Optimal EITC in the presence of cultural barriers for labor market participation

By Michel Strawczynski

June 2019

Abstract

In this paper I simulate the entrance to the labor market in the presence of cultural barriers that constraint labor market participation of low-income workers. In this case, an optimal EITC depends on social planner’s relative preferences for persistently unemployed and working poor. I check EITC optimality under different types of social planners - from mild inequality averse to Rawlsian; and different kinds of policy makers – conservative, who favors the Working Poor, and liberal, who tolerates cultural barriers and favors the unemployed. Using simulations, I find that the imposition of an EITC is optimal in all cases, except for a Rawlsian and liberal policy-maker under the unusual case of full compliance to minimum wage. By calibrating the model for Israel, a country with well-documented cultural barriers for labor market participation, I find that the proposed framework will remain relevant in the foreseeable future. In light of these results and of EITC documented advantages, its scare use in developed economies remains an open question that merits further research.

Key Words: EITC, cultural barriers, social planner.

JEL Classification Numbers: H24, H31, H53

---

1 Hebrew University of Jerusalem, Department of Economics and Bank of Israel, Research Department; email: michel.strawczynski@mail.huji.ac.il.
1. Introduction

The Earned Income Tax Credit (EITC) was imposed in the US in the mid 70's. Afterwards, other countries adopted this system, that co-exists with other tools for coping with poverty like child allowances, income maintenance for chronic unemployed, and minimum wage. Many papers analyze the optimality of the EITC, which is dependent on extensive and intensive margins elasticities, available budget for re-distribution, labor aversion by individuals and social planner inequality aversion. However, the literature is silent about a crucial characteristic related to low income individuals' participation: cultural barriers. These barriers, together with the low opportunity cost of staying unemployed because of a low hourly wage and an honorable income maintenance transfer, bring about an equilibrium in which the persistently unemployed avoids labor participation—posing a dilemma for policy makers: is it optimal in the short run to give a transfer to the unemployed or to implement an EITC? In this paper I build a model with an endogenous participation decision, which is characterized by cultural barriers. Using this model, I run simulations for different types of policy-makers and different behavioral parameters which are empirically plausible. I also apply the model to Israel, where there are two well-characterized low-income groups in which only one earner participates within the couple—because of well-known cultural barriers.

The seminal paper that analyzes EITC optimality is Saez (2002). Note, however, that Saez's framework is based on exogenous extensive-margin elasticities, without modeling explicitly the entrance of the poor to the labor market; this decision crucially depends on cultural factors and on the income effects related to the social transfer given by the government in case of non-participation. In this paper I mimic the Working Poor's entrance decision to the

---

2 As I show in the literature survey, cultural barriers are clearly relevant for immigrants. However, in the present context it is so mainly for the second generation. The topic of desired policy concerning first immigrants’ generation is a crucial policy issue, which is beyond the scope of the present paper.
labor market, and calculate the optimal EITC vis-à-vis the optimum social transfer that is provided by the government to the persistently unemployed. Like in Saez (2002), there is a crucial role to the inequality aversion of the social planner. Moreover, Saez (2002) stresses the difference between a liberal policy-maker (who gives a higher social weight to the chronic unemployed agent) and a conservative one (who gives a higher social weight to the Working Poor). In this paper I provide an explicit definition of a liberal policy maker: he/she is the one that tolerates cultural barriers.

The paper is organized as follows. In the next section I present a literature survey on cultural barriers, an example of cultural barriers using the case of Israel and a model that characterizes participation in the presence of cultural barriers. In section 3 I characterize optimal government policy for different types of inequality averse social planners, for both conservative and liberal policy-makers. Section 4 presents an application for the case of Israel, after calibrating cultural barriers according to observed behavior of the relevant groups at the labor market; section 5 calibrates results using a CRRA utility function. Section 6 includes a summary and conclusions.

2. A framework with cultural barriers for participation

2.1 Literature Survey on cultural barriers and labor market participation

Reimers (1985) makes a clear case for explaining the importance of cultural barriers in labor market participation. Her analysis shows that differences among ethnic sub-cultures may affect the labor supply of wives more than any other types of economic behavior. She stresses that these cultural differences may give rise to differences in the utility functions that lead to systematic differences in behavior by women in different ethnic or nativity groups. She claims that these cultural forces evolve slowly than economic conditions. In her work, which is based on the US labor market, she shows that one of the most evident effects is a lower participation of wives at the labor market, as can be seen in foreign born Asians, white Non-Hispanics and
even more clearly on Hispanic wives. She shows in her work that this result is related mainly
to particular characteristics that differ among these populations compared to white American
wives: language, family size, age composition and education.

The role of cultural factors among first-generation foreign-born workers in the US was
confirmed by Antecol (2001). Her empirical evidence reveals that for first generation
immigrants, over half of the overall variation in the gender gap in labor force participation is
attributable to home country labor force participation. This suggests that there exists a
permanent, portable factor, i.e., culture, that is not captured by observed human capital
measures, that affects outcomes. The smaller role of home country labor force participation
rates for second-and-higher generation immigrants, provides evidence of cultural assimilation
in the long-run.

Ghazal Read (2004) analyzes the role of cultural and ethnic factors by comparing labor force
participation of Arab-American women to US born workers. He shows that Arab-American
women behavior at the labor market is almost entirely due to traditional cultural norms that
prioritize women’s family obligations over the economic activity.

Fernandez and Fogli (2005) use past female labor force participation and total fertility rates
from the country of ancestry as cultural proxies. These variables should capture, in addition
to past economic and institutional conditions, the beliefs commonly held about the role of
women in society, i.e. culture. Given the different time and place, only the beliefs embodied
in the cultural proxies should be potentially relevant to women’s behavior in the US in 1970.
They show that these cultural proxies have positive and significant explanatory power for
individual work and fertility outcomes, even after controlling for possible indirect effects of
culture (e.g., education and spousal characteristics). They examine alternative hypotheses for
these positive correlations and show that neither unobserved human capital nor networks are
likely to be responsible. They also show that the effect of these cultural proxies is amplified
the greater is the tendency for ethnic groups to cluster in the same neighborhoods.
2.2. Documented advantages of the EITC

It is important to stress that the main documented advantage of the EITC is related to poverty alleviation. In fact, in late years both in academic studies (Kleiven, 2017) and in implemented plans, it was recognized that the employment effects of the EITC are important in terms of incentives – and less so in terms of actual increase in participation. These findings are in line with the spirit of the model presented in this paper, since under cultural barriers the employment effect is of minor importance.

The EITC program was found to have a positive effect 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 Michelmore (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, 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.

2.3 Cultural barriers: the case of Israel

The ultraorthodox men in Israel have a low participation rate because their life mandate is to study the bible, an occupation that is performed full-time. Figure 1 compares ultraorthodox men participation to other countries and other groups in Israel.
From this figure it is evident that the Ultraorthodox men group has a low participation rate, both compared to other men groups in Israel and to men in other countries. It is well-known that the reason for this feature is the ultraorthodox way of life – which acts as a barrier for labor market participation.

**Figure 1**

![Participation rate, Men (ages 25-64)](image)

Source: OECD, 2008

Cultural barriers are relevant also for Arab women: their family acts in a "traditional family" framework, according to which the men participate in the labor market and women stay at home, so as to be involved in children’s education (Figure 2). Note that Arab women in Israel act in a similar pattern as women in Turkey; Ultraorthodox women, by contrast, are characterized by a normal participation rate. I also stress that as a consequence of the existence of a single low-income earner, both Arab and ultraorthodox families are characterized by a poverty rate that is higher than 50 percent.
The result that emerges from these figures was confirmed by the negative participation dummies obtained by Brender and Strawczynski (2006) for both Ultraorthodox men and Arab Women. Different papers about Israel's labor market have characterized the impact of cultural aspects on this phenomenon. Eckstein and Lifshitz (2012) analyzed the role of a traditional family as opposed to a modern one: while the first type is characterized by participation of men and non-participation of women, in the second type we shall expect participation of both wage-earners which implies a lower risk for remaining below the poverty line. Yashiv and Kasir (2013) analyzed also the role of the traditional family on Arab women's labor participation; they show that the inclusion of usual explanators (like age, education and gender) poorly perform on explaining Arab women's low participation. They claim that this result is opposed to the inclusion of cultural factors, which according to their regressions explain more than 60 percent of Arab women's labor participation.
2.4 The Model

As shown by Regev and Strawczynski (2016) the participation decision of the poor shall consider income effects since those constitute an important factor for the participation decision. This is not the case for the tax payer who participates full time, and in his/her case there is no need to model income effects. Thus, in this section I work with different utility functions for these two groups, so as to make the analysis analytically tractable. I first characterize the behavior of the tax contributor who is the one that finances re-distribution.

2.4.1 Modeling behavior of the Tax Contributor

I choose the simplest utility function which allows a realistic characterization that depends on a constant labor elasticity:

\[ U^T = c - \frac{lt^{1-k}}{1-k} = w(1 - t)l - \frac{lt^{1-k}}{1-k} \]

Where \( U^T \) represents the utility of the tax payer, \( c \) represents consumption, \( l \) represents labor, \( w \) is the hourly wage, \( t \) is the income tax rate and \( k \) is a parameter. Deriving utility with respect to \( l \) implies the following labor supply:

\[ l = \left[ w(1 - t) \right]^{\frac{1}{k}} \]

It is easy to show that the constant labor elasticity in this case is: \( \eta = -\frac{1}{k} \). In model of re-distribution it is common to assume that the government maximizes the tax revenues from the richer group; however, since in this case we have assumed the existence of a single rich bracket, this assumption would imply that the tax rate is chosen so as to be at the maximum

---

3 This assumption is made only for achieving an analytical solution which technically eases the analysis and avoids the need for simulations. The parameters used under this function assure that the solution keeps relevance compared to reality. In section 5 I use an equal CRRA utility function for both low and high wage individuals, and by using simulations I show that the basic results that I have obtained concerning the optimal EITC are relevant also in this case.

4 This function was used in many papers aiming at characterization of re-distribution; among others see Mattos (2008) and Dahan and Strawczynski (2012).

5 See f.e. Piketty, Saez and Stantcheva (2014).
of the Laffer curve. Since this assumption is unrealistic, I choose a government rule according
to which the government chooses half of the Laffer tax rate. In order to calculate the Laffer
tax rate we maximize income tax revenues:

\[
T = twl = t w^{k-1} k (1 - t) \frac{1}{k}
\]

\[
\frac{\partial T}{\partial t} = w^{k-1} k (1 - t) \frac{1}{k} + t (1 - t) \frac{k-1}{k} = 0
\]

Solving this F.O.C. results in the following Laffer tax rate:

\[
t = \frac{k}{k-1}
\]

Using the labor elasticity \( \eta = -\frac{1}{k} \), we re-write the Laffer tax in terms of the labor elasticity:

\[
t' = \frac{1}{1+\eta}
\]

This means that the optimal tax rate that I will consider is:

\[
t'' = \frac{1}{2(1+\eta)}
\]

This result states that the optimal tax is inversely related to the labor supply elasticity: the
higher the elasticity the lower the optimal tax rate.

**2.4.2 Modeling the behavior of low-income individuals**

Assume that individuals obtain utility from consumption and leisure according to the following
standard CRRA utility function:

\[
V_i = c_i^{1-\theta} + \delta_i (1-I_i)^{1-\theta} \frac{1}{1-\theta}
\]

Where \( V \) represents utility of low income individuals, \( c \) represents consumption, \( I \) represents
labor, \( \theta \) is the constant relative risk aversion parameter and \( \delta \) is the labor aversion parameter.

The labor aversion parameter, which has been recently analyzed by Regev and Strawczynski
(2016), represents a cultural bias: a high $\delta$ implies that for cultural reasons the poor individual will seriously consider whether to participate or not. This cultural barrier is crucial for analyzing the desired policy with respect to the working poor — since a central matter of the discussion is the approach of policy makers to individuals that participate in the labor market at any circumstances (those that are characterized by a low $\delta$) compared to others that tend to stay out of the labor market because of cultural barriers (and are characterized by a high value of $\delta$). Note that in the long-run this parameter can evolve and change as a consequence of the government policy, which will imply a different equilibrium; moreover, government policy tools may not only include transfers but could be based on effective education policies, with long-run implications that are beyond the analysis of the present paper. The analysis presented here follows the approach of Apps, Long and Rees (2014), who calculate optimal policy for a given wage and tastes distribution that cannot be changed by the policy-maker. As these authors claim, while the policy outcome does not necessarily represent the ultimate policy action to be pursued, it provides an interesting characterization of the optimal government policy in the short-run.

At this stage let us assume that government intervention is characterized by a social transfer IM (Income maintenance) which is received independently to participation at the labor market. Under this assumption the following is the budget constraint of individuals $i$:

$$c_i = IM + w_il_i$$

where IM is the social transfer and $w$ is the wage of a unit of labor.

**Individual's Maximization**

Maximizing utility for the given budget constraint drives the following F.O.C.:

---

6 Such an analysis is presented by Regev and Strawczynski (2016).

7 Malul and Luski (2009) show that when education is part of individual’s decisions the EITC is not necessarily an optimal tool for young individuals.
\[
\frac{w_i}{(I+M+w_i I)^\theta} = \frac{\delta_i}{(1-I)^\theta}
\]

Which derives in the following labor supply function:

\[(8) \quad l_i = \frac{w_i^{1/\theta} - IM\delta_i^{1/\theta}}{w_i^{1/\theta} + \delta_i^{1/\theta} w_i^{1/\theta}}
\]

Note that in the general case (i.e., \(\theta \neq 1\)) the imposition of an EITC, that is symbolized by \(e\), implies both a substitution effect and an income effect. The labor supply in this case is:

\[(8') \quad l_i = -\frac{[w(1+e)^{1/\theta} - IM\delta_i^{1/\theta}]}{[w(1+e)]^{1/\theta} + \delta_i^{1/\theta} w(1+e)\delta_i^{1/\theta}}
\]

It can be shown that for a low \(\delta\) (which represents the case of the working poor) the derivative of labor with respect to the EITC is positive\(^8\); i.e., the EITC raises labor supply – which implies that the positive efficiency effect dominates. For the sake of simplicity, I will solve first the logarithmic case \((\theta = 1)\) in which the labor supply function is:

\[(9) \quad l_i = \frac{1}{1+\delta_i}\left(1 - \frac{IM\delta_i}{w_i(1+e)^{1/\theta}}\right)
\]

Note that the working poor will be characterized by a low \(\delta\) and consequently in his/her case \(l>0\). Note also that labor supply is affected positively by wage increase and by the imposition of an EITC\(^9\), and negatively affected by an increase in the labor aversion parameter and the social transfer.

Concerning the general case, note that in order to have a positive labor supply the term in parenthesis must be positive – which is not always the case. First, note that according to the

\(^8\) For a high \(\delta\), which represents cultural barriers, the derivative of labor supply with respect to the EITC may be positive or negative depending on the values of the wage and risk aversion. However, since for this case we assume a high \(\delta\), the individual with cultural barriers does not participate, and consequently does not receive an EITC.

\(^9\) In the logarithmic case \((\theta = 1)\) the income effect of the EITC as shown in the first term of the denominator of \(8'\) does not exist, because it cancels out with the same term in the numerator. Note that when there are cultural barriers (i.e., \(\delta\) is high) the EITC will not affect the entrance decision since the term in the numerator of \(8'\) will be negative. Thus, the omission of the income effect that is related to the EITC subsidy in the logarithmic case is of a minor importance in this analysis.
focus of our analysis the wage for a unity of labor is expected to be homogeneous and equal to the minimum wage; i.e., we will assume that for all low-income individuals $w_i = w$. Second, note that for simplicity we can think of two types concerning labor aversion tastes of low income individuals: those who work and have a low value of labor aversion, $\delta_W$, who participate permanently at the labor market and are symbolized by $W$; and those that have a high value of labor aversion, $\delta_U$, who tend to stay out of the labor market, and are symbolized by $U$. We will expect that the individual of type $U$ will not participate at the labor market in a permanent status, given his high labor aversion; the opposite will be the case for individual of type $W$:

$$\delta_U > \frac{IM}{w}; \delta_W < \frac{IM}{w}$$

Note that this characterization differs from Saez (2002), since in his framework the optimality of EITC depends on the extensive margin elasticity, which determines the extent of entrance to the labor market by the unemployed once the EITC is imposed; while here, it depends on social planner preferences, since the unemployed do not participate on a permanent basis. In my framework the entrance (exit) decision is associated only to the working poor.

Note also that this characterization of labor participation is consistent with the empirical results obtained in the literature concerning the effect of EITC on entrances and exits. Klaven (2018) claims that the EITC did not have a clear impact on entrances to the labor market, a result that is consistent with individuals of type $U$ that have a high threshold wage and consequently do not react to a small incentive; while Brender and Strawczynski (2019) found a significant impact of the EITC on exits reduction: this feature is consistent with model’s theoretical predictions about group $W$, who considers participation in the labor market on a permanent basis. In other words, many individuals among this group do not have cultural barriers today, possibly after overcoming those in the past; given this fact, for these individuals
the EITC is expected to be effective at the margin, reducing their exits from participation at the labor market.

Since the government is aware of cultural barriers, I assume that the design of government policy takes this feature into account which implies that the IM transfer is contingent on being permanently unemployed (or not participating\textsuperscript{10}). Thus, we will have the following budget constraints for individuals W and U:

\begin{align*}
(11) & \quad c_U = IM \\
(12) & \quad c_W = w_l w (1 + e)
\end{align*}

Where e is the optimal Earned Income Tax Credit (EITC) that is transferred to the working poor.

**Government’s Maximization**

The government maximizes a social welfare utility function of the following type (for low-income individuals):

\begin{equation}
(13) \quad MAX_e \sum_i \frac{\varepsilon u_i^{1-v}}{1-v}
\end{equation}

Where \(v\) is the inequality aversion parameter. Note that two particular cases are the utilitarian social planner (\(v=0\)) and the Rawlsian social planner (\(v\) tends to infinity). A peculiar component of this function is the parameter \(\varepsilon\), which is intended to represent the approach introduced by Saez (2002) which differentiates between a liberal type of social planner and a conservative one. In Saez’s framework, where the extensive-margin elasticities are exogenous, when the EITC is optimal for the liberal social planner, it would be necessarily so also for the conservative one. In our case the optimal decisions of low-income workers are a crucial feature, since the use of a particular transfer can make the difference between participating

\textsuperscript{10} Income maintenance systems are usually contingent on chronic unemployment. Concerning participation, an appropriate tool would be selective (i.e., mean-tested) child allowances.
or not in the labor market. The main question I will ask is whether the EITC is optimal for the different types of social planners – which will be characterized both in terms of political stand (liberal or conservative) and inequality aversion (in the range from utilitarian to Rawlsian).

In my set-up for the liberal social planner I will assume:

\[(14) \varepsilon_U > \varepsilon_W\]

While the opposite will be true for a conservative social planner:

\[(15) \varepsilon_W > \varepsilon_U\]

For simplicity I will assume that there are three individuals in the economy – U, W and the tax payer, symbolized by R. The collected revenues\(^{11}\) are distributed between the unemployed and the working poor:

\[(16) IM = t_w l_R - e_w l_w > 0\]

We distinguish between a case in which the government decides based on consumption, \(U_i = \ln(c_i)\), or based on utility of leisure and consumption. In the first case the F.O.C. is:

\[(17) \frac{e_w}{c_w} = \frac{e_u}{c_U}\]

Where consumption of individuals W and U appears in equations 11 and 12; i.e., e is set optimally so as to achieve the equality stated in equation 17.

When government’s maximization is based on utility (as in equation 13) the F.O.C. is:

\[(18) \frac{e_w}{u_w} = \frac{e_u}{u_U}\]

I will solve the optimum for different values of \(v\), representing different types of inequality averse social planners; and for the two types of political approach – liberal and conservative.

---

\(^{11}\) As in many re-distributive models I restrict myself to income taxation revenues that are used for transfers to low income individuals. This approach follows Saez (2002), who assumed that intervention is aimed at redistribution.
The main question we ask is: given realistic assumptions on the basic parameters, is an EITC optimal under the different types of social planner? In particular, it would be interesting to see whether that’s the case for the liberal policy-maker, who puts a lower social weight on the Working Poor.

3. Characterization of optimal government policy

The government always applies an income maintenance subsidy (IM) and in addition decides whether imposing an EITC. Beyond the characterization of liberal and conservative, we concentrate on a Rawlsian social planner \( (v \to \infty) \) and a mildly inequality averse social planner (positive and low \( v \)). Note also that if there are enough resources, the government will set IM so as to protect the unemployed from poverty. If the most labor loving Working Poor works full time, it seems plausible to assume\(^{12}\):

\[
 IM < w_l
\]

i.e., working full time \( (l_W = 1) \) derives in a higher income compared to being unemployed persistently. This means that:

\[
 IM - w_l = tw_R l_R - (1 + e)wl < 0
\]

I assume that the distribution of \( \delta \) is Pareto, with a support equal to \( \delta^- \).

Utility of Consumption

For the purpose of a gradual characterization assume first that the policy makers believe that utility is composed only by consumption and not by leisure.

\(^{12}\) Note that in the present context the relevant wage is the minimum wage. Thus, the situation differs to the usual non-linear optimal income tax problem: in that context the heterogeneity of wages drives increasing utility with wages (see Stiglitz, 1987). In the present context, if we assume the opposite assumption (i.e., that IM is higher than working poor’s full-time wage) and if labor causes disutility, then there is a clear incentive not to work; in that case we would have a corner solution where all working poor population becomes chronically unemployed, which is not compatible with what we see in reality.
3.1 A Conservative social planner

According to equation 15, for this social planner $\varepsilon_w > \varepsilon_U$. We shall proceed to government maximization using equation 17, given the labor supply (equation 9).

3.1.1 Mildly Inequality Averse and Conservative Social Planner

This social planner will decide according to the following equality:

$$\frac{c_U^V}{c_W^V} = \frac{\varepsilon_U}{\varepsilon_W}$$

For simplicity I take the case in which $v=1$; concerning the working poor, his/her income depends on labor supply which depends on $\delta_w$. It seems plausible to assume that $\delta_w \geq 0$; i.e., we cannot know a-priori whether the poorest individual is the unemployed or the working poor. The F.O.C. for the planner is:

$$\frac{\varepsilon_w}{w_l(1 + e)} = \frac{\varepsilon_U}{tw_Rl_R - ewl_w}$$

It is easy to show that:

$$e = \frac{\varepsilon_w tw_R l_R - w_l w_U}{(w_w + w_U)w_l}$$

A crucial question for solving 20 is whether:

$$tw_Rl_R > w_l w$$

Using the formula of optimal tax and labor supply of the tax payer, we re-write this inequality:

$$\frac{1}{2(1 + \eta)}w^{1-\eta} > w_l w$$

If the working poor is represented by the support $\delta_w = 0$, then his labor supply is equal to 1:

$$l_w = \frac{1}{1+\delta} = 1$$
Thus, this inequality is equivalent to:

\[ (21) \quad 2(1 + \eta)w_R^\eta < \frac{w_R}{w} \]

Note that this inequality holds under a low labor elasticity; when labor elasticity is low, then the government can impose high taxes and there are more resources for re-distribution. If we normalize \( w_R = 1 \), which implies that \( w < 1 \), I obtain:

\[ (21') \quad \eta < \frac{1-2w}{2w} \]

**Result 1** - A conservative and mildly inequality averse social planner will set a positive EITC.

Note that for a representative income distribution \( \left( w = 0.25 \right) \) the inequality in 21' becomes \( \eta < 1 \); this inequality clearly holds, and given that in this case \( \varepsilon_U > \varepsilon_U \), we obtain from equation 20 that \( e > 0 \).

### 3.1.2 A Conservative Rawlsian Planner

Since we talk about a conservative planner, it is not clear who is the individual with the lowest social utility. In order to decide, the Rawlsian social planner will compare:

\[ \varepsilon_U c^R_U \]

to:

\[ \varepsilon_W c^R_W \]

Note that since the social planner is conservative the weight for the working poor is higher than for the unemployed; on the other side, without an EITC, the consumption of the unemployed is higher than the one of the working poor.

Thus, the F.O.C. for the Rawlsian social planner is:

\[ \frac{c^R_U}{c^R_W} = \frac{\varepsilon_U}{\varepsilon_W} \]
Which implies:

\[(22) \quad e = \frac{e_w t_w l_R - w_l e_u}{(e_w + e_u)w_l} > 0\]

_Result 2_: A conservative and Rawlsian social planner will set a positive EITC.

Proof: the inequality that appears in equation 21' is also relevant in this case, and consequently the inequality shown in 22 holds; i.e., it is optimal to impose an EITC.

### 3.2 A liberal social planner

For this social planner \( \varepsilon_W < \varepsilon_U \). We shall proceed to government maximization using equations 11 and 12, given the labor supply (equation 9).

#### 3.2.1 Mildly Inequality Averse Liberal Social Planner

This social planner's F.O.C. is:

\[
\frac{c^*_W}{c^*_W} = \frac{\varepsilon_U}{\varepsilon_W}
\]

Also here I take for simplicity the case in which \( v=1 \). The F.O.C. is:

\[
e = \frac{e_w t_w l_R - w_l e_u}{(e_w + e_u)w_l} \leq \varepsilon_W
\]

As opposed to the previous case, here it is not obvious that \( e>0 \). In order for this result to be fulfilled the following inequality must hold:

\[
\frac{\varepsilon_U}{\varepsilon_W} < \frac{tw_l l_R (1 + \delta_w)}{w_l}
\]

This equation holds for:

\[(23) \quad \delta_W > \frac{w_l e_u - e_w t_w l_R}{e_w t_w l_R} \]

18
This inequality is not assured, since the taste parameter of the working poor is expected to be zero or very low. Given that in this case \( \varepsilon_U > \varepsilon_w \) we cannot know ex-ante whether this inequality will hold. The answer depends on available re-distribution resources.

**Result 3:** If there are enough resources for re-distribution a liberal and mildly inequality averse social planner will set a positive EITC.

In order for this result to be proved we need to look at the condition stated in 23. This equation will hold if the RHS is negative. For that to happen we need:

\[
\frac{w \varepsilon_U - \varepsilon_w t_w l_R}{l_R} < 0
\]

Or in other words:

\[
(24) \quad t_w l_R > \frac{w \varepsilon_U}{\varepsilon_w}
\]

Applying the inequality shown in 21' for this case derives in the following inequality:

\[
(25) \eta < \frac{\frac{1}{2} - 2w \varepsilon_U}{2w \varepsilon_U}
\]

As explained above for a realistic income distribution \( w = 0.25 \); even in the very favorable case in which \( \frac{\varepsilon_U}{\varepsilon_w} = 1.25 \), the relevant inequality becomes: \( \eta < 0.6 \). Since according to empirical work labor elasticity is relatively low\(^{13}\), this inequality holds.

Note that a realistic scenario implies incomplete compliance of minimum wage; in this case:

\[
\delta_W > \frac{\varepsilon_w (\beta - t_w l_R)}{\varepsilon_w t_w l_R}
\]

---

\(^{13}\) See Gruber and Saez (2002).
where $\beta$ is the ratio between minimum-wage non-compliance and political preferences of the social planner. Under these assumptions the term in the nominator is negative, which means that a zero or positive $\delta_w$ will meet the necessary condition for a positive EITC.

### 3.2.2 A Liberal Rawlsian Planner

**Result 4:** A liberal and Rawlsian social planner will not provide an EITC.

In this case both the consumption of the unemployed is lower than the one of the Working Poor, and the political weight assigned to him/her is higher; consequently, the Rawlsian social planner will care only about the unemployed which implies that the optimal EITC is 0.

Note, however, that with partial compliance of minimum wage the situation changes. In this case the optimum is:

$$\frac{c^l_U}{c^l_W} = \frac{\epsilon_U}{\epsilon_W}$$

i.e.:

$$\frac{\epsilon_W}{\beta_w l_w (1 + e)} = \frac{\epsilon_U}{tw_R l_R - e \beta_w l_w}$$

As explained above the poorest Working Poor’s labor supply is 1. Thus, by equation 19 the poorest individual of the economy is the unemployed. The Rawlsian social planner will give an EITC according to the F.O.C. which implies:

$$e = \frac{\epsilon_w tw_R l_R - \beta_w \epsilon_u}{(\epsilon_w + \epsilon_U) \beta_w} > 0$$

Note that in this case it is not clear whether the Rawlsian social planner will be willing to give an EITC. In order for this to happen we need the following inequality to hold:

$$\frac{\epsilon_U - \epsilon_W}{\epsilon_W} < \frac{tw_R l_R - \beta_w}{\beta_w}$$
The following equation must hold:

\[
\frac{\varepsilon_U - \varepsilon_W}{\varepsilon_W} < \frac{1}{2(1 + \eta)} \frac{w^{1-\eta}_R - \beta w}{\beta w}
\]

Using the values of a typical income distribution, an elasticity of 0.25 and assuming a 80 percent minimum wage compliance, the right-hand side equals 1 (i.e., the preference for the unemployed must be less than double). Thus, under partial minimum wage compliance a Rawlsian planner would plausibly opt for a positive EITC.

We conclude that an EITC is optimal in all cases except for a liberal Rawlsian planner with full minimum wage compliance.

**Utility of consumption and leisure**

In this case the social planner F.O.C. becomes:

\[
\frac{\varepsilon_W}{U_W} = \frac{\varepsilon_U}{U_U}
\]

For logarithmic utility and for the case in which the working poor has tastes of the type \( \delta_w = 0 \), this means that the component of the utility of leisure does not count; in the case of the unemployed, since labor supply is zero, the log is also zero, meaning that this term is not relevant. Thus, the main difference is related to a negative term that appears only for the case in which \( \delta_w > 0 \); i.e., the Working Poor has a positive and low labor aversion. Note that including this negative term into the F.O.C. only for the Working Poor, makes the EITC even more desired for the social planner, which means that the conclusions shown above for the case of \( U_i = \ln(c_i) \) are strengthened; thus, in this case the conclusions shown above are still relevant. In section 5 I will come back to this comparison under a more general utility function by calculating optimal EITC subsidies for Constant Relative Risk Aversion (CRRA) for different values of \( \theta \).
4. Estimating Basic Parameters for the case of Israel

In this section I derive plausible parameters in order to perform a simulation that will allow me to assess whether the imposition of an EITC is optimal under different types of social planners. Since it is not observable, estimating the labor aversion parameter is the most difficult challenge; this is so for both types: the Working Poor and the Unemployed. For this purpose we will use data from Israel, a country in which this issue is at the heart of the social discussion. In Israel there are two groups - the Arabs and Ultraorthodox Jews- that have a high poverty rate (more than 50 percent) and are characterized by low participation rates. In order to perform an accurate calculation, we will look at these two groups and distinguish between men and women, and also look separately at single parents.

From equation 9 and assuming that there is an EITC, we know that in order to participate the following equation must be fulfilled:

\[
(9') \quad w > \frac{\delta IM}{1+e}
\]

Where the right-hand side of equation 9' is the threshold wage. Since the variance of wages within each sub-group is relatively low, we can look at the average wage of each group as a good representative of the threshold wage. Thus, by using equation 9' we calculate the value of \( \delta \) above which individuals do not participate for each sub-group; i.e., a high threshold of \( \delta \) means that only individuals that are particularly labor averse do not participate. A low threshold means that most individuals have higher labor aversion and consequently do not participate.

In order to achieve an estimate, we collect data on IM by looking at the amount that individuals would receive in Israel in the case they do not work.\(^{14}\) We take the child allowances

---

\(^{14}\) This calculation was first done by Samuelov (2016) and presented in Endbeld, Achdut and Strawczynski (2017).
and spouse stipends as an estimate for the subsidy received in case of no work.\textsuperscript{15} We compute these amounts for the different sub-groups based on the typical family composition (number of children) and using the statutory child allowance and spouse stipend as stipulated by law (administered by the National Insurance Institute in Israel). In addition, we consider the EITC as given today in Israel so as to calculate the underlying parameter of labor aversion for each group. This data is shown in the following tables. We work with 10 types of individuals as presented in Table 1. Note that for non-ultraorthodox Jews I do not differentiate between men and women.

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-ultraorthodox Jews</th>
<th>Ultraorthodox men</th>
<th>Ultraorthodox women</th>
<th>Arab men</th>
<th>Arab women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Single</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

In order to apply equation (9') I need an estimate of the wage (left-hand side), the amount received by each group under non-participation at the labor market and the average EITC received (numerator and denominator in the right-hand side respectively). This data is shown in the Appendix. Applying equation 5' with the data shown in the Appendix allows me to estimate the threshold for $\delta$ which will vary for the different groups (Table 2).

<table>
<thead>
<tr>
<th>Type of family</th>
<th>Jews excl. Ultraorthodox</th>
<th>Ultraorthodox Men</th>
<th>Ultraorthodox Women</th>
<th>Arab Men</th>
<th>Arab Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-parents</td>
<td>9.6</td>
<td>3.0</td>
<td>2.3</td>
<td>6.0</td>
<td>4.2</td>
</tr>
<tr>
<td>Single-parent</td>
<td>2.2</td>
<td>1.3</td>
<td>1.1</td>
<td>1.8</td>
<td>1.2</td>
</tr>
</tbody>
</table>

\textsuperscript{15} Since these groups do not participate we cannot calculate their income maintenance stipend; moreover, for these two groups the child allowances and spouse stipend constitute the relevant alternative for participating at the labor market.
Note that the calculation of this threshold allows an interpretation for participation in the labor market by different groups. Figure 3 shows the translation of the performed exercise for one of the groups, assuming a Pareto distribution.

**Figure 3 – Labor aversion in the Secular Jews case**

This figure shows that in a secular Jewish Family with two parents, the probability of participation by one of the couple members is very high. This is so since the threshold labor aversion parameter is estimated at 9.6. which means that the density above this number is very low; in other words, most individuals have a lower labor aversion and consequently most probably they will participate at the labor market. This is not the case for single-parents for whom the threshold equals 2.7, which means that a relatively high density is above this parameter. Thus, in single-parent families we shall expect a lower participation rate.

For the purpose of my simulation I would like to calculate the average parameter of labor aversion for each of these groups. I assume that its distribution is Pareto according to the following formula:

\[
(25) \quad f(\delta) = \frac{\mu + \delta}{\delta^{H+1}}
\]
In order to know the average $\delta$ of these groups I can use the mean of the Pareto distribution:

$$E(\delta) = \frac{\mu \delta(0)}{\mu - 1}$$

In order to calculate $\mu$ for each group I use participation data. Given $\delta$ from Table 6, I know that the area below this parameter in the Pareto cumulative distribution represents the density of participation at the labor market. By using this piece of evidence, I can estimate the particular $\mu$ for each group, such that it reflects this area. In order to explain the way I can calculate the parameter, let us take a look at Figure 4. In this figure I show the participation percent of Arab married women in order to find out the Pareto parameter for this group.

I proceed as follows: from table 1 know the threshold parameter for labor aversion that was estimated for Arab women. This means that Arab women that participate at the labor market (35 percent) have a lower labor aversion that the one that is represented by the threshold value. This means that 65 percent of Arab women have a higher labor aversion parameter. Using the Pareto distribution formula, I calculate the corresponding $\mu$.

**Figure 4 – Finding the Pareto parameter $\mu$ for Arab Women**

I repeat this exercise for each of the types defined above. In Table 3 I show the results.
Table 3: The Pareto Parameter $\mu$ for each Group

<table>
<thead>
<tr>
<th>Type of family</th>
<th>Jews excl. Ultraorthodox</th>
<th>Ultraorthodox Men</th>
<th>Ultraorthodox Women</th>
<th>Arab Men</th>
<th>Arab Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-parents</td>
<td>0.9</td>
<td>0.6</td>
<td>1.8</td>
<td>0.9</td>
<td>0.3</td>
</tr>
<tr>
<td>Single-parent</td>
<td>2.7</td>
<td>3.0</td>
<td>15</td>
<td>2.9</td>
<td>2.5</td>
</tr>
</tbody>
</table>

After taking the proportions of the different groups, I can obtain the relationship between the parameter $\delta$ of the working poor, $\delta_w$, represented by non-ultraorthodox Jews, and the one of the unemployed, $\delta_U$, represented by the Arab Women and Ultraorthodox Jews. It turns out that the relationship between those two parameters equals 7.

This estimate is very high, making the case that the modelled policy scenario in this paper will be relevant for policy makers in Israel for a long time, even under evolving and changing cultural forces. Moreover, the minimum wage in Israel is characterized by partial compliance, which means that according to the results shown above in the Israeli context the existence of an EITC is relevant for all types of policy makers.

5. Simulations with a CRRA Utility

In this section I check the optimal EITC with a constant relative risk aversion utility function – which allows me to use the same utility function for all individuals. For that purpose I run simulations. I assume that the cultural barriers parameter for non-participation of the unemployed is 2 times higher than the representative working poor – a number that is much lower than the one that we found for Israel. Assuming that the case of Israel is extraordinary, we use this figure so as to avoid an extreme case. I will use three types of social inequality aversion: $v=2$, $v=4$ and $v=99$ which approaches the Rawlsian case. I will check sensitivity of
results to a higher ratio between working poor and unemployed income. Note that the case for an optimal EITC comes from the fact that a higher $\theta$ implies a higher penalty for the working poor since lower leisure penalizes utility of the working poor relatively to the unemployed. I will check the optimality of the EITC for two different values: $\theta = 0.3$ and $\theta = 0.6$. The tax rate for these two cases, calculated as half the Laffer tax rate, are respectively 35 and 41 percent. I have corroborated that the revenues are in line with average expenditure on transfer payments for the case in which optimal transfers are maximal when comparing the reported cases.

5.1 CRRA Utility, $\theta = 0.3$

Let me first show the case in which the ratio between the income of the working poor (after choosing labor supply) to the one of the unemployed is around 25 percent. Results are shown in Figure 5.

Figure 5: Optimal EITC – w=0.9, IM=0.5; $\theta = 0.3$

Note that the EITC by the conservative planner goes down as inequality aversion rises, and in particular as we approach the Rawlsian case (although it is still very much far away from 0). Since leisure is taken into account by the policy-maker, even the liberal planner will recognize
the utility premium obtained by the unemployed in terms of leisure. The Working Poor, by contrast, has a penalty in terms of utility. Thus, we expect that even the liberal social planner will give an optimal EITC. Interestingly, this planner is willing to provide a relatively high EITC, and the optimal EITC converges when the social planner becomes Rawlsian, at a level slightly higher than 0.8.

I check next the case where the income of the working poor is higher, which will result in a lower optimal EITC. Results for the case in which the ratio between the incomes of working poor and unemployed is around 60 percent, are shown in Figure 6.

Results show a similar pattern, with the conservative social planner converging to the optimal EITC given by the liberal planner in the Rawlsian case. As expected, in this case the optimal EITC is lower than the previous one and it converges to a level that is slightly higher than 0.5.

5.2 CRRA Utility, $\theta = 0.6$

We turn now to the case in which the CRRA parameter goes up – assume that it is doubled (from 0.3 to 0.6). Increasing this parameter affects the elasticity of substitution, penalizing the Working Poor and making the EITC even more desirable.
As in the previous sub-section we use similar parameters implying two different ratios between the working poor and unemployed income. Since labor supply is higher compared to the previous sub-section, the ratio between incomes become 45 and 67 percent, respectively. Optimal EITC for these two cases are shown in Figures 7 and 8.

Figure 7: Optimal EITC – w=0.9, IM=0.5; $\theta = 0.6$

![Figure 7](image1)

Figure 8: Optimal EITC - w=0.95, IM=0.5; $\theta = 0.6$

![Figure 8](image2)
Also in this case the conservative social planner converges to the liberal one as $v$ goes up, converging to the same optimal EITC at the case that tends to be Rawlsian. In the first case the optimal EITC converges to a number that is slightly higher than 1.2, while in the second it converges to 1. Note that the EITC is higher than the previous case, which implies that for a CRRA utility function it is quite plausible that at the optimum all social planners will impose an EITC. The conclusion of this subsection is that for the case in which I look at utility of both consumption and leisure, the different types of inequality averse social planners are willing to impose an EITC.

6. Summary and Conclusions

In this paper I check the plausibility of imposing an EITC in an economy in which low-income workers are subject to cultural constraints that restraint labor market participation. I depart from the usual analysis by modeling explicitly their participation decision, which is subject to income effects that are related to government transfers, which are provided in the case of non-participation. In this context, as explained by Saez (2002), the optimal policy depends upon the approach of the Social Planner – i.e., whether he/she is conservative and gives a higher weight to the working poor relatively to the unemployed, or whether he/she is liberal and tolerates cultural barriers. In this paper I pose the question of optimal policy for both types of policy maker under different degrees of inequality aversion.

My simulations show that in all plausible cases it is optimal to impose an EITC. The single case in which this result does not hold is for a liberal and Rawlsian policy-maker, under the assumption that there is full compliance to a minimum wage – an assumption that seems to be unrealistic. In all the rest of the cases it is desirable to implement an EITC, a result that is at odds with the applied policy in most advanced economies (except for some countries like US, UK, New Zealand and in late years also Israel).
I present an application of the model for the case of Israel, a country in which cultural bias is at the heart of the national debate, since two groups - that have more than 50 percent poverty rate - have low participation rates of one of the family members because of cultural aspects: ultraorthodox men and Arab women. These households are subject to income effects that are related to government transfers and provisions that are aimed at allowing minimum subsistence. By using data on government transfers and stipend provisions for single mothers I can deduce the behavioral parameter of the cultural bias, which is represented in the model by labor aversion. Assuming that this parameter has a Pareto distribution, I am able to calculate the threshold parameter that acts as a frontier between participation and non-participation. My model calculates these parameters for the relevant cultural groups, which beyond Arab and Ultraorthodox include also Single Parents and couples. The simulation shows that in the Israeli case cultural barriers are expected to be highly relevant in the foreseeable future.

Given the results presented in this paper, the scare implementation of an EITC in advanced economies remains an open question that is waiting for further research.
APPENDIX

Table A.1: wages of different types (in NIS)

<table>
<thead>
<tr>
<th></th>
<th>Jews non ultra-orthodox</th>
<th>Ultra-orthodox men</th>
<th>Ultra-orthodox women</th>
<th>Arab men</th>
<th>Arab women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab women</td>
<td>3,111</td>
<td>4,180</td>
<td>3,125</td>
<td>4,712</td>
<td>3,111</td>
</tr>
</tbody>
</table>

Table A.2: EITC (1 + percent of EITC)

<table>
<thead>
<tr>
<th>Group (β)</th>
<th>Non-ultr. Jews</th>
<th>Ultraorthodox men</th>
<th>Ultraorthodox women</th>
<th>Arab men</th>
<th>Arab women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple</td>
<td>1.05</td>
<td>1.11</td>
<td>1.17</td>
<td>1.1</td>
<td>1.17</td>
</tr>
<tr>
<td>Single</td>
<td>1.09</td>
<td>1.11</td>
<td>1.13</td>
<td>1.1</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Let us now calculate the alternative income IM. For that purpose, we need to know the number of children, since child allowances is the main source for an alternative income in the case of non-participation. Table A.3 shows the data.

Table A.3: Number of Children

<table>
<thead>
<tr>
<th></th>
<th>Jews non ultra-orthodox</th>
<th>Ultra-orthodox men/women</th>
<th>Arab men/women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>6.7</td>
<td>3.35</td>
</tr>
</tbody>
</table>

Based on the number of children we calculate the child allowances as a source of alternative income. Single parents receive mainly the maintenance stipend as stipulated by law. In Table A.4 I show the alternative income of the different groups.
Table A.4: Alternative Income

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-ultr. Jews</th>
<th>Ultraorthodox men</th>
<th>Ultraorthodox women</th>
<th>Arab men</th>
<th>Arab women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple</td>
<td>550</td>
<td>1537</td>
<td>1537</td>
<td>864</td>
<td>864</td>
</tr>
<tr>
<td>Single</td>
<td>2473</td>
<td>3460</td>
<td>3460</td>
<td>2787</td>
<td>2787</td>
</tr>
</tbody>
</table>

These tables provide all the elements for calculating the labor aversion parameter, by applying equation (9'). Table 2 shows the estimates of the $\delta$-threshold for the different groups.
References


Samuelov, S. (2016), "Raising the EITC in Israel: the impact on different groups", seminar work at Pakam, Hebrew University of Jerusalem (in Hebrew).

