

Behavioral Insights for Foresighted Public Finance

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Abstract

Behavioral insights are becoming part of the policy toolkit in countries around the world, and the IDB has positioned itself at the forefront of this movement in Latin America and the Caribbean. This policy brief discusses some of the reasons behind its success and serves as an encouragement for policymakers in the region to adopt some of these tools. In a region with numerous unfulfilled needs and limited resources, behavioral insights can play an important role for improving public finance in the region. Interventions leveraging behavioral insights can increase revenues by improving tax compliance and boosting tax morale. They can also improve the efficiency of public spending by encouraging preventive healthcare activities (involving vaccines, diet, exercise, etc.), promoting energy and water conservation, lowering traffic fatalities, and reducing teacher absenteeism, among other means. By surveying the evidence coming from interventions in the field in LAC and other parts of the world, this policy brief makes a strong case to the region to embrace behavioral insights and design behaviorally informed policies.

JEL classifications: H0, H20, H26, H3, H51, H52, H54, H55, H83, D91, E71, I18

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1. Introduction

Public policies usually attempt to change behavior by changing incentive structures. For example, countries can reduce cigarette consumption by increasing prices, by regulating (or prohibiting) who can buy them and where, and by restricting where smoking is allowed. In other cases, governments may want to promote the consumption of certain goods and provide subsidies to those who buy them.

Governments and international organizations are increasingly realizing, however, that merely announcing policies or introducing new measures cannot achieve their desired objectives. The success of policies depends in no small part on how well they are designed, and insights from psychology, behavioral economics and cognitive sciences have assumed a growing role in the design process. Behavioral insights can foster the creation of policies, structure incentives and design environments that take into account factors crucial to the decision-making process that were until recently often ignored by policymakers. For example, even if households are convinced of the benefits of connecting the sewerage system and have available credit to cover the cost of connection, simple procrastination may be getting in the way; habits and cultural practices may also present obstacles. Faced with these conditions, governments should go beyond simply bringing the pipeline to the doorstep. They may additionally need to make connecting more socially appealing by providing reminders and simple step-by-step solutions for paperwork.

This is hardly an isolated case. Among other examples, the cognitive cost of remembering a complicated vaccination schedule can get in the way of immunization, the frustrations of paperwork can cost years of unclaimed retirement benefits and postponing the adoption of more energy-efficient light bulbs can result in unnecessarily high utility bills. More complex issues arise when people are expected to change their habits or delay gratification in order to realize benefits in an uncertain and distant future; such difficulties notably affect motivating individuals to save, pursue education and engage in exercise and healthy living in general. In these areas, tools such as reminders or commitment devices—ways to give oneself rewards or punishments for action or inaction—can help guide behavior in the desired direction. At other times, outcomes depend on the behavior of others. Instituting pro-environmental behavior, increasing tax compliance and reducing littering, for instance, rely on widespread changes. In those cases, correcting misperceptions about others' behavior, as well as carefully employing descriptive and injunctive

norms, can have impressive results. We elaborate on a variety of such examples in the following sections.

More specifically, this brief addresses how behavioral insights can improve public spending, with a focus on Latin America and the Caribbean, and how the Inter-American Development Bank (IDB) has increased knowledge in this area. The importance of behavioral insights can hardly be overstated, as they tie in with two endemic problems facing the region's governments. First, tax evasion is rampant. Second, public spending is rapidly growing, and its composition is tilting away from investment to consumption. Even more worrisome, according to the IDB's flagship publication (Izquierdo et al., 2018), public spending efficiency is very low throughout the region. While governments are addressing both problems through traditional tools such as ramping up tax auditing and introducing fiscal management systems, these measures have only limited net effects. Not only do they require substantial resources to undertake, but they also work only with the right set of incentives. As noted by Hallerberg, Scartascini and Stein (2009), even the most sophisticated fiscal rules will not work if political incentives are not aligned.

Behavioral insights offer promising solutions to these endemic concerns. They can increase tax compliance by making monitoring and penalties more salient and boost tax morale by inducing reciprocity or leveraging peer effects. Section 2 of this brief presents substantial evidence about the success of these interventions around the world and in most countries in Latin America and the Caribbean. Furthermore, as discussed in Section 3, behavioral insights can help to reduce public spending by means including but not limited to improving preventive healthcare, promoting energy and water conservation, and lowering traffic fatalities. These are not the only areas in which behavioral intervention can have an impact, but they serve as a valuable array of examples. There are plenty of other examples we could have cited in the areas of education, waste management and recycling, savings, employee incentives, and others. There are also some other promising areas in which behavioral insights could be used. For example, there is very little work done in the area of regulation of public utilities.

2. Increasing Tax Compliance with Behavioral Insights

Tax evasion is a serious problem in Latin America and the Caribbean. According to the IDB's 2015 flagship publication (Corbacho, Fretes Cibils and Lora, 2015), tax evasion hovers around 50 percent for most countries and taxes. The following section highlights the most relevant behavioral

insights with respect to tax compliance and illustrates their use in interventions while highlighting their potential for increasing revenues.

2.1 The Message

Citizens of Latin America and the Caribbean who do not pay their taxes generally offer three explanations. The first involves the absence of deterrents—i.e., nothing happens in the case of non-compliance. The second is a peer effect: essentially, “Nobody else pays, so why should I?” The third involves reciprocity. If the government is viewed as wasting the revenues it already collects, citizens have little motivation to throw their money away by paying taxes.

In voluntary tax compliance, as in other policy areas, messages have nonetheless proven effective in changing behaviors in many policy areas. For example, the municipality of Junín, Argentina decided to redesign its property tax bill in order to increase compliance, and the design process included evaluating the effectiveness of different messages. In a randomized experimental design three different types of messages were sent to taxpayers, each stressing i) deterrence, ii) legitimacy or iii) equity. Castro and Scartascini (2015) found that introducing such messages in tax bills had an overall positive impact on taxpayers’ behavior, and that some messages were more effective than others. The most effective message involved deterrence, listing the actual fines and potential administrative and judicial steps that the municipality might follow in case of noncompliance. Tax compliance among the taxpayers that received this deterrence message increased by almost 5 percentage points compared to the control group, equivalent to reducing tax evasion by more than 10 percent.

Such interventions may additionally have positive spillovers. López-Luzuriaga and Scartascini (2019) provide insight on the question of what happens to compliance in other taxes when authorities increase enforcement in one tax. Further analyzing the data from the Junín experiment, and focusing on business owners who received the deterrence message, they find that increasing the salience of fines and enforcement probabilities for non-payment of property tax increases those individuals’ declared gross-sales tax by 2 percent.

Kettle et al. (2016) conducted a similar intervention in Guatemala. Individuals and firms who had failed to pay their 2013 income tax were randomly allocated to receive either no letter, the letter originally used by the Guatemalan Tax Authority, or four variants adapted using behavioral design. While all letters increased the rate of declaration, two variants additionally

succeeded at increasing the rate of payment and the average amount paid. The first, designed to overcome status quo bias, was a deterrent message framing non-declaration as a deliberate choice rather than an oversight. The second was a descriptive norm message, noting 64.5 percent of taxpayers had already paid their 2013 bill. These two variants positively impacted both extensive and intensive margins, overall more than tripling tax receipts, and the effect persisted after 12 months. The authors estimate that, if all taxpayers in the sample had received the social norms message, it would have generated additional tax revenues of approximately US\$760,000 in 11 weeks—36 times the cost of sending the letters.

Similar results were found in Peru, where Del Carpio (2013) examined the role of norms on tax compliance through a field experiment on property taxes. Through an official letter from the municipality, randomly chosen subsets of residents in two municipalities in the province of Lima were informed of the average rate of compliance in their municipality, the average level of municipal enforcement, or both, and a final group was only reminded of the payment deadline. Disclosing information on the level of compliance, which presented compliance as the normative behavior, had a large positive impact on compliance (20 percent relative to the control group). The payment reminder also raised compliance by 10 percent, an effect that persisted even after the municipality initiated legal proceedings against delinquent taxpayers. The enforcement treatment did not have a significant effect on compliance net of the reminder effect.

Table 1. Behavioral Interventions in Tax Compliance

Intervention	Location	Sample/Tax	Treatment	Results
Castro and Scartascini (2019)	Santa Fe, Argentina	54,000 delinquent municipal taxpayers	Simplification, salience	Increased probability of entering tax amnesty
Castro and Scartascini (2015)	Junín, Argentina	Property tax	Deterrence, legitimacy or equity	Tax compliance in deterrence treatment increased by almost 5 pp
Kettle et al. (2016)	Guatemala	Income tax (individuals and firms)	Deterrence, descriptive norm	Positive impact on both extensive and intensive margins, overall more than tripling tax receipts

Table 1, continued

Intervention	Location	Sample/Tax	Treatment	Results
Del Carpio (2013)	Lima, Peru	Property taxes	1. Descriptive norm 2. Enforcement 3. 1 + 2 4. Reminder	1. 20% compliance increase 2. Similar to reminder only 3. Similar to reminder only 4. 10% compliance increase
Ortega and Sanguinetti (2013)	Caracas, Venezuela	6,000 firms/ Business tax	Deterrence, moral persuasion	Similar effects w.r.t control, larger for small firms—contact effect?
Brockmeyer et al. (2019)	Costa Rica	Income tax	Enforcement emails	Payment rate among previously non-filing firms doubled
Carrillo, Castro, and Scartascini (2017)	Santa Fe, Argentina	Property tax	Lottery winners get free sidewalk construction	Payment rate among winners is 7pp higher than non-winners. Neighbors of winners increase compliance up to 15pp
Marshall and Pomeranz (2011)	Chile	VAT tax (firms)	Deterrence letter	Probability of declaring more than in the same month of previous year increased by 1.4 pp
Bérgolo et al. (2017)	Uruguay	20,440 SMEs	Information on audit probabilities and penalty rates	Decrease in firms' perception of audit probabilities BUT increased compliance
López-Luzuriaga and Scartascini (2018)	Junín, Argentina	Gross-sales tax	Information on penalties on the property tax	Increased individuals' declared gross-sales tax by 2 percent.
Carrillo et al. (2014)	Ecuador	Firms	Notified about discrepancies between declared revenues and reports from third-party	Increased reported revenues but increased reported costs, leading to only minor collection increases
Ortega and Scartascini (2020)	Colombia	Individuals and firms with tax delinquencies	Method of communication: letter, email, visit	Contacting the taxpayer had large effects on recovering debt. The effect of the visit was larger than the effect of the email, which was larger than the effect of the letter

The value of messages was further explored in Venezuela by Ortega and Sanguinetti (2013), who track the local business tax compliance of over 6,000 firms in a major municipality in Caracas. Firms were randomly assigned to a control of no stimulus, or to one of five treatment arms that received letters from the local tax administrator with different types of messages regarding tax compliance. While they find a larger effect for an enforcement message than for a moral persuasion message, these effects are not statistically distinguishable. The authors interpret this result as highlighting the effect of being contacted by the tax authority, regardless of the message's content. In line with this interpretation, they find the largest effects for small firms, which are largely unaccustomed to contact with the government.

Brockmeyer et al. (2019) arrive at somewhat different conclusions for Costa Rica. Using a nationwide randomized experiment, they find that sending firms credible enforcement emails tripled the income tax filing rate and doubled the payment rate among previously non-filing firms. The effect was highest when the email listed examples of third-party reports of a firm's transactions, with the return on an email reaching US\$19. The authors further found that the intervention had no negative spillovers on compliance with other taxes, that the treatment effects persisted in the medium term, and that treated firms became more likely to file information reports about their suppliers or clients, increasing the tax authorities' information set for future tax enforcement. The cost of the intervention, which involved the wages of officials who sent emails and replied to inquiries, is estimated to be US\$27,000, with US\$151,000 in gains from increased income tax revenue. The authors estimate that sending the strongest email would have generated an additional US\$93,000.

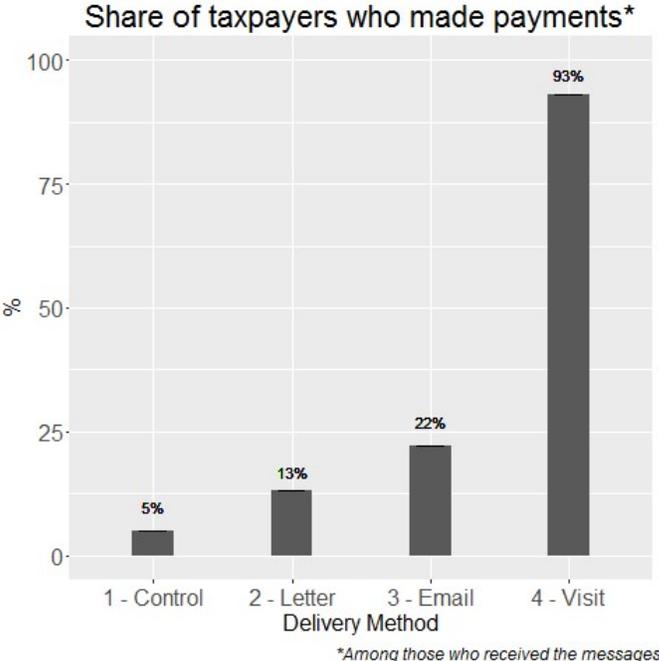
A variety of messages and strategies appear to have at least some effect. In 2008, for example, the Chilean Tax Authority sent letters indicating an increased audit probability to over 100,000 randomly selected firms. Marshall and Pomeranz (2011) estimate that the deterrence letter led to a 1,326 peso increase in the median VAT per month, a 7.6 percent increase compared to the baseline median. The probability of declaring more than in the same month of the previous year increased by 1.4 percentage points.

In Uruguay, Bérigolo et al. (2017) conducted a large-scale field experiment with the local tax authorities. Some 20,440 small-and medium-sized firms, which collectively pay over US\$200 million dollars in taxes per year, received letters providing information on audit probabilities and penalty rates. In addition to using administrative data to determine the actual taxes paid, the authors

used survey data to measure the letters’ impact on firms’ beliefs regarding the auditing process. Even though receiving information about audits decreased firms’ perception of the likelihood of being audited, which contradicted researchers’ predictions, the treatment nevertheless increased compliance. Those findings suggest that, in contrast to traditional models that depict agents as optimally trading off between the costs and the benefits of evasion (e.g., Allingham and Sandmo, 1972), the possibility of audits may instead deter tax evasion in the same way that scarecrows frighten off birds.

The effectiveness of this kind of deterrence, however, may be limited if taxpayers can make offsetting adjustments on less verifiable margins of the tax return. Carrillo, Pomeranz, and Singhal (2017) find evidence of such adjustments by analyzing a natural experiment in Ecuador, where the tax authority notified firms about discrepancies between their declared revenues and revenue reports from third-party sources. When firms were notified by the tax authority about detected revenue discrepancies on previously filed corporate income tax returns, they increased reported revenues, matching the third-party estimate when provided. On the other hand, firms increased their reported costs by 96 cents for every dollar of revenue adjustment, thus producing only a minor net gain tax collection.

Figure 1. Summary of Results from Ortega and Scartascini (2020)



2.2 The Messenger

Policymakers' work does not end with determining a message's content. They must also carefully select the channels through which that message reaches taxpayers. In Colombia, Ortega and Scartascini (2020) evaluated whether different mechanisms for delivering deterrence and moral persuasion messages had different effects on tax compliance. More than 20,000 taxpayers with unpaid liabilities were randomly assigned to a control group or one of three delivery mechanisms: a letter, an email or a personal visit. Taxpayers in the treatment groups all received the same message, which informed them of outstanding liabilities and warned them of the consequences of not paying. The effect on tax compliance, however, differed considerably across delivery methods: 8 percentage points for letters, 17 percentage points for emails, and 88 percentage points for personal visits. As shown in Figure 1, almost every person who received a visit by a tax agent made some kind of payment.

The average amount collected was around \$590 per email, \$550 per letter, and over \$2,000 for attempted in-person visits, with respective variable costs of \$0, \$0.5 and \$8. Hypothetically, successfully paying all 20,818 relevant taxpayers a personal visit could have generated \$36,639,680 in additional fiscal revenue (minus the \$166,544 required for implementation), representing 0.077 percent of Colombia's revenue from taxes on income, profits and capital gains in 2013 according to the OECD.

2.3 Positive Incentives

In addition to messages, there is also room for the use of positive incentives to increase tax compliance. In Argentina, Santa Fe municipality organized a lottery in an effort to reward good taxpayers and improve compliance with property taxes. Carrillo, Castro, and Scartascini (2017) estimated that the lottery, which entitled the winners to the construction or renovation of a complete sidewalk, as shown in Figure 2, made winners on average 3.1 percentage points more likely to pay their tax obligations on time over the period studied. The lottery raised the probability that property taxes were paid within three months by 2.4 percentage points and within six months by 2.1 percentage points, as shown in the ITT columns in Figure 3. Compared to their peers, lottery winners were also 3 percentage points more likely to continue paying on time; this effect persists for at least three years after the intervention. Completing sidewalk renovations increased timely payment rates by 7.1 percentage points on average for the period studied. It additionally made tax

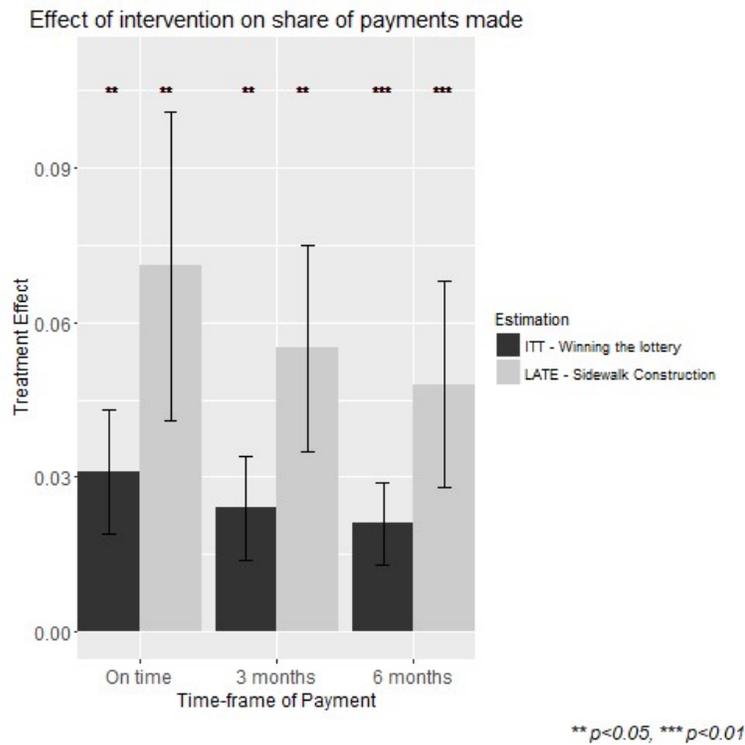
bills 5.5 percentage points more likely to be paid within three months and 4.8 percentage points more likely to be paid within six months, as shown in the local area treatment effects (LATE) columns in Figure 3. This effect similarly persisted over time.

Figure 2. A Renovated Sidewalk in Santa Fe, Argentina



Source: Carrillo, Castro and Scartascini (2017).

Figure 3. Summary of Results from Carrillo et al. (2017)



Positive incentives, however, can backfire as well as succeed, and policymakers should design them carefully. For example, the government of Montevideo, Uruguay, awarded a yearlong municipal tax holiday to randomly selected compliant taxpayers, which Dunning et al. (2017) found to result in lower compliance by winners after the tax holiday ended. This suggests that habit formation plays an important role in tax payment.

2.4 Salience and Clarity of Information

If taxpayers are supposed to react to a policy, they need to learn that the policy actually exists as well as understand the choices at their disposal. With these issues in mind, Castro and Scartascini (2019) evaluate the impact of providing simpler and more salient information involving a tax amnesty in the city of Santa Fe, Argentina. The authors redesigned notices sent to taxpayers to make them more likely to be aware of the information provided and to understand the benefits of the tax amnesty, and more than 54,000 delinquent taxpayers were randomized to receive traditional messages or the redesigned communication. Their results show that messages reducing cognitive costs made taxpayers more likely to enter the tax amnesty; moreover, the amount collected from the treatment group exceeded that from the control group by up to 8 percent. Improved communication, however, has its drawbacks. While taxpayers are more willing to cancel their past debt, they are also more likely to reduce their compliance with current tax bills, and there is a negative spillover effect on compliant taxpayers who previously had overdue bills.

3. Reducing Public Spending with Behavioral Insights

Beyond increasing revenues, behavioral insights can also help to increase the efficiency of public spending. In the infrastructure sector, this can be achieved through interventions that promote energy and water conservation or mitigate traffic fatalities. Public health costs can likewise be cut by encouraging preventive healthcare activities such as vaccinations or pre-natal check-ups. In agriculture, government spending can be reduced by relying more on behavioral nudges and less on fertilizer subsidies, while in education leveraging behavioral insights can increase the attendance of teachers and principals and reduce waste in spending and instructional time. Finally, successful interventions encouraging voluntary savings for retirement imply lower government spending on pensions in the long run. The rest of this section presents examples of behavioral interventions from the sectors mentioned above and highlights how they can improve the

efficiency of public spending. While many of these interventions were conducted in other parts of the world—particularly those involving infrastructure and agriculture—their results suggest that they could be adapted for use in Latin America and the Caribbean.

3.1 Infrastructure

3.1.1 Leveraging Social Norms for Energy and Water Conservation

Providing households information on their water and energy consumption—in combination with norm-based messages—has been shown to reduce water and energy consumption. Beyond the long-term environmental benefits of such interventions, governments can additionally benefit in the short term by reducing their spending on energy subsidies, which in some regions amount to a substantial share of GDP. According to the IMF, energy subsidies in Latin America and the Caribbean, approximately evenly split between fuel and electricity, amounted to about 1.8 percent of GDP in 2013. When negative externalities are considered, that figure more than doubles to about 3.8 percent of GDP (Di Bella et al., 2015).

In Ecuador, Pellerano et al. (2017) partnered with the electric utility that serves residential customers in Quito, Ecuador to conduct a randomized controlled trial in which some customers were informed of how their historical monthly electricity consumption compared to that of their neighbors; this approach paralleled the social comparisons conducted in the well-known Opower experiments discussed below. The authors find that the social comparison treatment reduces consumption relative to the control group by approximately 1 percent, or about 1.3 kWh less per month, the result of behavioral changes such as turning off a 60-Watt lightbulb for about one-half hour per day. While small in percentage terms, this effect is significant for a low-cost, one-time information treatment. By comparison, the Opower Home Energy Reports evaluations find consumption reductions in the range of 2 to 3 percent (Schultz et al., 2007; Allcott, 2011; Costa and Kahn, 2013; and Ayres, Raseman and Shih, 2013).

Similar interventions have been conducted in water conservation. In Costa Rica, Datta et al. (2015) tested three behavioral interventions to reduce water consumption in the city of Belén. Households were randomly assigned to receive one of the following letters: i) the standard water utility bill (control group), ii) a new utility bill that included a comparison of their water usage to that of the average household in the whole city of Belén (city comparison), iii) a new utility bill that included a comparison of their water usage the average household in their local neighborhood

(neighborhood comparison), or iv) a new utility bill that included a planning prompt with the goal of helping people set personal goals and create concrete plans to reduce their water consumption (plan-making). Relative to the control group, households receiving the latter two treatments reduced their water consumption by between 3.4 and 5.6 percent. Treatments, moreover, varied in their effects on different types of households. While the neighborhood comparison was more effective in reducing water consumption among households informed that they consumed more than nearby neighbors, the plan-making intervention had a greater impact among households informed that they consumed less than their nearby neighbors.

Figure 4. Comparative Messages Used in Datta et al. (2015)



Investigating a similar behavioral intervention in Colombia, Torres and Carlsson (2018) found that households randomly selected to receive monthly consumption reports with social information and appeals to norm-based behavior for one year reduced their water use by up to 6.8 percent. In addition, they found evidence of spillover effects: households not targeted by the campaign reduced their water use by 5.8 percent in the first six months following the intervention.

In the United States, Ferraro and Price (2013) report even more impressive results. They partnered with a metropolitan water utility to implement a natural field experiment examining the

effect of norm-based messages on residential water demand. The data, drawn from more than 100,000 households, indicated that social comparison messages had a greater influence on behavior than simple pro-social messages or technical information alone. Indeed, average water use declined approximately 7.41 to 53.38 percent more in the social norm group than in the control group. Had the strong social norm message been assigned to all 106,872 targeted households, the authors estimate that summer water use in the same county would have declined by approximately 186 million gallons, the equivalent of shutting off water to about 5,100 households. Based on the treatment costs in the experiment, the utility would have spent \$0.575 per thousand gallons saved. Had it been possible to target high-usage households, which were found to be the most sensitive to such messages, the intervention could have obtained 88 percent of the reduction for 75 percent of the total cost. Similar results have been found for water conservation in Australia (Fielding et al., 2012).

These studies nonetheless raise the question of whether such positive effects are sustainable in the long run. In the United States, Allcott et al. (2014) explore this question in relation to the Opower project mentioned above. Either for two years or indefinitely, households participating in the intervention were randomly assigned to receive reports providing individualized feedback about their energy use and comparing it to that of their neighbors, and concrete steps households could take to reduce energy consumption. The authors estimate that, for households receiving reports for only two years, treatment effects would disappear from five to 10 years after the reports ended. In contrast, households that received reports indefinitely continued to reduce their energy consumption; this suggests that consumers need more than two years to fully develop new habits. The study suggests that conservation interventions should be continued until customers have purchased energy efficient appliances to create long-term energy savings, and that the intensity of treatment can thereafter be reduced.

3.1.2 Behavioral Insights for Road Safety

Behavioral insights can also be leveraged to address rising traffic accidents and fatalities. In the United Kingdom, the Behavioural Insights Team (2016, 2017) partnered with the West Midlands Police force to reduce re-offending rates for reckless driving. The intervention consisted of explaining why speed limits exist and the dangerous consequences of breaking them, and it took advantage of an existing point of contact: the Notice of Intended Prosecution sent to drivers caught

speeding. A clustered randomized controlled trial among 15,346 drivers over 19 weeks found that the intervention made drivers 20 percent less likely to reoffend within six months. The intervention additionally increased by 13.7 percent the likelihood that penalty notices would be paid and reduced the likelihood of prosecution by 41.3 percent. Using Police and Home Office data, the authors estimated that the intervention would save the criminal justice system £1.5 million annually in the West Midlands alone, which could scale up to £25 million across England and Wales.

Figure 5. Message Sent to Randomly Selected West Midlands Drivers with Speeding Violations

**No driver means to kill
They were just going too fast**

Over the last five years, 779 children were killed or seriously injured on the roads in the West Midlands alone.

A lot of thought goes into setting speed limits. Speed limits take into account the history of accidents in the area – that’s why they’re there, because we don’t want to see history repeat itself.

Fortunately, most people understand there’s a good reason for the speed to be set to that limit and do the right thing.

The reason you’re getting this letter is to make sure the next time we’re called to investigate a serious collision, you’re not involved.

Important information about this notice

- If you were the driver, failure to provide your full driving licence information will result in you not being able to be considered for an educational course.
- Failing to provide information about the driver of the vehicle is an offence. This offence has a penalty of up to £1,000 and an additional six penalty points. Companies will receive a larger fine.
- Providing false information to the police is also a criminal offence. This offence has a penalty of between 6 and 24 months imprisonment and/or an additional fine.
- Do not complete and return the notice if you are not the named recipient.

You must pass the notice on to another person to complete or sign on your behalf.

Serving our communities, protecting them from harm
www.west-midlands.police.uk

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The reason you’re getting this letter is to make sure the next time we’re called to investigate a serious collision, you’re not involved.

Similar interventions have been undertaken in developing countries. In 2018, ideas42 conducted an experiment on traffic safety in South Africa in which residents who maintained clean driving records during the festive season in December and January received lottery tickets for cash prizes. The intervention resulted in a 42 percent decrease in fatalities compared to previous trends for that time of year (ideas42, 2018). In Kenya, stickers on mini-buses with evocative messages encouraging passengers to speak up against bad driving, combined with a lottery that rewarded mini-bus drivers for keeping the stickers in place, reduced insurance claims involving injury or

death by 60 percent. Net of lottery costs, the value of years of life saved was estimated at about 0.8 percent of per capita GDP, with material savings estimated at 0.2 percent of per capita GDP (Habyarimana and Jack, 2010). Continuing such annual savings over time could yield remarkable cumulative benefits in other developing countries. According to the World Bank (2017), similar reductions in traffic-related injuries and fatalities from 2014 to 2038 could add 22 percent to per capita GDP in Thailand, 15 percent in China, 14 percent in India, 7 percent in the Philippines and 7 percent in Tanzania.

Figure 6. Driving Safety Messages Used in Habyarimana and Jack (2010)



3.2 Health

3.2.1 Increasing Vaccination Using Micro-Incentives and Reminders

The health sector has made extensive use of behavioral insights in a variety of areas. They have proven to be an especially powerful and cost-effective tool for increasing immunization rates, which in turn has the potential to generate tremendous long-term savings for governments. Stack et al. (2011), for example, examine projected short and long-term economic benefits from the introduction and increased use of six vaccines in 72 of the world's poorest countries from 2011 to 2020. The authors estimate that an increase in vaccination rates against selected diseases in that period would save 6.4 million lives and prevent 426 million cases of illness, as well as save \$6.2 billion in treatment costs and \$145 billion in productivity losses.

In an intervention conducted by the Inter-American Development Bank (Busso, Cristia and Humpage, 2015), community health workers at clinics in Guatemala were given monthly lists of children due for vaccination and could thus send timely reminders to families. This increased the probability of vaccination completion by between 2.2-4.6 percentage points. A similar action increased prenatal doctor's visits in rural Guatemala (Busso, Romero and Salcedo, 2017). In India, setting up a reliable immunization camp and giving lentils as incentives resulted in a 33-percentage point higher immunization rate in treated villages than in control villages (Banerjee et al., 2010). Immunization with incentives incurred a cost of approximately US\$17.35 per person, notably higher than the approximately US\$4 per individual allocated in India's budget. The cost is comparable, though, with payment of US\$20 to member countries from the Global Alliance for Vaccines and Immunization per extra child who would not have been immunized otherwise.

3.2.2 Prenatal Monitoring, Adherence to Treatment and Obesity

In Peru, pregnant women were directly contacted by SMS (Beuermann et al., 2015) to encourage prenatal visits and checkups, with messages including appointment reminders and suggestions for healthy behaviors during pregnancy. This intervention increased the number of prenatal visits by 5 percent and the number of timely prenatal check-ups by 10 percent. Such reminders have also been proven effective in other health contexts such as increasing adherence to treatment (Tao et al., 2015; Pop-Eleches et al., 2011) and reducing missed appointments in the healthcare system (Milkman et al., 2012). Others have used commitment devices—self-administered rewards or punishments for specified behaviors—to increase exercise in adults (Adams et al., 2017; Royer, Stehr and Sydnor 2015). This amounts to a very low-cost strategy, especially in comparison to the toll that obesity is taking on governments: losses are estimated at US\$500 million in Chile, US\$4.3 billion in Ecuador and US\$28.8 billion in Mexico, representing GDP losses of 0.2 percent, 4.3 percent and 2.3 percent, respectively (World Food Program, 2017).

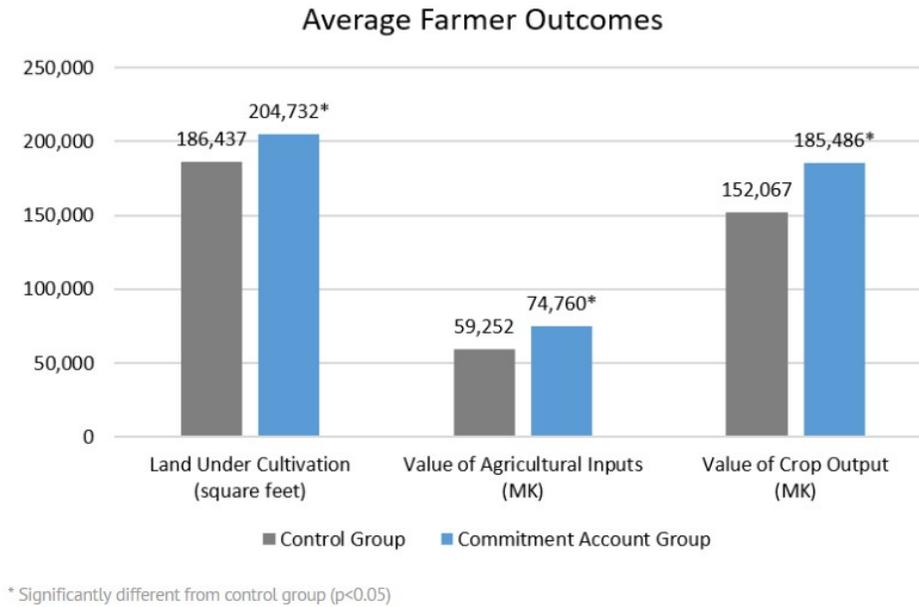
3.3 Agriculture

In recent years the agricultural sector has increasingly employed behavioral interventions, mostly involving farmers' use of fertilizer. Such interventions can generate savings for governments in two major ways. First, correct use of fertilizer and/or hybrid seeds allows farmers to maximize their individual yields and potentially increase total agricultural output. For example, evidence

from experimental farms in Kenya suggests that fertilizer and hybrid seeds increase yield from 40 to 100 percent (Kenyan Agricultural Research Institute, 1994; Karanja, 1996). A more recent estimation by Duflo, Kremer, and Robinson (2008) found that the mean rate of return to using the most profitable quantity of fertilizer was 36 percent over a season, or 69.5 percent on an annualized basis. Other levels of fertilizer use, however, including the combination of fertilizer plus hybrid seed recommended by the Kenyan Ministry of Agriculture, were not profitable for farmers in their sample. Second, measures such as those described in this section provide alternatives to fertilizer subsidization, which can place a heavy burden on developing countries. Subsidies on farm-purchased variable inputs such as energy and fertilizers have recently become particularly notable in Brazil, Chile, and Mexico (Gurria, Boyce, and De Salvo, 2016), while fertilizer subsidies amounted to 0.75 percent of India's GDP in 1999-2000 (Gulati and Narayanan, 2003). In Zambia, fertilizer subsidies consume almost 2 percent of the government's budget (World Bank, 2008).

Beyond their use in the health sector, as described above, commitment devices in agriculture can encourage farmers to save between harvest and planting. Given the intention to save for fertilizer at harvest, it can prove beneficial to provide farmers a way to keep their money safe, such as having a special account that lets them lock up some of their money and free it for later use at a time of their own choosing. Brune et al. (2011) tested such an intervention on farmers in rural Malawi. A randomized controlled trial with 3,150 farmers found that offering the commitment account option was associated with a 9.8 percent increase in land under cultivation, a 26.2 percent increase in agricultural input use, and a 22 percent increase in crop output in the subsequent harvest compared to the control group mean (see Figure 7). These sizeable effects involved only relatively small expenses: maintaining a commitment savings account for one season costs a participating bank \$23.34 per customer and costs the customer \$11.30.

Figure 7. Summary of Results from Brune et al. (2011)



Modifying components of the decision-making process, such as timing, can bypass reliance on self-control. The Savings and Fertilizer Initiative program initiated in Kenya by Duflo, Kremer, and Robinson (2011) found that providing small, time-limited reductions in the cost of purchasing fertilizer at the time of harvest (when farmers have available income), combined with free delivery later in the season (when farmers need the fertilizer), induced increases of 46 to 60 percent in fertilizer use, depending on the treatment. This effect was greater than that of offering free delivery later in the season, even with a 50 percent subsidy on fertilizer. For the average farmer in the sample (who farms 0.93 acres of land), this implies that using fertilizer would increase net income from maize by about US\$9.59 to US\$15.68 per season from a base of about US\$89.02.

3.4 Education

Behavioral interventions can play an important role in improving education outcomes while being extremely cost-effective. One way to do so is by targeting students' motivation. In an intervention conducted by the World Bank (eMBeD, 2018a), 800 public schools in Peru were randomly assigned to either a control or a 90-minute session where students and teachers discuss a specialized article on how brains can grow. The local average treatment effect (LATE) results, which account for lower-than-expected take up due to challenges during implementation, suggest

adjusted effects as high as 0.35 and 0.23 standard deviation increases in math and language test scores, respectively. The largest results are equivalent to up to four months of schooling and are highly cost-effective at US\$0.20 per student.

Another important area for improvement is teacher absenteeism, an especially relevant issue for developing countries. In Peru, data from random spot checks conducted by the government found that, on average, 7 percent of teachers and 17 percent of principals were absent on any given day; this represents missing 12.5 days a year for teachers and 30.5 days a year for principals. These absences affect students' outcomes because substitute teachers are generally inferior to regular teachers and they often teach on brief notice and without necessary preparation (Herrmann and Rockoff, 2012; Clotfelter, Ladd, and Vigdor, 2009). Miller, Murnane, and Willett (2008) estimate that 10 additional days of teacher absence reduced fourth grade students' mathematics achievement by 3.3 percent of a standard deviation in an urban school district in the United States.

Poor attendance of educational staff is unquestionably a waste of valuable government resources. To address this problem, the Peruvian Ministry of Education worked with the World Bank and the United Kingdom's Behavioural Insights Team to test whether attendance could be influenced through behaviorally informed email messages (eMBeD, 2018b). Around 100,000 teachers and principals in 27,000 schools were divided into three groups. The control group received no email, and each of the two treatment groups received a different message: one citing social norms and another emphasizing pro-social motivation. While messages had no effect on teachers, principals in the treatment groups increased their attendance by 4 percent in comparison to the control group. In a school year of 179 days this amounts to seven fewer missed days—at almost no cost to the Peruvian government.

Such small changes can add up to big differences in public expenditure. Primary education accounts for over 3 percent of India's GDP, for example, and a nationwide study of rural public schools found that the teacher absence rate was around 23.6 percent, for an estimated salary cost of US\$1.5 billion a year (Muralidharan et al., 2016). At that time the Indian government had just committed to spending US\$5 billion a year on hiring additional teachers in order to reduce the student-teacher ratio (STR) from 40:1 to 30:1. According to those authors' calculations, however, hiring additional supervisors to monitor teachers' attendance would be 12.8 times more cost-effective than hiring additional teachers at reducing the effective STR (net of teacher absence). As

discussed above, incorporating insights from behavioral economics could further boost gains achieved by increased monitoring.

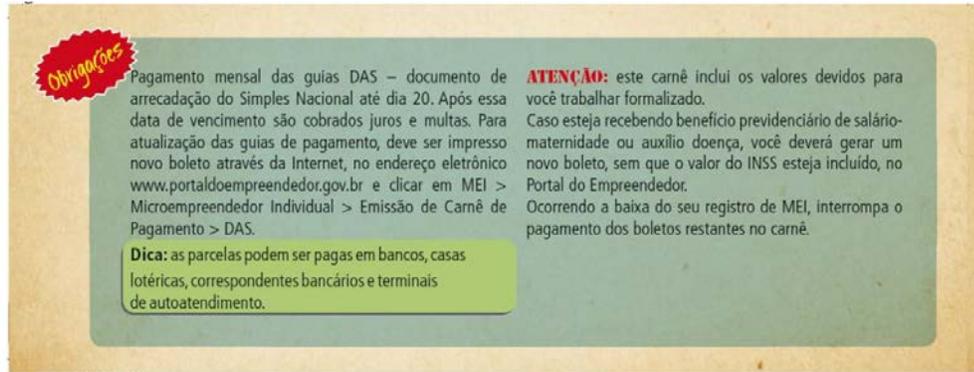
3.5 Retirement and Social Security Savings

Behavioral interventions have been shown to be a promising tool for increasing voluntary savings through reminders, commitments and defaults. An intervention with automatic enrolment in retirement savings plans in the United States, for example, led to a 90 percent participation rate among eligible employees (Madrian and Shea, 2001). Without automatic enrollment, participation was around 70 percent and included mainly older and higher-paid employees. Reminders and commitment devices, as discussed in Section 3.2 on health, are relevant in this area as well.

In Brazil, the IDB collaborated with the Brazilian Ministry of Social Security to increase contributions from the self-employed. Self-employed workers were mailed a booklet reminding them of their obligation to contribute to social security, and this intervention was estimated to increase payments by 15 percent and compliance rates by 7 percent. It should be noted, though, that the increase was concentrated in the month following delivery and disappeared after three months (Bosch Mossi, Fernandes and Villa, 2015). In the Philippines, offering a commitment saving product to randomly selected clients of a local bank increased average savings balances by 81 percentage points relative to those assigned to the control group after one year (Karlan et al., 2016).

Understanding how to successfully promote retirement savings and social security contributions is crucial for economic development and stability. In Latin America and the Caribbean, public spending on social security as a percentage of GDP averaged 3.3 percent in 2015, as shown in Figure 9. As shown in Figure 10, however, less than half of workers contributed to social security. This is particularly alarming in a region where the population over 65 years of age is expected to double by 2050 (Bosch, Melguizo and Pagés, 2013), at which time between 47 and 60 percent of elderly adults will reach retirement age without the level of savings or pensions needed to support themselves. By 2100, pension expenditures in the region are predicted to reach 18 percent of GDP (Cavallo et al., 2016). The region faces the challenge of providing adequate income to an anticipated 140 million retirees, and behavioral economics is an important tool for addressing the issue.

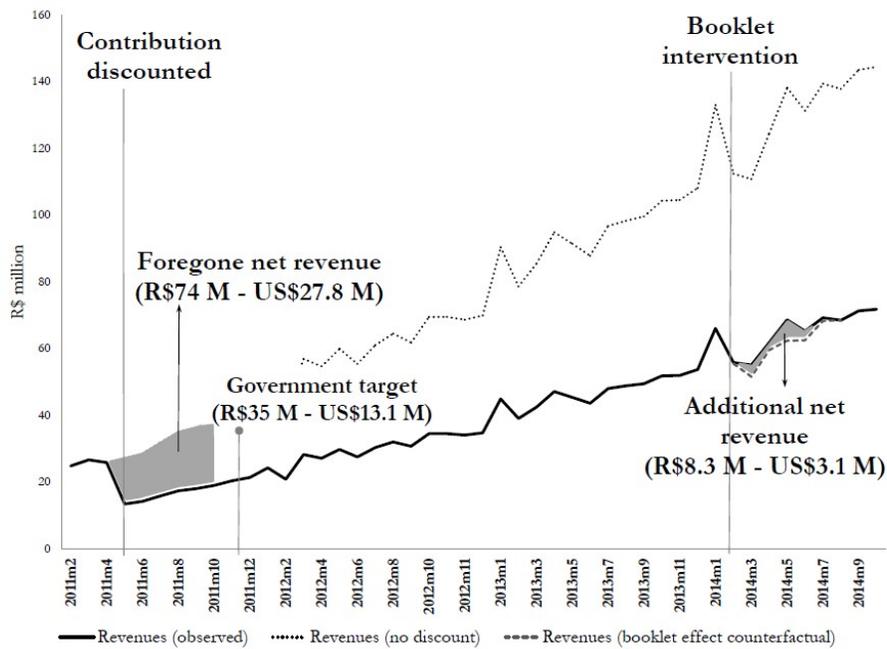
Figure 7. Example of Booklet from Bosch Mossi, Fernandes and Villa (2015)



Source: SEBRAE.

Figure 8. Estimated Treatment Effects in Bosch Mossi, Fernandes and Villa (2015)

Figure 10. Social security revenues with effect trends.



Source: Authors based on administrative data from the Ministry of Social Security and Rocha et al. (2014).

Figure 9. Composition of Government Social Spending in Latin American Countries

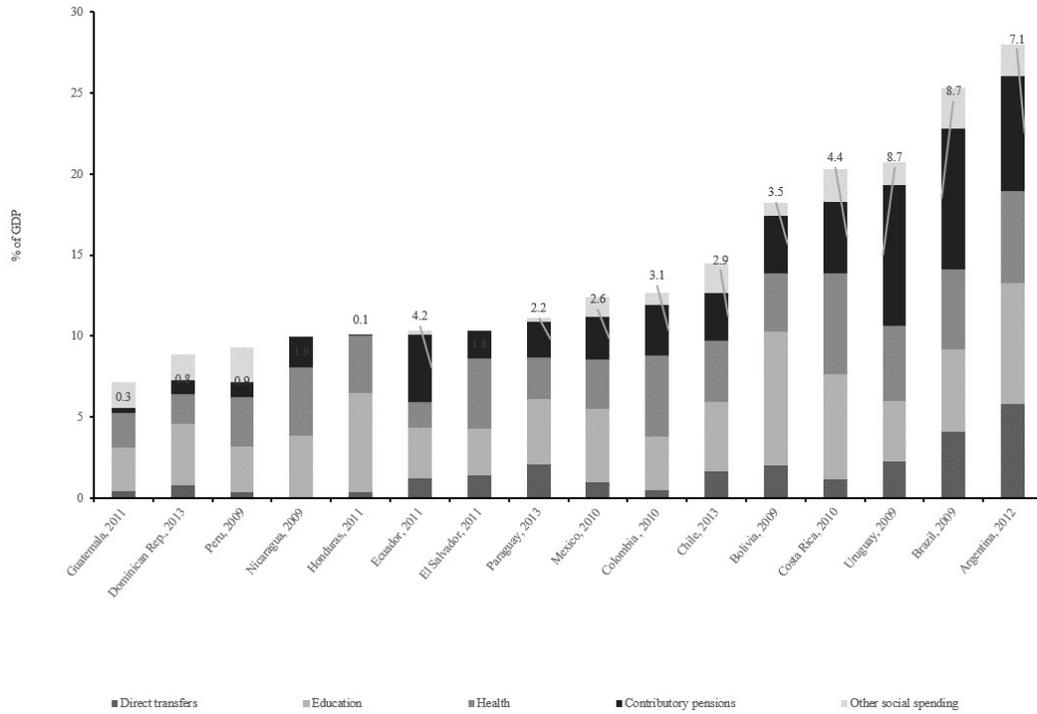
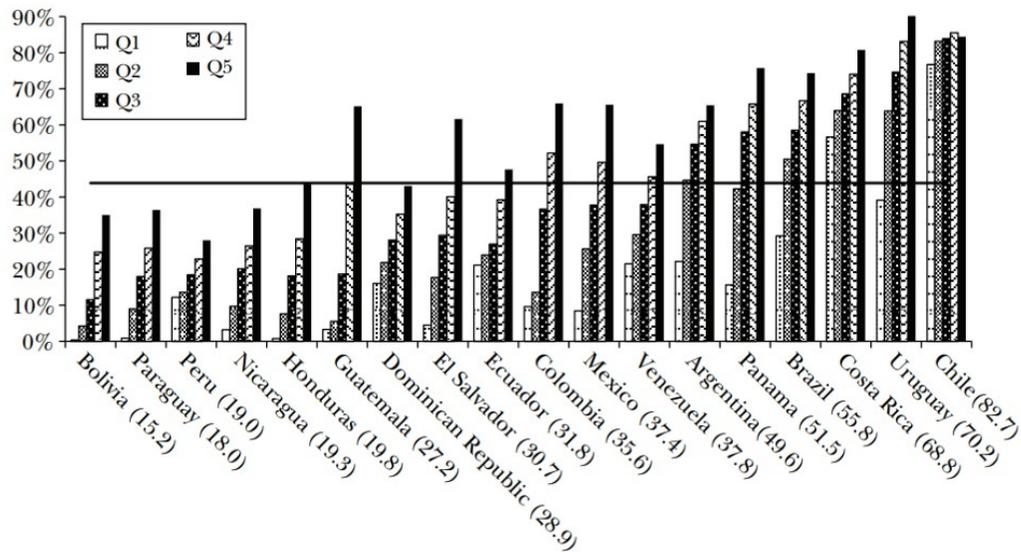


Figure 10. Coverage of Contributory Social Insurance by Country and Income Quartile



4. Final Thoughts

The interventions presented in this policy brief indicate that behavioral insights can improve public finance by improving tax compliance and by making public spending more efficient. A wide variety of tools is available. Governments can use messages, reminders, positive incentives, and other methods of communication to improve engagement with the population and increase voluntary compliance. Such tools can help to reduce spending or increase efficiency—and possibly both. Simple and inexpensive solutions exist that could lead to increasing energy and water conservation, improving road safety, encouraging preventive behaviors such as vaccination and prenatal monitoring (which in turn reduce overall health system costs), increasing student motivation and decreasing absenteeism, and encouraging savings for retirement and social security contributions. All of these are crucial issues for Latin America and the Caribbean.

Interventions leveraging behavioral insights are generally low cost but can nonetheless yield notable results, making them highly cost-effective. It is important to note, however, that they cannot do magic by themselves. Behavioral interventions do not exist in a vacuum and must complement other, more traditional policy tools. A government or municipality sending messages to increase tax compliance should additionally ensure proper and credible enforcement, as well as provide decent administrative conditions for making payments. The success of sending vaccination reminders to families likewise relies on the availability of vaccines and health infrastructure such as clinics and medical supplies. It is also important to stress the importance of access to data. The more data there is, the higher the chances that interventions can be designed appropriately. Big data should help to design and implement more effective interventions.

It is further necessary to stress the importance of design, and to note that not all interventions are successful. We tend to learn about those that succeeded and rarely hear about attempts that failed or backfired. On the academic side, this is grounds for encouraging replications and publication of null results. On the policy side, this knowledge will hopefully encourage policymakers to invest heavily in the diagnostic, design, and evaluation sequence. As Castro and Scartascini (2014) note, when designing and implementing behavioral interventions “the devil is in the details.”

The evidence presented in this brief makes a strong case for including behavioral insights as an intrinsic part of project design and execution. This recommendation is not limited to line

ministries. Finance ministries should also embrace implementing behavioral insights and designing behaviorally informed policies, simply because it is in their best interest to do so.

At the IDB, we leverage behavioral insights across projects, countries and policy designs to improve educational outcomes, increase personal savings, improve public health, and promote greater tax compliance, among many other fields. The IDB Behavioral Economics Group drives these efforts, positioning the Bank as a thought leader while improving lives in Latin America and the Caribbean. We believe that mainstreaming behavioral insights across our projects has the potential to create better policies and improve the lives of the citizens of Latin America and the Caribbean.

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