

# The EITC Program in Israel: employment effects and evidence on the differential impacts of Family vs. Individual-Income Based Design <sup>1</sup>

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June 2019

## **ABSTRACT**

*The Israeli EITC program is based on individual incomes, unlike the EITC programs in the US and the UK, which supplement low-income families' earnings according to the combined family income. Using a large administrative panel dataset of tax and benefit records, and the natural experiment created by the gradual implementation of the program, we find that the absence of interdependence between spouses' benefits curtails the negative employment effects that were found for married women in the US and the UK. We find that an increase of NIS 100 in the monthly EITC amount is associated with a reduction of 0.6 percentage points in the probability of an eligible person to stop working, and that EITC eligibility is associated on average with a reduction of 1- 1.5 percentage points in exits from employment, about 20-25 percent of the exit rate among the relevant populations. We also find that spousal collection of an EITC has no negative effect on employment, except among ultraorthodox women and young (ages 23-35) mothers to newborns (ages 0-2) that are not eligible for the EITC themselves. Finally, we find that the EITC has the largest positive effect on the employment of ultraorthodox men - a population characterized by low employment rates – and on older women (55+ years old). These findings stress the importance of EITC programs' design in balancing employment-encouragement and precise targeting of social expenditure for reducing poverty among low-income families.*

**Key Note Words: EITC, Working Poor, Program Design.**

**JEL Classification Numbers: H24, H31, J22**

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<sup>1</sup> We thank Gilad Shalom, Uria Domb and Sara Amati for excellent research assistance, Jacob Bastian, Naomi Hausman, Douglas Sutherland, Itay Shurtz and Pietro Tommasino for useful discussions, and seminar participants at the Public Policy School at the Hebrew University, the IIPF conference in Tampere, the Bank of Israel, the OECD Economics Department, the 21<sup>st</sup> Banca D'Italia Fiscal Workshop, and the Atara Kaufman annual conference on Law and Globalization at the IDC in Herzliya for useful comments.

## 1. Introduction

The treatment of family income in the EITC (Earned Income Tax Credit) program in Israel differs substantially from those in the US and the UK (where the program's name is Working Families' Tax Credit - WFTC). While in the US and UK the EITC's calculation is based on the cumulative family income, in Israel it is based on individuals' incomes up to a relatively high limit.<sup>2</sup> Consequently, the incentives for individuals' labor market participation are markedly different. Blundell et al. (2000), and Blundell and Hoynes (2004) examined the impact of the EITC on the labor market performance in the UK and found that the EITC has a positive effect on labor market participation among single mothers, and a negative effect on married women's participation. Eissa and Hoynes (2004, 2006a and 2006b) compare the effect of the EITC on the participation of married mothers to that of married women without children (whose benefits in the US EITC system are much lower) and find a negative effect of the EITC due to the disincentives generated by the family-based benefit schedule. Specifically, they found that the EITC has a negligible effect on the employment of men (that are more frequently the prime earners in the household) and a negative effect on the employment of their wives.<sup>3</sup> In Israel, this disincentive is not relevant because the EITC is paid according to the individual's wage (up to the ceiling mentioned above). This feature provides a unique opportunity to examine whether the negative effects on employment found in the UK and in the US disappear in an environment in which the benefits are determined on an individual basis. Understanding the employment effects of EITC programs, and identifying ways to improve their design in a way that supports employment, is important to policy-makers because of the beneficial effects that the program was found to have on various components of welfare among low-income working families. Hoynes and Patel (2018) found that the benefits are concentrated among earners in the range of 75 to 150 percent of the income-to-poverty line ratio, while the very poor and higher-income earners do not benefit from it. They also found that these gains were previously underestimated by the literature. Bastian and Micheltore (2018) stress the importance of the exposure to EITC expansions in childhood for education and employment outcomes in adulthood, and show that an additional 1,000 dollars in a household's EITC exposure when a child is 13-18 years old increases the likelihood of completing high-school by 1.3%, completing college education by 4.2%, being employed as a young adult by 1%, and increases earnings by 2.2%. Additionally,

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<sup>2</sup> The maximum monthly amount that a family can earn and still be eligible for the full individual credit is 13,000 NIS (about 3,700 dollars or 130 percent of the average salary). If the couple's earned income exceeds this amount, the credit of the eligible individual is offset against the excess income.

<sup>3</sup> For a comprehensive review of the EITC's effects on labor supply, see Meyer (2010).

Hoynes et al. (2015) find positive longer-run effects of the EITC on children raised in EITC-eligible families, and Evans and Garthwaite (2014) find positive effects on women's health. Newmark (2016) provides a review of the literature on non-employment benefits of the EITC.

The EITC program in Israel was launched in October 2007. Until the end of 2011, it was applied only in specific regions of the country populating about 17% of the labor force.<sup>4</sup> The program provided workers that earn a monthly wage between 20-60 percent of the average wage and meet several other criteria (i.e., over the age of 23 with children up to 18 years old, or individuals more than 55 years old) a transfer that amounted to 4-14 percent of their income. The program expanded gradually from a pilot project in 2008-2010<sup>5</sup> to a nationwide coverage since 2011, increasing eligibility from 65,000 to 350,000 persons.

Analysis performed by Israel's Official EITC Research Team (2015), based on a survey of 2,000 individuals (both treated and a matched group of untreated), has found some evidence for a reduction of exits from the labor market. However, the team did not use the much larger sample facilitated by administrative data to examine the employment effect of the EITC – an analysis performed in this paper for the first time. The use of this larger dataset is particularly important in analyzing the effects of spousal eligibility for the EITC, due to the small sample of dual recipients or non-eligible spouses of recipients in the survey.

This study has two main goals: i) to examine whether individuals that were eligible for the EITC had a lower tendency to exit the labor market,<sup>6</sup> compared to similar individuals that were not; ii) to examine the effect of the EITC on the employment of the spouses of individuals that received the transfer – which is paid according to the individual's income. Unlike the findings in the UK and the US, where the transfer is based on the family-income, we expect to find that exits of EITC eligible/recipient individuals in Israel, whose spouses are also eligible for the EITC, did not increase in response to the implementation of the Program.

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<sup>4</sup> The program is described in more detail in Section 3.

<sup>5</sup> Since 2009, women with children aged two or less became eligible nation-wide.

<sup>6</sup> We explain below why we focus only on exits from employment.

## 2. The empirical findings in the US and the UK<sup>7</sup>

Many studies in the US document the impact of the EITC on employment. Most papers compare employment before and after the implementation of EITC expansions at the federal level by looking at differences in employment between treated groups (affected directly by changes in the EITC's amount) and control groups (not affected), with special emphasis on single-mothers who constitute a large share of the recipients in the US (but not in Israel).

Eissa and Liebman (1996) compared the change in labor force participation and in hours worked by single mothers to that of childless single women after the EITC expansion of 1986. They found a sizeable labor-force participation response of 2.8 percentage points, with no discernible impact on working hours. Meyer and Rosenbaum (2001) examined the 1993 EITC expansion and found that it raised single mothers' annual employment rates by 3.1 percentage points, implying an extensive-margin elasticity of 0.7. Hotz, Mullin and Schotz (2002) evaluated labor supply responses of larger welfare families to the marginal second child credit. Using administrative data on welfare recipients in four California counties during the 90's, they found a dramatic increase in the employment rate of larger families - of 6 to 8 percentage points - relative to families with one child. These findings imply a substantial range of labor-force participation elasticities with respect to the net income of working parents, up to 1.7. Later studies, like Eissa and Hoynes (2006a), and Hoynes and Patel (2018) that focused on the 1993 EITC expansion also document a positive participation impact on single mothers accompanied by no sizable impact on hours worked. Blundell and Hoynes (2004) have found similar results for the UK's "in-work" program.

While the evidence based on the difference-in-differences model are consistent overall, and suggest fairly strong participation effects, especially for female household-heads, Nichols and Rothstein (2015) argue that many questions arise concerning the causality relationship between EITC and single mothers' participation. In fact, following their arguments, Kleven (2018) claims that causality has not been established and that more careful analysis is needed. Nevertheless, there is a consensus that the EITC is one of the single social programs that do not have a negative effect on participation of primary earners.

Concerning the impact of the EITC expansions on second-earners' labor market participation, Eissa and Hoynes (2004) examined the labor supply response of married couples to EITC expansions

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<sup>7</sup> Several other countries have EITC programs, but in most of them the EITC amount is either smaller than the income taxes (including Social Security contributions) paid by the eligible individuals, or are not refundable. Bettendorf, Folmer and Jongen (2014) study an EITC effect on single mothers in the Netherlands, but this selection makes their results less relevant to our research question of spousal effects. Stancanelli (2008) examines the employment effects of the EITC in France, but also focuses on single mothers.

between 1984 and 1996. They performed a difference-in-differences analysis by comparing the reaction of families with children ("treated") to that of couples with no children, who are not eligible to the EITC ("control"). By looking at the reaction of married women to the EITC's 1993 expansion, they concluded that the expansion reduced the labor supply of married couples. Specifically they found that the decline of participation by married women more than offsets the increase in participation of their spouses. While men increased participation by 0.2 percentage points, the decrease of participation by married women was about 1 percentage point, and women facing the strongest disincentives reduced participation by 2 percentage points. As noted above, Blundell and Hoynes (2004), among others, have found similar results for the UK.

### **3. The EITC Program in Israel**

The EITC program in Israel was launched in October 2007 and until the end of 2010 it was applied only in specific regions of the country, the "pilot zones", populating about 17% of the labor force.<sup>8</sup> The EITC was paid to workers that earn a monthly wage between NIS 1,800 and NIS 6,000<sup>9</sup> and met several criteria: i) individuals at age 55 or above and parents aged 23-54 with one or two children at age 0-18; ii) individuals aged 23 or above that were parents of three children or more. The latter group was eligible for a higher transfer, that was calculated, as described below, according to a trapezoid-like schedule: an initial amount for the benchmark monthly income of NIS 1,800,<sup>10</sup> a marginal benefit of 16% or 23% per each additional NIS up to an income of NIS 3,140, a flat amount of 290 or 420 NIS up to an income of NIS 4,190, and then a phase-out of the amount at a rate of 23%.

Eligible individuals trigger the payment process for a given year by submitting a short simple declaration (with no additional documents) in a post-office during the subsequent year. Since Israel has a broad network of post-offices the application process does not require a major logistic effort, and one of its major purposes is simply to receive the details of a bank account to which the payment can be transferred. Once the form is submitted, the Tax Authority verifies it and an

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<sup>8</sup> The included cities/localities were Jerusalem, Ashkelon, Sderot, Natzeret, Natzeret Ilit, Ein Mahal, Bakajet, Mishmarot, Ein Iron, Ararar, Kfar Pines, Kfar Kara, Or Akiva, Hedera, Pardes Hana-Karkur, Natanya, Moawia, Barta and Ein Asala.

<sup>9</sup> These numbers describe the range of the "trapezoid" that serves as a basis for the EITC subsidy. The trapezoid is relevant for low-wage workers; for instance, the legal minimum wage was around the center of the flat range of the "trapezoid".

<sup>10</sup> This amount is equivalent to about one-half of the minimum wage. It was chosen to reflect the policy that only individuals with significant employment - at least 50% of a full-time job - will be eligible to the EITC. Since the tax authority has no information on hours worked, this benchmark served as a substitute.

electronic transfer is made to the individual's bank account. The authentication process typically takes several weeks.

While initially, in 2007, the program applied only to employees, since 2008, eligibility was extended to self-employed workers who lived in the pilot zones areas. In 2009, as part of an initiative to support working mothers, the eligibility for EITC was extended on a nationwide basis to mothers of children aged two years or less whose wage was in the eligibility income-range. In May 2010, the legal basis for the EITC application was revoked, causing a temporary suspension of the program between May and December 2010.<sup>11</sup> The last significant change during our sample period took place in 2012, when the amount of the grant for working mothers was raised by 50%. In 2011<sup>12</sup>, the EITC was resumed as a nationwide program, and since then it expanded, increasing eligibility from 65,000 to 350,000 persons. While the initial take-up rate among the eligible candidates in the pilot period was around 45 percent, it has gradually increased to over 70 percent after 2011. Additionally, since 2012 the EITC amount for women was raised by 50 percent.

From the very beginning, EITC eligibility was based on individuals' income, with the explicit intention to avoid negative employment incentives for spouses. To avoid complications in the application process, it was also decided to exclude most non-labor incomes from the EITC calculations. The only exception is that ownership of multiple real estate assets, for which the ITA has readily available data, leads to non-eligibility.

While the program targeted low-wage workers, its focus on individual, rather than household income, makes it potentially susceptible to allocating significant amounts to households at high-income ranges. Although a clear definition of an income range for the target population was never announced, an analysis conducted by the Bank of Israel (2013) mitigates this concern. According to this analysis, about 75 percent of the EITC was paid to households at the bottom two quintiles of the wage-income distribution<sup>13</sup>, and none to the top quintile. The actual EITC amount paid to households in the bottom quintile accounted for about 12 percent of their income. Nevertheless, this distribution of the benefits is not as accurate as in the US and the UK, pointing to a potential trade-off between allocation precision and employment effects.

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<sup>11</sup> Effectively this implied that eligible individuals in 2010 received only one third of the annual transfer. In our analysis below, we account for the potentially limited effect of the program in 2010.

<sup>12</sup> From now on all mentions of particular years related to the EITC Program, refer to the year for which the transfer is paid, i.e. the year in which the individual earned the eligible income. As we explain below, the EITC is paid in the following year.

<sup>13</sup> Household income was calculated as the sum of wage incomes of household members divided by the standardized number of household members.

#### 4. Data and key variables definitions

Our study is based on administrative data of the Israeli Tax Authority. The Tax Authority's records consist of employers' annual reports on 'Form 126' whose submission is mandatory for each employee. These forms include data on all payments and deductions, credits, number of months worked etc., as well as basic data on the employee's personal status. Data for each individual from multiple employers are merged, while preserving the separate information from each employer as well. The data do not include hours worked nor the employees' education level.

Our dataset contains a random sample of 10% of the employees and their spouses – about 300,000 observations per year - and follows the same individuals year after year. When looking at subsequent years we examine whether the individual appears in the file – which means that he or she is either employed or retired;<sup>14</sup> if the individual does not appear in the file, it indicates that he or she is either unemployed or (rarely) self-employed.<sup>15</sup> We merged these data with the population's registry that includes individuals' marital status, number and age of children, immigration date and residence address. Finally, we merged into this dataset information on whether the individual is eligible for the EITC<sup>16</sup> and whether he/she submitted an application form to receive an EITC from the Tax Authority.

Since we focus on employment effects, the observations of retired individuals were removed from the dataset. We use data for 23 to 62 years old women, and 23 to 67 years old men (consequently removing 9 percent of the sample). These age ranges were selected because 62 and 67 are the respective official retirement ages for women and men in Israel, and 23 is the minimum age for eligibility. We also restrict our sample to married individuals, because one of our key questions relates to spousal income effects.<sup>17</sup> To focus on individuals that are more likely to be directly affected by the EITC we only include those with average monthly earnings of NIS 500 to 9,000 – close to the EITC eligibility "trapezoid".<sup>18</sup> The lower limit of this range is below the minimum amount required to be entitled for an EITC (NIS 1,800 in the first years of the program's implementation, NIS 2,100 currently) but above zero - to exclude people that are only marginally employed.<sup>19</sup> The upper limit is higher by NIS 2,000 than the maximum amount that qualifies for an

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<sup>14</sup> We can then distinguish between retired and employed individuals based on their income type code.

<sup>15</sup> Sample tests, combining employee and self-employed datasets have identified very few cases of shifts of employees to self-employment among low-income individuals.

<sup>16</sup> "Eligibility" outside the pilot zones was defined by the ITA based on the individual's characteristics, meaning that had that person lived in a pilot zone he/she would have been eligible.

<sup>17</sup> This removes from the "treated" sample single parents and single individuals at ages 55+.

<sup>18</sup> We report below robustness tests using narrower income ranges.

<sup>19</sup> We exclude those marginally employed because their inclusion could artificially increase the observed EITC effect since they are not eligible for the EITC and may have a stronger tendency to exit employment.

EITC. We choose this broader range in order to include persons that have a potential to qualify for the EITC either by increasing income (lower limit) or working less (higher limit). Finally, we restrict our sample to the period from 2005 to 2014, which includes the years immediately prior to the implementation of the EITC (until 2007), as well as the years in which it was in effect. In the analysis that focuses on the pilot period, we restrict the sample to the years 2008 and 2009.

Our analysis includes variables that are related to the EITC eligibility and status, and control variables related to employment. Table 1 presents variables' averages by year and gender. The table indicates that in the years in which the program was applied nationwide, more than 20% of our sample were eligible for the EITC, while in the pilot period the numbers are, naturally much smaller, since the pilot zones covered only 17% of the country.

Our focus variable in this study is "treated" which is defined as an individual that was eligible for an EITC in a given year. In some estimates, we refer to the "treated" group only as those who also submitted the EITC forms for that year, since they are the ones experiencing an actual income change. We discuss below why we see the range of results for these alternative definitions as indicating the boundaries of the potential effect. Since the EITC is paid only in the year that follows the one for which the recipient is entitled for the benefit, "treatment" in year  $t$  implies receiving the grant on that later year ( $t+1$ ). For example, a "treated" individual in 2008 received the EITC payment only in 2009.<sup>20</sup>

The implementation of an EITC can potentially affect both entries into the labor market and exits. In this study we only focus on exits, however, because our dataset does not include non-working individuals. Accordingly, we cannot perform a proper analysis of the EITC effect on entries, as we have no information on the non-working population.<sup>21</sup> Moreover, during the pilot period, the government operated the "Wisconsin" program in the pilot zones, which focused on encouraging long-term unemployed individuals to work. This might have affected entries of similar individuals to those affected by the EITC.<sup>22</sup> As noted above, we have no information on hours worked, so we cannot examine intensive-margin effects.

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<sup>20</sup> The payment is not conditioned on working in  $t+1$  as well.

<sup>21</sup> The gross entry rate to employment (the share of new employees) in the pilot zones in 2008-09 was slightly lower than in the rest of the country, but we have no data on the characteristics of the individuals that were not employed (from which these entrants came) that would allow us to isolate the EITC's effect.

<sup>22</sup> To the extent that the "Wisconsin" program had an effect on exits, it would likely be to increase them, due to the competition of the existing employees with these new entrants in the pilot zones. This would reduce the EITC effect we measure. Furthermore, the potentially weaker attachment to the labor market of those long-term unemployed that began working due to the "Wisconsin" program is also likely to reduce the EITC effect we find. Additionally, in all the regressions in the pilot period, we control for new-entrants, and the full-period regressions include individual random or fixed effects (see discussion below).

**Table 1: Mean values of key variables (all binary, unless specified otherwise)**

Variable	2007		2008		2009		2010		2011		2012		2013	
	Men	Woman												
N	48,347	63,812	47,050	63,160	56,851	70,761	55,140	69,696	52,906	68,665	50,618	66,563	47,653	65,277
EITC Eligible	0.050	0.034	0.049	0.033	0.045	0.079	0.035	0.062	0.224	0.216	0.237	0.229	0.244	0.231
Spouse eligible for EITC	0.025	0.016	0.025	0.014	0.052	0.014	0.044	0.009	0.157	0.091	0.170	0.096	0.177	0.095
Submitted EITC request	0.019	0.019	0.018	0.017	0.018	0.038	0.016	0.034	0.099	0.124	0.134	0.161	0.139	0.167
Spouse Submitted EITC	0.014	0.006	0.012	0.006	0.024	0.006	0.023	0.005	0.093	0.043	0.124	0.059	0.133	0.061
Eligible but did not Submit & Spouse Submitted	0.001	0.000	0.001	0.000	0.001	0.001	0.001	0.000	0.009	0.003	0.011	0.003	0.011	0.003
Submitted & Spouse Submitted	0.004	0.003	0.004	0.003	0.004	0.003	0.003	0.002	0.032	0.024	0.045	0.034	0.047	0.035
Exit for at least 1 year	0.080	0.077	0.078	0.075	0.066	0.065	0.063	0.059	0.065	0.060	0.069	0.059	0.071	0.059
Exit for at least 2 years	0.051	0.044	0.055	0.053	0.046	0.040	0.044	0.039	0.047	0.041	0.050	0.040	...	...
Average Annual Salary (NIS)	56,330	48,035	56,935	48,485	55,021	48,328	55,993	48,864	56,895	49,927	57,673	50,732	58,590	51,396
Spouse Monthly Salary (NIS)	3,446	8,101	3,548	8,324	3,653	7,806	3,686	7,943	3,890	8,420	4,071	8,601	4,219	8,716
Parent for 0-1 years old child	0.218	0.210	0.221	0.217	0.194	0.200	0.198	0.205	0.207	0.212	0.213	0.217	0.221	0.229
Parent for 5-9 years old child	0.325	0.329	0.330	0.335	0.286	0.305	0.285	0.305	0.288	0.311	0.295	0.313	0.305	0.322
Parent for 15-17 years old child	0.167	0.170	0.171	0.169	0.146	0.152	0.147	0.150	0.150	0.152	0.157	0.155	0.165	0.162
Arab	0.198	0.085	0.206	0.091	0.195	0.093	0.204	0.099	0.213	0.106	0.220	0.113	0.227	0.120
Ultra Orthodox	0.029	0.036	0.031	0.039	0.029	0.038	0.031	0.040	0.033	0.043	0.034	0.044	0.037	0.048
Immigrated to Israel up to 15 Years ago	0.152	0.141	0.137	0.129	0.112	0.113	0.099	0.103	0.087	0.091	0.077	0.082	0.069	0.073
Immigrated to Israel more than 15 Years ago	0.194	0.182	0.198	0.183	0.185	0.175	0.189	0.180	0.190	0.181	0.191	0.184	0.189	0.184
Age	41.248	38.747	41.595	38.896	39.535	37.492	39.854	37.620	40.238	37.777	40.690	38.049	41.171	38.264
Age Spouse	37.8	41.7	38.1	41.9	35.4	40.0	35.7	40.2	36.1	40.4	36.6	40.8	37.2	41.1
Close to Retirement	0.071	0.090	0.080	0.094	0.072	0.085	0.077	0.087	0.082	0.090	0.085	0.092	0.087	0.093
Spouse Works	0.619	0.675	0.624	0.674	0.556	0.635	0.561	0.694	0.562	0.697	0.559	0.685	0.570	0.705
Recent Student	0.002	0.004	0.003	0.006	0.004	0.007	0.004	0.008	0.005	0.008	0.005	0.009	0.005	0.009
Parent for 1-2 children	0.399	0.433	0.396	0.432	0.341	0.387	0.338	0.387	0.338	0.390	0.348	0.393	0.357	0.401
Parent for 5 children or	0.145	0.096	0.152	0.101	0.133	0.093	0.138	0.096	0.146	0.102	0.152	0.104	0.160	0.110
Pilot zone	0.188	0.156	0.189	0.157	0.180	0.156	0.182	0.158	0.186	0.158	0.188	0.160	0.191	0.162
Public Sector	0.121	0.335	0.113	0.326	0.103	0.290	0.101	0.278	0.096	0.277	0.091	0.266	0.089	0.270

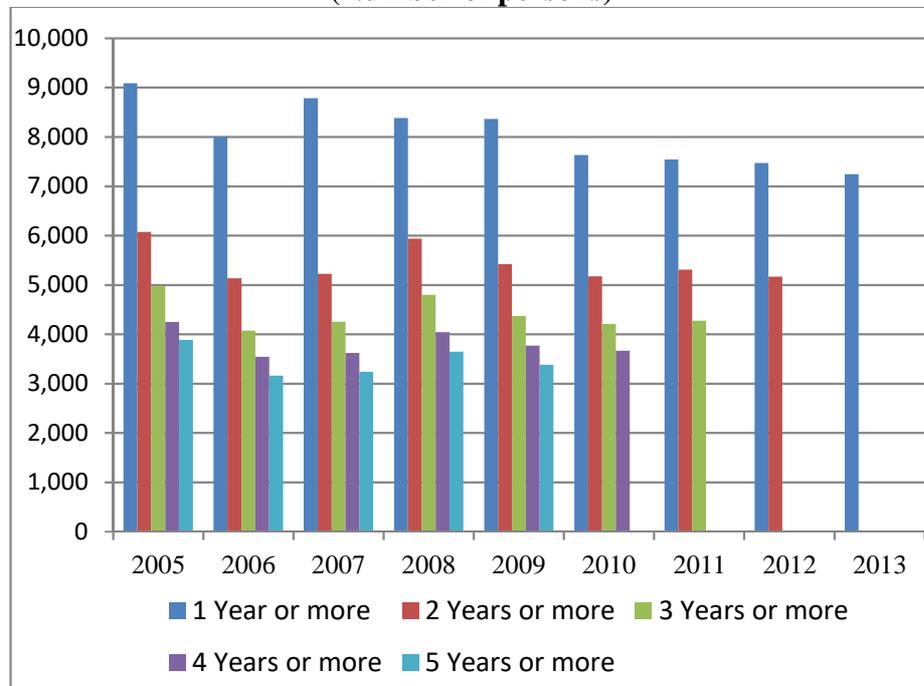
**Notes:** The table includes married men and women in ages 23-67 and 23-62, respectively, with an average monthly income between NIS 500 and 9,000 and at least one employer (i.e., the income is not a pension). Residents of East Jerusalem are excluded from the sample.

**Source:** administrative data of the Israel Tax Authority and authors' calculations.

The "Exit" variable is computed as follows: if an individual that appeared in the data file in year  $t$  does not appear in the file of the following year ( $t+1$ ), and if it is not a "retirement exit", then the variable "Exit" takes the value of 1; otherwise, it takes the value of 0. Although, theoretically, it is possible that the individual became self-employed; such occurrences (low-income employees becoming self-employed with no income as employees) are very rare in Israel. Our choice to focus on exits at  $t+1$ , reflects the fact that this is the year in which the individual receives the money, but is also justified by the persistence of eligibility: 65% of those eligible to the EITC in year  $t$  are also eligible in  $t+1$ . To the extent that our choice to use exits in  $t+1$  affects our results, it is likely to

reduce the estimated effect of the EITC on employment (since some individuals that we define as “treated” may already know that they are no longer eligible).<sup>23</sup>

**Figure 1: Distribution of exits according to exit length in years: 2005 – 2013  
(Number of persons)**



**Notes:** The figure is based on the panel for the years 2005-14, which includes married men and women in ages 23-67 and 23-62, respectively, with an average monthly income between NIS 500 and 9,000 and at least one employer. Due to data limitations, residents of East Jerusalem are excluded from the sample.

**Source:** administrative data of the Israel Tax Authority and authors calculations.

Figure 1 shows the number of exits for each year differentiated by exit length.<sup>24</sup> By looking at the magnitude of the difference between two consecutive columns, we can derive how many people stayed out of employment exactly one year, or two years etc. For example, the number of employees that stopped working in 2005 and stayed out of employment for one year can be calculated in the following way: the number of 'at least one year' exits in the sample is about 9,000 and the number of 'two years or more' exits' about 6,000; thus, the number of people that stayed out of employment exactly one full calendar year is about 3,000. Due to the structure of the data, in the later years of the sample we cannot determine the full length of exists, because this can be determined only when we observe the return to employment. For example, for people who

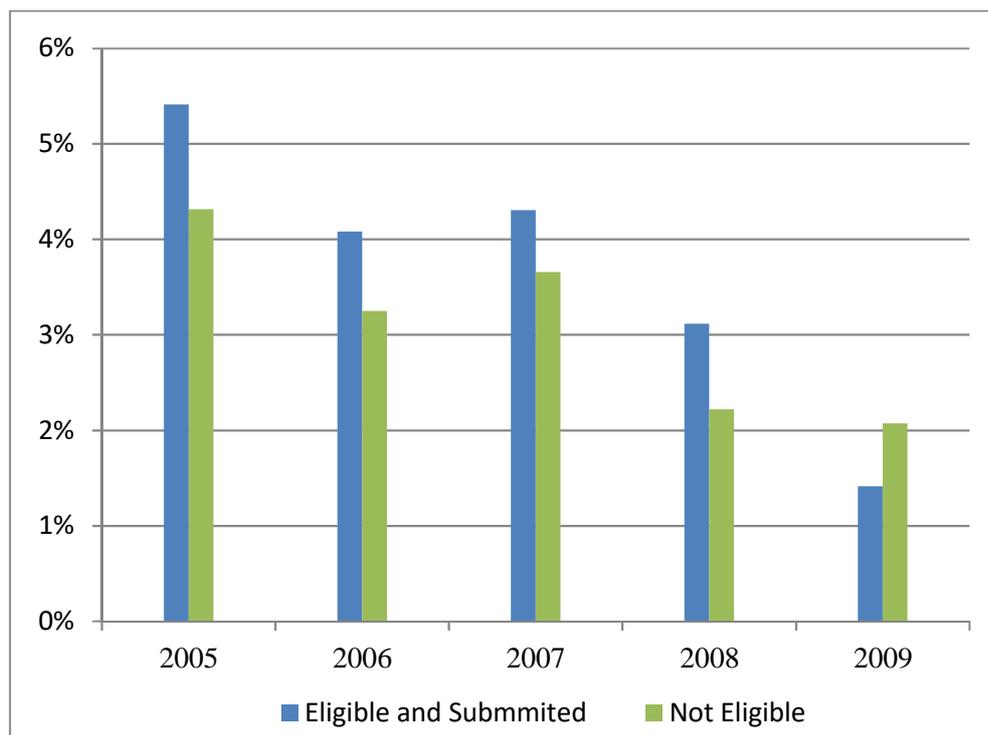
<sup>23</sup> Of course, we cannot use eligibility in year  $t$  to examine exits in year  $t$ , because the individual has to work in year  $t$  to be eligible.

<sup>24</sup> Exit lengths are determined by calendar (tax) years. Employees who worked part of a year are considered as employed in that year.

stopped working in 2013 we can only tell that they did not work in 2014, but not the duration of the exit, because the panel ends in 2014.

It is evident that many exits are short – one or two years. Nevertheless, there is a substantial number of longer exits (3 years or more), suggesting that exits from employment are significant events. We can also observe a downward trend in the overall number of exits since 2007.

**Figure 2: Exits in 2005—2009 by EITC characteristics in 2011**  
 (Percent of the employees in that group; based on the sample of individuals who were employed in both 2005 and 2011)



**Notes:** This analysis only includes married individuals in 2005 that appear in the files both in 2005 and in 2011 with an average monthly salary of NIS 500 - 9,000 in 2005: women in the ages 23-62 and men aged 23-67. Observations from East Jerusalem are excluded. These individuals were divided into two groups according to their eligibility to the EITC in 2011: 1) eligible and submitted a request for the EITC in 2011, and 2) not eligible in 2011. The numbers of exits in 2005, 2006, 2007, 2008, 2009 in each group were divided by the total number of persons in that group that appear in the file in that specific year.

**Source:** administrative data of the Israel Tax Authority and authors' calculations.

Figure 2 compares the proportion of exits between 2005 and 2009 among individuals that were eligible for the EITC in 2011 and submitted a request, and among those that were not eligible. We only include in this comparison individuals that appear in both the 2005 and 2011 files.<sup>25</sup> The data indicate that individuals who received an EITC (eligible and submitted the EITC forms) had a **higher**

<sup>25</sup> That is, if individuals interrupted their employment during that period they returned to work by 2011.

tendency to exit before the EITC was implemented, but that gap disappeared in 2009, when the program was in effect.<sup>26</sup> This higher tendency to exit may be an indication that our results understate the EITC effect, because the affected population is characterized by a higher tendency to exit from employment (see further discussion below).

## **5. The impact of the EITC on exits from employment**

In order to examine the effect of EITC eligibility on exits from employment we compare individuals that were eligible for the credit to individuals with similar characteristics that were not (we also analyze, as an extension, employees who received the EITC - i.e. eligible and submitted the forms - to non-recipients). In particular, we examine whether the tendency of eligible individuals to exit employment changed when the EITC was implemented, in a different magnitude than exits among non-eligible ones. For this purpose, we use two methods: 1. panel regressions that control for individual characteristics and year effects; 2. Propensity Score Matching (PSM), where we match similar pairs - by "Nearest Neighbor Matching"- and examine how differences in the treatment variable – EITC eligibility - are reflected in the outcome variable - exit. We distinguish between two periods:

1. The years 2008-09, when the program was applied throughout the year but only in the pilot zones. This allows us to compare eligible individuals to others with identical incomes and personal characteristics that were not eligible only because they did not reside in the pilot areas. In the same way we also compare individuals whose spouses were eligible to the EITC to those whose spouses would have been eligible had they resided in the pilot zones. The advantage of this sample is the precision of the EITC effect due to the quality of the control group. Its disadvantage relates to the analysis of the spousal eligibility effect, since the sample of couples with dual eligibility in this specification is small. This small sample also limits the ability to disentangle the EITC effect on sub-groups of the population.

2. The years 2011-13, when the program operated nationwide, so the eligible individuals can only be compared to those in close – but different – income ranges, or to those with different personal characteristics, such as age or not-parenting children under the age of 18. This sample is much larger, and increases more than six-fold the number of couples with dual eligibility. Nevertheless, as the control group in this sample matches the treated one less closely, it is

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<sup>26</sup> The overall decline in exits, in both groups, reflects the structure of the sample that includes only people who worked in 2011. Hence, employees with "long" exits in the later years are excluded from the sample by construction.

important to verify that the main results with respect to the treatment effect are similar to those obtained for the pilot period, before using the spousal analysis results.

In all our regressions, in both periods, we control as a baseline for a vector of individual characteristics that may affect the tendency to exit from employment. These variables are age, age squared, the salaries of the individual and of the spouse, the number of working months during the previous year and the number of different employers. We also include binary variables for Arabs,<sup>27</sup> Ultraorthodox<sup>28</sup>, new immigrants<sup>29</sup>, old immigrants<sup>30</sup>, parents to a child under the age of 2, parent to a child aged 5 to 9, parent to a child aged of 15 to 17, parent of up to two children, and parent of 5 children and more. In addition, we use year fixed effects to account for potential macro effects. For the period in which the program was implemented on a nationwide basis, we also control for being a resident of a pilot zone.

### 5.1 Panel regressions: overall effect on exits

Our panel analysis includes married individuals with income in the relevant range who worked during the years 2005-2013. Our full sample includes 490,949 observations of women-years (109,734 individuals) and 372,912 observations of men-years (92,439 individuals).<sup>31</sup> The sample that covers only the pilot period includes 28,290 women and 27,069 men.

We estimate regressions in which the dependent variable is binary, indicating whether the individual who worked in period  $t$  stopped working in period  $t+1$  ("exit"); i.e., we check exits from employment that last one year or more. Accordingly, we conduct our main analysis using logit equations<sup>32</sup>. Our focus explanatory variable relates to the entitlement (and in some specifications, receipt) for an EITC ("treated"): this variable takes the value of 1 if the individual was eligible for an EITC and 0 otherwise.<sup>33</sup> In addition to the "treated" variable, we examine the effect of spousal

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<sup>27</sup> We define Arabs according to the place of residence. If the individual is defined as Arab in one year- then we define him as Arab for the entire sample. We omit individuals from East Jerusalem (0.4% of the sample) because of the special characteristics of their interaction with the Israeli labor market.

<sup>28</sup> Ultra-Orthodox are defined by their place of residence. We define towns as "Ultra-Orthodox" according to the variable "Ultraorthodox Homogeneity Level" (CBS variable), which is constructed based on the voting patterns in the 2003, 2006 and 2009 elections: if more than 50% of the town voted for Ultra-Orthodox parties, then the town is defined as Ultra-Orthodox.

<sup>29</sup> Defined as: born outside of Israel, and the year of immigration is in the last 15 years.

<sup>30</sup> This variable is defined in a similar way to "new immigrant" but with more than 15 years in Israel.

<sup>31</sup> The number of women is larger because working-women wages are more frequently in the lower income range examined in this paper.

<sup>32</sup> Probit equations yielded very similar results.

<sup>33</sup> In all the equations, we control for all the characteristics that determine EITC eligibility, such as income, the number of children, residing in a pilot zone, age and spousal income. Hence, the treatment effect reflects the actual eligibility beyond the potential effect of these characteristics.

eligibility for the EITC and an interaction between the individual's eligibility and having an eligible spouse for the transfer.

### 5.1.1. The pilot period

We begin our analysis by estimating regressions for women and men based on a sample that includes only the years 2008-2009, in which the EITC was restricted to the “pilot zones”. The “treated” group are those eligible for the EITC according to the ITA records, and the control group comprises of those in the non-pilot zones that would have been eligible had they lived in the pilot zones. As noted above, this design provides us with a control group of individuals with very similar characteristics (including family composition and income), but with a smaller sample than during the nationwide implementation.<sup>34</sup>

The results for women and men are reported in Table 2. Equations 1 and 2 report odds-ratios for women – including and excluding the (not statistically significant) control for spousal eligibility.<sup>35</sup> The results indicate that being eligible for an EITC is associated with a decrease of 17-20 percent in exits. Given the average exit rate of about 7 percent reported in Table 1, this implies a reduction of 1.2-1.4 percentage points in the exit probability of women. These effects are similar to those obtained from OLS estimations reported in Table A.1 in the appendix. The effects for men, are reported in equations 3 and 4, and are somewhat larger – about 25 percent, which are equivalent to a reduction of 1.7 percentage points in exits.

As for the control variables, we find the expected signs in most cases. Higher income and working in the public sector (not shown) reduce exits, while being a parent of a young child increases exits of mothers and reduces those of fathers. An interesting result is that spousal wage income, and changes in it, have a statistically significant negative effect on exits for both men and women. According to Knabe, Schoeb and Weimann (2016) men assign a high weight to labor market participation following their traditional role in the family; i.e., if the wife's income increases, it is important for a man to work as well. Nevertheless, since we find the same effect for women, we cannot rule out that the negative correlation between spousal income and exits reflects local labor market conditions around the family's residence, rather than intrinsic behavior of individuals.

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<sup>34</sup> In 2009, we remove from the sample women with children in ages 0-2, because they became eligible nationwide, so we do not have a proper control group.

<sup>35</sup> We analyze the spousal eligibility effect in detail below using much larger samples.

**Table 2 - The Effect of EITC Eligibility on Exits from Employment for at Least One Year, 2008-2009 (Odds Ratio from Logit Regressions)**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	0.832*	0.806**	0.727***	0.766***
Spouse treated	0.874		1.302*	
One year change in spousal income (NIS)	0.981***	0.981***	0.979***	0.979***
Monthly wage income (NIS 1,000's)	0.737***	0.737***	0.763***	0.763***
Annual spousal income (NIS 1,000's)	0.942***	0.943***	0.954***	0.954***
Parent to a child under the age of 2	1.634***	1.633***	0.841***	0.843***
Parent to child aged 5 - 9	1.135**	1.135**	0.991	0.991
Number of observations	28,290	28,290	27,069	27,069
Log likelihood	-6,192.4	-6,192.7	-7,631.8	-7,633.1

**Notes:** The regressions are estimated for the years 2008-9 and only for married women and men aged 23-62 and 23-67, respectively, who meet one of the following criteria: (a) They lived in the pilot zones and were eligible for the EITC according to the ITA's records; (b) Based on their income and family characteristics they would have been eligible for an EITC had they lived in a pilot zone; (c) For women in 2009: they did not have a child aged 0-2. Because of incompleteness, observations from East Jerusalem are excluded. In all the regressions, we define "treated" as being eligible for an EITC (i.e. living in a pilot zone) and the control group are those living outside the pilot zones.

Regression 1 and 3 for women and men, respectively, control for whether the person's spouse was eligible for an EITC (in the pilot zones). In 2 and 4, we re-estimate the regression without the spouse eligibility variables.

- In all of the regressions, we also control for age, squared age, the number of working months during the previous year, and the number of different employers. We also include binary variables for: Ultraorthodox, Arabs, new immigrants (less than 15 years in Israel), veteran immigrants, parents to one or two children, parents to five or more children, parents of at least one child aged 15 - 17, 5 - 9, 0 - 2, the year 2009 and for employment in the public sector.

- \*\*\* Significant at 1 %; \*\*significant at 5 %; \*significant at 10 %.

**Source:** Administrative data of the Israeli Tax Authority and authors' calculations.

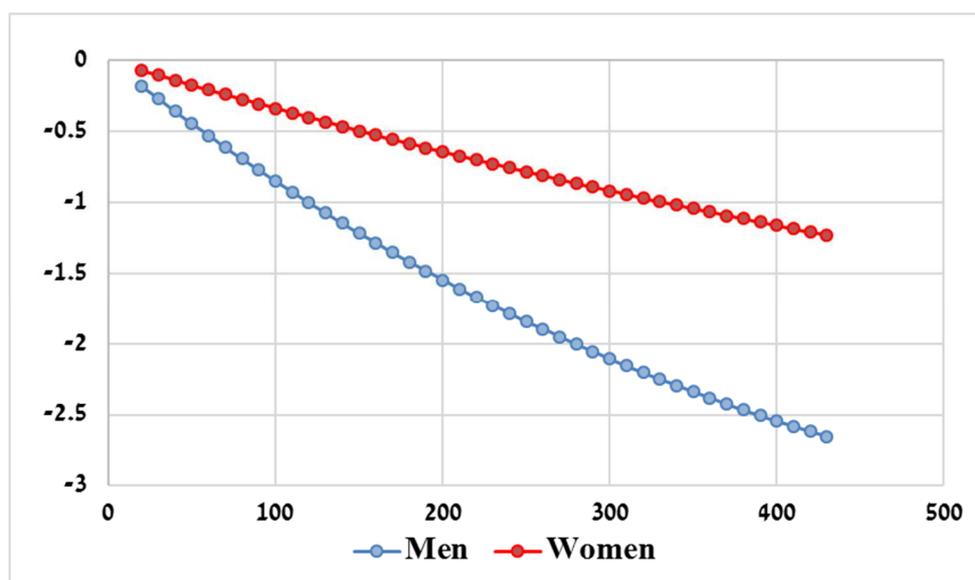
In Table 3, we replace the binary treatment effect with continuous variables that account for the specific amount of the EITC to which the individuals were eligible. The interaction of this variable with being actually eligible is our variable of interest. We find that larger EITC amounts are associated with a lower probability to exit from employment: a monthly increase of NIS 100 reduces the probability to exit by 6-7 percent for women (0.4-0.5 percentage points on average) and by 10 percent for men (0.7 percentage points). Figure 3 depicts the marginal effects of an increase in the EITC effect throughout the relevant credit amount range.

**Table 3 - The Effect of EITC Eligibility Amount on Exits from Employment, 2008-2009 (Odds Ratios from Logit Regressions)**

	Women		Men	
	(1)	(2)	(3)	(4)
EITC amount (NIS 100s)	0.999	1.000	1.078***	1.076***
Treated and EITC amount (NIS 100s)	0.940*	0.928**	0.889***	0.902***
Spouse treated	0.857		1.271	
Number of observations	28,290	28,290	27,069	27,069
Log likelihood	-6,192.7	-6,193.0	-7,626.3	-7,627.5

**Notes:** Logit equations estimated for the years 2008-9, using the same sample and control variables as in Table 2. Instead of the binary variable for EITC eligibility, we use the amount of EITC to which the individual is eligible.  
Equations 1 and 3 show the effect of the EITC amount (or the potential amount for those living outside the pilot zones) on exits, for women and men, respectively. Equations 2 and 4 repeat the estimation, omitting the controls for the spouse's EITC eligibility.  
- \*\*\* Significant at 1 %; \*\*significant at 5 %; \*significant at 10 %.  
**Source:** Administrative data of the Israeli Tax Authority and authors' calculations.

**Figure 3: The effect of the Monthly EITC Amount (in NIS) on the Probability of Exits, 2008-2009 (Percentage points)**



**Notes:** The figure depicts the marginal effects of the EITC amounts (the interaction between the EITC amount and being eligible for the EITC), calculated based on equations 1 and 3 in Table 3, using the "margins" command in Stata. The figure shows the product of the marginal effect (when all the variables are held constant at their average values) and the EITC amount.

In Table 4, we report robustness tests in which we truncate the low-income part of the sample, which may be less attached to the labor force. We remove all the observations with monthly income below 3,000 NIS, reducing the sample size by about 25%. The treatment coefficient for

both genders is somewhat increased by this truncation – as indicated by the lower odds ratios - compared to equations 1 and 3 in Table 2. This result is consistent with the results in Table 3, since the EITC amounts paid for individuals with monthly incomes below NIS 3,000 are lower than those paid to higher-income ones. In equations 2 and 4, we restrict our sample only to individuals with a working spouse. The effect on women is somewhat larger than that reported in Table 2, and there is no noticeable effect on men, despite a reduction of 40% in the sample size. All the differences in the coefficients of interest between Tables 2 and 4 are not statistically significant.

**Table 4 - The Effect of EITC Eligibility on Exits from Employment, Robustness Tests, 2008-2009 (Logit Regressions, Odds Ratio)**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	0.762**	0.727**	0.689***	0.730**
Spouse treated	0.963	0.966	1.321	1.308
Number of observations	20,794	16,717	22,661	13,499
Log likelihood	-3,858.9	-3,614.6	-6,010.8	-3,502.6
<p><b>Notes:</b> The regressions are estimated for the same sample and definitions used in Table 2, but narrowing the monthly income range to NIS 3,000 - 7,000, in equations 1 and 3, and including only individuals whose spouses are working (defined as earning at least 500 NIS monthly) in equations 2 and 4.</p> <p>- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.</p> <p><b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.</p>				

The employment effects reported in Tables 2-4 are based on comparing EITC eligible individuals to similar individuals that were not eligible because they did not reside in the pilot zones. This design offers a realistic indication for the potential effect of an EITC expansion because it accounts for the argument that had the EITC been expanded to the non-pilot areas, some of the eligible individuals there - too - would not apply. On the other hand, the results may be too conservative since the utilization rate of the EITC has increased substantially, from 45% at its initial phase (2008-2009) to roughly 70% currently, partly reflecting improved understanding of the program due to its nationwide spread. If this is the case, the application rate in the early years – used so far – may understate the potential employment effect of the program.<sup>36</sup>

In Table 5, we provide a sensitivity analysis in which we change the "treatment" definition from eligibility to an EITC to actually receiving the transfer (i.e., being eligible and applying). The control group still includes all those living outside the pilot zones that would have been eligible had they

<sup>36</sup> Chetty et al. (2013) discuss the effect of knowledge about the EITC on the behavior of EITC recipients.

resided in the pilot zones, as well as those eligible that did not apply.<sup>37</sup> Not surprisingly, we find much larger effects than in the previous analyses; the odds ratio for exit of individuals who collected the EITC is about one-half of that of non-eligible ones. The OLS estimates (equations 2 and 4) show a collection effect of around 3.0 percentage points for women and 3.8% for men.

**Table 5 - The Effect of EITC Collection on Exits from Employment for at Least One Year, 2008-2009 (Odds Ratio from Logit Regressions and OLS)**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	0.424***	-0.030***	0.526***	-0.038***
Spouse treated	0.901	-0.010	1.229	0.015
Number of observations	27,012	27,012	24,810	24,810
Log likelihood	-5,828.2		-6,999.6	
R squared		0.038		0.026
<p><b>Notes:</b> Equations 1 and 3 are estimated for the same sample and definitions used in Table 2, except that we drop all the EITC-eligible individuals who live in the pilot zones that did not apply to collect the EITC. In equations 2 and 4, we re-estimate the equations using OLS.</p> <p>- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.</p> <p><b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.</p>				

While this analysis suggests that our main specification may be conservative, we remain cautious about treating the results in Table 5 as a baseline. The possibility that those who did not apply may have unobservable personality characteristics that may also affect their exits, make the non-collecting group a less than ideal control group and we cannot tell which individuals outside the pilot zone would have collected the EITC had they been eligible.

### 5.1.2 Spousal eligibility effects

In Table 6, we examine the effect of spousal eligibility for the EITC. For this purpose, we change the way in which we select our sample, and choose individuals whose spouses are eligible for the EITC, regardless of whether the individuals themselves are eligible. Our control group are individuals outside the pilot zones whose spouses would have been eligible for the EITC had they

<sup>37</sup> Robustness tests omitting the eligible individuals that did not apply from the control group yielded very similar results.

lived in the pilot zones. We also control, within this sample, for the eligibility of the individual herself - although here this group is small.<sup>38</sup>

**Table 6 - The Effect of Spousal EITC Eligibility on Exits from Employment, 2008-2009 (OLS and Logit Regressions' Odds Ratio)**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	0.662**	-0.042***	1.087	-0.003
Spouse treated	1.019	0.009	0.998	0.004
Number of observations	13,678	13,678	16,686	16,686
Log likelihood	-3,554.6		-3,303.5	
R squared		0.065		0.035

**Notes:** The regressions are estimated for the years 2008-9 and only for married individuals whose spouse is in the age range of 23-67 for women or 23-62 for men, and also meets one of the following criteria: (a) They lived in the pilot zones and the spouse was eligible for the EITC according to the ITA's records; (b) Based on their income and family characteristics the spouse would have been eligible for an EITC had they lived in a pilot zone; (c) For men: they did not have a child aged 0-2 in 2009. The individuals themselves are not necessarily eligible. Because of incompleteness, observations from East Jerusalem are excluded. In all the regressions, we define "treated" as being eligible for an EITC (i.e. living in a pilot zone) and the control group are those living outside the pilot zones. Regression 1 and 3 are logit (for which we report the odds ratios) and equations 2 and 4 are estimated using OLS.

- \*\*\* Significant at 1 %; \*\*significant at 5 %; \*significant at 10 %.

**Source:** Administrative data of the Israeli Tax Authority and authors' calculations.

The estimation indicates that spousal eligibility for the EITC has no statistically significant effect on exits from employment for both genders, regardless of whether we use logit (equations 1 and 3) or OLS (equations 2 and 4). This lack of statistical significance holds for a host of other specifications and sub-samples including when we omit the "treated" variables, which do not have well defined control groups in this specification. These results are in line with our a-priori expectations given the individual design of the EITC program in Israel. Nevertheless, given the small sample and the positive signs of the spousal eligibility coefficients in the OLS equations, we reserve judgement until further examination of these effects in the nationwide sample.

<sup>38</sup> We do not include an interaction between being treated and having a treated spouse because, by construction, each treated individual in this sample also has a treated spouse.

### 5.1.3 Full-sample panel estimates

Table 7 reports similar regressions to Tables 2 and 3, but for a longer period, including years in which the EITC was not in effect (2006 and 2007), and years in which the EITC was applied nationwide (2011 until 2013). We control for the year and for individual random effects.<sup>39, 40</sup>

**Table 7 - The Effect of EITC Eligibility on Exits from Employment for at Least One Year, 2006-2013 (Logit Regressions, Odds Ratio)**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	0.716***	0.730***	0.738***	0.728***
Treated and spouse treated	0.962		1.084	
Spouse treated	1.200***		0.803***	
One year change in spousal income (NIS)	0.991***	0.991***	0.977***	0.976***
Monthly wage income (NIS 1,000's)	0.726***	0.725***	0.772***	0.772***
Annual spousal income (NIS 1,000's)	1.008***	1.008***	1.000	1.001
Parent to a child under the age of 2	1.692***	1.698***	1.024	1.010
Parent to child aged 5 - 9	1.066***	1.069***	1.068***	1.061***
Working in the public sector	0.613***	0.613***	0.703***	0.703***
Number of observations	490,949	490,949	372,912	372,912
Log likelihood	-97,389.2	-97,400.6	-81,409.0	-81,426.2
Number of individuals	109,734	109,734	92,439	92,439
<p><b>Notes:</b> The regressions are estimated for the years 2006-13, using only married women and men with monthly incomes between NIS 500 NIS and 9,000, in ages 23 – 62 and 23-67, respectively. We exclude observations from East Jerusalem. All the equations are estimated using logit with random individual effects and year fixed effects. Equations 1 and 3 control for spousal EITC-eligibility, while 2 and 4 do not. In all the regressions, "treated" individuals are those who are eligible for an EITC according to the ITA data. All the regressions also control for age, squared age, the number of working months during the previous year, and the number of different employers. We also include binary variables for: Ultraorthodox, Arabs, new immigrants (less than 15 years in Israel), veteran immigrants, parents to one or two children, parents to five children, parents of at least one child aged 15 - 17, 5 – 9 and 0 - 2, being a resident of a pilot zone, and employment in the public sector.</p> <p>- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.</p> <p><b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.</p>				

Although the sample used in Table 7 is much larger than in Table 2, and the control group matches the treated population less closely, the results are quite similar to those obtained for the pilot

<sup>39</sup> Equations with Individual fixed effects yield similar results, but drop the majority of the observations, in which the individual stayed employed throughout the period.

<sup>40</sup> Specifications in which we included interactions between EITC collection and the year 2010, in which the EITC was paid only for 4 months, yielded very similar results.

period, especially for men.<sup>41</sup> The odds ratios for both genders are between 0.7-0.75, implying that EITC eligibility reduces the probability of a working-person to exit employment by 1.5-2.0 percentage points (given the average 6.5-7 percent exit-rate during the sample period, reported in Table 1). The somewhat larger effect on women's eligibility may be associated with the higher take-up rate in this period, as compared to the pilot period, due to the more intensive government effort to advertise the program.

Turning to spousal-eligibility, we find some evidence that having an EITC-eligible husband increases the probability of the wife's exit from employment, indicating an income effect. However, this effect is not sufficiently large to offset the positive employment effect on EITC-eligible women. Accordingly, EITC-eligible women with a husband who is also eligible are less likely to exit employment than non-eligible women who do not have an EITC-eligible husband (the product of the coefficients of "treated", "treated and spouse treated" and "spouse treated" - 0.827). Moreover, we show below that very specific population segments drive even the spousal effect that we do find. Our findings therefore differ from those in the US and the UK, and are in line with the individual incentive structure in Israel. As for men, we find that a wife's eligibility to an EITC significantly reduces the probability that her husband will exit from employment.

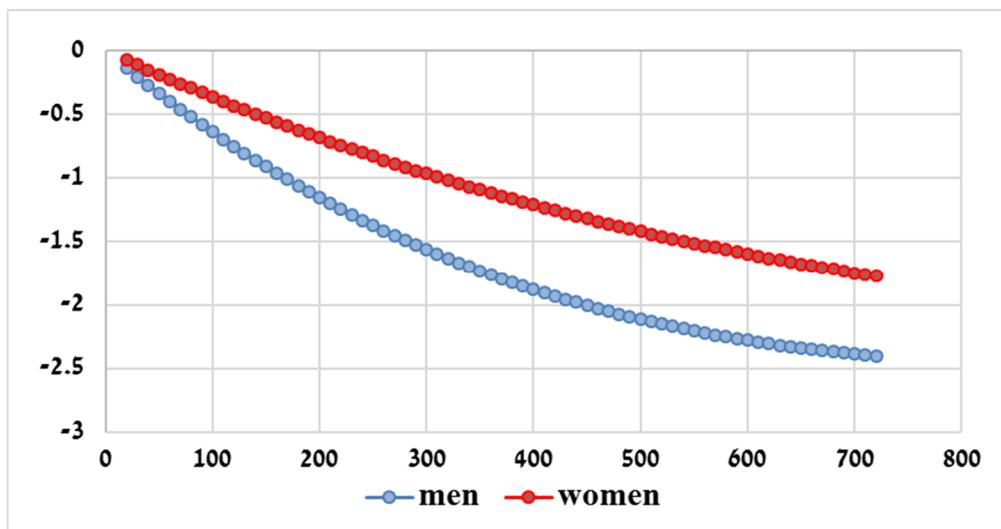
**Table 8 - The Effect of EITC Eligibility Amount on Exits from Employment, 2006-2013 (Logit Regressions, Odds Ratio)**

	Women		Men	
	(1)	(2)	(3)	(4)
EITC amount (NIS 100's)	0.968***	0.978**	1.064***	1.072***
Treated and EITC amount	0.928***	0.923***	0.882***	0.871***
EITC amount of the spouse (NIS 100's)	1.078***		0.995	
Treated and EITC amount of the spouse	0.975		1.051	
Number of observations	327,759	397,774	356,434	400,426
Log likelihood	-72,389.0	-79,190.2	-77,902.6	-79,860.8
Number of individuals	90,384	105,801	91,888	105,930
<p><b>Notes:</b> Logit equations estimated for the years 2006-13, using the same sample and control variables as in Table 7. Instead of the binary variable for EITC eligibility, we use the amount of EITC to which the individual is eligible. Equations 1 and 3 show the effect of the EITC amount (or the potential amount for those not eligible) on exits, for women and men, respectively, as well as the amounts to which their spouses are eligible. Equations 2 and 4 repeat the estimation, omitting the controls for the spouse's EITC amount.</p> <p>- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.</p> <p><b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.</p>				

<sup>41</sup> Hausman tests find that the results for women are not statistically different from those in Table 2. OLS results are reported in Table A.2 in the appendix.

In Table 8, as in Table 3, we replace the binary variable for EITC eligibility with the EITC amount to which the individuals were eligible. We find that a monthly increase of NIS 100 in the EITC amount reduces the probability of exit by 7 percent for women (odds ratio of 0.93) and by 12 percent for men, very similar to the effects found in the pilot period. We also find that the EITC amount to which the spouse is eligible (the coefficient of the interaction variable "spouse treated and EITC amount of the spouse") does not affect exits. In Figure 4, we depict the marginal effects of the EITC amount on exits for both genders.

**Figure 4: The effect of the Monthly EITC Amount (in NIS) on the Probability of Exits, 2006-2013 (Percentage points)**



Notes: The figure depicts the marginal effects of the EITC amounts (the interaction between the EITC amount and being eligible for the EITC), calculated based on equations 1 and 3 in Table 8, using the "margins" command in Stata. The figure shows the product of the marginal effect (when all the variables are held constant at their average values) and the EITC amount.

In Table 9, we report the results of robustness tests similar to those reported in Table 4, but now we focus on the spousal-treatment effect. The results are similar to those in Table 7 in both specifications: when the sample is restricted to individuals in the monthly income range of NIS 3,000 – 7,000 and when we restrict the sample to individuals with a working spouse.

One of the concerns in the estimation of the regressions in Tables 2 – 6, which are based on the pilot period, is that the results reflect a fixed effect of the particular localities that were assigned to take part in the program's pilot period. To mitigate that risk, we control in the nationwide sample for whether the individual resides in one of the pilot zones. We find some indications that residing in these zones actually **increases** the likelihood of exits, mitigating the concern.

**Table 9 - The Effect of EITC Eligibility on Exits from Employment, Robustness Tests, 2006-2013 (Logit Regressions, Odds Ratio)**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	0.698***	0.754***	0.667***	0.725***
Spouse treated	1.178*	1.177***	0.966	0.787***
Treated and spouse treated	0.940	0.913	0.908	1.090
Number of observations	295,794	366,146	225,398	250,035
Log likelihood	-49,596.2	-70,425.1	-49,495.5	-49,078.7
Number of individuals	83,572	87,754	70,481	69,993

**Notes:** Logit equations estimated for the years 2006-13, using the same sample and control variables as in Table 7. In equations 1 and 3 we narrow the monthly income range to NIS 3,000 - 7,000. In equations 2 and 4, we include only individuals whose spouses are working (defined as earning at least 500 NIS monthly).

- \*\*\* Significant at 1 %; \*\*significant at 5 %; \*significant at 10 %.

**Source:** Administrative data of the Israeli Tax Authority and authors' calculations.

To explore the possibility of a special pilot zones effect further, we estimated "placebo" equations for 2005-2006 based on the specifications used in Table 2 for 2008-2009. These equations intend to examine whether the results we find are an artifact of the econometric design and reflect characteristics of the pilot zones that reduce exits, rather than an EITC effect, because the program was not in effect in 2005-2006. To the extent that the results we obtained so far are indeed driven by the EITC, we expect to find no similar effect in the "placebo" tests. The results are reported in Table 10. We find no "treatment" effect in these years for women, nor spousal "eligibility effect". For men, the coefficients suggest that residing in the pilot zones may be actually associated with a **higher** probability to exit employment, indicating that, if anything, our estimates may be too conservative.<sup>42</sup>

<sup>42</sup> In further robustness tests, we estimated several regressions on narrower income bands surrounding the EITC trapezoid. These regressions find similar results to Table 7 and are available upon request from the authors.

**Table 10 - The Effect of EITC Eligibility on Exits from Employment,  
Placebo Test, 2005-2006 (OLS and Logit Regressions, Odds Ratio)**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	0.929	-0.004	1.259***	0.025***
Spouse treated	1.162	0.010	0.815**	-0.022**
Number of observations	40,535	40,535	37,551	37,551
Log likelihood	-9,864.1		-12,168.4	
R squared		0.028		0.020

**Notes:** The regressions are estimated for the years 2005-6. The sample includes married individuals that, based on their income and family characteristics, would have been eligible for an EITC had the program been in place during the years 2005-6. Because of incompleteness, observations from East Jerusalem are excluded. In all the regressions, we define "treated" as being a residence of a pilot zone (i.e. eligible for an EITC had the program been in effect) and the control group are those living outside the pilot zones. We define spouse "treatment" in the same way. In all the regressions, we include the same control variables as in Table 2.  
Equations 1 and 3 are logit estimations (for which we report the odds ratios), and equations 2 and 4 are estimated using OLS.

- \*\*\* Significant at 1 %; \*\*significant at 5 %; \*significant at 10 %.

**Source:** Administrative data of the Israeli Tax Authority and authors' calculations.

## 5.2 Panel regressions: impact on exits of specific groups

In this sub-section, we examine the impact of the EITC implementation on exits of specific groups. This analysis is of particular policy relevance since some population segments in Israel are characterized by low participation rates, which calls for analyzing whether the EITC is a "game changer" for them. Two groups with particularly low participation rates are Arab women and Ultraorthodox men.<sup>43</sup> Interestingly, the EITC take-up rate among the Arab population is slightly lower than the average, while among the ultraorthodox it is much higher.

The (not mutually exclusive) groups we analyze are Ultraorthodox, Arabs, Younger individuals (less than 35 years old), and a core group that includes all married individuals aged 35-55, that are not ultra-orthodox, Arabs, or new immigrants. The regressions are estimated separately for each group based on specifications 1 and 3 in Table 7. We also report for comparison the results for the entire sample ("All").

Table 11 shows the results for women, indicating a negative and statistically significant effect of EITC eligibility on exits among all the groups. We also find that the effect is larger in the "core"

<sup>43</sup> Brender and Strawczynski (2006) show that the Ultraorthodox and Arab groups are characterized by persistent low participation; this is partly due to cultural barriers among members of these groups.

group and among older women than among the other groups. It is worth noting, however, that due to the higher tendency of Arab women to exit employment (9.9%, as compared to 5.7% for the entire population, as reported in the 2<sup>nd</sup> row from the bottom of the table); the EITC effect on their exits in percentage points is quite similar to the effect in the other groups.

**Table 11: Treatment Effects by Group – Women (2006-2013)**

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Core	Ultra-orthodox	Arabs	Older (55+)	Young (23-35)
Treated	0.716***	0.591***	0.808**	0.826***	0.594***	0.740***
Treated and spouse treated	0.962	1.217	0.757	1.121	0.746	0.852*
Spouse treated	1.200***	1.003	1.422*	0.931	0.999	1.358***
Number of observations	490,949	175,429	19,951	44,214	50,265	232,707
Log likelihood	-97,389.2	-29,947.8	-3,341.6	-12,704.3	-9,428.3	-50,291.5
Percent of exits	5.7	4.7	4.7	9.9	5.3	6.3
Number of individuals	109,734	45,075	4,217	11,556	15,698	62,349
<b>Notes:</b> The regressions are estimated separately for each group using the specification of equation 1 in Table 7.						
- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.						
<b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.						

As for the effect of spousal eligibility: only within two groups - Ultraorthodox and Young women - there is a significant positive effect on exists of an EITC eligibility of spouses. That is, when husbands are eligible for an EITC, their wives are more likely to stop working. These two groups account for the spousal effect found for the full sample in Table 7. Moreover, this effect is fully offset if the wife is also eligible for an EITC.<sup>44</sup> In all the other groups, we do not find a significant effect of the husband's eligibility for an EITC on the wife's employment.

The results for Ultraorthodox women are not surprising. Many Ultraorthodox families settle for low financial income, so a transfer to the husband is likely to be reflected in a reduction in the employment of the wife, if she does not receive a transfer as well. As for the young women, we explored the result further, noting that, by construction, this group is composed of young

<sup>44</sup> About 60 percent of the women with an EITC eligible spouse in our sample are also eligible themselves. Among men, the comparable proportion is about 40 percent.

mothers.<sup>45</sup> Indeed, when we remove from the sample (not shown) mothers to children in the ages of 0-2 (12% of the sample of young women), the spousal effect is decreased by more than 60% and loses its statistical significance. Therefore, the spousal eligibility effect is entirely driven by Ultraorthodox women and mothers to newborn children.<sup>46</sup> As for the latter, this effect should be viewed as less concerning than exits among other groups since Brender and Strawczynski (2015) find that exits of young mothers in Israel last up to two years, and these mothers recover their previous wage levels within a short period.

Table 12 reports the results for men, indicating that the negative effect of EITC eligibility on exits is present in all the groups. The size of the odds-ratio is quite stable at 0.7-0.8 except for ultraorthodox men for whom the effect is significantly larger – 0.56. The latter group is the one with the lowest participation rate among men in the Israeli labor market (although here we observe the ultraorthodox men who do work). We also find that wives' eligibility to the EITC **reduces** exits consistently across all groups, except older men (age 55+). This result is in line with findings in the literature that men tend to increase employment in response to an increase in their wife's income and employment (Knabe, Schoeb and Weimann, 2016).

**Table 12: Treatment Effects by Group – Men (2006-2013)**

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Core	Ultra-orthodox	Arabs	Older (55+)	Young (23-35)
Treated	0.738***	0.704***	0.562***	0.771***	0.785***	0.675***
Treated and spouse treated	1.084	1.115	1.231	1.136	0.954	1.304**
Spouse treated	0.803***	0.812***	0.664**	0.755**	1.011	0.647***
Number of observations	372,912	99,275	11,152	76,360	63,451	153,668
Log likelihood	-81,409.0	-22,165.0	-2,410.5	-17,727.0	-13,945.5	-32,237.1
Percent of exits	6.3	6.5	6.2	6.9	6.4	5.9
Number of individuals	92,439	29,375	2,683	17,601	17,410	47,728
<b>Notes:</b> Notes: The regressions are estimated separately for each group using the specification of equation 1 in Table 7.						
- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.						
<b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.						

<sup>45</sup> For a young man – the husband - to be eligible, the couple must have at least one child.

<sup>46</sup> Beyond the direct effect of having a newborn child, which is controlled for in all the regressions and is positive, large, and statistically significant.

### 5.3 Propensity Score Matching (PSM) and diff-in-diff Analysis

In this sub-section, we perform the diff-in-diff analysis by using the PSM method, still focusing on married people in working ages with monthly incomes of NIS 500 - 9,000.<sup>47</sup> We restrict the analysis to the effect of the EITC on recipient's exits.

In the first stage, we select a fixed population of individuals who worked before and after the EITC's implementation. By examining the same individuals over time, we aim at neutralizing idiosyncratic elements related to their labor market preferences, and a possible common trend. Thus, we leave room for a more precise identification of the treatment (EITC) effect. To do that, we select individuals that worked in 2012, when the program was operational nationwide, and then trace them in the 2006 data. This backwards selection process results in a loss of about 43 percent of the original 2012 sample, but the decline is similar among the treatment and control groups, alleviating the concern for a sample selection bias. In the second stage, we estimate probit equations of the treatment variable, defined as "being eligible for an EITC". We estimate it separately for men and women in 2012. The explanatory variables are those that appeared in Regression 1 in Table 2. Using the obtained coefficients, we then calculate the predicted probability of receiving an EITC. In the third stage, the observations are arranged using "the nearest neighbor criterion" (with "no replacement"): we select from the untreated group a subsample that includes for each treated individual the non-treated person with the closest probability of being treated, based on the prediction of the probit equation. Finally, we subtract the average of the outcome variable (exits) of the selected control group of "nearest neighbors" from that of the treatment group in 2006 and in the treatment year 2012;<sup>48</sup> the difference of the differences between the base year and the treatment year is the treatment effect, and we perform a t test to examine its statistical significance. Figure 4 depicts the results for men and women.

The results are similar for men and women: the diff in diff is statistically significant in all cases (not reported) and has the expected sign. The differences between the exit rates of the treatment and the control groups in 2006 – prior to the EITC implementation – are small and not statistically significant, and they increase significantly (both statistically and economically) in 2012, when the program was in place. In that year the differences in exit rates for both men and women are about 3 percentage points (about 40% of the overall exit rate of the relevant population reported in Table 1).<sup>49</sup> Another interesting result is that among the treated women the exit rates declined between

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<sup>47</sup> We also performed (not reported) the analysis for the whole sample (i.e. including also non-married individuals). In that analysis, we also find that the EITC is associated with a significant decrease in exits.

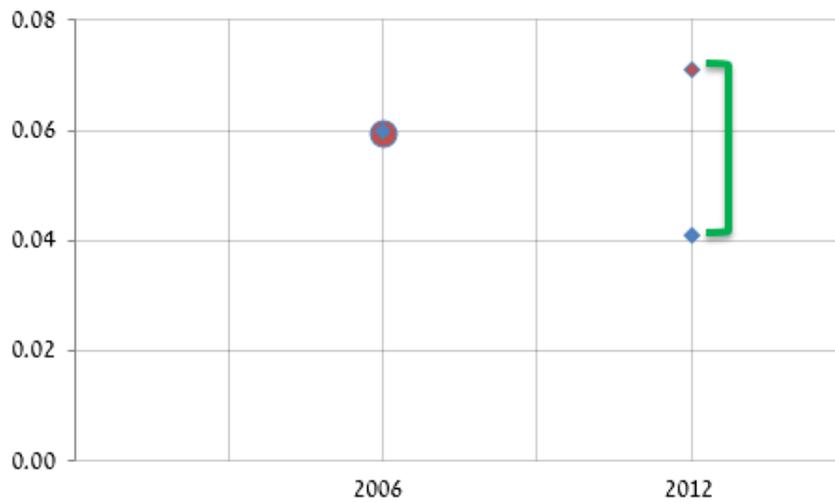
<sup>48</sup> We remind that exits in 2012 imply that an individual who worked in 2012 stopped working in 2013, and similarly an employee in 2006 stopped working in 2007.

<sup>49</sup> Alternative estimations yield an effect size between 1.5 to 3 percentage points.

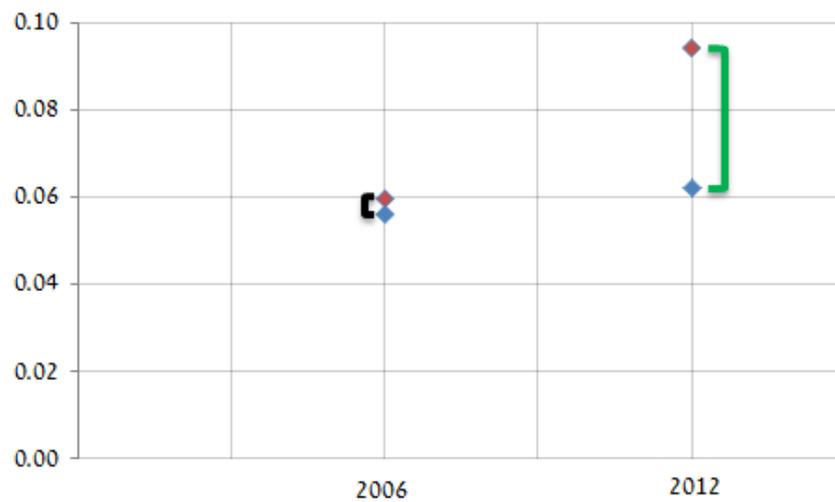
2006 and 2012, while among men they did not, but increased significantly in the control group. This increase in exits among the control group, while exits decrease in general (Table 1) may reflect a general equilibrium impact of the EITC on wages, as suggested by Rothstein (2010): the implementation of an EITC Program might have reduced the wages at the low-income range, curtailing the incentives of non-recipients to work.

**Figure 4**

**4a: diff in diff for women exits - 2012 compared to 2006**



**4b: diff in diff for men exits - 2012 compared to 2006**



**Notes:** the two points on the left show the percentage of exits from employment of the treated group (blue point), and the control group (red point) in 2006, before the EITC's introduction. The two points on the right, show the percentage of exists from employment in 2012.

**Source:** authors' calculations based on administrative data of the Israeli Tax Authority.

As an additional test we use the estimated coefficient of the probabilities to be treated that were calculated in 2012, to generate an exit probability for individuals in 2005 and 2006. That is, we

multiply each coefficient by the variables of each individual. We then use the estimated probabilities to be "treated" as a "placebo" test in an equation that predicts exits in 2005 and 2006. We find that the coefficients for this variable are positive (although small) and statistically significant. This implies that if anything, our estimates of the EITC effect may be understating the true effect, because the set of characteristics that determines eligibility is associated with a higher tendency to exit from employment.

## **6. Summary and Conclusions**

This paper analyzes the effect of the EITC program in Israel on exits from employment of the eligible population. We also examine whether the negative effect of the EITC on employment of married women found in the US and the UK, due to its design according to family income, disappears when the system is constructed on an individual basis, as is the case of Israel. For this purpose, we use Israeli administrative data for the period 2005-2014, which comprises years before and after the implementation of the EITC. This period includes a sub-period in which the EITC was applied only in certain parts of the country (the pilot zones) and a sub-period in which it was implemented on a nationwide basis. The first sub-period allows us to examine very similar treatment and control groups before and after the implementation of the program, comparing areas that were subject to treatment to areas where the program was not applied. Since our administrative data allow us to examine only whether individuals stayed employed or not (as opposed to entrances, for which we do not know the employment history of individuals, or hours of work – the intensive margin), we focus on exits from employment.

We find that EITC-eligibility is associated with a reduction of 1-1.4 percentage points in exits of women from employment, with some variation between specific groups. Quantitatively, this effect is economically significant and reduces exits among the treated population by 20-25 percent. The effects on exits of men are similar, or slightly larger in some specifications. We also find, as expected, that a larger transfer is associated with a stronger impact on exits: a monthly increase of NIS 100 is associated with a decrease of 0.4-0.7 percentage points in the probability of exits. To the extent that this is a net effect on employment,<sup>50</sup> it translates to an increase of about 0.1-0.15

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<sup>50</sup> The difference in differences methodology cannot identify whether the treatment effect is solely driven by a decrease in exits of the eligible employees, or also by an increase in the exits among the control group. We also cannot control for potential negative effect on entries, although this would seem to be a less likely outcome of the program.

percent in employment annually<sup>51</sup>, compared to an overall average increase in employment of about 2 percent. This is a worthy return for a program that costs less than 0.1 percent of GDP.

Turning to intra-family effects, we find that spousal eligibility for the EITC has no negative effect on the employment of men (and possibly a positive one). As for women, we find a small negative effect of husbands' eligibility on their wives' employment, when the wife is not eligible for an EITC (possibly due to the income effect), and no effect when the wife is also eligible. This effect is present only in the ultraorthodox population and among mothers in ages 22-35 who have newborn children (ages 0-2). Combining the individual and spousal effects, married women's employment is positively affected by EITC eligibility in all population segments, even when their spouses are also eligible.

Our findings stress the role of EITC programs' design in boosting employment of low-income families and suggest a non-negligible effect on overall employment. They also indicate an important tradeoff between precise targeting of the program towards low-income working families, as done in the US and the UK, and efficiency considerations, in terms of the EITC's employment effects. The findings are particularly relevant in light of the major contribution of two earners' participation to family's poverty alleviation in Israel (Bank of Israel, 2016) and because there is a rising policy interest in introducing EITC-like programs in OECD countries.

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<sup>51</sup> Our sample range covers about 36% of all the employees in Israel, and 23% of the sample are eligible to the EITC (Table 1).

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### Appendix A: OLS Estimations

In this appendix, we show the results of an OLS estimation for both men and women during the two relevant sub-periods. The results are consistent with the ones obtained using logit regressions.

**Table A.1 - The Effect of EITC Eligibility on Exits from Employment for at Least One Year, 2008-2009**

	<b>Women</b>		<b>Men</b>	
	(1)	(2)	(3)	(4)
Treated	-0.009*	-0.011**	-0.023***	-0.019***
Spouse treated	-0.009		0.020*	
One year change in spousal income (NIS)	-0.001***	-0.001***	-0.002***	-0.002***
Monthly wage income (NIS 1,000's)	-0.016***	-0.016***	-0.021***	-0.021***
Annual spousal income (NIS 1,000's)	-0.004***	-0.004***	-0.003***	-0.003***
Parent to a child under the age of 2	0.030***	0.030***	-0.014***	-0.013***
Parent to child aged 5 - 9	0.008**	0.008**	-0.0001	-0.00004
Number of observations	28,290	28,290	27,069	27,069
R squared	0.037	0.037	0.026	0.026
<b>Notes:</b> The regressions are estimated in OLS using the same sample and specification as in Table 2.				
- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.				
<b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.				

**Table A.2 - The Effect of EITC Eligibility on Exits from Employment for at Least One Year, 2006-2013**

	Women		Men	
	(1)	(2)	(3)	(4)
Treated	-0.010***	-0.010***	-0.013***	-0.014***
Treated and spouse treated	-0.009**		0.004	
Spouse treated	0.012***		-0.016***	
One year change in spousal income (NIS 1,000's)	-0.0003***	-0.0003***	-0.0005**	-0.0005***
Monthly wage income (NIS 1,000's)	-0.018***	-0.018***	-0.017***	-0.017***
Annual spousal income (NIS 1,000's)	-0.00002	-0.00004	-0.001***	-0.001***
Parent to a child under the age of 2	0.023***	0.023***	-0.0008	-0.002
Parent to child aged 5 - 9	0.008***	0.008***	0.002	0.001
Working in the public sector	-0.006***	-0.006***	-0.009***	-0.009***
Number of observations	490,949	490,949	372,912	372,912
R squared	0.120	0.120	0.105	0.105
Number of individuals	109,734	109,734	92,439	92,439
<b>Notes:</b> The regressions are estimated in OLS using the same sample and specification as in Table 7.				
- *** Significant at 1 %; **significant at 5 %; *significant at 10 %.				
<b>Source:</b> Administrative data of the Israeli Tax Authority and authors' calculations.				