The persuasive role of information: The case of EITC reminders by mail

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Abstract
While the cost estimates of reminders by mail are readily available for policy-makers, estimation of their benefits requires thoughtful analysis. For this purpose, we used data about earned income tax credit (EITC) reminders by mail which the Israel Tax Authority sent to eligible applicants during the period of 2008–2011. Using a framework of repeated letters, we identify those who applied for the EITC in response to such a reminder. Using an analytical framework of learning, we characterised different types of reactions to these reminders, with an emphasis on their role in persuading individuals to apply. We estimate the persuasive role of receiving reminders – which prompts an increased uptake – at 1.5%. Using independently-performed questionnaires, we characterise the ‘letter-dependent’ population, defined as those who depended on receiving reminders for requesting the EITC transfer. We find that these applicants were older; they received a lower transfer, they had a fair level of knowledge of the programme and they did not actively seek out information about the amount of the expected transfer.

Keywords
Earned income tax credit (EITC), information in public administration, Israel Tax Authority, policy learning, reminder letters

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Introduction

A well-known feature of transfers to the socially disadvantaged is that many targeted people fail to receive their benefits (Currie, 2006). The initial stage of the earned income tax credit (EITC) in the United States and the newly-introduced EITC system in Israel are good examples of this phenomenon, with estimated incomplete uptake rates of 30% and 50%, respectively.¹

In this paper, we benefitted from a unique database of EITC reminders by mail in Israel. This allowed us to track a person’s behaviour over a period of four consecutive years, during which they received letters and had an opportunity to decide whether to apply for the transfer. Since these reminders were sent directly by the Israel Tax Authority² to candidates for the EITC, the recipients’ uncertainty about eligibility was relatively low: the first letter constituted a clear incentive for applying for the transfer. Using the Tax Authority’s database of reminders by mail allowed us to check the impact of four consecutive communiqués of this type. This was based on letters sent annually to eligible recipients during the first 4 years of implementation of the programme. By using a model of learning, we were able to differentiate between those who waited for the letters in order to apply and those who did not. Thus, we were able to produce an estimate of the persuasive role of the information. This is important, since it ultimately quantifies the direct contribution of receiving reminders on an increase in uptake, as opposed to the informational content of the letters: this, too, is key, but can be provided through other policy tools (e.g. in the media). Distinguishing the varying effectiveness of different policy tools is an important contribution for facilitating a cost-benefit analysis for policy-makers.³

The paper is organised as follows: in the next section we provide a short literature survey on the low uptake of benefits and public services in general, governance through persuasion, the importance of reminders and information as tools for increasing the rate of uptake and the quantitative importance of reminders for increasing uptake. In addition, and since we based our study on a model of learning, we provide a survey of types of learners. In the following section, we give a general explanation of the EITC in Israel and a description of the timeline and content of the letters sent to potential recipients; next, we show the impact of the letters on claims and analyse the learning patterns of individuals. In the subsequent sections, we produce an estimate of the impact of reminders by mail on the rate of uptake. Finally, we summarise and offer a conclusion in the last section. An appendix shows the text of the reminder used in Israel.

Literature survey

Low uptake of benefits and public services

A low rate of social programmes uptake is a well-known, documented fact for the countries using an EITC programme. Scholars generally cite three explanations for this: lack of information, stigma and the cost of the transaction (Currie, 2006).
Coe (1983) emphasised lack of information as a significant explanation for the unsatisfactory rate of uptake of the food stamps programme. Although this may be an important contributing factor to the phenomenon, it has become quite clear that it provides only a partial explanation for incomplete uptake. In an attempt to quantify its relevance, Daponte et al. (1998) used a randomised experiment. Their study showed that 35% of those eligible had applied for food stamps after they had received information, while 65% did not apply, even after they had been informed of their eligibility.

Moffitt (1983) modelled the decision to materialise social benefits in a cost-benefit framework. According to his analysis, stigma was a much more prevalent explanation for low rates of uptake. This direction was analysed further by Hancock et al. (2004). They investigated the patterns of uptake of the three main means-tested benefits to which pensioners may be entitled in Britain: Income Support, the Housing Benefit and the Council Tax Benefit (CTB). The researchers found that, although 36% of the pensioners in the sample failed to claim their entitlement to at least one of these benefits, only 16% of non-claimants failed to claim amounts worth more than 10% of their income. Thus, according to their findings, uptake is high where the entitlement is high.

Attempting to estimate the relevance of transaction costs, Warlick (1982) used small cities as a proxy for higher administrative costs. According to his findings, the rate of uptake in these cities is lower than elsewhere. Daponte et al. (1998) showed that half of the households that did not apply were eligible for modest monthly benefits (fewer than US$10), which is clearly influenced by the administrative costs involved upon receiving these benefits. This point was also documented by Dorsett et al. (1991), Koning and Ridder (1997) and Bitler et al. (2003). Brien and Swann (1999) showed in cross-sectional data that requiring income documentation of WIC applicants reduced the rate of their participation. Bitler et al. (2003) found that requiring more frequent visits to the WIC office also reduces participation, while Chatterji et al. (2002) found that restricting the types of foods that can be purchased (i.e. reducing the value of the benefit) discourages uptake. Hence, even in smaller programs, the transaction costs relative to the benefits appear to be important determinants of uptake.

**Persuasion as a form of governance**

The EITC in Israel is a government subsidy for low-income earners who apply for it by filling in a form. One important question is whether the government’s involvement in building a transfer system is sufficient: should the government make active efforts to increase the uptake? This issue belongs to a strand in the literature known as ‘persuasion as a form of governance’.

Bell et al. (2010) look at persuasion as a governance strategy based on a social process, often found within markets, hierarchies and networks. They stress that efforts to govern through persuasion are long-standing: governments seek to persuade people to smoke less, eat more healthily, drink less alcohol, save water,
recycle their rubbish, report suspected terrorists, engage in voluntary work, pay their taxes on time, use public transportation, take regular exercise, cut their carbon emissions, undertake regular medical examinations, read to their children at night, gamble responsibly, eschew drugs and save for their retirement. In the present context – and given the incomplete uptake mentioned in the previous subsection – the act of persuasion is related to the basic issue of materialising citizens’ social rights.

Other relevant literature in public administration relates to the issue of framing. A low uptake may be related to the way in which low-income earners perceive the system. Druckman (2001) stresses this point with regard to citizens’ political judgement. For example, the success of different social policies for combatting a particular disease can depend on whether these are framed in terms of saving lives or losing them. In the case of the EITC, the issue of framing is twofold: (i) the way in which the EITC should be promoted to avoid stigma, and (ii) how the letter should be written to maximise uptake.

While these two issues are not covered directly in this paper, our finding that letters do have an impact is important in motivating future behavioural experiments related to reminders by mail. For example, Nelson and Oxley (1999) undertook laboratory experiments showing that people changed their attitude to controversial issues as a function of framing. In this study, one important issue that future research should study is whether a specific set-up for implementing the operation to remind potential applicants by mail might generate a result of increased uptake.

The impact of letters and information on the rate of uptake

The difference between the informative and persuasive content of devices has been extensively analysed and discussed in the area of marketing, as explained by Leffler (1981), Hurwitz and Caves (1988) and Narayanan et al. (2003). This literature shows that persuasive tools are designed ex-ante so as to stress the characteristics of a product that may convince consumers to purchase it. In the context of our study, the letters constitute a useful device, since they stress the need for applying for eligibility as a last call, emphasising the persuasive aspects of the information provided.

Bertrand et al. (2006) emphasise the important role of persuasion in helping the poor. A relevant example is the low rate of bank use among the low-income population. Because of a limited history of banking among family and friends, the poor may have little information about what some of the benefits of a bank account may be. They may also find themselves under emotional stress and cognitive overload. This suggests potentially extensive, positive welfare effects from well-designed information campaigns regarding the benefits of banking one’s earnings. Although this may appear to be obvious, the idea that the poor may be operating without complete information about the financial environment they are facing or under emotional and cognitive duress is not part of the standard
economic model, which assumes that information is easily accessible and easily understandable.

The literature on influence and persuasion also offers some guidance regarding possible best practices for increasing the efficacy of information campaigns. Studies designed to alter entrenched behaviours (involving, for example, dietary or health practices) have found that information presented in the context of small discussion groups is substantially more effective than the same information conveyed individually through lectures. Even when the information is persuasive, when it is presented individually, it fails to counteract the pressures of group norms. Conversely, when such information is introduced in the context of newly-established groups, it allows new norms to be created and communicated through declared intent and by public support. This suggests that there are potentially large social gains in organising more discussion groups in less-advantaged areas, which would focus on the costs and benefits of banking and the way to open and manage a bank account.

The cognitive literature also suggests ways to improve responsiveness to the information being provided. Because of the asymmetry in the perception of gains and losses, in particular, it might be expected that a marketing frame that stresses the losses associated with not banking one’s earnings would be more effective than an alternative frame that stresses the benefits associated with banking.

It is worth noting that reminders by mail have characteristics that are in line with these features: they target the individual and are therefore likely to capture his/her attention; furthermore, they stress the losses related to a failure to apply for the offered benefit since they are sent at the last possible date for application.

The importance of reminders

Thaler (1990) stresses the role of ‘mental accounts’ as a decisive factor for explaining the behaviour of economic agents. Such an example is a person’s behaviour toward Individual Retirement Accounts (IRA): a rational maximiser would create an account at the earliest possible date so that the income would be benefit from its interest return for as long as possible. According to the American law, however, tax payers may make tax-deductible purchases for a given financial year until April 15 of the following year. Evidence shows that nearly half of the IRA purchases are made between January and April of the following year, i.e. at the latest date allowed by the law for materialising deductible purchases. In this case, clearly, the date stipulated by the law acts as a reminder.

Reminders are a well-known tool for increasing uptake in a diverse range of fields. In medicine, for example, it is well known that patients fail to adhere to medical treatment, despite the fact that it alleviates their problem. Van Dulmen et al. (2007) show that a reminder is an important tool that can be used to deal with this issue.

Recently, the effectiveness of reminders was tested by experiments in behavioural economics. Karlan et al. (2010) showed the setting, design and
implementation of three field experiments performed by banks in Peru, Bolivia and the Philippines. The three banks targeted the working poor and lower-middle class for the products they had chosen. The experiments succeeded in demonstrating two predictions: (1) that reminders increase savings and (2) that reminders mentioning a particular planned future expenditure will increase savings more than reminders that do not mention the expenditure. In each experiment, after the account was opened, the bank randomly assigned clients to either receive a reminder or not. The results showed convincingly that the clients who received reminders changed their behaviour compared to those who did not.

In the field of social programmes, Bhargava and Manoli (2011) performed an experiment in collaboration with the US Inland Revenue Service (IRS), based on sending reminders about the EITC to eligible recipients. They showed that the mere receipt of a letter increased residual uptake by 0.14, as compared to an initial response of 0.41 (approximately one-third). Since the second mailing from the IRS was a reminder about the original letter, this experiment implies that the simple receipt of a reminder acted as a persuasive device for those individuals.

Learning

An important tool that we used in this study for distinguishing among people who reacted differently to the reminders by mail was learning. While we do not aim to build a theory of learning for the different types of personality who received such reminders, we have borrowed from the psychological and educational literature in order to define the different personality types reacting to the reminder mechanism.

Learning theory may be described as a body of principles advocated by psychologists and educators to explain how people acquire skills, knowledge and attitudes. Over the years, many theories have been proposed to explain this phenomenon. Although psychologists and educators are not in complete agreement, most do agree that learning may be explained by a combination of two basic approaches: behaviourism and cognitive theories.

Barbe et al. (1979) defined the basic principles of learning based on previous analysis of the concrete versus the abstract, and active versus reflective learning. They built a theory based on the superiority of perceptive learning – which includes frontal learning – and the use of movement and oral learning.

Later, different authors defined different learning styles. McCarthy (1990) mentions four types: (1) the innovative learner, who prefers participative and practical learning; (2) the analytical learner, who prefers learning through informative sources and experts’ dissertations; (3) the common-sense learner, who focuses on the way things work and (4) the dynamic learner, who likes simulations and creates his/her own dynamic learning process.

Endorf and McNeff (1991) state that the five types of adult learners are (1) pragmatic, goal-oriented; (2) affective; (3) transitional; (4) integrated and (5) risk-taking. Appropriate teaching strategies are (1) clear objectives, with relevant
content; (2) personal interaction; (3) opportunities to discuss experiences through mentoring; (4) opportunities for self-direction and (5) innovation. Vincent and Ross (2001) provide an overview of learning styles, personality types and multiple intelligences theories. They list and describe selected testing instruments that are available on the Internet and provide strategies for teaching and learning, considering the various learning styles.

Note that these types are analysed in the literature in order to fit precise educational tools. In our study, they are used to define a person’s reaction to reminders by mail in the framework of a learning process. An interesting line for future research may be to try to design the optimal mechanism for reminders so as to generate effective learning by the recipients.

The EITC in Israel and the mechanism of reminders by mail

In October 2008, the EITC programme was implemented in certain regions of Israel, with the purpose of enhancing incentives for participation in the labour market. The child allowance reduction that had applied since 2004 was actually substituted by the transfers given through the EITC system: this gradually grew from a pilot project from 2008 to 2010 to a nation-wide programme from 2011 onward, increasing participation from 65,000 to 350,000 people. The uptake rate of the programme – which was around 50% during the initial period – is gradually increasing. In 2013 the transfer to working mothers increased by 50%, which – in addition to other factors – resulted in an increase in the rate of uptake of up to 62%.

The legislative process was quick and left no time for individuals to learn about the system, resulting in a relatively low initial rate of uptake – a phenomenon that is quite usual at the beginning of this kind of programme. The EITC is implemented by the Israel Tax Authority and is based on a person’s income in the previous year.

From the beginning, the Israel Tax Authority designed a reminder in four languages: Hebrew, Russian, Arabic and Amharic (Ethiopian); given the flow of immigration and the minorities living permanently in Israel, these languages cover the target population fairly well. While this design assures that the language will not be an obstacle for participating in the programme, cultural characteristics may affect participation. This certainly seems to be the case, given the heterogeneity of rates of uptake among the different populations. In fact, since the implementation of the programme, the rate of uptake is higher among ultra-Orthodox Jews (70%) than among the Arab population (40%) and the population of East Jerusalem – which is also predominantly Arab (35%). The general rate of uptake was 45% in the first 3 years of implementing the programme and climbed to 52% in the fourth year.

In this paper, we intend to assess the impact of reminders on the varying rates of uptake. In a world of plentiful information, in which there were no differing cultural factors, we would expect to find a full rate of uptake. However, it is
well-known that this is not the case in reality. In the United States, also, the rate of uptake rose substantially from 30% in the 1980s to 75% by the end of the 1990s, after a substantial – if gradual – increase in the amount of the EITC transferred. Considering this phenomenon, reminders by mail can strongly influence the rate of uptake, since they may provide a trigger to respond – a decision that would otherwise be postponed, in view of the hard daily life of the potential participants. Given the timetable for receiving the transfer, postponing one’s response implies not receiving the credit at all, thus reducing the rate of uptake. The paper concentrates on the potential persuasive role of information: does the reminder make the difference between applying and not applying for the EITC transfer?

For this purpose we used administrative data from the Israel Tax Authority, which receives computerised files from all employers annually, with details regarding employees’ income. At the end of each financial year, these data – combined with those from other sources (the National Insurance Institute, the Land Registry and the Israel Ministry of Interior) – allow the ITA to obtain a full picture of the potential participants, according to their income, age, the number and ages of their children and ownership of assets. These attributes are needed to determine their eligibility for the EITC (see the next section). The Tax Authority uses these data to create a list of potential participants, which is used later in the year to remind people about their right to claim the EITC. Since the recipients’ reaction to this letter is highly significant, we shall analyse the pattern of the claims, in order to learn about the impact of the reminders on the rate of uptake.

**The mechanism of reminders by mail**

According to the EITC law, those who are eligible must fill in a form at the post office; this is then sent to the Israel Tax Authority, which checks whether the applicant’s situation suits its criteria. The law stipulates the way in which the EITC is paid, according to the time of application: those who apply at the beginning of the budget year receive the transfer in four equal payments (typically in July, October, and the following January and April), as an attempt to imitate the pattern of receiving permanent income rather than a ‘windfall’; those who apply in the second quarter of the financial year receive the same amount in three payments only; applicants in the third quarter receive their EITC in two equal payments. Those who apply at the end of the financial year receive the entire amount in one payment. If people do not submit an application until December, they generally lose their right to do so, and there are few exceptions.

Establishing the programme in October 2008, the Israel Tax Authority sent the reminders to eligible people in November of that year. In the following years, they were sent in September, as shown in Table 1.

We noted that the common factor of the sending date was that it was sent at the end of the eligibility period and thus potentially constituted both a reminder and a persuasive device. The reason for choosing such a timetable is complicated. On the one hand, the Tax Authority receives more accurate information as the end of the
The impact of reminders and people’s learning patterns

The reminders and the programme uptake

Figure 1 shows the impact of the reminders on the number of people applying for the EITC (the reminders are explicitly marked above the bar of the month in which they were sent). From this figure it is evident that after receiving the letter in September (for 2008, 2009 and 2010), many people applied to the Tax Authority, causing a significant increase in both the number of applicants and the share of applicants who were actually eligible to receive the benefit.

Note, however, that the population applying after receiving the reminder was heterogeneous: some were applying for the first time, while others were applying...
after having done so in the past; some had not been aware of their eligibility. In order to deal with this issue, we built a framework of learning, using data about the letters received over a period of 4 years, from 2008 until 2011.11

The population selected for the analysis consisted of applicants who (1) were eligible for the EITC, based on each of the consequent income years 2007–2010; (2) actually applied for the EITC in each of the corresponding years – with or without receiving a letter. The total number of people who fulfilled these conditions was 5,619.

A learning framework

We assumed that people who received reminders in all 4 years and applied for the EITC took part in a learning process that was influenced by previous action. Thus someone who applied for the EITC after receiving a letter could potentially learn about their eligibility and consequently might not need a reminder the following year. Note that, for this reason, it is important to look at the eligible population who applied for the transfer, since those who did not apply (for example, they knew that they were ineligible because they were employed in the shade economy, and the Tax Authority did not have their updated data) or who applied without actually being eligible, were not necessarily part of this learning process.

Accordingly, we looked at a person’s behaviour in applying for the EITC: did he/she apply before or after receiving the reminder? When performing the analysis, we kept in mind the possibility that the letters were not sent to people who applied on their own initiative before the date of sending the reminders. We assumed that people who applied before receiving the letter may have learned from their past experience; if they applied after receiving the reminder (given that they had received one in the past), that means that the learning process was not strong enough or even took the undesired direction of teaching them to wait for a letter. Using these factors, it is possible to build a framework of learning patterns according to observed behaviour after 4 years of implementing the reminder mechanism.

Table 2 shows the possible types of people, according to their learning pattern. In this table, the word ‘yes’ means that an individual applied for the EITC after receiving a reminder; the word ‘no’ means that they did not need a reminder to apply: i.e. they applied for the benefit before receiving a reminder.

People who needed a reminder after having applied before without one are defined as subject to ‘distraction’, which can be frequent (if it happens repeatedly) or slight (if it happens only once). If they needed a reminder after applying twice for the EITC without having received a letter, they are defined as ‘forgetful’. Someone who did not need a letter the first time, but always needed one in following years, is subject to a ‘regression’, according to our analysis. Two additional patterns can also be defined: people who learn and those who depend on reminders for applying. Those who learn initially needed a reminder and then continued to apply for the EITC until the end of the sample dates without one. We found both ‘first-time learners’ and later learners (‘second-time’ or ‘late’). People who were
dependent on reminders were those who, at the end of the sample dates, never did learn to apply without a receiving a reminder (‘letter-dependent’). Some of them had already learned to apply by themselves, but still waited for a letter (‘letter addicts’).

**The dynamic learning process**

The different types described above are defined ex-ante among people who applied for the transfer in all 4 years. If learning is random, then we should not see a convergence of the different types and groups should continue to change in substantial terms until the end of the sample.

However, if learning is not random, and people tend to be of a particular type from the very beginning, by the third and fourth stages, we should expect the types who are subject to the polar learning characterisations (‘first-time learners’ and ‘letter-dependents’) to converge. In other words, if ‘first-time learners’ quickly learn to apply without the need of a reminder, then by the third and fourth stages we expect to see only a few individuals leave this group and switch to groups defined as ‘distraction’. Similarly, if ‘letter-dependents’ do not learn at all and continually depend on receiving a reminder, by the third and fourth stage their number should remain approximately constant, or at least may change to a relatively small degree.
In the next section, we shall analyse the dynamic pattern of learning. In order to evaluate whether learning is random, we shall concentrate on the extreme patterns of learning – ‘first-time learners’ and ‘letter-dependents’ – to see whether there is convergence in the number of people who belong to these types.

**An estimate of the impact of reminders on the rate of uptake: The persuasive role of information**

In this section, we apply the framework shown in the previous section by looking at the population who received reminders in all 4 years of the sample and applied for the EITC – sometimes before receiving the letter and sometimes after receiving it.

**Learning types**

Table 3 shows the number of people in each different type. It is interesting to note that most groups constitute less than 5% of the population, except for two large groups: the ‘first-time’ learners’ and ‘letter-dependents’. As explained above, ‘first-time learners’ are those who applied for the EITC after receiving a reminder for the first time and continued to apply for the benefit each year on their own initiative; ‘letter-dependent’ people are those who needed a reminder every year before applying. These types comprise 34.5% and 14.6% of the sample, respectively.

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second-time learners (STL)</td>
<td>306</td>
<td>5.4</td>
</tr>
<tr>
<td>Late learner (LL)</td>
<td>331</td>
<td>5.9</td>
</tr>
<tr>
<td>Very late learner (VLL)</td>
<td>257</td>
<td>4.6</td>
</tr>
<tr>
<td>First-time learners (FTL)</td>
<td>1940</td>
<td>34.5</td>
</tr>
<tr>
<td>Slight distraction 1 (SD1)</td>
<td>275</td>
<td>4.9</td>
</tr>
<tr>
<td>Slight distraction 2 (SD2)</td>
<td>257</td>
<td>4.6</td>
</tr>
<tr>
<td>Forgetful (F)</td>
<td>228</td>
<td>4.1</td>
</tr>
<tr>
<td>Frequent distraction 1 (FD1)</td>
<td>86</td>
<td>1.5</td>
</tr>
<tr>
<td>Frequent distraction 2 (FD2)</td>
<td>149</td>
<td>2.7</td>
</tr>
<tr>
<td>Regression (R)</td>
<td>230</td>
<td>4.1</td>
</tr>
<tr>
<td>Frequent distraction 3 (FD3)</td>
<td>198</td>
<td>3.5</td>
</tr>
<tr>
<td>Frequent distraction 4 (FD4)</td>
<td>218</td>
<td>3.9</td>
</tr>
<tr>
<td>Letter addict 1 (LA1)</td>
<td>221</td>
<td>3.9</td>
</tr>
<tr>
<td>Letter addict 2 (LA2)</td>
<td>101</td>
<td>1.8</td>
</tr>
<tr>
<td>Letter-dependent (LD)</td>
<td>822</td>
<td>14.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5619</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
All other groups make up a small percentage of the total. Note that there is a small bias in the size of groups toward learning: ‘second-time learners’, ‘late learners’ and ‘very late learners’ constitute 5.4%, 5.9%, and 4.6%, respectively, of the total population sample and are among the largest groups, compared to all the other groups (except for ‘slight distraction’, which comprises 4.9%).

As a first attempt to summarise this analysis, we can say that people tend to learn after receiving reminders, since ‘first-time learners’ constitute the largest group compared to all other groups, and the groups characterised by learning are slightly larger than those who evince ‘distraction’ or ‘letter addiction’. This last statement is not true for ‘letter-dependents’, however, which turned out to be a large group meriting separate analysis: we shall carry this out in the following sections.

One of the problems in analysing these data is that we did not have a similar population that might serve as a reference for understanding the different learning patterns. However, assuming that learning is similar in different contexts, we compared the different groups of our sample to a population that was also subject to a learning process: university students in a world of inflating grades, as analysed by Bar et al. (2009). While this population was completely different to that of our sample, it did have a common characteristic: the information received at each stage influenced its subsequent behaviour.

The first definition is related to the size of the groups and, in particular, whether they are in line with a distribution that we would expect ex-ante; for this purpose, we looked at the distribution of grades at universities. Despite the difference between the populations, it is well known that learning is characterised by standard normal distributions. We therefore looked at the parallel case – the range of grades at university – so as to learn about the normative pattern of the distribution of learning by polar sub-groups, as in the cases of the FTL and LD populations in our sample. According to Bar et al. (2009), about 40% of the distribution is characterised by excellence (grade A). This would be comparable to the best-performance group of our sample – FTL – which applies to 34% of the population sample; this percentage would correspond approximately to that presented by Bar et al. for the period 1990–1997. The other sizeable population presented in our analysis is the LD group, 14.6% of the population sample; this corresponds to the worst performers in the parallel university population, formed by grades C–F. It is interesting to note that this number roughly coincides with the 16% group presented by Bar et al. (2009) for grades C–F (around the year 2000).

A second relevant analysis is dynamic learning, which is defined in the next subsection.

**Dynamic learning**

The framework outlined earlier allows us to analyse the dynamic pattern of learning. By looking at the difference in the number of people in the late stages (the third and fourth ones), we can evaluate whether the number of people tends to
converge – i.e. they are not switching to another category, implying that learning is still taking place (remember that this cohort comprised the same people in all 4 years of the sample). If the number of people in the last two stages stabilises, this means that the learning process ended, and we can categorise the people who appear in this slot as a particular type. For example, if we look at the FTL in the third and fourth stages, a fixed number of agents would imply that this group learned after receiving the first reminder without any need for further letters. On the other hand, if the difference between the number of people between the third and fourth stages is high, this means that the learning process continued and another step is needed in order to estimate the permanent number of people of this type. Ideally, if the difference between the number of people at the third and fourth stage is zero, we would view this as a reflection of the final stage of the learning process.

Similarly to the previous section, we used the study by Bar et al. (2009) to analyse normative patterns of learning. These authors show that there are two different periods for grades in their sample, which must be taken separately because of inflation of the grades. According to their methodology, we analysed separately the learning process of the two groups (parallel to grades A and C–F for FTL and LD, respectively) during the two sub-samples (1990–1997 and 1998–2004), so as to have a normative scale for judging the dynamic pattern of learning. As mentioned above, while the people considered in these two periods were not the same, their comparison is interesting, since they belonged to an identical group in terms of performance. Because of the inflation of grades, group A rose between these two periods, since the students were searching for courses with higher grades; in contrast, groups C–F declined, since individuals belonging to this group abandoned it in search of courses with higher grades. Since our focus was on learning, we took the figures of the later period (1998–2004), which implied a higher degree of learning concerning inflated grades. Next, we looked at the highest deviation during the period among each group, and calculated its ratio to the average size of the group during the same sample period (1998–2004). We found that the highest deviation was 15.3% of the average for grade A (which roughly corresponds to FTL), and 25.3% of the average for grades C–F (which corresponds to LD).

Figure 2 shows the absolute value of the average difference of people with regard to the third and fourth rounds of reminders, as a percentage of the total number of people in the group. We determined this number by the following method: firstly, we calculated the difference between the number of people at the third stage as compared to the second, and computed the percent as a share of the people in the group at the second stage. The difference was clearly negative: i.e. some individuals left the group and some stayed. Secondly, we calculated the difference between the number of people at the fourth stage, as compared to the third (which is also negative), and computed the percentage as a share of the people in this group at the third stage. Finally, we calculated the average of these two percentages.

It is interesting to note that two groups clearly differ from the rest: the ‘first-time learners’ and ‘letter-dependents’. The average percentage differences of these two
groups are less than 30%, and these are the lowest, as compared to all the other groups. Of particular interest is the average difference of ‘first-time learners’ – 12% – which, although far from zero (which would imply full convergence), – is similar to the number calculated using the data by Bar et al. (2009) – 15.3%. Concerning ‘letter-dependents’, the difference is low compared to all the other groups, but it is still relatively high – 26%. Note that this percentage is similar to the figure calculated according to Bar et al. (2009) for a parallel category (grades C–F) – 25.3%.

The fact that the polar groups of learning have the lowest difference among the varying types supports our conclusion that the learning types constitute a strong reference: some people learned quickly (the ‘first-time learners’) while others did not learn at all (‘letter-dependents’). The fact that these differences are still far from zero means that further rounds of reminders would result in producing better estimates of the quantitative importance of these two groups.

While the spikes in applications following the receipt of reminders provide convincing evidence of the effect of the letters (because there were four such occasions rather than only one reminder by mail, it was unlikely to be a random effect), in theory we still do not really know whether the letters themselves caused the increases in applications for tax credits or other factors. It is important to note that the Jewish New Year (which may cause people to decide to wait for the start of the year) was not a factor: in two instances (2008 and 2009) the holiday occurred before the last date of application and in the other two years (2007 and 2010) it occurred after the last date of application.

In order to further analyse the impact of the reminders, we looked at the behaviour pattern of applications in the fourth round, i.e. at the maximum point of learning, with regard to the ‘first-time learners’ and the ‘letter-dependents’. This is shown in Figure 3.

From this figure we learn that the ‘first-time learners’ were not influenced at all by the reminders. The highest number of applications occurred in March, in the
first quarter, with a declining pattern afterwards. Note also that in September, the month in which the letter was sent, this group did not respond.

In complete opposition to this pattern, the ‘letter-dependents’ responded instantly to the reminders: most of the applications from this group occurred immediately after their receiving the reminder in September (65%); the rest (35%) applied for the transfer mainly in October and some in November.

**Regression analysis**

We performed a regression analysis of variables affecting application before receiving a reminder: the dependent variable (‘before receiving a letter in 2010’) is a dummy variable that is equal to 1 if the person applied before receiving the letter in 2010, and 0 otherwise.¹³

The observations are based on people who applied for the transfer in all 4 years and received at least one reminder during the time period of the sample. The explaining variables are:

- **Age_2007** – a person’s age at the beginning of the sample. Ex-ante it is difficult to know the expected sign of the coefficient: younger workers may be more dependent on the transfer, but older workers may have more experience in materialising social rights.
- **Age_squared** – this variable was introduced in order to check a non-linear relationship, and particularly a declining (rising) propensity to apply for the EITC before receiving a reminder.
- **Female** – a dummy variable that takes the value of 1 if the applicant is female, and 0 if they are male; assuming that the woman is the second earner (as it is typical

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**Figure 3.** The pattern of applications during the different months of the year in the fourth round of reminders (2010).
in the Arab population) and consequently the household’s dependence on the transfer is lower, we should expect a negative coefficient.\textsuperscript{14}

\textbf{Count\_letters\_2007-2009} – the number of letters the person received in the past (may take values from 0 to 3); since receiving a reminder enhances the person’s knowledge about the programme, this variable takes account of their learning behaviour.

\textbf{Sent\_2009} – a dummy variable that takes the value of 1 if the person applied in 2009 after receiving a reminder; this variable is representative of our previous analysis in which we noted that people who applied after receiving a letter tend to continue to do so.

\textbf{Cum\_amount\_2007-2009} – the total amount of EITC received in previous years; we expected that the higher the amount received, the higher the probability of a person’s applying on their own initiative, before receiving a reminder.

\textbf{Amount\_eligible\_2010} – the amount that the person will receive if they apply. Theoretically, this variable should have a positive coefficient; however, some irregularities in the implementation of the system may have had a negative effect on the results (see the explanation below).

\textbf{High\_trapezoid} – a dummy variable that takes the value of 1 if the applicant is a parent of three or more children and therefore eligible for a higher amount of EITC, and 0 otherwise. This variable represents big families.

\textbf{Pct\_amount\_from\_household\_income\_2007-2009} – The EITC payments received as a percentage of total household income (two earners). It is difficult to set ex-ante the expected coefficient: on the one hand, a high percentage implies that the transfer is more significant, but on the other, it may represent a more vulnerable household (with informational difficulties in applying).

The list of variables we chose relates to the availability of data and does not include unobserved factors such as the recipients’ family background. While the limited choice of variables (according to the available data) maybe associated with endogeneity, the existence of such a bias drove us to be cautious for interpreting causal links among variables.

In order to assess the regression, we first demonstrated its power of prediction. Table 4 shows the number of observations that were predicted correctly, given the different types: 1 when the person applied before receiving a reminder and 0 otherwise. The total number of observations is 5619.

The results show a success of 69.5\% for those who applied after receiving a letter, 74.5\% for those who applied before, and 72.6\% overall. Thus, our regression was successful in predicting the overall attitude toward reminders.

Next, we performed a regression analysis. For this purpose we ran a wide range of regressions based upon a list of potential explaining variables, and chose the variables that were consistent in all performed regressions (as shown in Tables 5 and 8) in the sense that the coefficients are significant in at least one of them.\textsuperscript{15} The results of the first regression are shown in Tables 5 and 6. Since the interpretation of logistic coefficients was not trivial, we further calculated the probability of
### Table 4. Classification table of observations in the first regression

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Percentage correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before_letter_2010</td>
<td>Before_letter_2010</td>
<td>Percentage correct</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>69.5</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>74.5</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
<td>72.6</td>
</tr>
</tbody>
</table>

### Table 5. What are the determinants for applying before receiving a reminder?

<table>
<thead>
<tr>
<th>Dependent variable: before_letter_2010</th>
<th>Coefficient (B)</th>
<th>Standard error</th>
<th>Wald statistic</th>
<th>Significance</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age_2007</td>
<td>0.024</td>
<td>0.020</td>
<td>1.430</td>
<td>0.232</td>
<td>1.024</td>
</tr>
<tr>
<td>Age_squared</td>
<td>0.000</td>
<td>0.000</td>
<td>2.680</td>
<td>0.102</td>
<td>1.000</td>
</tr>
<tr>
<td>Female</td>
<td>-0.203</td>
<td>0.069</td>
<td>8.658</td>
<td>0.003</td>
<td>0.817</td>
</tr>
<tr>
<td>Count_letters_2007_2009</td>
<td>-0.039</td>
<td>0.048</td>
<td>0.666</td>
<td>0.414</td>
<td>0.961</td>
</tr>
<tr>
<td>Sent_2009</td>
<td>-1.833</td>
<td>0.084</td>
<td>480.449</td>
<td>0.000</td>
<td>0.160</td>
</tr>
<tr>
<td>Cum._amount_2007_2009</td>
<td>0.00003</td>
<td>0.000</td>
<td>4.201</td>
<td>0.040</td>
<td>1.000</td>
</tr>
<tr>
<td>Amount_eligible_2010</td>
<td>-0.00006</td>
<td>0.000</td>
<td>2.873</td>
<td>0.090</td>
<td>1.000</td>
</tr>
<tr>
<td>Pct_amount_from_household_Income_2007_2009</td>
<td>-0.941</td>
<td>1.228</td>
<td>0.587</td>
<td>0.444</td>
<td>0.390</td>
</tr>
<tr>
<td>High_trapezoid</td>
<td>-0.095</td>
<td>0.081</td>
<td>1.369</td>
<td>0.242</td>
<td>0.909</td>
</tr>
<tr>
<td>Constant</td>
<td>1.148</td>
<td>0.431</td>
<td>7.108</td>
<td>0.008</td>
<td>3.151</td>
</tr>
</tbody>
</table>

**Nagelkerke R squared**: 0.242

### Table 6. The change in the probability of applying before receiving a reminder

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Odds ratio</td>
<td>4.97</td>
<td>4.95</td>
<td>4.06</td>
<td>4.78</td>
<td>0.76</td>
<td>4.98</td>
<td>4.94</td>
<td>4.92</td>
<td>4.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability (%)</td>
<td>83.25</td>
<td>83.19</td>
<td>83.23</td>
<td>82.70</td>
<td>43.33</td>
<td>83.29</td>
<td>83.17</td>
<td>83.12</td>
<td>81.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔProbability (%)</td>
<td>-0.06</td>
<td>-3.0</td>
<td>-0.56</td>
<td>-39.9</td>
<td>0.04</td>
<td>-0.08</td>
<td>-0.13</td>
<td>-1.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*aIncluding the impact of squared age.*
applying before receiving a reminder valued at the median value of the different variables. Then, by using the odd ratio, we demonstrated the marginal contribution of each variable to this probability (as shown in Tables 6 and 9).

The results show that not all variables had an impact. In particular, the age and age squared were not significant at 10%. As expected, being a woman significantly decreased the probability of a person’s applying for the transfer before receiving a reminder. The most interesting results were obtained for learning and economic incentives. With regard to learning, the number of letters received in previous years was not significant at 10%, but the most recent year of application – 2010 (income of 2009) – was very significant (at 1% significance level); i.e. self-motivated applicants tended to continue to apply on their own initiative, and those who waited for a reminder also did so the following year. This result stresses that the persuasive role of the reminders, since – on average – many people still need one in order to claim their rights. We shall analyse this point further in the next sub-section.

With regard to financial incentives, two variables were significant: the cumulative amount in 2007–2009 (at 5% significance level), which was positive, and the amount received in 2010 (at 10%), which was negative. We interpreted this result in the following manner: the recipients knew the amount they had received in previous years and so we expected a positive correlation. A possible explanation for the negative coefficient of the amount received in 2010 is that, in that year, all the eligible applicants received the EITC based on only part of the months they actually worked, and the one sector that received a full year’s worth of the transfer was women with small children (up to 2 years of age). While the coefficients were low, the fact that those for 2007–2009 were positive and significant means that financial incentives do play a role in increasing uptake.

In order to facilitate the interpretation of the coefficients, we show in Table 6 the joint probability for applying before receiving a reminder, valued at the median value of the different variables. Then, we show the marginal contribution of each variable to this probability.

The results show that the single variable that increased the probability of applying before receiving a reminder was the cumulative amount received in previous years. The highest impact on the probability was for people who had received a letter in previous years: for them, the probability of applying before receiving a reminder was lower by 40%, which clearly shows that the letters have a persuasive effect on these people.

In order to increase the sample, we looked at the applicants in 2009 and 2010, bringing the number up to 17,889 individuals. Table 7 shows that the overall prediction rate in this new sample is 60.5%.

We performed the same regression (as shown in Tables 5 and 6) using the enlarged sample. The results are shown in Table 8. In this regression, age had a positive and significant impact for application, with a non-linear pattern implying a reduction in marginal application for those of high ages. Here, too, we see that people who applied after receiving a reminder tended to repeat their behaviour, since the coefficient is negative.
As before, financial incentives played an expected role: the amount received was positive and significant at 1% in 2009 and at 10% in 2010. For the first result, it continued to be significant (at 10%) when computed as a percentage of household income. This was not the case for the percentage of household income in 2010, where the coefficient was negative. As before, we have interpreted this result as reflecting the statistical characteristics of applicants, and particularly mothers with small children.

As in our previous regression, we show in Table 9 the implications for the probability of applying before receiving a reminder. Our base case scenario is based on the median value of the variables and so the probability is 74.4%. In this regression, four variables increased the probability of applying before receiving a letter: the individual’s age, the amount received in the previous year, the amount received the same year and the percentage of household income in the previous year. The percentage of household income the same year and the highest part of the trapezoid had a negative effect on the probability, probably because of composition

### Table 7. Classification table of the second regression

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Before_letter_2010</th>
<th>Percentage correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before_letter_2010</td>
<td>0</td>
<td>5,269</td>
<td>3,162</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3,911</td>
<td>5,547</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 8. A regression for the sample of applicants in 2009 and 2010

<table>
<thead>
<tr>
<th>Dependent variable: Before_letter_2010</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Sig.</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age_2010</td>
<td>0.065</td>
<td>0.010</td>
<td>43.459</td>
<td>0.000</td>
<td>1.067</td>
</tr>
<tr>
<td>Age_squared_2010</td>
<td>-0.001</td>
<td>0.000</td>
<td>42.272</td>
<td>0.000</td>
<td>.999</td>
</tr>
<tr>
<td>Female</td>
<td>-0.219</td>
<td>0.037</td>
<td>34.803</td>
<td>0.000</td>
<td>.804</td>
</tr>
<tr>
<td>Sent_2009</td>
<td>-0.929</td>
<td>0.032</td>
<td>837.909</td>
<td>0.000</td>
<td>.395</td>
</tr>
<tr>
<td>Amount_eligible.2009</td>
<td>0.000094</td>
<td>0.000</td>
<td>35.811</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Amount_eligible.2010</td>
<td>0.000035</td>
<td>0.000</td>
<td>2.872</td>
<td>0.090</td>
<td>1.000</td>
</tr>
<tr>
<td>Pct_amount_from_household_income_2009</td>
<td>1.120</td>
<td>0.670</td>
<td>2.795</td>
<td>0.095</td>
<td>3.064</td>
</tr>
<tr>
<td>Pct_amount_from_household_income_2010</td>
<td>-3.888</td>
<td>0.939</td>
<td>17.146</td>
<td>0.000</td>
<td>.020</td>
</tr>
<tr>
<td>High_trapezoid</td>
<td>-0.149</td>
<td>0.038</td>
<td>15.109</td>
<td>0.000</td>
<td>.861</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.777</td>
<td>0.215</td>
<td>13.113</td>
<td>0.000</td>
<td>.460</td>
</tr>
<tr>
<td>Nagelkerke R squared</td>
<td>0.093</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
effects related to the fact that the highest part of the trapezoid included women with more than three children, including the group of Arab women. Note that the highest effect was for a reminder received the previous year (−21%), which stresses the persuasive role of the letters.

The persuasive role of information

The letter-dependent population would not have applied for the transfer without receiving a reminder. These people were aware of the EITC programme (see the next section) and yet clearly waited for the letter in order to apply for a reason that is yet to be discovered; a first attempt to understand this behaviour occurs in the next section.

This behaviour gives us a unique opportunity to estimate the persuasive role of information. We are talking about a population that learned about the programme and still waited to receive a reminder before applying for the transfer. Moreover, since the letter was sent in the last quarter of the financial year and was a kind of ‘last chance’ call, we believe that it made a difference between application and failure to apply.

By taking the number of letter-dependent people, and dividing it by the relatively stable number of potential applicants, we obtain the result that this population numbers 1.5% among the potential applicants. In other words, the persuasive role of education, based on a conservative estimate, stands at 1.5%.

Given that the administrative costs of operating a mechanism of reminders by mail can be minimised by implementing it at the same place in which the programme is operated (thereby saving the fixed costs), and that the reminders have an additional informative power for all the types of potential applicants, this estimate supports the application of such a mechanism.

Characterising the ‘letter-dependent’ population

In order to understand the populations who were subject to the persuasive role of information, we looked at their characteristics as compared to all the other groups.
Figure 4 summarises these in terms of age, sex and their classification to the EITC amount (people with two children or who were 55+ years-old received lower amounts compared to those earning the same wage who had three children).

We learned that two characteristics of the ‘letter-dependent’ people were clearly different than those of the other groups: ‘letter-dependents’ were older (44-years-old compared to 40 for ‘first-time learners’ and 38 for all the other groups) and they received a lower amount, since 65% had two children or less or were 55+ years-old (compared to 52% and 47% for ‘first-time learners’ and all the other groups, respectively).

Since the monetary incentives are particularly interesting, we show Tables 10 and 11 that compare the amounts which these groups received.

**Figure 4.** Characteristics of the different learning types.

**Table 10.** EITC amounts received by different learning types

<table>
<thead>
<tr>
<th>Eligibility year</th>
<th>Amount of EITC</th>
<th>Pct. diff vs. Mean all groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All groups</td>
<td>First-time learners</td>
</tr>
<tr>
<td>2007</td>
<td>3,021</td>
<td>3,079</td>
</tr>
<tr>
<td>2008</td>
<td>3,263</td>
<td>3,348</td>
</tr>
<tr>
<td>2009</td>
<td>3,359</td>
<td>3,459</td>
</tr>
<tr>
<td>2010</td>
<td>1,467</td>
<td>1,376</td>
</tr>
</tbody>
</table>

Note that the ‘letter-dependent’ people received a lower amount compared to the other groups (especially in 2010), which is in line with the effectiveness of financial incentives: the persuasive effect of the reminders influences a group with a lower financial incentive for applying.

Figure 4 summarises these in terms of age, sex and their classification to the EITC amount (people with two children or who were 55+ years-old received lower amounts compared to those earning the same wage who had three children).

We learned that two characteristics of the ‘letter-dependent’ people were clearly different than those of the other groups: ‘letter-dependents’ were older (44-years-old compared to 40 for ‘first-time learners’ and 38 for all the other groups) and they received a lower amount, since 65% had two children or less or were 55+ years-old (compared to 52% and 47% for ‘first-time learners’ and all the other groups, respectively).

Since the monetary incentives are particularly interesting, we show Tables 10 and 11 that compare the amounts which these groups received.
In order to learn more about the letter-dependent population, we used information based on questionnaires administered in November 2010 in an experiment designed by the Research Group of the EITC. By cross-checking people’s identification from the Tax Authority’s data and that from the questionnaire experiment, we were able to identify 22 individuals who were letter-dependent: these participants answered many questions related to their knowledge of the programme parameters and their reasons for not applying.

The first question we checked was whether this population had learned about the details of the applying process, by looking at their answers to the question: Where should you apply? From their answers it was clear that these people knew this information very well, since more than 90% mentioned the Post Office and the Israel Tax Authority. This was the correct answer.

The second issue we looked at was the person’s knowledge about the parameters of the programme: does the transfer depend on wage? does it depend on a couple’s income? (as noted earlier, there is a limit on the maximum income for a couple); are both members of the couple eligible?, and finally, is the income maintenance amount

<table>
<thead>
<tr>
<th>Eligibility year</th>
<th>t Statistic</th>
<th>Mean difference</th>
<th>Standard error difference</th>
<th>Significance</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variance</td>
<td>4.64</td>
<td>244.7</td>
<td>52.7</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variance</td>
<td>4.60</td>
<td>244.7</td>
<td>53.2</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not assumed</td>
<td>Between groups</td>
<td></td>
<td></td>
<td></td>
<td>22</td>
<td>0.000</td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variance</td>
<td>5.45</td>
<td>283.6</td>
<td>52.0</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td>Equal variance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>not assumed</td>
<td>5.45</td>
<td>283.6</td>
<td>52.1</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>30</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
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provided by the National Insurance Institute offset? About 86% knew the first question to be true, which clearly constitutes evidence of an acceptable level of knowledge about the programme. Regarding the other questions, although close to only 40% gave the correct answer, we noted that a relatively low percentage gave incorrect answers; this means that people did have some basic knowledge about the programme.

Next we checked whether these people were ‘rational maximisers’, in the sense that they spent time checking about their rights and inquiring about the amounts they could receive from applying for the EITC. For this purpose, we checked their answers to the questions on their previous efforts to obtain the transfer. We saw that most people did not make an effort to analyse the information about the possible amount they might receive through the EITC system. It is particularly interesting to see that no ‘letter-dependents’ used the EITC simulator, a device which other types actively used.

In summary, ‘letter-dependents’ tended to be older than the rest, they did not actively seek information before applying for the transfer and they had a lower financial incentive due to the lower amount of EITC that they would receive.

Finally, we cross-checked this information by looking at the data on both the FTL and LD populations as they appear at the questionnaire survey. While the number of observations is much lower, the characteristics that are common to the total population look similar, which increases our confidence about the reliability of these data. The advantage of this analysis is that it provides detailed information about the applicants’ years of education, and particularly about cultural groups (e.g. the Arab and ultra-Orthodox populations) and indices of cultural strength (such as fluency in Hebrew and English). The results are suggestive. We also see here that the LD population was older. In terms of education, the results show that all the sample populations were weak: this was expected, given their income range.

The most interesting characteristics came from the cultural aspects of the data. While the Arab population was a substantial part of the FTL, they did not belong at all to the LD population. The opposite was true, however, for the ultra-Orthodox: more than 40% belonged to the LA or LD populations and none of them were part of the FTL population. Another interesting result relates to second earners: the FTL population looked stronger in economic terms, since both members of the family participated in the labour market (58.8%). This means that they had a strong incentive to participate, since the EITC in Israel is applied at the individual level, and thus they received a double amount of the subsidy. In the LD population, only 25% of the families had two earners. Two additional variables indicating that the FTL was a stronger population were fewer problems with languages (both Hebrew and English) and a higher percentage of house ownership.

**Summary and conclusions**

The approach of governing through persuasion in a situation in which citizens tend not to try to materialise their social rights, leads governments to adopt an active
role in assuring that this does occur. In particular, it calls for finding methods that are efficient in increasing the uptake of social programmes. Reminders by mail constitute a useful tool for persuading people about their rights. There is therefore a need for research on the effectiveness of such reminders and on the desired mechanism for ensuring the maximum efficacy of implementing this idea.

In this paper, we studied the behaviour of applicants for the EITC who received reminders by mail from the Israel Tax Authority. The sample comprised people who applied for the transfer in all 4 years of our sample, and received at least one reminder by mail. Since all of the participants in the sample received a reminder in the first year, 2008, this means that those who received a letter only once applied in subsequent years before the reminders were sent (in all cases, toward the last quarter of the financial year). The choice of this sample is intended to analyse the learning pattern of the applicants, by looking at their behaviour regarding application for the EITC.

Our study shows that 1.5% of the applicants were ‘letter-dependents’ – i.e. they waited for the Tax Authority’s reminder before applying for the transfer. Since this letter played the role of a ‘last call’ (given the time of year in which it was sent), we interpreted this result as a conservative estimate of the persuasive role of information. As the administrative costs of operating such a mechanism can be minimised by implementing it at the same place in which the programme is operated (thereby saving the fixed costs), and given that the reminders have an additional informative power for all types of recipients, our estimate supports the implementation of the mechanism of reminders by mail.

We used the information provided by independent questionnaires that were performed for a sub-sample of the relevant population, and looked at the characteristics of the ‘letter-dependent’ sector. We learned that these people were older and received a lower transfer than the other groups analysed in our sample. We also learned that ‘letter-dependents’ were aware of the main requirements for applying for the EITC, and their knowledge on basic parameters was fairly good. Nevertheless, we found that they did not actively seek information concerning the amount that they would receive upon applying for the transfer. We also learned that cultural aspects were relevant: the ultra-Orthodox sector was highly represented in the ‘letter-dependent’ population. Another characteristic of the latter population was that a lower percentage of households had a second earner, and there was a higher percentage of problems with fluency in languages (Hebrew and English).

A regression analysis allowed us to learn about the reaction of applicants to financial incentives. While the reaction to the amount received in real time was not always significant, we found that the amount received in previous years was positively correlated with applying before receiving a reminder. Receiving a letter in previous years correlates positively with the probability of waiting for one in the following year, a result that emphasises our findings on the persuasive role of the reminders on the applicants’ behaviour. While our results are suggestive, the possible existence of missing variables calls for further tests on the causality of the
relationships we found. Nonetheless, the fact that the regressions were based on a population that received reminders on four occasions allowed us to conclude that reminders by mail are a potentially persuasive device.

This leads us to believe that there is a need for further research on the importance of reminders by mail as a way to improve the fulfilment of citizens’ rights. It would be an interesting experiment to see whether letter-dependent individuals would react differently as a result of the framing (for example, who sends the letter or whether there are voluntary institutions backing the information) or whether it is related to learning.

**Authors’ note**
In order to uphold the privacy rights of individuals, access to the data used in this research requires a special permit from the Data Committee of the Israel Tax Authority.

**Acknowledgements**
We are grateful to the participants in the Public Policy Seminar of the Federman School of Government at the Hebrew University of Jerusalem, and to three anonymous referees who provided excellent remarks and recommendations. Any remaining errors are our own responsibility.

**Notes**
1. In the United States, participation is documented in Hotz and Scholz (2003), Blumenthal et al. (2005) and Plueger (2009). The rate of uptake gradually increased from 30% in the first 5 years of implementation to more than 75% after 15 years as the amounts received climbed to the maximal actual level of 45% of the wage.
2. The institution in Israel that runs the EITC.
3. For example, Ebenstein and Stange (2010) show that inconvenience does not constitute a substantial factor in explaining the uptake.
5. The included cities/localities are Jerusalem (800,000 inhabitants), Ashkelon, Sderot, Nazareth, Upper Nazareth, Ein Mahal, Barkan, Mishmarot, Ein Iron, Arara, Kfar Pines, Kfar Kara, Or Akiva, Hadera, Pardes Hana-Karkur, Netanya, Moawia, Barta and Ein Asala.
6. According to the system, workers who earn a monthly wage of NIS1,800–6,000 may fill in a form at the post office, requesting the subsidy provided by the EITC system, which is managed by the Israeli Tax Authority. The amounts received (at the time of implementation of the programme) ranged between NIS20 and NIS420 per month, according to two categories: fewer than two children (the maximum amount was NIS300) and more than three children (the maximum amount was NIS420).
7. In 2010 and 2011 (based on wages earned for 2009 and 2010, respectively), mothers with children up to 2-years-old received the transfer on a national basis.
8. For instance, that was the case in the United States, as documented by Wiseman (2007).
9. In Great Britain, for example, Storey and Chamberlin (2001) show that 11% of eligible parents do not claim free meals from the public system, due to a lack of awareness of their
eligibility. One-third of pupils and two-fifths of parents mentioned stigma and embar-
rassment as the main reason for this.

10. The three main conditions at the time of implementation were earning a wage between NIS1,800 and NIS6,000 (without exceeding the limit of NIS12,000 for a couple), having children or being 55-years-old or more.

11. According to existing provisions in the law, this right is related to the income generated in the previous year: for example, the transfers paid in 2008 were based on income generated in 2007.

12. Assuming that learning distributions are normal, we can use data from other cases for the purpose of a comparison aiming to characterise different sub-populations.

13. An alternative approach would be to run a panel regression using the data for all years, which would result in an increase of statistical power. However, since our analysis is focused on learning, we define as a dependent variable the action taken by applicants in 2010, which reflects a cumulative learning process.

14. The participation of women in the Arab population is considerably lower compared to those in the Jewish sector (including the ultra-Orthodox, which is a smaller group in which women participate at standard rates). The share of the Arab population is 20%.

15. Examples of variables whose coefficients were not significant are the settlements and the spouse additional income.

16. Because of legal issues related to the definition of local communities eligible for the EITC in 2010, applicants from local communities received only one-third of the annual payments. The one exception was mothers of children up to two years of age, who received the EITC in a national basis and thus received the full yearly amount; this fact increased the impact of mothers of children in that particular year. As explained before, this group includes women characterised by lower participation in the programme.

17. In the questionnaire, only one member of a family was interviewed and thus we know with certainty that each observation represents a family.

References


**Appendix**

*The text of the reminder by mail in 2010*

The following is the text of the reminder:

In the framework of government policy for improving the welfare of low-wage working families, it has been established that an Earned Income Tax Credit will be paid according to certain conditions stipulated by the law.

This payment is intended to help these families and also to encourage their participation in the labour market.

The eligibility and the sum paid is stipulated according to the residential region of the applicant, his/her wage, the number of children in the household, the existence of other sources of income, ownership of the family’s housing and the family’s total earnings.

According to our updated data for your earned income in 2009, there is a reasonable chance that you belong to the population that is suitable to fit the conditions for receiving the transfer.

For receiving further information and checking your eligibility for receiving the transfer, you can call the telephone numbers *4954 (*taxes), 1-222-4954 or 02-5656400, without the need to identify yourself.

In addition, a simulator for calculating the amount of the transfer is available at the Tax Authority Internet site: www.mof.gov.il/taxes.

The application for receiving the transfer must be filled in personally at your earliest convenience at one of the post offices near your residence. To apply, you need bring only your identification card and a copy of a check or an official bank letter confirming that you have an account at that bank under your name.
This letter does not constitute any commitment whatsoever that you will receive the transfer.

We stress that the Tax Authority will check your eligibility only after receiving the application form.

Sincerely yours
The Israel Tax Authority