
												(11.14)
1.variablecav#24.sector#8.region												-6.125
												(17.37)
1.variablecav#24.sector#9.region												9.040
												(11.24)
1.variablecav#25.sector#2.region												3.422
												(18.09)
1.variablecav#25.sector#3.region												-0.765
												(15.78)
1.variablecav#25.sector#5.region												-5.194
												(13.41)
1.variablecav#25.sector#9.region												10.13
												(12.88)
Constant	77.90***	99.96***	99.54***	87.39***	86.32***	86.47***	86.42***	87.90***	88.21***	87.82***	88.14***	87.36***
	(0.0950)	(1.523)	(1.549)	(2.244)	(2.244)	(2.373)	(2.374)	(2.415)	(2.535)	(2.534)	(2.534)	(2.573)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Observations	12,678	12,678	12,678	12,678	12,636	12,628	12,628	12,628	12,628	12,628	12,628	12,628
R-squared	0.015	0.031	0.031	0.040	0.047	0.050	0.050	0.063	0.065	0.068	0.067	0.090
Dummy Sector	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Dummy region	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Interaction Sector CVA	No	No	No	No	No	No	No	No	No	Yes	No	Yes
Interaction Region CVA	No	No	No	No	No	No	No	No	No	No	Yes	Yes
Interaction Sector Region CVA	No	No	No	No	No	No	No	No	No	No	No	Yes

Standard errors in parentheses   *** p<0.01, ** p<0.05, * p<0.1

Type of procurement	
variableproccurementdummy	
ID	Name
0	Non profit organizations procurement
0	Direct procurement
0	Private procurement for public entity
0	Minimum amount
1	Merits contest
1	Public bidding
1	Short selection

Type of Executor	
Iexecutor	
ID	Name
1	Enviromental regional corporation
3	Departments
4	Municipalities
5	Other entities
6	Public universuty

Region	
Iregion	
ID	Name
1	CARIBE
2	CENTRO ORIENTE
3	CENTRO SUR
4	CORMAGDALENA
5	DEL LLANO
6	EJE CAFETERO
7	LLANOS
8	NACIONAL
9	PACIFICO

Type of firm	
_Ivariablefirmtypecode	
ID	Name
1	Association of Municipalities
2	Consortium
3	Cooperative
4	Public services company
5	State Industrial and Commercial Company
6	LTDA Company
7	Sole proprietorship
8	Private Entity
9	Public entity
10	Non-profit entity
11	Territorial entity
12	Trustee body
13	International organization
14	Natural person
15	Indigenous reservation
16	Anonymous society
17	Simplified Joint Stock Company
18	Capital companies
19	Temporary union

26

Sector	
Isector	
ID	Name
1	Agriculture
2	Commerce, Industry and Tourism
3	Culture
4	Defense
5	Education
6	Employment
7	Energy and mining
8	Energy and mining
9	Enviroment and sustainable development
10	Exterior relations
11	Health
12	Health
13	Housing
14	INFLEXIBILIDADES
15	IT and comunnications
16	Interior
17	Justice
18	Local government
19	Planning
20	Science, technology and innovation
21	Social inclusion and reconciliation
22	Sports and recreation
23	Statistical information
24	Transport infraestructure
25	Water and sanitation

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[26] Sectors on pink where not used, correspond to junk data on the database.