

When Winners Feel Like Losers

Evidence from an Energy Subsidy Reform

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Abstract

In 2011 the Government of El Salvador implemented a reform to the gas subsidy that increased the welfare of households in all but the top two deciles of the income distribution. However, the reform turned out to be rather unpopular, especially among winners. This paper relies on ad hoc household surveys conducted before the implementation and in the following two and a half years to test which factors help explain the puzzle. The analysis uses probit and logit models to show that misinformation (a negativity bias by which people with limited information inferred

negative consequences), mistrust of the government's ability to implement the policy, and political priors explain most of the (un)satisfaction before implementation. Perceptions improved gradually—and significantly so—over time when the subsidy reception induced households to update their initial priors, although political biases remained significant throughout the entire period. The results suggest several implications with respect to policy reforms in cases where agents have limited information.

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When Winners Feel Like Losers: Evidence from an Energy Subsidy Reform[☆]

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1. Introduction

The government of your country announces a certain policy change. How do you know if it will benefit you or not? There are many things you may take into account. For example, what do the media and different political parties say about it? Who do you trust? What are your beliefs about the government's capacity to deliver? The list of factors to consider could go on. But what happens when your assessment is wrong? Sometimes winners may believe they are losers. This paper explores empirically one such case. More specifically, it analyzes the determinants of the citizens' satisfaction about a reform of the gas subsidy in El Salvador, a reform that was expected to improve the welfare of around three-quarters of the population but which was initially unpopular.

The theoretical literature has long recognized the potential importance of such scenario. If individuals are uncertain about the benefits of a policy change it can lead to a status quo bias, in which a policy that would benefit the majority of the population is not be adopted (Fernandez and Rodrik [5]). Under individual-specific uncertainty, an increase in the number of expected winners could reduce the probability that a reform is approved, until it reaches a critical threshold and becomes an overwhelming majority (Jain and Mukand [12]). More generally, the inability of the policymaker to persuade the electorate of the benefits of a policy change has featured in a large number of political economy models (reviewed by Drazen [4]). Recently, the literature has turned its attention to the importance that the dynamics of learning about reform outcomes may have on support for reforms (van Wijnbergen and Willems [15]). Others have pointed out that political support for reforms can vary dramatically over time, which may alleviate the problem of status quo bias because governments may be able to withstand long periods of low popularity, as long as political support recovers before election day (Veldkamp [16]). While the theoretical literature is abundant, it has proven difficult to identify these effects empirically.¹

This paper contributes to the literature in three ways. First, it documents a case of a reform that benefited the majority of the population but was initially unpopular. Second, it uses new survey data to identify the factors that help explain this puzzle. Third, it analyzes how the main factors driving the popularity of the

¹One of the few examples in the literature is represented by Harrison [8] who discusses the British Columbia carbon tax reform.

reform evolved once the reform was implemented. The policy experiment that is the focus of this study is the reform of the gas subsidy implemented in El Salvador in April 2011. In order to do so we rely on six consecutive surveys, one conducted before the implementation of the reform and the remaining five afterwards. The reform implied the removal of the price subsidy for liquefied petroleum gas (LPG) resulting in a price increase for consumers from \$5.10 to \$13.60 per 25-lbs bottle of LPG, the most common fuel used for cooking by Salvadorans at home. In place of the price subsidy the authorities introduced a monthly income transfer of \$8.50 to households with an electricity consumption of less than 200 Kwh per month. This was a relatively high cut-off as around 94 percent of households with access to electricity consumed less than the eligibility threshold. For these households the monthly subsidy of \$8.50 (equivalent to a bottle of LPG) was provided through the electricity bill. Households without access to electricity were entitled to a government-issued card that would allow them to collect the monthly \$8.50.

Overall, an incidence analysis of the reform suggests that around two-thirds of households benefited from the reform (Tornarolli and Vazquez [13]). Ex-ante the winners from the reform included two groups. First, households that did not use LPG as cooking fuel and would now benefit from the \$8.50 per month. Since LPG use was not as common among the lowest income groups as among the richest this facet of the reform was particularly pro-poor. Second, households who consumed less than one bottle of LPG per month would also benefit from the reform. On the losing side, some of the richest households in El Salvador would become ineligible for the LPG subsidy on account of their high electricity consumption or because they could collect the subsidy for only one of their properties. Households that consumed more than one bottle of LPG per month would also lose out. Nevertheless, the reform proved to be – at least initially - highly unpopular. In January 2011 just one-third of the electorate favored the upcoming reform and in August of the same year less than 45 percent of people declared to be either ‘satisfied’ or ‘very satisfied’ about it. The satisfaction rate continued to increase during the following year and a half before stabilizing at around 65 percent, the level observed in our last survey in September 2013.

In our empirical investigation we answer two research questions. First, what are the factors driving the unpopularity of the reform before and in the aftermath of its implementation? Second, what variables account for the relatively high popularity of the reform two years after it was implemented? In selecting potential explanatory variables to include in our analysis we draw from the recent literature on energy subsidies which

has suggested a number of common barriers to successful subsidy reform, including lack of information about the magnitude and shortcomings of subsidies and lack of government credibility and administrative capacity (IMF [10]). Widespread media and information campaigns appear to have played an important role in successful reform efforts in countries such as Ghana, Namibia, and the Philippines, and the need for public information campaigns has been identified as a key lesson learned from country case studies (Vagliasindi [14]). Case studies on the political economy of reform in sectors other than energy also highlight the importance of providing information to citizens about the benefits and costs of different policy choices (Fritz et al. [6]). Finally, creative solutions such as advanced compensatory payments deposited in new bank accounts for households, have allowed governments to circumvent lack of trust among citizens when implementing subsidy reform efforts as in the case of Iran (IMF [11]). To the best of our knowledge our paper provides the first empirical test on the role that information and trust in the government capacity play in explaining support for an energy subsidy reform.

We identify three main factors that explain the evolution of the popularity of the reform: the individual's level of information (which is especially relevant ex-ante), his/her trust in the government's ability to implement the reform effectively (or the ability to deliver the subsidy ex-post), and his/her political views. Using Logit and Probit regressions we test the marginal effect of each of these factors in the six surveys, respectively conducted in January 2011, May 2011, August 2011, May 2012, August 2012, and September 2013. Our results - robust to a large set of checks - suggest three main conclusions. We first show that in January 2011 - before implementation - the level of information about the reform, the expectations on the ability of the government to deliver and political priors help explain most of the overall satisfaction rate. On average, around 70 percent of the variance of the dependent variable is captured by our main regressors. Second, we show that the increase in the satisfaction rate over time is essentially driven by the ability of the government to deliver the subsidy. Throughout the five surveys following April 2011 the significance and magnitude of the coefficient identifying the above effect progressively increases. Finally, we show a non-marginal effect of political partisanship in the perception of the reform not only before the reform was implemented but also throughout the entire period of analysis.

Our findings may be useful for those considering subsidy reforms. The starting point of a reform cannot be to assume that accurate information is widely known or that departures from perfect information are un-

biased. Surveying the extent of information and categorizing attitudes so as to inform any public information campaign are worth undertaking (as suggested by Fritz et al. [6]). Any efforts at informing the public would then need to be evaluated against that baseline. In some cases the timing of reforms may need to be adjusted if the priors that individuals hold suggest that reform efforts would be premature. In those cases, emphasis could be put first on affecting the information landscape. Piloting of reforms could also help governments test, learn, and adapt their interventions (Haynes et al. [9]). The timing of releasing information about any upcoming reform is also to be carefully planned to minimize the need for adjustments that could add to the confusion and undermine the credibility of the reform efforts.

The rest of the paper is organized as follows. Section 2 explains the details of the gas subsidy reform. Section 3 describes the dataset. Section 4 explains our empirical models. Section 5 presents our results and robustness checks. Finally, section 6 concludes.

2. The reform

In April 2011, the Government of El Salvador implemented a substantial reform of the subsidy for gas to improve targeting and to alleviate fiscal pressures. The main element of the reform, as we will see further below, involved eliminating the price subsidy (so that now gas would be sold at market price) and introducing a compensatory cash transfer to eligible households. Liquefied petroleum gas (LPG) is one of the most common fuels used for cooking in El Salvador with around 70 percent of households using LPG in their homes. Around 75 percent of all LPG is sold bottled, the form that households consume, the rest being sold in bulk to industry. LPG bottles are sold in 10, 20, 25, 35, and 100-lbs presentations. The most widely-used bottle is the 25-lbs, with an 85 percent market share of all LPG sold.

The government had been subsidizing bottled LPG since 1974. Until April 2011 the authorities set a maximum retail price for the 10, 20, 25, and 35-lbs bottles so that consumers experienced a fixed price of the bottle. Prices for consumers had remained unchanged from 1996 to April 2008, when the consumer price of a 25-lbs LPG bottle was increased from \$4.15 to \$5.10, a price which was relatively well-known by the population at large. As of April 2011 the amount of subsidy per 25-lbs bottle that the authorities paid for was \$8.50, bringing the hypothetical market price, without subsidy, of a 25-lbs bottle to \$13.60. Knowledge by the population of this price without subsidy was, as we will see later, more limited.

The LPG subsidy scheme proved to be increasingly costly. As the international oil price increased in the 2000s the fiscal costs of the LPG soared from around \$10 million in 2004 to \$109 million in 2007 (or around 0.5 percent of GDP). Despite the increase in the consumer price to \$5.10 the fiscal cost of the LPG subsidy kept increasing, especially after international energy prices rebounded after 2009. In 2010, the last full year in which the subsidy scheme described above was in force, the fiscal cost of the LPG subsidy reached \$154 million (or 0.7 percent of GDP). The goal of the gas benefit had been to subsidize domestic consumption by Salvadoran households but leakages happened. Smugglers would buy the subsidized bottles in El Salvador and ship them illegally to neighboring countries which did not subsidize LPG. In January 2011 the market price of a 25-lbs bottle of gas was around \$16 in neighboring Guatemala and around \$12 in Honduras and Nicaragua. Gas that was legally imported from Guatemala to El Salvador was shipped back illegally to Guatemala after having been retailed for household consumption in El Salvador. The LPG subsidy scheme was also regressive. While 70 percent of all households used LPG for cooking the use was not as widespread among the poor. The exclusion error was high: around 47 percent of households in the bottom 40 percent of the income distribution did not receive the LPG subsidy because they did not consume gas. If we restrict ourselves to the bottom decile of income, 67 percent of households did not cook with LPG (Artana and Navajas [1]). As a result the subsidy was poorly targeted with the households in the bottom 40 percent of the income distribution receiving only 27 percent of the entire benefits of the subsidy. Think tanks and international organizations had been highlighting these issues for some time. A 2006 World Bank report argued that “there is no social or economic justification to keep the current gas subsidy” on account of its fiscal cost and the many inclusion and exclusion errors (WorldBank [17]).

The reform implemented in April 2011 changed drastically the way the LPG subsidy was provided. Instead of subsidizing prices at the point of sale, the new mechanism delivered an income transfer to a large set of eligible households. As a result of this change the consumer price increased from \$5.10 (the subsidized price) to \$13.60 (the price without subsidy). Individual households received a transfer of \$8.50 per month, provided they were eligible. The eligibility requirement was consuming less than 200 Kwh in electricity per month, a criterion that was meant to exclude the highest income brackets of the population from receiving the gas subsidy. Property owners that had two or more properties registered with the electricity company could only collect the subsidy once. Households that lacked electricity needed to register at a governmental office and

provide their address so that the household received a card that entitled it to collect monthly the \$8.50. No eligibility criteria were required other than providing information to ensure that the household was receiving the subsidy only through one instrument (i.e., through the electricity bill or via the government-issued card). For those receiving the subsidy through the electricity bill the mechanism was as follows. The subsidy came in the form of a barcode at the bottom of the electricity bill that people had to take to the bank; the teller would then scan the barcode and give the choice to the consumer if they wanted to apply it against the electricity bill or cash it. Most people applied the subsidy to the bill, which then got discounted. For those with the electricity bill under a direct debit scheme (which very few people did), they still had to go to the bank and get the teller to scan the barcode and give them the cash.

It is worth highlighting that the reform had been announced long before its implementation and it suffered a few adjustments along the way. Within the first 100 days after taking office in June 2009 the government announced the intention to “rationalize” or “focalize” the LPG subsidy. However, the plans materialized only in late 2010 when the specifics of the reform described above were introduced to the public. Between December 2010 and February 2011, the eligibility criteria based on electricity consumption was revised (the maximum consumption limit increased from 99kw/h to 200kw/h). The eligibility criteria for individuals without electricity or individual electricity meters did not change, but subsistence business became eligible for the subsidy shortly after implementation began. These groups faced a few challenges for registering and getting the electronic card. Issues frequently raised by individuals include long lines and lack of adequate information at the registration center. These implementation adjustments could potentially have affected individual’s views about the reform.

An incidence analysis of the April 2011 reform shows that the new scheme was substantially more pro-poor than the one in existence until then. First, the poor households that did not use LPG as cooking fuel would now benefit from the \$8.50 per month. Second, some of the richest households in El Salvador would become ineligible for the LPG subsidy on account of their high electricity consumption or because they would collect the subsidy for only one of their properties. Based on electricity billing records, around 6 percent of households consumed 200 or more KWh per month. In addition, the incentive to smuggle was removed and consumption of LPG in El Salvador decreased by 15 percent in 2011 compared to 2010, while it increased in Guatemala by 7 percent (CEPAL [3]).

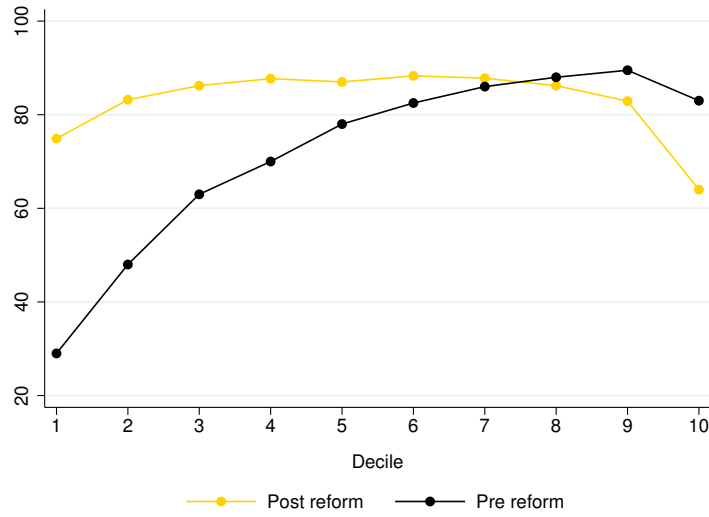
An important aspect of the reform was that the amount of the subsidy was now limited to \$8.50 per month to each eligible household regardless of how many bottles per month the household purchased. Those households who consumed more than one bottle per month would be worse off under the new scheme. This could potentially hurt some of the poor. However, a survey conducted in May 2011 indicated that one 25-lbs bottle of LPG was enough to cover their monthly consumption for 80 percent of households. Among the 20 percent of households for which one 25-lbs bottle was not enough to cover their monthly consumption needs, the majority (almost 70 percent) were households with a monthly income above the average. Finally, since the subsidy was for household consumption, not industrial use, indirect effects on the price level and other second-order effects can be thought of as relatively minor in this case.

To sum up, the incidence analysis suggests that the winners of the reform included the poor that did not use LPG but would now receive \$8.50 per month and any household that consumed less than 25-lbs of LPG per month. The losers would be the top 6 percent households in electricity consumption,² the owners of more than one property, those households that consumed more than one 25-lbs bottle of LPG per month, as well as the smugglers and the distributors (who saw a decline in volumes). The overall incidence by income decile of the LPG subsidy before and after the April 2011 reform is shown in figure 1.

The incidence analysis is based on *de jure* eligibility for the subsidy not on whether people actually received the subsidy. This is an important distinction because it quickly became apparent that a number of households that were entitled to the subsidy did not cash it in. In the estimates of the authorities around 70,000 households did not collect the subsidy even though they were legally entitled to it. While we do not have information on the income level of these households, the anecdotal evidence available suggests that these were households with access to electricity and relatively high income. A common explanation for this surprising behavior is that they did not think it was fair to claim a benefit that was meant for the poor. It is also possible that the benefit was lower than the opportunity cost of cashing it (going to the bank, queuing, etc.). As a result, the *de jure* incidence analysis may underestimate the pro-poor nature of the reform. At the same time it is also possible that some poor households were not well informed about the benefit or were unable to prove their eligibility which would have reduced the pro-poor nature of the reform. However, there

²Meaning with an electricity consumption higher than 200kw/h.

Figure 1: Incidence by income decile of the LPG subsidy.



Source: Tornarolli and Vazquez [13].

is no evidence that a large number of poor households were unduly excluded. Therefore, we believe that on balance the incidence analysis based on *de jure* eligibility provides a good approximation to the actual direct impact on households.

2.1. The puzzle

While the reform benefited a large part of the population (and proportionally more the poor) it initially proved to be highly unpopular. A nationally representative survey conducted in late January 2011 showed that 70 percent of Salvadorans disapproved of the planned LPG subsidy reform. Criticism came from a variety of angles. Some critics stood to lose from the reform, such as LPG distributors, who would see the volume of sales decreased and who would eventually mount a short-lived and ineffective strike in late May 2011.

Other criticisms came from more unlikely quarters. In early February 2011 the Archbishop of San Salvador, Monsignor José Luis Escobar Alas, expressed his concern that “the poor may be left out” and asked the authorities to reconsider the reform plan. This was not an off-the-cuff remark. The Archbishop spoke to the press on a variety of issues regarding the LPG subsidy reform at least on three different occasions in February

2011 and would continue to do so after the reform was implemented in April 2011. As Monsignor Escobar Alas himself put it: “We have expressed on several occasions our concern that so-called the focalization of the liquified gas subsidy is, with all due respect to the Government or the Ministry of Economy, not the right measure.”³ It is worthwhile spending some time on the Archbishop’s views as those of someone who has legitimacy among the population at large. In fact, the most recent survey of the Latin American Public Opinion Poll shows that Salvadorans have more confidence in the church than in any state institution, with the exception of the armed forces.

The dissatisfaction with the reform of the LPG subsidy apparently played a role in the Congressional elections held on March 11, 2012, in which the ruling party (Frente Farabundo Martí para la Liberación Nacional, FMLN) suffered significant losses. Reflecting on the reasons for the electoral outcome representatives from both the FMLN and the opposition party ARENA agreed that the gas subsidy reform had played a role. The head of the ARENA group in Congress, Donato Vaquerano, argued that the subsidy reform had been a “colossal mistake” by the FMLN. The head of party organization at the FMLN, José Luis Merino, recognized that the subsidy reform “undoubtedly had an effect among urban sectors who have resented the measure.”⁴ The president of Congress, Sigfrido Reyes, also of the FMLN, lamented that the defeat of his party had been due in part to “serious mistakes [including] the change in the gas subsidy [which] increased tremendously the price of gas for domestic use.”⁵ Other analysts also agreed that the gas subsidy reform had “hurt” the FMLN.⁶

Even more puzzling than the overall lack of popularity was the fact that the reform was particularly unpopular among the poor. For example, in January 2011 among those respondents in the bottom 40 percent of the income distribution only 28 percent were satisfied while among those with an income in the top decile almost 50 percent were satisfied with the reform. Overall, the satisfaction of respondents that were expected to benefit from the reform was no different from the satisfaction of those that were expected to lose

Table 1: Satisfaction rate - January 2011.

| | | |
|-----------------------|---|------|
| Total population | | 30.0 |
| (a1) | Bottom 40 percent of income distribution | 28.0 |
| (a2) | Rest of income distribution | 33.2 |
| “Losers” or “Winners” | | |
| (b1) | Consume more than 200 Kwh per month (losers) | 26.9 |
| (b2) | Consume less than 200 Kwh per month (winners) | 30.5 |

(see table 1)⁷.

Yet the puzzle faded over time, slowly but surely. The popularity of the reform improved substantially but only after many months of implementation. The evolution of satisfaction rates is shown in figure 2. While in January 2011 only 30 percent of people were satisfied with the upcoming reform by August 2012 it more than doubled to 66 percent. This pattern was observed also among the poor, who went from a 28 percent satisfaction rate in January 2011 to 68 percent in August 2012. In short, it took many months before the reform became popular among the majority of the population. In May 2011 the overall satisfaction with the reform was better but still low at around 40 percent, even though by then households had been receiving the benefit under the new scheme for two months. It appears that people’s negative priors about the reform were only slowly adjusted.

3. Data

This study uses data from 6 waves of household surveys conducted by *‘La Prensa Gráfica’*, the largest newspaper in El Salvador. The survey reflects the regular practice of that institution of polling people’s views on political and social issues. As discussions about the proposed subsidy reform had become a contentious political issue the newspaper decided to start polling, devoting a module of its periodic survey to the reform.

³It is also worth noting that under the new scheme churches were not eligible for receiving the benefit.

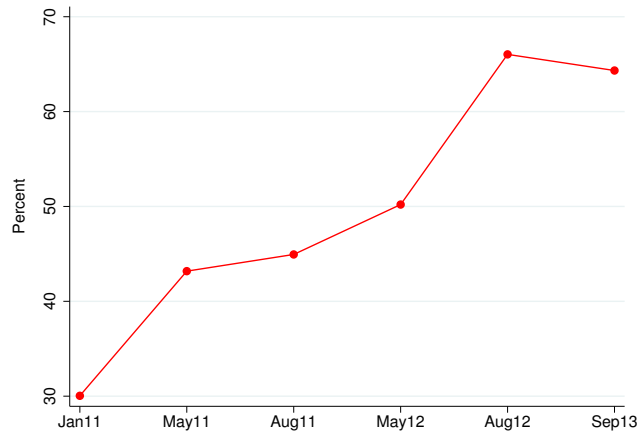
⁴Agencia EFE, March 15, 2012.

⁵Agencia EFE, March 12, 2012.

⁶René Portillo, dean of the Universidad Tecnológica de El Salvador, as quoted by the newspaper *La Opinión* on March 13, 2012.

⁷A t-test fails to reject the null that the satisfaction rate among ‘losers’ is statistically different from the one of ‘winners’.

Figure 2: Satisfaction rate over time.



Note: people answering either 'satisfied' or 'very satisfied'.

The waves considered by the study (January 2011, May 2011, August 2011, May 2012, August 2012, and September 2013) include a special module on the gas subsidy reform implemented in April 2011. The surveys were conducted through face-to-face interviews. Each survey between January 2011 and August 2012 include a total of 1,200 adult respondents drawn from a stratified random sample using the population census as frame. The wave of September 2013 polled 610 respondents. The samples were designed to be nationally representative with a margin of error of ± 2.9 percent and a 95 percent confidence level.

The January 2011 survey, conducted prior to the implementation of the subsidy reform includes a more comprehensive set of questions, which allows exploring different dimensions associated with *ex-ante* satisfaction with the reform. The survey included direct questions assessing individuals' satisfaction with the reform (whether individual consider the reform a good or bad idea, what positive consequences they thought the reform would bring about, what negative consequences they thought the reform would bring about, whether they considered that the reform would have mainly positive or negative consequences for families like them); their level of information about it (how much they estimated the real cost of a 25-lbs bottle of LPG without subsidy to be, how informed they considered themselves to be about the reform, what they understood the subsidy reform to be); their trust in the government fulfilling its commitment (whether they thought that they would receive the compensation that the government had promised); and their political views (party for which they voted in the last election, whether their political views are aligned with government party or

the opposition). In addition, the survey collected information on cooking fuel and electricity consumption patterns, which allow us to identify potential “losers” from the reform. Finally, the survey collected a variety of individual and household characteristics that are used as controls (see table [A.7](#) for details).

Surveys between May 2011 and August 2012 collected only a subset of the questions asked in the January 2011 survey. These included questions about the level of satisfaction with the subsidy reform implemented, whether an individual received the benefit, political views, cooking fuel and electricity consumption patterns and household characteristics. The September 2013 survey expanded on this subset by including questions about the ex-post level of information (whether individuals know the electricity threshold that qualifies for the subsidy, or how often it is distributed), and questions about the mechanism through which the benefit was received (whether it was received through the electricity bill or electronic card or withdraw in cash or not). These two sets of variables are used as part of the robustness checks, to verify if, even years after the implementation, there are misconceptions about the benefit, and whether issues such as salience play a significant role (table [2](#) provides descriptive statistics on the satisfaction rates across surveys).

Table 2: Descriptive statistics.

| | JANUARY 2011 | | MAY 2011 | | AUGUST 2011 | | MAY 2012 | | AUGUST 2012 | | SEPTEMBER 2013 | |
|---|--------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|----------------|---------------|
| | <i>Rate</i> | <i># Obs.</i> | <i>Rate</i> | <i># Obs.</i> | <i>Rate</i> | <i># Obs.</i> | <i>Rate</i> | <i># Obs.</i> | <i>Rate</i> | <i># Obs.</i> | <i>Rate</i> | <i># Obs.</i> |
| Overall satisfaction | 30.0 | 1,200 | 43.2 | 1,200 | 44.9 | 1,200 | 50.2 | 1,200 | 66.0 | 1,200 | 64.3 | 610 |
| <i>Satisfaction rates conditional on:</i> | | | | | | | | | | | | |
| Being a loser from reform | 26.9 | 48 | 39.5 | 129 | 42.5 | 216 | 45.5 | 226 | 59.3 | 322 | 59.5 | 136 |
| Gender: males | 37.7 | 493 | 43.4 | 499 | 45.6 | 550 | 48.2 | 439 | 65.0 | 535 | 66.6 | 283 |
| Age - less than 40yo | 29.2 | 594 | 39.4 | 585 | 44.6 | 647 | 50.5 | 522 | 64.4 | 635 | 65.1 | 301 |
| <i>Cooking method</i> | | | | | | | | | | | | |
| Propane gas | 29.2 | 864 | 43.8 | 911 | 53.0 | 963 | 49.6 | 901 | 65.9 | 977 | 64.3 | 510 |
| Kerosene | 25.0 | 4 | 50.0 | 8 | 60.0 | 5 | 50.0 | 8 | 71.4 | 7 | 100.0 | 1 |
| Electricity | 46.1 | 13 | 50.0 | 10 | 0.0 | 8 | 50.0 | 6 | 83.3 | 6 | 33.3 | 3 |
| Wood | 33.5 | 140 | 37.8 | 111 | 94.7 | 190 | 51.7 | 126 | 65.7 | 114 | 69.2 | 13 |
| <i>Political party</i> | | | | | | | | | | | | |
| ARENA | 18.8 | 254 | 33.8 | 260 | 44.2 | 287 | 42.1 | 273 | 52.7 | 290 | 55.0 | 120 |
| FMLN | 44.1 | 344 | 57.7 | 296 | 50.5 | 261 | 57.8 | 292 | 76.9 | 342 | 71.3 | 164 |
| <i>Education level</i> | | | | | | | | | | | | |
| None | 22.9 | 135 | 55.4 | 119 | 34.7 | 141 | 57.3 | 82 | 71.9 | 114 | 65.6 | 32 |
| Sixth grade | 29.0 | 306 | 48.6 | 290 | 44.3 | 338 | 51.7 | 224 | 71.2 | 282 | 62.5 | 104 |
| Nineth grade | 28.0 | 182 | 41.9 | 193 | 49.1 | 242 | 49.1 | 171 | 65.9 | 217 | 69.1 | 107 |
| High school | 31.5 | 241 | 37.6 | 255 | 39.8 | 271 | 44.3 | 255 | 64.2 | 302 | 62.7 | 188 |
| Higher than high school | 41.0 | 153 | 36.4 | 152 | 52.4 | 157 | 54.5 | 153 | 50.5 | 166 | 63.4 | 89 |
| <i>Income level (per month)</i> | | | | | | | | | | | | |
| Less than \$150 | 29.0 | 372 | 51.3 | 308 | 36.8 | 385 | 52.5 | 328 | 70.4 | 408 | 66.6 | 139 |
| \$150 - \$250 | 26.6 | 263 | 38.7 | 261 | 50.5 | 275 | 50.5 | 178 | 64.3 | 219 | 63.5 | 129 |
| \$251 - \$450 | 27.7 | 162 | 41.4 | 176 | 43.4 | 205 | 48.2 | 143 | 52.6 | 167 | 62.8 | 70 |
| \$451 - \$750 | 29.4 | 85 | 40.5 | 79 | 47.5 | 82 | 46.1 | 65 | 71.6 | 81 | 58.8 | 51 |
| \$751 - \$1000 | 45.7 | 35 | 32.0 | 25 | 62.5 | 40 | 50.0 | 38 | 57.6 | 59 | 61.2 | 31 |
| More than \$1,000 | 52.0 | 25 | 44.0 | 25 | 42.3 | 26 | 44.7 | 38 | 56.1 | 41 | 85.7 | 21 |

Note: Satisfaction rates are calculated only considering defined opinions ('NS/NR' answers and missing observations are dropped out).

A descriptive analysis of the satisfaction with the reform indicates no obvious links between being a winner (loser) of the reform and being satisfied (unsatisfied) with the reform. Through out the surveys a simple t-test fail to reject the null that the satisfaction rates are significantly different across groups (e.g. between losers and winners). Also, the overall lack of popularity of the reform does not appear to differ significantly across a range of characteristics such as income or the source of fuel for cooking. For example, the approval of the reform was highest among the richest respondents to the survey conducted in January 2011 (around 50 percent of those in the top 15 percent of income were satisfied with the reform compared to 30 percent for rest of the sample) but the reform turned out to be more popular among poor people in later surveys (for instance in May 2012). Males appear slightly more favorable than females at any point in time but again, not significantly so. Unsurprisingly, there was a visible difference across education levels in January 2011 (more educated people resulted more favorable to the policy change) but already in May 2012 the difference across levels was not significant.

Rather, the level of information about the reform appears to be associated with the views of the respondents. Most of the respondents had limited information and acknowledged it so. In January 2011 only 18 percent of people considered themselves to be well (or very well) informed about the policy change. The lack of information was also reflected in the fact that only 15 percent of the respondents correctly identified the true price of LPG in the absence of a subsidy. Around 25 percent of the population did not know what the price without subsidy would be and a further 22 percent underestimated it by more than five dollars (see figure 3). It is noteworthy that those that considered themselves to be informed had different priors about the consequences of the reform (see table 3).

Among those respondents that were well-informed (top panel of table 3) the satisfaction with the reform was relatively high at 54 percent (compared to 24 percent among the badly informed). Among the well-informed 46 percent mentioned that the reform would have at least one positive effect, for example improving the lives of the poor. At the same time, those well-informed were also able to come up with negative effects at a similar rate (45 percent mentioned at least one negative effect). In contrast, among those that were badly informed (bottom panel) only 13 percent mentioned any positive effects while 69 percent were able to identify a negative consequence.

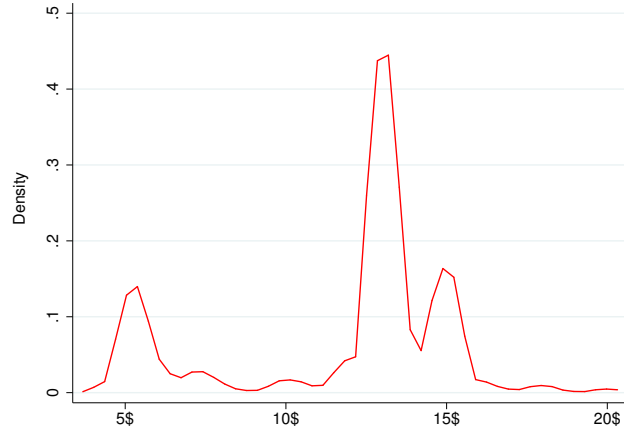
The finding that the uninformed came up more easily with negative than positive consequences of the

Table 3: Expected consequences from the reform (January 2011 survey).

| INFORMED PEOPLE | | | |
|----------------------------------|---------------|-----------------------|---------------|
| Satisfaction rate = 53.7 percent | | | |
| Positive consequences | | Negative consequences | |
| Identify at least one | 45.80 | Identify at least one | 44.50 |
| Identify none | 9.68 | Identify none | 9.35 |
| NS/NR | 44.52 | NS/NR | 46.13 |
| Total | 100.00 | Total | 100.00 |

| UNINFORMED PEOPLE | | | |
|----------------------------------|---------------|-----------------------|---------------|
| Satisfaction rate = 24.0 percent | | | |
| Positive consequences | | Negative consequences | |
| Identify at least one | 13.10 | Identify at least one | 69.36 |
| Identify none | 40.40 | Identify none | 1.22 |
| NS/NR | 46.95 | NS/NR | 29.42 |
| Total | 100.00 | Total | 100.00 |

Figure 3: Kernel density - perception about unsubsidized price (January 2011 survey).



Note: Kernel = Epanechnikov, Bandwidth = 0.3178.

reform may be related to what is known in the psychology literature as negativity bias or positive-negative asymmetry. While the concept refers to a broad range of psychological phenomena it has also been found to apply to information processing. In a survey of the extensive literature on the issue, Baumeister et al. [2] conclude that 'bad information is processed more thoroughly than good'. This may help to explain why some survey respondents could come up with examples of negative impact more readily than for positive impacts. It is worth stressing that the survey results suggest that information about the reform is linked with a lower negativity bias. Satisfaction with the reform also differed depending on the respondents' trust in the government's intention and ability to deliver on the proposed reform. In particular, satisfaction with the reform was higher among those respondents who thought that the government would be able to deliver on its promise (42 percent) than among those who had no trust (22 percent). Satisfaction with the reform was also higher among those leaning politically with the government (44.1 percent) than among those who favored the political opposition (18.9 percent). This may reflect the well-established fact that people assimilate information in a way that is skewed in the direction of support for their antecedent beliefs (Glaeser and Sunstein [7]). In our context, such biased assimilation of information may simply take the form of supporters of the political party in government paying more attention to or believing the positive aspects of the reform proposed by their party.

While our dataset provides unique information about individual's perception and knowledge about the subsidy reform, it has a few caveats worth mentioning. First, the surveys are not a panel, but separate cross sections. We are not able to track changes in satisfaction for the same individual in different periods, and have to rely on change in representative samples of the population. Some variables, such as the level of information of the respondent about the reform, are not included in the intermediary surveys, which prevents us from following its evolution in time. Finally, different surveys were collected in different times of the year, and some control variables such as income or occupation could have been affected by seasonality. It is unlikely that our main variables of interest (satisfaction, information, access to the benefit, and political partisanship) are significantly affected by seasonal effects.

4. The empirical model

In our empirical analysis we aim to quantify the effect of different factors affecting the satisfaction with the reform before and after its implementation. The analysis before implementation explores the role of three main factors of interest: (i) the level of information about the reform (variable 'Information'), (ii) whether the respondent trusts the government's ability to deliver the subsidy (variable 'Delivery'), and (iii) the political partisanship of the individual (variable 'Partisanship'). 'Information' is a dummy variable taking the value of '1' if the respondent declares to be 'informed' or 'well informed' about the upcoming reform. 'Delivery' captures the expectations of getting the subsidy conditional on qualifying for it, in other words conditional on a level of monthly electricity usage below the threshold. Finally, 'Partisanship' is a dummy variable taking the value of '1' if the respondent is a voter of FMLN, President Mauricio Funes' party. In order to avoid endogeneity issues (the consensus towards FMLN could be endogenous to the satisfaction about the reform), we consider the preference expressed at the 2009 general elections, before the reform was announced.

Our dependent variable is a dummy taking the value of '1' if the respondent expressed a view that the proposed reform was either a 'very good' or 'good' idea and '0' otherwise. We do not consider individuals without a defined opinion of the reform (those answering 'NS/NR') and drop them out of the regressions. This choice reduces - although only marginally - the statistical power of our estimates but it does not affect the significance of our results. In robustness checks we relax this assumption and show the results are insensitive to this choice. In the analysis after implementation we have a slightly different set of explanatory variables. One may expect that the level of information about the reform would increase significantly once it is implemented. Using the September 2013 survey we can observe directly how well-informed about the nature of the reform are individuals and whether this is relevant for the individuals' satisfaction with the reform. We consider 'informed' the respondents correctly reporting the electricity consumption threshold to qualify for the subsidy.⁸ The variable 'Delivery' now captures whether the respondent effectively gets the subsidy or not. The variable 'Partisanship' remains unchanged. 'Delivery' and 'Partisanship' are available for all five surveys after implementation.

⁸In robustness checks exercises (not reported in the paper but available upon request) we allow for a margin of error (up to 5US\$) in the responses and show that our results are fully robust in this dimension.

Following the nature of our dependent variable we employ a Probit (Logit) model estimated using standard maximum likelihood techniques. Our baseline model can be formally expressed as

$$Y_i = \alpha_i + \beta_1 Information_i + \beta_2 Delivery_i + \beta_3 Partisanship_i + \boldsymbol{\theta}' \mathbf{X}_i + \boldsymbol{\delta}' \mathbf{Z}_i + \varepsilon_i \quad (1)$$

where α_i is a constant term, $\boldsymbol{\theta}$ and $\boldsymbol{\delta}$ are vectors of coefficients, \mathbf{X}_i is a matrix containing controls describing personal characteristics of the respondent, \mathbf{Z}_i is a matrix of geographical dummies, and ε_i is an error term. The coefficients of interests are β_1 , β_2 and β_3 . The models are run twice, the first time specifying a probit regression while the second a logit regression. Following the classical approach of limited dependent variable regressions, we report (for the two main surveys: January 2011 and September 2013) the marginal effects of the three main regressors keeping all other variables at their mean values. Finally, in order to overcome the traditional issues of the R^2 in probit/logit models, for each regression we report two alternative measures of goodness of fit: the percent of correctly predicted (PCP) observations⁹ and the 'receiver operating characteristic' (ROC) curve that overcomes the arbitrarily PCP cutoff to classify the observations.

5. Results

The results of our baseline regressions are reported in table 4 for the January 2011 survey, in table 5 for the four intermediate surveys, and in table 6 for the September 2013 survey. The marginals for the three main regressors are plotted in figures 4 to 6 for the January 2011 survey and in figures 7 to 9 for the September 2013 survey. In each table we report the results of model (1) allowing for different controls. As for the January 2011 and the September 2013 surveys, the model is run four times: the first one including our main regressors plus a constant term only, the second one controlling for the individual characteristics, the third one by entering a set of geographical dummies, and the fourth one by including all controls. On the other hand, for the four intermediate surveys (May 2011, August 2011, May 2012, and August 2012) we allow for

⁹ The procedure involves three steps: first, run the model and estimate \widehat{Y}_i , second classify as a '1' any observation with a predicted probability higher than 0.5; finally, the PCP measure is calculated as $PCP = (100 \cdot \text{Correct Predictions}) / N$ where a correct prediction arises if $\widehat{Y}_i = Y_i$.

two specifications: the first one including a constant term only and the second one including all controls.

We start the description of our results by considering the January 2011 survey (table 4). The three regressors of interest enter significantly at 0.1 percent level in all models for both, probit and logit regressions. The estimates of β_1 , β_2 and β_3 are comparable across models even if in the probit the point estimates are lower than in the logit. While the sign and significance of the coefficients in the regressions is informative, the magnitude has no specific meaning. For this reason we report the marginal effects of each variable keeping all other variables at their mean values. The marginals for 'Information', 'Delivery', and 'Partisanship' are shown in figure 4, 5, and 6. Being informed about the reform increases the probability of being satisfied by around 20 percentage points. Similar effects are found for the variable 'Delivery' and the variable 'Partisanship'. It is also possible to estimate the joint effect of the three variables. While the unconditional satisfaction rate is 30.0 percent (on a total of 1,032 observations), it increases to 50.0 percent for informed people (204 observations). If we further condition on being confident about receiving the transfer (99 observations in total), meaning that the variable 'Delivery' = 1, the satisfaction rate increases to 59.6 percent. Finally, if we also condition on being an FMLN voter, the satisfaction rate jumps to 75.0 percent. As a measure of goodness of fit we rely on the PCP and on the area under the ROC curve. These two synthetic measures are reported at the bottom of table 4 together with the Akaike (AIC) and Bayesian (BIC) information criterion. Although the estimates of the coefficients of interest are slightly different, the goodness of fit of all models is high (ranging between 0.7 and 0.8) indicating a high power of the model to explain the variance of the dependent variable.

The results of the regressions run on the four intermediate surveys are reported in table 5. The focus of these regressions is on the significance of the variables 'Delivery' and 'Partisanship'. For each survey we run model (1) twice, the first time including a constant term only while the second time adding all controls. The point estimate of the variable 'Partisanship' is positive and progressively more significative: the coefficient is not significant in the August 2011 survey but it is in the May 2012 survey and it becomes significative at 0.1 percent level in the August 2012 one. On the other hand the variable 'Delivery' remains significant in all surveys. Overall, our results show that over time the personal characteristics lose power in explaining the satisfaction about the reform in favor of our main regressors.

Finally, the results for the September 2013 survey are reported in table 6. As for the January 2011 survey

the regressions are run four times, each time specifying a different number of controls. The only two significant variables are 'Partisanship' and 'Delivery'. In all models the variable 'Delivery' is significant at 1 percent level showing a large impact on the dependent variable. The variable 'Partisanship' enters significantly at 1 percent level in all models except for model 4 where it is significant at 5 percent level. On the other hand, the level of information ('Information') is not significant in any model. The marginal effects are shown in figures 7. The marginal impact of the political partisanship ('Partisanship') is significant, increasing the probability of satisfaction from around 62 percent to around 74 percent. Even more significant is the marginal effect of the variable 'Delivery' that increases the probability of being satisfied from around 35 percent to around 75 percent.

Table 4: Baseline - January 2011 survey.

| | PROBIT | | | | LOGIT | | | |
|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Information | 0.564*** (0.103) | 0.526*** (0.108) | 0.589*** (0.112) | 0.555*** (0.118) | 0.927*** (0.170) | 0.869*** (0.180) | 0.986*** (0.187) | 0.940*** (0.199) |
| Delivery | 0.551*** (0.089) | 0.588*** (0.094) | 0.606*** (0.097) | 0.617*** (0.103) | 0.904*** (0.148) | 0.968*** (0.160) | 1.009*** (0.165) | 1.027*** (0.177) |
| Partisanship | 0.505*** (0.088) | 0.503*** (0.092) | 0.561*** (0.099) | 0.568*** (0.104) | 0.833*** (0.148) | 0.831*** (0.156) | 0.939*** (0.170) | 0.961*** (0.180) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 |
| PCP | 0.70 | 0.72 | 0.74 | 0.77 | 0.70 | 0.73 | 0.75 | 0.77 |
| ROC | 0.71 | 0.75 | 0.77 | 0.80 | 0.71 | 0.75 | 0.77 | 0.80 |
| AIC | 1143.8 | 1142.5 | 1221.7 | 1222.4 | 1145.0 | 1144.8 | 1223.0 | 1224.3 |
| BIC | 1163.6 | 1310.3 | 1641.0 | 1789.4 | 1164.8 | 1312.6 | 1642.2 | 1791.4 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

Table 5: Baseline - Four intermediate surveys.

| | SURVEY | | | | | | | |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | MAY 2011 | | AUGUST 2011 | | MAY 2012 | | AUGUST 2012 | |
| | | | | | | | | |
| Delivery | 0.502*** | 0.233* | 1.127*** | 0.856*** | 0.599*** | 0.605*** | 0.899*** | 0.965*** |
| | (0.093) | (0.116) | (0.084) | (0.109) | (0.098) | (0.116) | (0.087) | (0.104) |
| | 0.817*** | 0.377 | 1.852*** | 1.404*** | 0.965*** | 1.013*** | 1.465*** | 1.627*** |
| | (0.154) | (0.198) | (0.146) | (0.186) | (0.160) | (0.194) | (0.144) | (0.177) |
| Partisanship | 0.489*** | 0.463*** | 0.152 | 0.135 | 0.251** | 0.269* | 0.429*** | 0.464*** |
| | (0.087) | (0.104) | (0.093) | (0.107) | (0.090) | (0.109) | (0.091) | (0.107) |
| | 0.788*** | 0.791*** | 0.255 | 0.242 | 0.405** | 0.451* | 0.724*** | 0.805*** |
| | (0.142) | (0.177) | (0.153) | (0.179) | (0.147) | (0.180) | (0.156) | (0.186) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Controls | | YES | | YES | | YES | | YES |
| Observations | 1040 | 1040 | 1166 | 1166 | 954 | 954 | 1104 | 1104 |
| PCP | 0.62 | 0.73 | 0.69 | 0.79 | 0.70 | 0.74 | 0.71 | 0.72 |
| ROC | 0.63 | 0.80 | 0.67 | 0.85 | 0.70 | 0.74 | 0.69 | 0.75 |
| AIC | 1364.0 | 1314.4 | 1152.0 | 1000.0 | 1166.4 | 1188.7 | 1286.0 | 1341.4 |
| BIC | 1378.8 | 1848.2 | 1166.5 | 1484.7 | 1181.0 | 1595.1 | 1301.0 | 1925.1 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

PROBIT results in blue, LOGIT results in red.

Complementary statistics (PCP, ROC, AIC, and BIC) refer to Probit regressions.

Table 6: Baseline - September 2013 survey.

| | PROBIT | | | | LOGIT | | | |
|---------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|
| Information | 0.202 (0.141) | 0.131 (0.151) | 0.166 (0.143) | 0.101 (0.153) | 0.346 (0.239) | 0.225 (0.256) | 0.289 (0.243) | 0.178 (0.260) |
| Delivery | 1.104*** (0.137) | 1.260** (0.435) | 1.096*** (0.139) | 1.276** (0.438) | 1.798*** (0.228) | 2.050** (0.729) | 1.788*** (0.232) | 2.064** (0.732) |
| Partisanship | 0.337** (0.129) | 0.335* (0.138) | 0.344** (0.130) | 0.343* (0.138) | 0.578** (0.221) | 0.567* (0.236) | 0.590** (0.222) | 0.570* (0.236) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 527 | 527 | 527 | 527 | 527 | 527 | 527 | 527 |
| PCP | 0.72 | 0.73 | 0.72 | 0.72 | 0.72 | 0.73 | 0.72 | 0.73 |
| ROC | 0.69 | 0.74 | 0.70 | 0.74 | 0.69 | 0.74 | 0.70 | 0.74 |
| AIC | 621.7 | 632.3 | 622.6 | 633.4 | 621.6 | 632.5 | 622.5 | 634.1 |
| BIC | 638.8 | 747.1 | 648.2 | 756.7 | 638.6 | 747.3 | 648.1 | 757.5 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

Figure 4: Marginal effect - Information (Jan '11 survey).

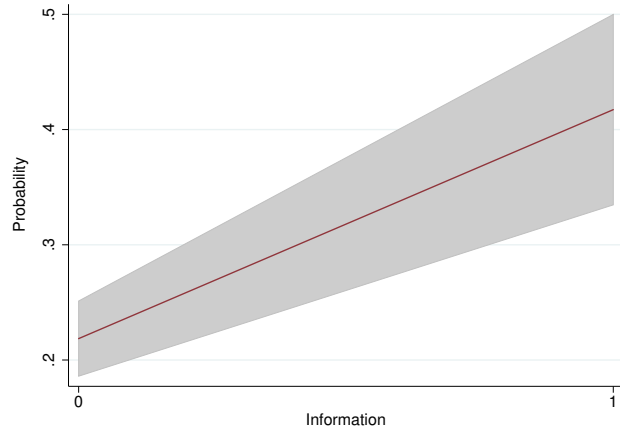


Figure 5: Marginal effect - Delivery (Jan '11 survey).

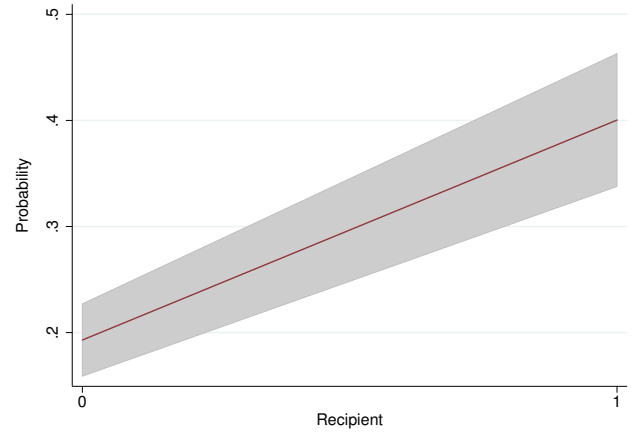


Figure 6: Marginal effect - Partisanship (Jan '11 survey).

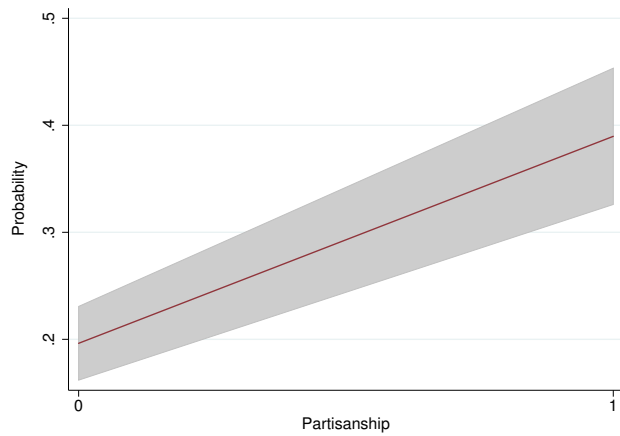


Figure 7: Marginal effect - Information (Sep '13 survey).

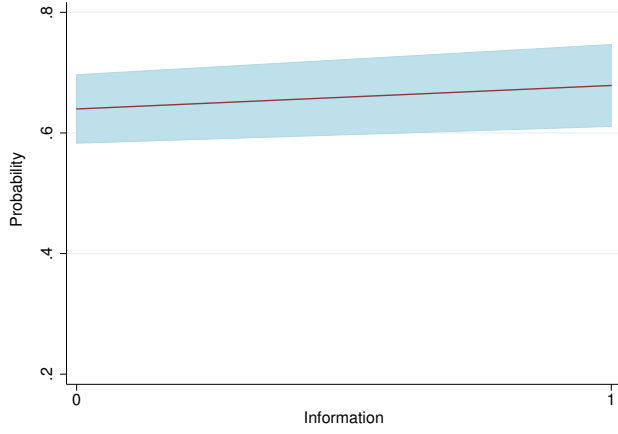


Figure 8: Marginal effect - Delivery (Sep '13 survey).

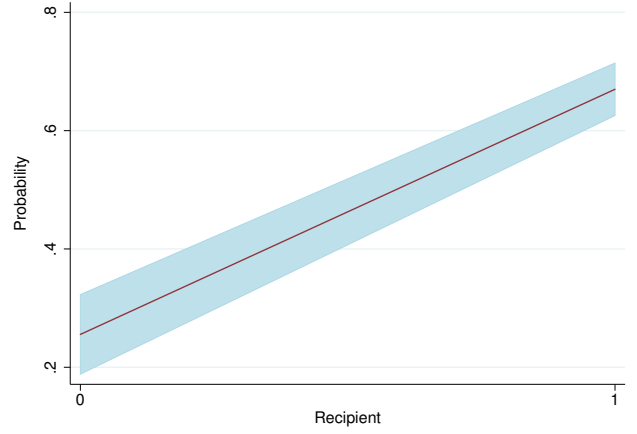
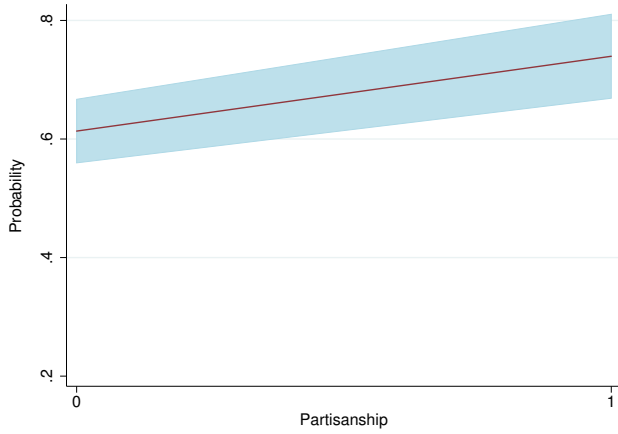


Figure 9: Marginal effect - Partisanship (Sep '13 survey).



5.1. Robustness checks

In order to further validate the main results, this section proposes a number of robustness checks considering different samples, alternative definitions for the variables of interest and additional controls. Given the

number of questions of the surveys, we run our checks using the January 2011 and September 2013 surveys. All tables containing robustness check results are shown in [Appendix A](#).

The first set of checks considers different samples, including the observations omitted in the baseline (those for which the respondent replied 'NS/NR'). We treat these individuals as unsatisfied and assign a value of '0' in the corresponding entry of the dependent variable.¹⁰ The number of observations increases to 1,200 for the January 2011 and to 610 for the September 2013 survey, significantly larger than the baseline case. The results of this check, reported in tables [A.8](#) and [A.9](#) are extremely close to the baseline in terms of significance and magnitude of the coefficients. All coefficients remains significant and in most cases the magnitude of the coefficients differs only at the margin. Therefore, the baseline results are fully robust to changes in the sample considered.

The second set of checks considers alternative definition to the three variables of interest: political partisanship, information and delivery. We start by checking whether the partisanship effect applies only to FMLN voters or it applies also to ARENA (the major opposition party) voters.¹¹ In this check the variable 'Partisanship' is a dummy variable taking the value of '1' if the respondent is a voter of the ARENA party in the 2009 elections and '0' otherwise. The results, shown in tables [A.10](#) and [A.11](#) are similar to the baseline. The estimated coefficients of the variable 'Partisanship' are highly significant for both surveys. They have negative sign as expected and their magnitude (in absolute value terms) is in line with the baseline case. These results suggest that the marginal effect induced by political partisanship (either in favor or against the governing party) is a non trivial contribution to satisfaction.

We further check our definition of 'information'. The baseline case considers 'informed' those individuals who explicitly answered to be 'informed' or 'well informed' about the subsidy reform. This robustness check exercise redefined the variable 'Information' using a different question in the 2011 survey. This variable reflects whether the respondent is informed not only about the reform but also about the unsubsidized gas price, or in other word, the value of the subsidy. In this check the variable 'Information' is the same dummy variable as in the baseline however it is conditional on knowing the correct unsubsidized price. The

¹⁰While in principle the 'NS/NR' responses could be treated both ways (as 'satisfied' or 'unsatisfied' people), we think that treating them as unsatisfied is more appropriate given how widespread was the opposition to the reform.

¹¹FMLN and ARENA are the two major parties of the country representing almost 70 percent of preferences in the last elections.

respondent is considered informed about the unsubsidized price if his/her answer is less than 3 US\$ away (in both directions) from the 'true' price. This choice is more restrictive than the baseline case. While in the baseline 216 people are considered as 'informed', in this robustness check only 121 are considered so. The results of the regressions with the more restrictive definition of 'Information' are reported in table [A.12](#). The focus in this case is on the coefficient of the variable 'Information'. The magnitude of the estimated coefficient is slightly lower than in the baseline but the estimates remain significant at one percent level in all models. Furthermore, the estimated coefficients of the other two regressors remain highly significant. We also consider a bigger error band (5US\$) and report the results in table [A.13](#). The baseline scenario is confirmed also in this case.

Finally, we consider a slightly different definition to the variable 'Delivery'. In the baseline analysis for the January 2011 survey, the variable 'Delivery' is a dummy variable taking the value of '1' if the respondent declares to be confident about receiving the subsidy under the announced new scheme. However, it could be the case that the respondent answers 'no' because she or he does not qualify for the transfer. This robustness exercise considers under the variable 'Delivery' only individuals with a monthly usage of electricity below the qualifying threshold, i.e. those that qualify for the benefit. This choice reduces the number people confident in the delivery (meaning the number of observations taking the value of '1') from 373 (baseline) to 305. The results are reported in table [A.14](#). The coefficient of 'Delivery' is only marginally lower than in the baseline but the variable remains significant at one percent level. Overall these results suggest that the baseline findings are fully robust to the alternative definitions of delivery, information, and partisanship and that these variables play an important role in individuals' satisfaction.

6. Conclusion

In this paper we analyze the determinants of the citizens' satisfaction about a reform of the gas subsidy in El Salvador. The reform was expected to improve the welfare of around three-quarters of the population but turned out to be highly unpopular. Our contribution is double. First, using newly collected data on six consecutive surveys we document the evolution of the popularity of the reform across individuals. Second, using Probit/Logit models we test the marginal effects of three key observables: the individual's level of information (which is especially relevant ex-ante), his/her trust in the government's ability to implement the

reform effectively (or the ability to deliver the subsidy ex-post), and his/her political views. We first show that in January 2011 - before implementation – the level of information about the reform, the expectations on the ability of the government to deliver and political priors help explain most of the overall satisfaction rate. On average, around 70 percent of the variance of the dependent variable is captured by our main regressors. Second, we show that the increase in the satisfaction rate over time is essentially driven by the ability of the government to deliver the subsidy. Throughout the five surveys following April 2011 the significance and magnitude of the coefficient identifying the above effect progressively increases. Finally, we show a non-marginal effect of political partisanship in the perception of the reform not only before the reform was implemented but also throughout the entire period of analysis.

Overall our findings suggest that the level of satisfaction with the reform could potentially have been affected by actions to increase the information of individuals. It is important to stress that such efforts could have played a role without necessarily modifying the content of the reform. In this sense the findings of our paper point to issues that go beyond the political economy of reform as it is often understood, i.e., in the sense of identifying winners and losers. Our paper suggests that exploring factors that may affect why an individual considers himself to be a winner or a loser is an under-studied yet worthwhile effort for understanding the success or failure of policy reforms.

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Appendix A. List of control variables - robustness checks

We control for all observables contained in the surveys. Most of the variables that we use as controls are dummies constructed from answers to questions contained in the surveys. For each variable in table A.7 we specify whether it is a dummy variable, the number of dummies created for each variable and whether the variable is included when running our model on a specific survey. As usual, to avoid collinearity issues, the number of dummies for each variable is equal to the number of possible answers minus 1 (e.g. gender is a single dummy for males).

Table A.7: List and description of controls.

| | Dummies | Number of dummies* |
|---------------------------|---------|--------------------|
| Personal income | YES | 5 |
| Gender | YES | 1 |
| Age | NO | - |
| Level of education | YES | 4 |
| Being 'loser' from reform | YES | 1 |
| Coking method | YES | 3 |
| Head of the family | YES | 1 |
| Religion | YES | 3 |
| Type of house | YES | 3 |
| Number of people in house | NO | - |
| Marital status | YES | 5 |
| Occupation | YES | 4 |
| Type of job (if working) | YES | 11 |
| Urbanization zone | YES | 2 |
| Geographical region | YES | 2 |
| Geographical department | YES | 13 |
| Party running local gov. | YES | 2 |

Number of dummies = number of categories of each variable -1.

Table A.8: Robustness check - Entire sample (January 2011 survey).

| | PROBIT | | | | LOGIT | | | |
|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Information | 0.606*** (0.099) | 0.550*** (0.105) | 0.613*** (0.107) | 0.560*** (0.113) | 1.004*** (0.166) | 0.918*** (0.175) | 1.036*** (0.181) | 0.956*** (0.190) |
| Delivery | 0.578*** (0.085) | 0.598*** (0.090) | 0.617*** (0.092) | 0.609*** (0.097) | 0.960*** (0.144) | 0.992*** (0.155) | 1.024*** (0.158) | 1.010*** (0.169) |
| Partisanship | 0.477*** (0.084) | 0.455*** (0.087) | 0.525*** (0.094) | 0.510*** (0.097) | 0.797*** (0.144) | 0.760*** (0.150) | 0.889*** (0.161) | 0.871*** (0.170) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| AIC | 1234.1 | 1237.1 | 1318.9 | 1323.3 | 1235.8 | 1239.6 | 1321.1 | 1325.0 |
| BIC | 1254.5 | 1410.0 | 1750.8 | 1907.4 | 1256.2 | 1412.5 | 1753.0 | 1909.1 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

Table A.9: Robustness check - Entire sample (September 2013 survey).

| | PROBIT | | | | LOGIT | | | |
|---------------------|---------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Information | 0.202 (0.104) | 0.154 (0.152) | 0.165 (0.143) | 0.125 (0.154) | 0.346 (0.239) | 0.265 (0.259) | 0.289 (0.244) | 0.220 (0.262) |
| Delivery | 1.142** (0.420) | 1.245** (0.436) | 1.169** (0.422) | 1.263** (0.439) | 1.829** (0.700) | 2.023** (0.730) | 1.875** (0.702) | 2.038** (0.733) |
| Partisanship | 0.227** (0.127) | 0.226* (0.138) | 0.344*** (0.130) | 0.345* (0.139) | 0.578** (0.221) | 0.568* (0.237) | 0.589** (0.222) | 0.574* (0.237) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 610 | 610 | 610 | 610 | 610 | 610 | 610 | 610 |
| AIC | 632.7 | 631.3 | 624.6 | 632.7 | 623.6 | 631.6 | 624.5 | 633.5 |
| BIC | 645.1 | 750.4 | 654.5 | 760.3 | 644.9 | 750.7 | 654.4 | 761.1 |

*** indicates significance at 1% level, ** at 5% level and * at 10% level.

Table A.10: Robustness check - Alternative definition of 'Partisanship' (January 2011 survey).

| | PROBIT | | | | LOGIT | | | |
|---------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Information | 0.584*** (0.103) | 0.537*** (0.108) | 0.618*** (0.111) | 0.576*** (0.117) | 0.957*** (0.168) | 0.889*** (0.178) | 1.036*** (0.186) | 0.976*** (0.196) |
| Delivery | 0.579*** (0.088) | 0.617*** (0.093) | 0.632*** (0.096) | 0.645*** (0.102) | 0.954*** (0.147) | 1.021*** (0.158) | 1.058*** (0.163) | 1.082*** (0.175) |
| Partisanship | -0.401*** (0.105) | -0.408*** (0.110) | -0.453*** (0.115) | -0.436*** (0.120) | -0.682*** (0.184) | -0.682*** (0.192) | -0.772*** (0.201) | -0.724*** (0.210) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 |
| AIC | 1161.2 | 1157.9 | 1237.5 | 1238.8 | 1161.7 | 1159.7 | 1238.2 | 1240.8 |
| BIC | 1181.0 | 1325.7 | 1656.8 | 1805.8 | 1181.5 | 1327.6 | 1657.4 | 1807.8 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

Table A.11: Robustness check - Alternative definition of 'Partisanship' (September 2013 survey).

| | PROBIT | | | | LOGIT | | | |
|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Information | 0.194 (0.141) | 0.148 (0.153) | 0.158 (0.143) | 0.119 (0.155) | 0.328 (0.240) | 0.255 (0.260) | 0.270 (0.244) | 0.209 (0.263) |
| Delivery | 1.176** (0.429) | 1.258** (0.440) | 1.199** (0.431) | 1.269** (0.443) | 1.859** (0.703) | 2.032** (0.731) | 1.895** (0.706) | 2.042** (0.734) |
| Partisanship | -0.379** (0.137) | -0.514** (0.184) | -0.384** (0.138) | -0.523** (0.185) | -0.628** (0.227) | -0.838** (0.303) | -0.634** (0.228) | -0.854** (0.305) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 527 | 527 | 527 | 527 | 527 | 527 | 527 | 527 |
| AIC | 623.0 | 629.5 | 624.0 | 630.9 | 623.0 | 629.8 | 624.2 | 631.6 |
| BIC | 644.4 | 748.6 | 653.9 | 758.5 | 644.4 | 748.9 | 654.0 | 759.2 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

Table A.12: Robustness check - Alternative definition of 'Information' (January 2011 survey).

| | PROBIT | | | | LOGIT | | | |
|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Information | 0.478*** (0.129) | 0.521*** (0.135) | 0.525*** (0.142) | 0.583*** (0.149) | 0.728*** (0.212) | 0.863*** (0.226) | 0.869*** (0.236) | 0.979*** (0.252) |
| Delivery | 0.573*** (0.088) | 0.605*** (0.094) | 0.630*** (0.096) | 0.633*** (0.102) | 0.942*** (0.147) | 0.996*** (0.159) | 1.051*** (0.163) | 1.053*** (0.176) |
| Partisanship | 0.501*** (0.088) | 0.496*** (0.092) | 0.559*** (0.099) | 0.563*** (0.104) | 0.825*** (0.147) | 0.820*** (0.155) | 0.938*** (0.168) | 0.952*** (0.179) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 |
| AIC | 1160.0 | 1151.1 | 1235.7 | 1229.2 | 1161.0 | 1153.4 | 1237.2 | 1231.6 |
| BIC | 1179.7 | 1318.9 | 1654.9 | 1796.2 | 1180.8 | 1321.3 | 1656.5 | 1798.6 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

Table A.13: Robustness check - Alternative (5US\$ cutoff) definition of 'Information' (January 2011 survey).

| | PROBIT | | | | LOGIT | | | |
|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Information | 0.524*** (0.125) | 0.552*** (0.131) | 0.555*** (0.136) | 0.585*** (0.143) | 0.859*** (0.205) | 0.915*** (0.218) | 0.920*** (0.228) | 0.984*** (0.243) |
| Delivery | 0.572*** (0.088) | 0.605*** (0.094) | 0.630*** (0.096) | 0.635*** (0.102) | 0.940*** (0.147) | 0.998*** (0.159) | 1.051*** (0.163) | 1.058*** (0.175) |
| Partisanship | 0.495*** (0.088) | 0.492*** (0.092) | 0.552*** (0.099) | 0.557*** (0.104) | 0.816*** (0.147) | 0.814*** (0.155) | 0.926*** (0.169) | 0.945*** (0.179) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 |
| AIC | 1156.0 | 1148.2 | 1232.9 | 1227.9 | 1157.1 | 1150.5 | 1234.4 | 1230.3 |
| BIC | 1175.8 | 1316.0 | 1652.1 | 1794.9 | 1176.9 | 1318.3 | 1653.7 | 1797.3 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.

Table A.14: Robustness check - Alternative definition of 'Deliver' (January 2011 survey).

| | PROBIT | | | | LOGIT | | | |
|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Information | 0.587*** (0.103) | 0.551*** (0.108) | 0.622*** (0.111) | 0.594*** (0.117) | 0.966*** (0.168) | 0.911*** (0.178) | 1.041*** (0.186) | 1.003*** (0.197) |
| Delivery | 0.450*** (0.093) | 0.462*** (0.098) | 0.474*** (0.102) | 0.468*** (0.107) | 0.734*** (0.154) | 0.753*** (0.165) | 0.782*** (0.172) | 0.762*** (0.184) |
| Partisanship | 0.526*** (0.088) | 0.527*** (0.091) | 0.584*** (0.098) | 0.595*** (0.103) | 0.868*** (0.147) | 0.872*** (0.154) | 0.978*** (0.168) | 1.005*** (0.178) |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES |
| Personal | | YES | | YES | | YES | | YES |
| Dummies | | | YES | YES | | | YES | YES |
| Observations | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 | 1032 |
| AIC | 1158.7 | 1159.3 | 1239.1 | 1239.9 | 1159.6 | 1161.0 | 1240.1 | 1241.4 |
| BIC | 1178.5 | 1327.2 | 1658.4 | 1806.9 | 1179.3 | 1328.9 | 1659.3 | 1808.4 |

*** indicates significance at 0.1% level, ** at 1% level and * at 5% level.