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## The Effect of Income on Religiousness<sup>†</sup>

By THOMAS BUSER\*

*How does income affect religiousness? Using self-collected survey data, we estimate the effects of income on religious behavior. As a source of exogenous income variation we use a change in the eligibility criteria for a government cash transfer in Ecuador and apply a regression discontinuity strategy to estimate causal effects. We find significant effects of income on religiousness. Families that earn more go to church more often. Families that earn more are also more likely to be members of an Evangelical community rather than of the mainstream Catholic Church. (JEL D14, H23, J12, J31, O15, Z12)*

A majority of the world's population claim adherence to a religion. But while there is a growing literature on the effects of religiousness on economic behavior<sup>1</sup>, we know very little about how economic factors affect religiousness. How income affects religious behavior and affiliation is an especially important question for developing countries experiencing a rise in the average incomes of poor and lower middle class households. Whether these families will become more or less religious (or even change their religion) as they grow richer will have an impact on the way their societies develop.

We make use of a policy change in Ecuador which generates quasi-exogenous variation in unearned income. The Ecuadorian government provides poor households with a monthly transfer of US\$35. Eligibility for the transfer depends on a household's score on a wealth index: households just below the fortieth percentile receive the transfer while those just above do not. In 2009, after a new survey of all households, the composition and variable weights of the index changed. As a consequence, some households who previously did not receive the transfer suddenly gained it while some previous recipients suddenly lost it, leading to permanent changes in unearned income. We use a regression discontinuity approach to estimate causal effects of the income variation engendered by the cash transfer for families close to the cutoff.

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<sup>1</sup> See Iannaccone (1998) and Hoffmann (2013) for surveys.

Our data allows us to answer the following three questions.<sup>2</sup> Do people become more or less religious as they become richer? Do people change their religion as they become richer? And do people increase or decrease church attendance as they become richer? To the best of our knowledge, we are the first to provide credible causal estimates of both positive and negative income shocks on church membership and attendance at the household level. We find positive and sizable effects of income on church attendance and religious denomination. For the households in our sample, the income shock amounts to around 12 percent of expenditures, which is sizable but hardly dramatic. This indicates that religious participation and church membership are quite elastic with respect to income.

Building on the secularization thesis which predicts that as societies develop, religion gradually loses its importance (Stark and Bainbridge 1985), economists have used cross-country studies to uncover a negative association between per capita gross domestic product (GDP) and measures of religiousness (Barro and McCleary 2003 and McCleary and Barro 2006a, 2006b). Empirical studies using individual-level data are scarce and mostly correlational with the direction of causality left unclear (Iannaccone 1998). An exception is Chen (2010) who uses differential exposure to the Indonesian financial crisis to estimate the causal effects of economic distress on religious intensity. He finds that families who suffer greater distress increase Koran study and are more likely to send their children to Islamic schools. He also demonstrates that religious participation serves as an *ex post* social insurance mechanism.

A related literature finds evidence for a significant negative effect of education on religious participation. Gulesci and Meyersson (2012) and Cesur and Mocan (2014) study the same educational reform in Turkey, which exogenously increased the educational attainment of women, and find that education reduces religious identification. Becker, Nagler, and Woessmann (2014) find a negative association between school enrollment and Protestant church attendance in Germany between 1890 and 1930. Hungerman (2014) uses Canadian compulsory schooling laws to estimate a negative effect of education on religious identification. To the extent that economic development and education go together, these results indicate that rising average incomes could lead to secularization.

The Latin American context is especially interesting for the study of the effects of income on religiousness. The region has recently experienced a dramatic shift away from Catholicism towards Evangelical denominations (Levine 2009). These new churches specifically target poor and lower middle class households, through, for example, the use of indigenous languages and by establishing themselves in poor neighborhoods.<sup>3</sup> While these Evangelical communities are very diverse, they have in common that they are smaller, more tightly integrated, and more participative than the official Catholic Church. They also ask a higher commitment both in terms of time and of financial contributions (traditionally, Evangelicals are supposed to

<sup>2</sup>The dataset used in this study was collected by Buser et al. (2014) who use it to estimate the effects of income changes on child health.

<sup>3</sup>For examples of the media coverage of the rise of the Evangelical churches in Latin America, see <http://www.time.com/time/magazine/article/0,9171,156277,00.html>, <http://www.aljazeera.com/indepth/features/2012/03/201232593459332334.html>, <http://www.economist.com/node/9116934>, and [http://www.economist.com/node/18063674?story\\_id=18063674&fsrc=rss](http://www.economist.com/node/18063674?story_id=18063674&fsrc=rss).

give a tithe, or one-tenth, of their income to the church).<sup>4</sup> The rapid expansion of Evangelical churches in Latin America fits the general pattern that successful and fast-expanding religions tend to be above average strict, sectarian, theologically conservative, and demanding in terms of financial and time contributions (Iannaccone 1998).<sup>5</sup>

How could income affect denomination and church attendance? Churches can be modeled as social clubs.<sup>6</sup> An increase in unearned income could both free up time for church attendance and increase the utility of attendance by increasing the status of the recipient, possibly through increased donations to the church. This is especially true for Evangelical churches where communities are much smaller and where members are expected to donate part of their income. We would therefore expect a positive effect of income on church attendance and on membership in Evangelical churches. On the other hand, as Chen (2010) demonstrates, religious participation can serve as an ex post insurance mechanism and it is therefore possible that families which lose part of their income increase participation in return for assistance.<sup>7</sup>

### I. Context and Cash Transfer Program

Ecuador is a lower middle income country which has high poverty levels and high inequality. Seventy-two percent of its population of around 14 million live in urban areas. According to a survey of people above the age of 16 conducted in five large cities by the National Institute of Statistics (INEC), 76 percent of the population describes themselves as Catholic and 10 percent belongs to a non-Catholic (Evangelical) Christian denomination.<sup>8</sup> While Protestant churches have been active in Ecuador since the late nineteenth century, the numbers of their followers remained marginal until fairly recently. Non-Catholic Christians made up less than 1 percent of the population in 1962 and around 3 percent in 1986 (Goffin 1994).

Table A1 in the online Appendix presents OLS results, regressing a binary indicator for being Evangelical on gender, age, and income quintile dummies using the INEC data. We present results for the subsample of people from Quito and Guayaquil in the second income quintile (which comes closest to our own sample) as well as for all respondents. Women are around 2 percentage points more likely to belong to an Evangelical church while age plays no role. People in the highest income quintile are 5 percentage points less likely to belong to an Evangelical church compared to

<sup>4</sup>Studying Evangelicals in Mexico, Bowen (1996) finds that congregations typically have less than 150 members and the majority of members live within walking distance of the church. Most members attend at least two weekly services and even poor believers give substantial amounts to their church. A much lower member to preacher ratio than the Catholic Church further increases personal attention and social control.

<sup>5</sup>Iannaccone (1994) argues that strict churches are more successful because strictness reduces free riding and stimulates participation.

<sup>6</sup>See Iannaccone (1992), Berman (2000), and Berman and Laitin (2008) on the club-good model of religious participation.

<sup>7</sup>Further evidence for church membership functioning as social insurance comes from Dehejia, DeLeire, and Luttmer (2007), who find that US households who donate to a religious organization are better able to insure their consumption against negative income shocks, and from Ager and Ciccone (2014), who find that historically, US counties with higher rainfall risk had larger church communities.

<sup>8</sup>The survey description and data can be found at <http://www.ecuadorencifras.gob.ec/filiacion-religiosa/>. The survey was conducted in 2012 in Guayaquil et al.

the rest of the population. In Section III, we will have a more detailed look at the INEC data and compare our own sample with the national averages.

The Ecuadorian government runs a cash transfer program called Bono Desarrollo Humano (BDH), which was launched in 2003 and is aimed at the poorest 40 percent of households. Initially, these families received a transfer of US\$15 per month that was increased to US\$30 in 2007 and then to US\$35 in 2009. The transfers are collected by the mother through local banks. Contrary to most other government-run cash transfer programs in Latin America, the BDH is not conditional on certain desirable behaviors by the recipients.<sup>9</sup>

Eligibility for the BDH is determined by a households' percentile on a wealth index (called SELBEN).<sup>10</sup> This index is based on a range of observable variables including household assets and housing characteristics (e.g., access to water, toilet, and shower), possession of appliances (e.g., TV, DVD, microwave), characteristics of the head of household (e.g., schooling and employment), childrens' characteristics, and household size. From these variables, the index is calculated using nonlinear principal components analysis. The variables were collected through a census of all households living in poor areas.<sup>11</sup> In 2007–2008, all households in these areas were resurveyed and the definition of the index was changed (SELBEN II). The index is now composed of 59 variables covering the same categories (see Fabara 2009, for the complete list of variables). This new index was implemented in 2009, which led to changes in eligibility for many households close to the cutoff fortieth percentile. Some households who had received the transfer for over seven years suddenly lost it while others suddenly gained it.

## II. Empirical Strategy

### A. Regression Discontinuity Design

Not all families who are eligible collect their transfer and we therefore apply a fuzzy regression discontinuity design, using official eligibility as an instrument for winning or losing the transfer. The regression discontinuity design is essentially an instrumental variables approach in which a binary indicator  $Z$  for having a SELBEN II score below the cutoff is used as an instrument for receiving the monthly cash transfer. Additionally, we condition on a polynomial in the SELBEN II score ( $s$ ), which is the forcing variable, and, in some specifications, on a set of controls  $\mathbf{X}$ :

$$Y_i = \alpha + \delta T_i + f(s) + \mathbf{X}_i \beta + \lambda E_i + \varepsilon_i,$$

where  $Y$  is the outcome variable,  $T$  is a binary indicator for receiving the transfer and  $E$  is a binary indicator for having received the transfer before the change.  $T$  is instrumented by  $Z$ .  $\delta$  gives the causal effect of receiving the cash transfer on the outcome

<sup>9</sup>In theory, recipients should send their children to school and to half-yearly health checks, but these conditionalities were neither effectively communicated nor controlled or enforced. In 2012, the government eventually started random checks that still only cover a small proportion of recipients.

<sup>10</sup>SELBEN stands for Selection of Beneficiaries.

<sup>11</sup>The government used poverty mapping to select neighborhoods with a high incidence of poverty.

TABLE 1—NUMBER OF OBSERVATIONS

		Eligibility before change		
		no	yes	
Eligibility after change	no (nonrecipients)	648	653	1,301
	yes (recipients)	670	674	1,344
		1,318	1,327	2,645

measure. The group of nonreceivers consists of households who lost the transfer and households who never received it, whereas the group of receivers consists of households who newly gained the transfer and those who already received it before the change. In estimating this equation, we therefore assume symmetry of the effects of income variation caused by winning and losing the transfer, i.e., of positive and negative income shocks.  $\delta$  can then be interpreted as the effect of an extra US\$35 of income. We also conduct the regression discontinuity estimation separately on the subsample of those who did not receive the transfer before the change (therefore comparing those who newly gained the transfer to those who never received it) and the subsample of those who did receive the transfer before the change (therefore comparing those who lost the transfer to those who kept receiving it). For all our estimations, we will present results for various specifications of  $f(s)$ .

### B. Sampling and Data Collection

For our data collection, we randomly sampled households from poor neighborhoods in three urban centers (Guayaquil, Quito, and Santo Domingo) using the SELBEN II dataset. The sampling frame consisted of the following households:

- they scored within 0.3 standard deviations of the cutoff on SELBEN II;
- they are single-core households so that our sample only contains households which, if eligible, receive the transfer exactly once;
- they are located in Guayaquil, Quito, or Santo Domingo;
- they complied with their status of receiver or nonreceiver before the change was implemented (we used administrative data to only include households in our sampling frame which complied with their eligibility status before the change).

The eligibility change divides households into four groups: those that are always below the cutoff (always receive the transfer), those that are always above the cutoff (never receive the transfer), those that move from above to below the cutoff (gain the transfer) and those who move from below the cutoff to above the cutoff (lose the transfer). To ensure a balanced number of households across these four groups, the households were randomly sampled within each city as follows. We randomly picked a household from one of the four groups and then randomly picked one of each of the other three groups from the same government parish. This also ensures that the groups are geographically balanced. Table 1 shows the number of observations in each of the four groups.

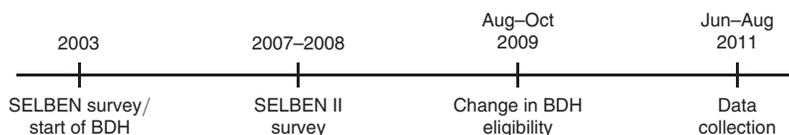


FIGURE 1. TIMELINE

The households in our sample were visited by professional enumerators who were instructed to only conduct the interview with the mother of the house. In case of her absence, the enumerators were to revisit the household several times. In case of repeated absence, a random replacement was drawn from within the same parish. In the end, we received data from 2,645 households. The SELBEN II survey was executed in 2007–2008 and the change in eligibility was implemented between August and October 2009. Our survey took place approximately two years after the change. Figure 1 shows the timing of the SELBEN surveys and our own data collection.

### C. Validity of Regression Discontinuity Approach

For our estimation strategy to be valid, households must not be able to precisely manipulate the assignment variable (Lee and Lemieux 2009). While it is easy to imagine how a respondent could make herself look poorer than she actually is, all that is required for the regression discontinuity approach to be valid is that she is not able to precisely determine her position on the SELBEN II index, so that near the cutoff every household has the same chance to have a score just above and just below the cutoff. In our case, this assumption is not a strong one as neither the weights of the variables nor the cutoff score were public information at the time the households were visited. Furthermore, the cutoff was determined ex post such that exactly 40 percent of households receive the cash transfer. As we can see from Figure 2, which shows the distribution of SELBEN II scores, there is indeed no indication of bunching near the threshold.

Our sampling frame ensures that all households in our sample complied with their status of recipient or nonrecipient before the change. Having access to administrative data, we can determine exactly which families collected a transfer at their local bank after the change. Figure 3 shows collection rates left and right of the cutoff. Compliance rates are high: 97 percent of ineligible households do not collect the transfer while 86 percent of eligible households collect their transfer. Noncollection of transfers can easily be explained with imperfect information. While the eligibility change was announced through the media, there was no personal communication with eligible households.

The online Appendix contains further validity checks. Table A2 shows  $F$ -statistics for the first stage (i.e., regressions of a binary indicator of transfer collection on the assignment variable) controlling for first, second, and third degree polynomials in the SELBEN II score. The  $F$ -statistics are in all cases very high and well above the rule-of-thumb threshold of around ten (Angrist and Pischke 2009). In Table A3, we check whether the background variables which we include as controls exhibit a discontinuity at the threshold by using the regression discontinuity approach described

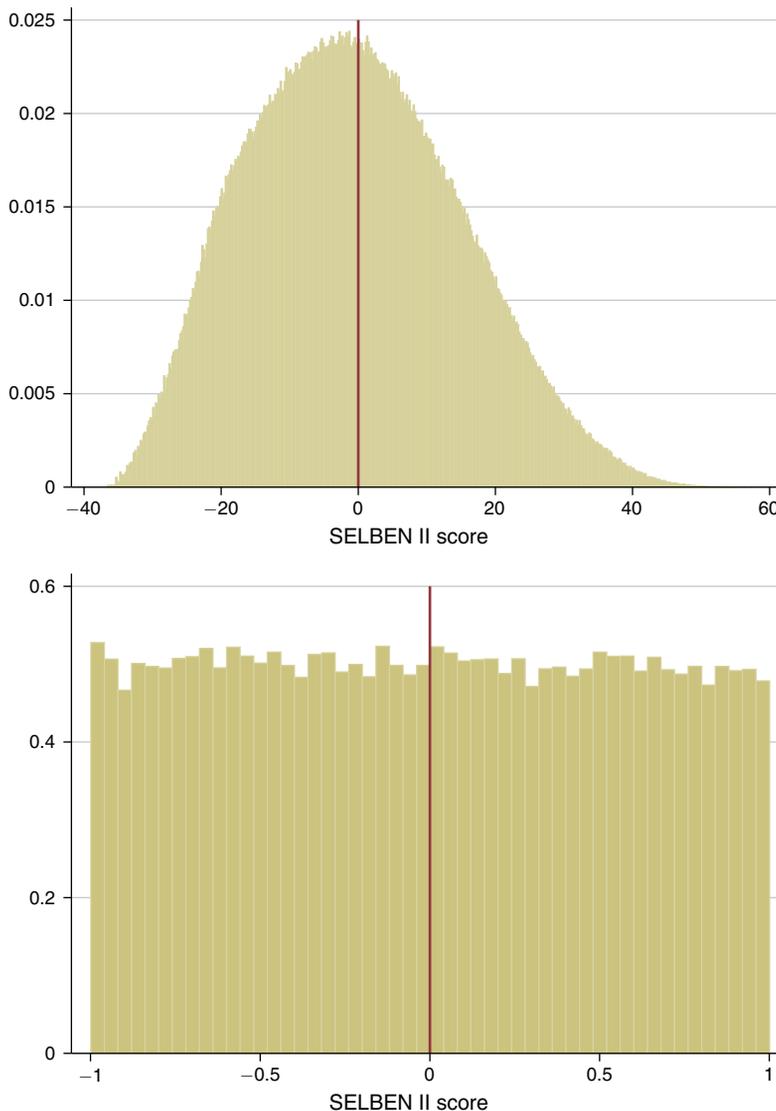


FIGURE 2. FREQUENCY DISTRIBUTION OF SELBEN II (Population)

Notes: The histograms are generated using the full SELBEN II database (2,175,512 households). The cutoff is normalized to zero.

above with the controls as dependent variables. Neither household size, age of the responder, nor years of schooling of the responder vary significantly around the cutoff conditional on a linear control in the forcing variable.

### III. Data

Our survey data contains answers to the following three religion-related questions. Which religion does your family have? How religious is your family (on a scale from 0 to 10)? And how often do you attend a religious service? Table 2

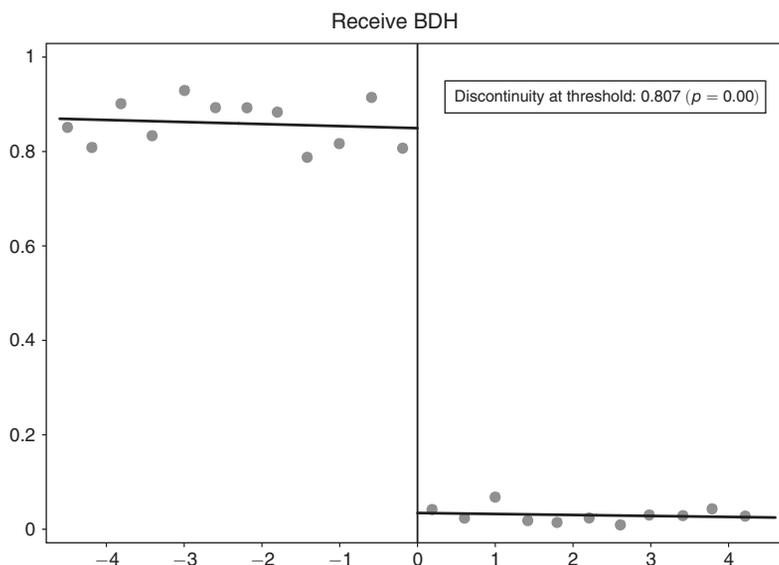


FIGURE 3. FIRST STAGE

*Notes:* The figure shows the proportion of households who collect the BDH above and below the cutoff. Observations are divided into bins with a width of 0.4 points and the SELBEN II score is normalized to be zero at the cutoff. Households to the left of the cutoff are eligible to receive the transfer while those to the right are not.

describes the answers. Roughly 75 percent of the households in our sample are Catholic, 17 percent are non-Catholic (Evangelical) Christians, 6 percent adhere to another religion, and 2 percent describe themselves as atheists. Forty-four percent of households go to church at least once a week while 19 percent go only for special occasions or never. This translates to an average of around 4.3 religious service attendances per month.<sup>12</sup> Finally, the average respondent judges her family's religiousness as roughly a 7 out of 10.

Table 2 also shows population averages for the urban population using data from the INEC survey. We report averages for individuals from the second income quintile who live in Quito or Guayaquil (the closest equivalent to our sampling frame) and for all respondents. Compared to the more comparable restricted INEC sample, our sample contains more Catholics and less atheists. Thirty-nine percent of individuals in the INEC sample go to church at least once a week, while 24 percent go only for special occasions or never. The average respondent judges her own religiousness as roughly a 7 out of 10. The restricted INEC sample differs from the entire sample mainly by containing more Evangelicals and less Catholics. The numbers show that our own sample does not differ dramatically from the urban population of Ecuador, which it was drawn from.

<sup>12</sup>We translated the discrete answer options shown in Table 2 into monthly attendances in the following way: "every day" = 30 monthly attendances; "4 to 6 times a week" = 20; "2 to 3 times a week" = 10; "once a week" = 4; "2 to 3 times a month" = 2.5; "once a month" = 1. The categories "less than once a month," "only for special occasions," and "never" were coded as zero monthly attendances.

TABLE 2—DESCRIPTIVE STATISTICS

	Sample		INEC survey	
	Observations	Percent	Population 1: Percent	Population 2: Percent
<b>Religion:</b>				
Catholic	1,971	74.52	69.73	76.17
Non-Catholic Christian	452	17.09	16.65	10.04
Jewish	2	0.08	0.50	0.24
Atheist/none	53	2.00	8.07	6.57
Other	167	6.31	5.05	6.98
<b>Service attendance:</b>				
Never	192	7.26	Never	7.35
Only for special occasions	310	11.72	Only for special occasions	16.68
Less than once a month	138	5.22	Once a year	7.90
Once a month	324	12.25	Once a month	21.41
2 to 3 times a month	507	19.17	More than once a month	7.35
Once a week	738	27.90	Once a week	30.74
2 to 3 times a week	257	9.72	More than once a week	8.56
4 to 6 times a week	106	4.01		
Every day	73	2.76		
	Mean	SD	Mean	Mean
Attendance per month	4.32	6.14		
Religiousness (0–10)	6.83	2.38	6.79	6.74
Household size	4.46	1.97		
Age responder	42.7	11.0		
Years of schooling responder	7.4	3.7		
Household expenditure	297	151		

Notes: For the INEC data, Population 1 includes respondents from Quito and Guayaquil in the second income quintile. Population 2 includes all respondents.

Table 3 shows attendance figures separately for Evangelicals and for the rest of the sample. The table also shows the corresponding numbers for the urban population from the INEC survey. Although the INEC survey uses a different answer key, the same stark differences are apparent. Evangelicals go to a religious service much more often: 69 percent of Evangelicals (INEC: 75 percent) go to a service at least once a week while this only applies to 39 percent of other households (INEC: 31 percent). This translates to 9.3 monthly attendances for Evangelicals compared to 3.3 attendances for the rest of the sample.

We combine our survey data with the households' SELBEN II scores and administrative transfer collection records to implement our regression discontinuity strategy. The average household in our sample has monthly expenditures of US\$297 which means that an income change of US\$35 amounts to 11.8 percent of household expenditure.

#### IV. Results

Figure 4 shows the relationship between the SELBEN II score and the three outcome measures: monthly church attendance, the likelihood of membership in an Evangelical church, and self-rated religiousness. The observations are divided into

TABLE 3—CHURCH ATTENDANCE BY DENOMINATION (Percentages)

	Sample			INEC Pop 1		INEC Pop 2	
	Evangelical	Rest		Evangelical	Rest	Evangelical	Rest
Never	5.53	7.62	Never	2.42	8.45	1.02	9.03
Only for special occasions	5.75	12.95	Only for special occasions	7.88	18.63	5.19	15.21
Less than once a month	4.20	5.43	Once a year	1.82	9.25	3.05	8.24
Once a month	5.75	13.59	Once a month	9.70	23.99	9.98	24.04
2 to 3 times a month	9.96	21.07	More than once a month	3.03	8.31	4.99	8.13
Once a week	20.58	29.41	Once a week	42.42	28.15	41.45	32.57
2 to 3 times a week	25.66	6.43	More than once a week	32.73	3.22	34.32	2.78
4 to 6 times a week	11.95	2.37					
Every day	10.62	1.14					
Attendance per month	9.27 (9.34)	3.30 (4.63)					

TABLE 4—IV REGRESSION RESULTS: EFFECTS OF ELIGIBILITY FOR CASH TRANSFER

	(1)	(2)	(3)	(4)	(5)	(6)	Observations
Church attendance	1.727*** (0.497)	1.722*** (0.494)	1.524* (0.903)	1.872*** (0.512)	1.863*** (0.511)	1.634* (0.836)	2,645
Being Evangelical	0.066** (0.032)	0.064** (0.032)	0.034 (0.058)	0.071** (0.033)	0.069** (0.033)	0.037 (0.056)	2,645
Self-rated religiousness	0.270 (0.173)	0.256 (0.174)	0.313 (0.269)	0.278 (0.171)	0.267 (0.171)	0.350 (0.257)	2,645
1st-order polynomial	✓			✓			
2nd-order polynomial		✓			✓		
3rd-order polynomial			✓			✓	
Controls				✓	✓	✓	

Notes: Controls in columns 4 to 6 include household size, age of the responder, and years of schooling of the responder. All columns control for eligibility before the change. Standard errors in parentheses are clustered at the parish level.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

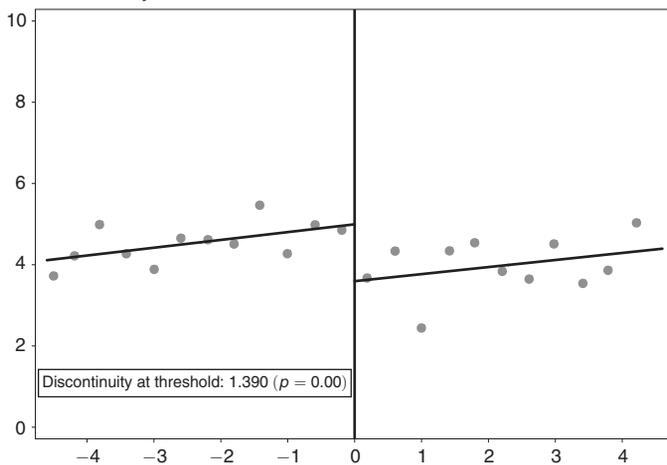
\*Significant at the 10 percent level.

bins with a width of 0.4 SELBEN points. Each dot represents the average outcome for the households in the corresponding bin. The solid lines are the best linear fits through the dots. Below the graph, we report an estimate of the discontinuity at the cutoff and its *p*-value (from OLS regressions of the outcome variable on transfer eligibility including no control variables apart from the SELBEN II score and earlier eligibility). Table 4 shows IV regression results for different orders of the polynomial in the forcing variable.

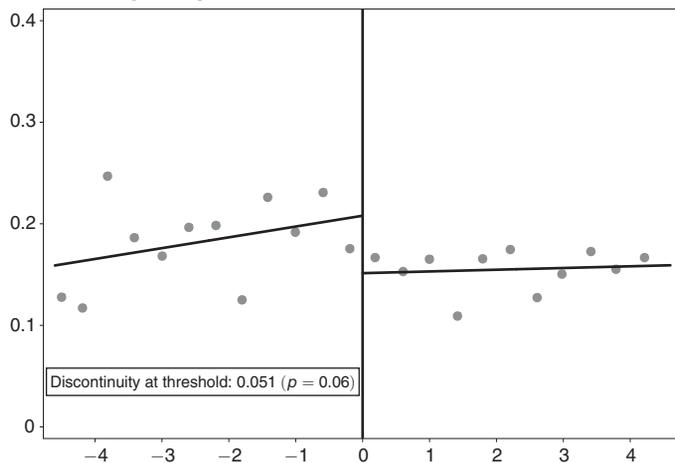
We first take a look at church attendance. The panel A of Figure 4 shows that there is a clear and significant discontinuity at the threshold. Two years after the change in eligibility, transfer recipients attend more religious services than nonrecipients. The IV results in Table 4 show that this effect is robust to the order of the polynomial and to the inclusion of controls. The effect is equal to roughly 1.7 additional monthly church visits.

Next, we look at whether income has an impact on which kind of church people attend. The panel B of Figure 4 shows the relationship between the SELBEN II

Panel A. Monthly service attendance



Panel B. Being Evangelical



Panel C. How religious are you?

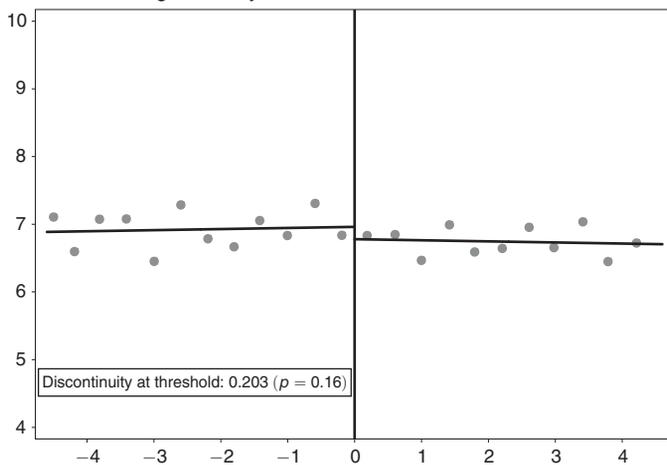


FIGURE 4. REGRESSION DISCONTINUITY GRAPHS

score and the likelihood of being Evangelical. Again, there is a discontinuity at the threshold with transfer recipients being more likely to be Evangelical. Using IV regressions, Table 4 shows that recipients are around 6.5 percentage points more likely to be Evangelical. This effect is significant at the 5 percent level and is robust to using a second order polynomial and to the inclusion of controls, but not to using a third order polynomial.

Finally, there is no effect of income on self-rated religiousness. The panel C of Figure 4 shows that there is no gap at the threshold and the coefficients reported in Table 4 are small (equal to around 10 percent of a standard deviation) and insignificant.

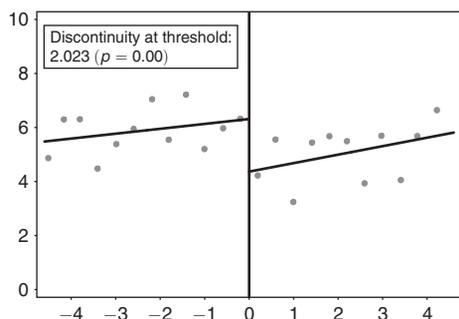
As we have shown, Evangelicals tend to go to church more often than people adhering to other religions. The average Evangelical family attends 9.3 times per month compared to 3.3 for the rest of the sample (see Table 3). This leads to the question whether the observed shift to Evangelical churches is enough to explain the effect of income on church attendance. Families who receive the transfer are 6.5 percentage points more likely to be Evangelical. If we assume that joining an Evangelical church increases monthly attendance by six visits, this leads to  $0.065 \times 6 = 0.39$  additional visits. This makes it very unlikely that all or most of the effect of income on attendance comes from denomination switching.

It seems intuitive that more religious people would be more attracted to the intense worshipping practiced at Evangelical churches. Given that the income shock has no impact on self-rated religiousness, we can split the sample into below and above average religious families and apply our regression discontinuity strategy to each subsample. The results of this exercise are reported in Figure 5 and Table 5. For the likelihood of being Evangelical, we can see that the income effect indeed stems exclusively from above average religious families, who are around 14 percentage points more likely to be Evangelical if they receive the cash transfer. The effect is close to zero for the below average religious families (the effects obtained from the two subsamples are significantly different from each other;  $p = 0.04$ ).<sup>13</sup> The same applies for the effect of income on attendance, which is large and significant for above average religious households and small and insignificant for below average religious households. The difference in the effects is significant ( $p = 0.04$ ).

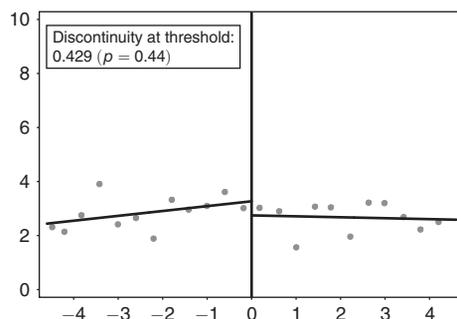
In our analysis, we have so far assumed symmetry. That is, we have assumed that the effect of losing income is the exact opposite of the effect of gaining income. We are now going to relax this assumption by splitting the sample into those who received the transfer before the change (i.e., comparing those who kept receiving it to those who lost it) and those who did not receive the transfer before the change (i.e., comparing those who newly gained it to those who continued without the transfer). Figure 6 shows regressions discontinuity graphs for these subsamples. For the positive shock, those to the left of the cutoff newly gained the transfer while those to the right never received it. For the negative shock, those to the left of the cutoff kept receiving the transfer after the change while those to the right lost it. Table 6 reports IV regression results.

<sup>13</sup>The test statistic was obtained by running OLS regressions (controlling for the SELBEN II score and earlier eligibility) and then applying Stata's seemingly unrelated estimation (suest) command.

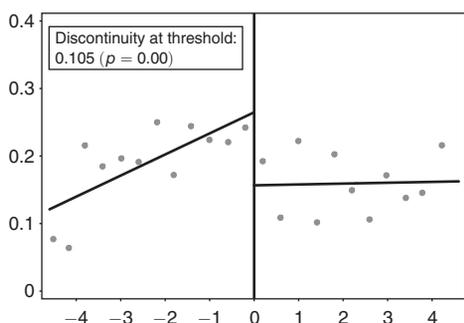
Panel A. Monthly service attendance (above average religious families)



Panel B. Monthly service attendance (below average religious families)



Panel C. Being Evangelical (above average religious families)



Panel D. Being Evangelical (below average religious families)

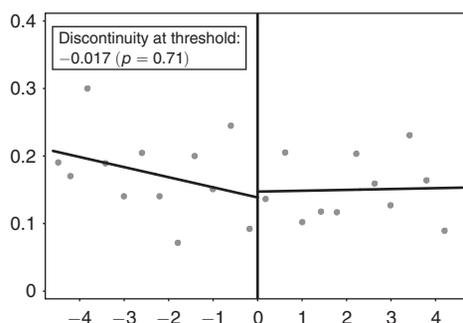


FIGURE 5. REGRESSION DISCONTINUITY GRAPHS (By religiousness)

TABLE 5—IV REGRESSION RESULTS: EFFECTS OF ELIGIBILITY FOR CASH TRANSFER (Sample split by religiousness)

	(1)	(2)	(3)	(4)	(5)	(6)	Observations
<i>Church attendance:</i>							
Above average religious	2.456*** (0.735)	2.495*** (0.709)	2.081** (1.051)	2.617*** (0.799)	2.639*** (0.782)	2.072** (1.044)	1,480
Below average religious	0.620 (0.641)	0.548 (0.659)	0.776 (0.981)	0.735 (0.605)	0.666 (0.624)	0.995 (0.958)	1,165
<i>Being Evangelical:</i>							
Above average religious	0.140*** (0.040)	0.132*** (0.040)	0.054 (0.057)	0.150*** (0.042)	0.142*** (0.042)	0.060 (0.060)	1,480
Below average religious	-0.028 (0.054)	-0.023 (0.055)	0.005 (0.094)	-0.025 (0.054)	-0.020 (0.056)	0.008 (0.095)	1,165
1st-order polynomial	✓			✓			
2nd-order polynomial		✓			✓		
3rd-order polynomial			✓			✓	
Controls				✓	✓	✓	

Notes: Controls in columns 4 to 6 include household size, age of the responder, and years of schooling of the responder. All columns control for eligibility before the change. Standard errors in parentheses are clustered at the parish level.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

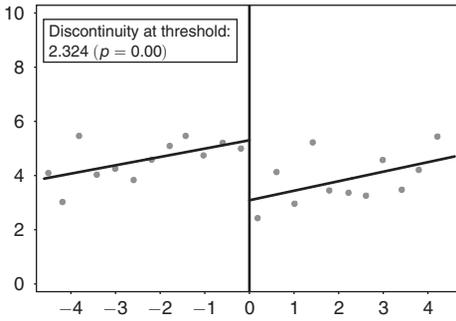
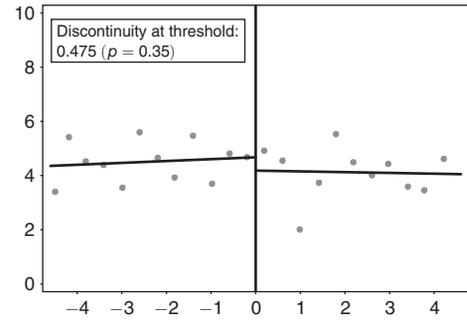
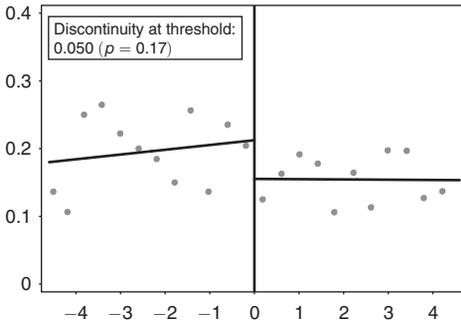
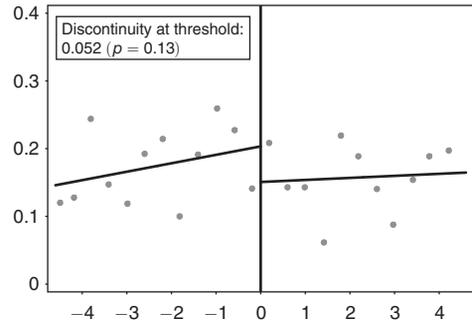
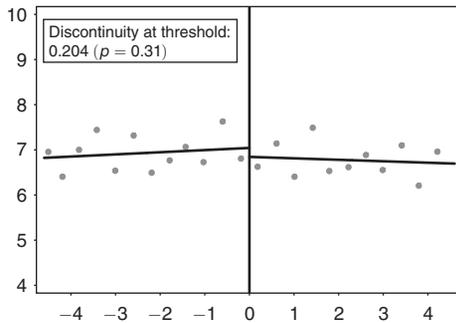
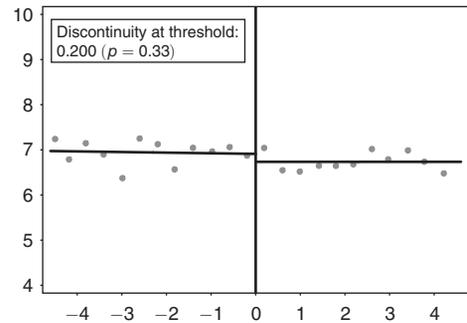
Panel A. Monthly service attendance  
(positive shock)Panel B. Monthly service attendance  
(negative shock)Panel C. Being Evangelical  
(positive shock)Panel D. Being Evangelical  
(negative shock)Panel E. How religious are you?  
(positive shock)Panel F. How religious are you?  
(negative shock)

FIGURE 6. REGRESSION DISCONTINUITY GRAPHS (Positive versus negative shocks)

We can see that the effect of income on church attendance stems exclusively from positive income shocks. The effect is equal to approximately three additional church visits per month for those who newly gained the transfer while the effect for those who lost the transfer is close to zero and insignificant. The difference between the magnitudes of the effects of positive and negative income shocks is significant ( $p = 0.05$ ). The effects of negative and positive income shocks on the likelihood of being Evangelical, on the other hand, are virtually symmetric ( $p = 0.96$ ). This indicates that as people get richer, they tend to switch to Evangelical denominations and

TABLE 6—IV REGRESSION RESULTS: EFFECTS OF ELIGIBILITY FOR CASH TRANSFER  
(Positive versus negative income shocks)

	(1)	(2)	(3)	(4)	(5)	(6)	Observations
<i>Church attendance:</i>							
Gaining transfer	3.056***	3.084***	2.777*	3.340***	3.355***	2.913**	1,318
(versus continuing without)	(0.931)	(0.941)	(1.661)	(0.929)	(0.937)	(1.409)	
Keeping transfer	0.579	0.555	0.552	0.603	0.591	0.628	1,327
(versus losing transfer)	(0.611)	(0.588)	(0.894)	(0.599)	(0.577)	(0.895)	
<i>Being Evangelical:</i>							
Gaining transfer	0.069	0.066	0.058	0.084*	0.080*	0.068	1,318
(versus continuing without)	(0.046)	(0.047)	(0.103)	(0.045)	(0.046)	(0.097)	
Keeping transfer	0.062*	0.062	0.014	0.062*	0.061	0.014	1,327
(versus losing transfer)	(0.037)	(0.038)	(0.044)	(0.037)	(0.038)	(0.044)	
<i>Being Evangelical (above average religious):</i>							
Gaining transfer	0.121*	0.107	0.006	0.151**	0.136*	0.025	744
(versus continuing without)	(0.065)	(0.069)	(0.101)	(0.069)	(0.075)	(0.099)	
Keeping transfer	0.155***	0.152***	0.091*	0.159***	0.156***	0.101*	736
(versus losing transfer)	(0.036)	(0.035)	(0.053)	(0.037)	(0.035)	(0.058)	
<i>Self-rated religiousness</i>							
Gaining transfer	0.308	0.281	0.191	0.335	0.306	0.235	1,318
(versus continuing without)	(0.241)	(0.255)	(0.368)	(0.230)	(0.240)	(0.347)	
Keeping transfer	0.237	0.232	0.413	0.229	0.230	0.442	1,327
(versus losing transfer)	(0.239)	(0.233)	(0.408)	(0.235)	(0.230)	(0.401)	
1st-order polynomial	✓			✓			
2nd-order polynomial		✓			✓		
3rd-order polynomial			✓			✓	
Controls				✓	✓	✓	

Notes: Controls in columns 4 to 6 include household size, age of the responder, and years of schooling of the responder. All columns control for eligibility before the change. Standard errors in parentheses are clustered at the parish level.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

as they become poorer they tend to switch back. As the effect of income on church membership stems exclusively from above average religious families, Table 6 also reports regression results for this subsample. The picture is similar, the effects of gaining and losing the transfer are similar in magnitude, and not significantly different ( $p = 0.49$ ). As indicated by the absence of an income effect for the combined sample, neither positive nor negative income shocks have an impact on self-rated religiousness.

Our survey data does not contain information on potential pathways for the effects of income on attendance and denomination. Any discussion of the mechanisms behind our results must therefore remain speculative. Our results are consistent with churches, and in particular Evangelical churches, being social clubs where participation is costly. Some households seem to use their new-found wealth to gain access to these churches and increase their participation in church services. Potentially, income increases the utility of participating in church activities by increasing status within the community, possibly through donations. The social-club explanation gains further support from the fact that religious participation, but not

self-rated religiousness, is affected by income changes. Households who are negatively affected are less likely to attend an Evangelical church but do not decrease church attendance. This is consistent with the church providing a coping mechanism for those who experience negative economic shocks. As in other Latin American countries, starting in the 1960s the Catholic church in Ecuador embraced the liberation theology movement with its focus on helping and empowering the poor (Goffin 1994). Receiving assistance from the church might require continued attendance. A further potential explanation for the asymmetry of the effects of positive and negative income changes on attendance is habit formation. Through attending church more often, people may develop a taste for participation in religious activities or being part of a religious community.

The online Appendix contains a number of robustness checks. In Table A3, we show that none of the background variables we include as controls exhibit a discontinuity at the threshold by repeating the above regression discontinuity approach with the controls as dependent variables. In Table A4, we investigate whether the results are sensitive to the choice of bandwidth. As we gradually reduce the bandwidth from roughly 4.5 points in the unrestricted sample, significance levels naturally fall as standard errors rise with the shrinking sample size, but effect sizes do not change dramatically. We conclude that our results are robust to our choice of sampling frame. Finally, it is interesting to ask whether higher income makes families more religious or simply increases their participation in social and communal activities in general. Our survey data contains information on participation in 11 different communal activities over the past 12 months, including communal childcare, communal construction, and fundraising activities. In Table A5 we show average participation rates and the effect of income on participation for each of these activities. None of them is significantly affected by income.

## V. Concluding Remarks

Not much is known about how income affects religiousness at the individual level. We use a change in the eligibility for a government cash transfer in Ecuador as a source of exogenous income shocks. We find that a moderate difference in income has sizable and significant effects on the frequency with which families attend religious services and on the kind of church they attend. Higher income leads to a higher frequency of religious service attendance and increases the likelihood that a family joins an Evangelical community. These effects stem exclusively from above average religious families. On the other hand, income has no effect on how religious people rate themselves to be.

Higher income may increase the utility of participating in church activities by increasing status within the community, possibly through donations. Evangelical churches offer a more intense worshipping experience in smaller groups. Apart from a higher commitment in terms of time, members are also encouraged to give part of their income to the church. For religious people attracted by these churches, the cash transfer may therefore lift resource constraints for membership.

Cross-country studies generally find that national income is negatively associated with religiousness although the direction of causality is often unclear. Our results

show that it is far from clear that higher income leads to lower religious participation at the individual level. A possibility for reconciliation is offered by findings of a negative association between education and religiousness. As societies develop, not only do average incomes rise, in the long-run people also tend to become more educated. Our study looks at individual income shocks and measures effects over a period of two years and therefore isolates the effect of income from other effects of economic development.

Nevertheless, our results indicate that we should not automatically expect other societies to follow the European example and become more secular as they grow richer, at least not in the short to medium term. Rather, church membership and attendance seem to be similar to membership and participation in social clubs. They are costly in terms of time and money and, for the households in our sample, have a positive income elasticity.

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