CHAPTER 4: INTRATEMPORAL SOCIAL INSURANCE: ATTRACTIONNESS TO MIGRANTS AND ATTITUDE OF NATIVE-BORN

Introduction

A key intratemporal feature of the welfare state is the emphasis placed on the tax system as an income redistribution mechanism. The welfare state employs progressive taxes and uses revenues to provide either cash or in-kind transfers to the poor. Very often the transfers (health care, education, etc.) may be universal, accorded to all, but nevertheless they are quite progressive in the sense that they constitute a greater share of the income of the poor than of the rich. The old age security insurance analyzed in the preceding chapter is a form of an intertemporal social insurance. In this chapter we turn to an analysis of redistributive taxation which serves as a form of intratemporal social insurance.\(^1\)

The intratemporal redistribution feature of the welfare state makes it an attractive destination for immigrants, particularly for low-skill immigrants. George Borjas (1994) reports that foreign-born households in the United States accounted for 10 percent of households receiving public assistance in 1990, and for 13 percent of total cash assistance distributed, even though they constituted only 8 percent of all households in the United States. In this chapter we explore the implications of various redistribution policies for the attitude of the native-born towards migrants. The next two chapters analyze the effect of migration on the shape and magnitude of redistribution policies that are determined in a political economy equilibrium; at the same time, we address the question whether the level of mi-
igration, when not restricted, is higher or lower in this welfare state than in the laissez-faire (no-redistribution) economy.

An Intratemporal Model

Since we want to focus on intratemporal income redistribution, it is adequate to employ a one-period, static setup. In order to contrast the intratemporal feature of the analysis in this chapter with the intertemporal feature of the preceding chapter, it is useful to retain as much as possible the analytical framework of the preceding chapter. We therefore strip down the preceding model from its dynamic structure and consider a one-period, static version of it.²

As before, there is a continuum of individuals. Each individual is characterized by the innate ability parameter $e$ which is the time cost needed to acquire skill. The c.d.f. of $e$ is given by $G(\cdot)$, which is normalized as in equation (3.1). All individuals live for one period. They are born unskilled, each with a unit of labor time and $K$ units of capital. By investing $e$ units of labor time in education, an individual becomes skilled which means that each unit of her remaining labor time (that is, $1 - e$) is worth one unit of effective labor. If, however, she does not acquire skill (that is, she remains unskilled) her labor time is worth only $q(<1)$ units of effective labor.

The government can only employ an income tax in order to redistribute income. Many studies (for instance, Mirrlees (1971)) suggest that the best egalitarian income tax may be approximated by a linear tax which consists of a flat rate $(\tau)$ and a lump-sum cash demogrant $(b)$.³ Since all families are of similar size and age structure, the uniform demogrant may capture also free provisions of public services such as health care, education, etc.
As in the preceding chapter, we continue to assume that the tax has no effect on the decision to acquire skill. Thus, the cutoff ability level \((e^*)\) between acquiring and not acquiring skill is given by the following equation:

\[
e^* = 1 - q
\]  

which is identical to equation (3.2).

Denote the consumption of an e-individual by \(c(e)\). It is equal to disposable income:

\[
c(e) = \begin{cases} 
(1 - \tau)w(1 - e) + [1 + (1 - \tau)r]K + b & \text{for } e < e^* \\
(1 - \tau)qw + [1 + (1 - \tau)r]K + b & \text{for } e = e^*,
\end{cases}
\]

where \(1 + r\) is the gross rental price of capital and, as before, it is assumed that capital fully depreciates at the end of the production process; the income tax \((\tau)\) applies to the net rental price of capital \((r)\).

Note that the disposable income (namely, consumption) distribution curve is piecewise linear in the ability parameter \(e\). This refers to the native-born population. For individuals who do not acquire skill (i.e. those with an ability parameter \(e\) above the cutoff parameter \(e^*\)), the ability parameter is irrelevant and they have the same income. Naturally, within the group of individuals who do decide to become skilled (i.e. for \(e \leq e^*\)), the more able is the individual (i.e. the lower is \(e\)), then the higher is her disposable income. As can be seen from (4.2), this relationship is linear. The income distribution curve is depicted
in Figure 4.1. Note that the slope of the downward sloping segment is \(-(1 - \tau)w\). Also, notice that \(e^*\) is unaffected by the income distribution policy (namely, \(\tau\) and \(b\)), as can be seen from equation (4.1). Finally, as we assume that the migrants arrive with no capital, their disposable income is only \((1 - \tau)qw + b\) which is below that of the unskilled native-born individuals.

We assume a standard (concave, constant-returns-to-scale) production function:

\[
Y = F(K, L),
\]

where \(Y\) is gross output; \(K\) is the total stock of capital (recall that each individual possesses \(K\) units of capital and the number of individuals is normalized to one), and \(L\) is the supply of labor which is given by:

\[
L = \int_0^{e^*} (1 - e)dG + q[1 - G(e^*)] + qm, \tag{4.4}
\]

as in equation (3.8). We assume, as before, that the migrants (whose number is \(m\)) are all unskilled and possess no physical capital.

The wage rate and the gross rental price of capital are given in a competitive equilibrium by the marginal productivity conditions:

\[
w = F_L(K, L) \tag{4.5}
\]
The income tax parameters $\tau$ and $b$ are related to each other by the government budget constraint:

$$b(1 + m) = \tau(Y - K).$$  \hspace{1cm} (4.7)

Note that the base for the flat income tax rate is net domestic product $(Y - K)$, including labor income of migrants which is subject to the income tax.\(^4\) Also, migrants qualify to the uniform demogrant $b$.

Finally, there are no barriers to migration so that $m$ is determined endogeneously by:

$$(1 - \tau)qw + b = w^*,$$  \hspace{1cm} (4.8)

where $w^*$ is the opportunity income of the migrants in the source countries.

This model is employed in the next sections in order to investigate two issues: (i) How the welfare state attracts migration of various skill levels? (ii) More importantly, what are the effects of migration on the income distribution among the native-born and, consequently,
what is their attitude towards migrants?

The Attractiveness of the Welfare State to Migrants.

Within this framework we address the first issue of whether the welfare state indeed attracts migrants. More generally, is it true that more taxes and more transfers attract more migrants in the context of our stylized model? Specifically, we study the sign of \( dm/d\tau \).

To simplify the analysis we assume a uniform distribution of the ability parameter \( e \) over the interval \([0, 1]\). This assumption yields a simple labor supply function as follows:

\[
L = \frac{1}{2}(1 - q)^2 + q(1 + m),
\]

where use is made of (4.1).\(^5\)

Substituting (4.3), (4.4'), (4.5) and (4.8) into (4.7) and rearranging terms yields:

\[
\left\{ w^* - (1 - \tau)qF_l \left[ K, \frac{1}{2}(1 - q)^2 + q(1 + m) \right] \right\} (1 + m) = \tau \left\{ F \left[ K, \frac{1}{2}(1 - q)^2 + q(1 + m) \right] - K \right\}. \tag{4.9}
\]

This equation describes the general equilibrium relationship between \( \tau \) and \( m \).

Total differentiation of the latter equation with respect to \( \tau \) yields:
\[
[w^* - qF_L - (1 + m)(1 - \tau)q^2F_{LL}] \frac{dm}{d\tau} = F - K - (1 + m)qF_L.
\]

By substituting (4.5), (4.8), \(F = (1 + r)K + wL\) (Euler’s equation) and (4.4') into (4.10) we conclude that:

\[
[b - q\tau w - (1 + m)(1 - \tau)q^2F_{LL}] \frac{dm}{d\tau} = rK + \frac{1}{2}(1 - q)^2w.
\]

It follows from the government budget constraint (namely, \(b(1 + m) = \tau(rK + wL)\)) that the tax on labor income paid by an unskilled individual (namely, \(\tau qw\)) must fall short of her demogrant (namely, \(b\)), that is \(b > \tau qw\). Since \(F_{LL} < 0\), it follows from (4.11) that:

\[
\frac{dm}{d\tau} > 0.
\]

Thus, more taxes and transfers attract more unskilled migrants.

This unambiguous conclusion that the more intensive is the welfare state, the more attractive it becomes to migrants is restricted naturally to the main case that we discuss throughout of low-skill migration. If we allow for high-skill migrants as well, we can see in a natural extension of our stylized model that the welfare state attracts more low-skill migrants but fewer high-skill migrants, as long as “supply-side economics” does not prevail.
Nevertheless, high-skill migrants from developing countries are still attracted to developed countries with an elaborate and extensive ("high" tax, "generous" benefits) welfare system, as the current debate in the U.S. over H-1B visa quotas for professional workers attests. These workers are mostly attracted to the high-tech, new economy. Currently, almost one-third of the entrepreneurs and higher-level employees in the Silicon Valley come from overseas. These migrants are typically net contributors to the welfare state. As put by Gary Becker: “Since skilled immigrants earn more than average workers, they pay more than their proportional share in taxes. They make few demands on the public purse for they have negligible unemployment rates, seldom go on welfare, make little use of medicare and medicaid, and commit few crimes. Being mainly in their twenties and thirties, they contribute much more to social security taxes than they will withdraw in retirement benefits” (Business Week, April 24th, 2000).

The Attitude of Native-Born Towards Migration

Migration changes the income distribution among the native-born and the attitude of the native-born towards migrants is therefore shaped accordingly; for earlier analyses see Wildasin (1994) and Razin and Sadka (1995).

A Benchmark Case: No Redistribution Policies

Let us start with a benchmark case where the government does not engage in redistributing income. This benchmark case highlights the gains from trade effect of labor mobility. In this case we set the tax-transfer parameters at zero (i.e., \( \tau = b = 0 \)) and drop out the government budget constraint (4.7).
Suppose initially that there is no migration, so that \( m \) is set equal to zero and the migration equilibrium condition (4.8) is dropped out. The resulting income distribution among the native-born is depicted by the curve ABC in Figure 4.2, which is based on numerical simulations. Assuming that \( e \) is uniformly distributed, the area under the income distribution curve is equal to net output (i.e., \( Y - K \)), less payments to migrants (i.e., \( w^*m \)) which is initially zero.

Now we allow free migration. That is, we reinstate the migration equilibrium condition (4.8) and reintroduce \( m \) as an endogenous variable. The ensuing income distribution among the native-born is described by the curve DEF in Figure 4.2. As expected, the gains from trade effect is impeccable in the absence of any costly redistribution: total income of the native-born (i.e., the area under the income distribution curve) rises as a result of the influx of migrants.\(^7\)

The determination of the free migration number of immigrants is neatly described in Figure 4.3. The aggregate labor supply of the native-born is perfectly inelastic. (Capital is also fixed.) Thus, the labor supply of migrants changes the total domestic labor supply one-to-one. The downward-sloping curve describes the marginal product of low-skilled migrants (namely, \( qw \)) as a function of the number of migrants. The equilibrium level of \( m \) occurs at point A, where \( qw \) is equated to \( w^* \). The standard gains from trade (to the native born) is measured by the triangle-like area ABC, which consists of the total output produced by the migrants (\( OCAm \)), less the amount of wages paid to them (\( OBAm \)).

However, the distributional effects of migration are in general not clear: Some must always gain, but others may lose. In our particular model and for our specific parameter
values, it so happens that some individuals (those with an ability parameter above \( \bar{e} \); see Figure 4.2) gain, but other individuals (those with \( e < \bar{e} \)) lose. Nevertheless, with an active redistribution policy all may lose as we shall see below.

**Redistribution Policy**

Now, consider a typical welfare state which redistributes income from the rich to the poor. That is, it levies a positive flat tax \( (\tau > 0) \) on income (labor and capital) and uses the proceeds to finance a positive demogrant \( (b > 0) \). The immigrants are typically not only subject to the income tax, but also eligible for the benefits of the welfare state, in contrast to guest workers.

We perform the following exercise. Suppose first that there is no migration. The closed economy equations described above (that is, (4.1), (4.3)-(4.7)), allow the government one degree of freedom in designing its redistribution policy (that is, the \( \tau \) and \( b \) parameters). Thus, for each \( \tau \) there is a corresponding equilibrium \( b \). Consider a certain configuration of the equilibrium pair \( (\tau, b) \). For this pair we find the income distribution curve given by (4.2). We then allow free migration, that is, we endogenize \( m \) and reinstate the free migration equilibrium equation (4.8). We next redesign the tax-transfer pair \( (\tau, b) \) in such a way so as to maintain the income of the native-born unskilled individuals at its pre-migration level; and ask what happens to the income of the skilled individuals. The above exercise is carried out for various (pre-migration) tax-transfer configurations, starting from a very low level of redistribution up to a very high level.

Notice that in the absence of migration, the redistribution is not distortionary: In the absence of a pecuniary cost of acquiring education, the redistribution policy affects
neither the individual decision whether to become skilled or remain unskilled (that is, the
determination of $e^*$), nor the supply of labor and capital. A dollar taxed away from some
individuals ends up entirely, with no deadweight loss whatsoever, at the hands of some
other or the same individuals. With migration, there is still no deadweight loss in the
common use of this term: It is still the case that a dollar taxed away from some individuals
ends up entirely at the hands of some other or the same individuals. But there is a loss
from the point of view of the native-born individuals because the low-skilled migrants are
typically net beneficiaries of the welfare state in the sense that their tax payments (namely,
$\tau_{qwm}$) fall short of their gross benefits (namely, $bm$); thus, a dollar of revenues collected
from the native-born does not end up entirely at the hands of the native-born, as a portion
of it “leaks” to the migrants.

Furthermore, note that with a redistribution policy the gains from trade (to the
native-born) may disappear altogether: Total income of the native-born may actually decline
as a result of migration. To see this, refer again to Figure 4.3. The migrants who are low-
skilled and do not own any capital are net beneficiaries of the welfare state. That is,
$\tau_{qw} < b$ which means that their net income (namely, $(1 - \tau)qw + b$), is above their net
marginal product (namely, $qw$). Since their net income is equal to their reservation income
$w^*$, it follows that free migration occurs at a point such as $D$, where $qw < w^*$. In this case
the net gain to the native-born is measured by the area ABC, less the triangular-like area
AED. This “gain” from trade could well become negative when $\tau$ (and $b$) are sufficiently
high. When this happens, it may also be the case that all (skilled and unskilled) native-born
individuals lose from free migration.
Our simulations show (see Table 4.1) that when the flat tax rate ($\tau$) in the absence of migration is between 35% to 55% (and the corresponding demogrant ($b$) is between 17.7% to 25.7% of GDP), indeed the skilled individuals all strictly lose from migration, if the redistribution policy is adjusted in order to maintain the disposable income of low-skill native-born at its pre-migration level. The aggregate gains (losses) to the skilled individuals are presented in the last column of Table 4.1. These gains (losses) to the skilled individuals are also the aggregate gains (losses) to the entire native-born population, as the redistribution policy is geared at leaving the unskilled individuals intact. Thus, migration cannot be a Pareto-improving shock for the native-born population, when $\tau$ originally (before any migration takes place) exceeds 35%.

As was already mentioned, when the income distribution policy is geared to maintaining the income of the native-born unskilled individuals intact, then the net gain (or loss) to the native-born skilled individuals measures the standard gain (or loss) from trade to the native-born population. For instance, when pre-migration $\tau$ is between 35% to 55% (and the corresponding $b$ is between 17.7% to 25.7% of GDP), then the curves describing the disposable income distribution among the native-born look like the curve ABC in Figure 4.4. Now, if we allow free migration and adjust the tax-transfer parameters so as to maintain the disposable income of the native-born unskilled intact, then the new disposable income distribution curves look like the curve DBC. (Note that among the native-born the triangle-like area ADB in Figure 4.4 measures the total net loss to the native-born and is therefore equal to the area AED, less the area ABC in Figure 4.3.)
Appendix 4.1: The Welfare State and the Skill Mix of Migration

Let us allow for high-skill migrants as well as low-skill migrants. Denote the number of low-skill migrants and high-skill migrants by \( m^* \) and \( m_h \), respectively. Suppose that their reservation wages in their home countries are \( w^*_e \) and \( w^*_h \), respectively. Then equation (4.8) is replaced by two equations, one for each skill type:

\[
(1 - \tau)qw + b = w^*_e \tag{A4.8a}
\]

and

\[
(1 - \tau)w + b = w^*_h. \tag{A4.8b}
\]

The labor supply equation (4.4') becomes now

\[
L = \frac{1}{2}(1-q)^2 + q(1+m^* + m_h) = \frac{1}{2}(1-q)^2 + q + m_1, \tag{A4.4'}
\]

where \( m_1 \equiv qm^* + m_h \) is the labor supply of the migrants in efficiency units. The government's budget constraint (namely, equation (4.7)) becomes now:
\[ b(1 + m_2) = \tau(Y - K), \quad (A4.7) \]

where \( m_2 \equiv m_\cdot + m_h \) is the total number of low and high skill migrants. Finally, the other equations of the model, namely (4.1), (4.3), (4.5) and (4.6), remain intact.

We can solve equations (A4.8a) and (A4.8b) for \( b \) and \( w \):

\[ b = \frac{w^* - qw_h^*}{1 - q} \quad (A4.1) \]

and

\[ w = \frac{w_h^* - w^*}{(1 - \tau)(1 - q)}. \quad (A4.2) \]

Substituting (A4.4') and (A4.1) into (A4.7) we get:

\[ \left( \frac{w^* - qw_h^*}{1 - q} \right)(1 + m_2) = \tau \left\{ F \left[ K, \frac{1}{2}(1 - q)^2 + q + m_1 \right] - K \right\} \equiv R(\tau, m_1), \]

where \( R(\tau, m_1) \) is tax revenues. Substituting (A4.2) and (A4.4') into (4.5) yields:
\[ w_h^* - w^* = (1 - \tau)(1 - q)F_L \left[ K, \frac{1}{2}(1 - q)^2 + q + m_1 \right]. \tag{A4.5} \]

The latter two equations (namely, (A4.3) and (A4.5)) can be solved for the labor supply \((m_1)\) and the number \((m_2)\) of the migrants as functions of the tax rate \((\tau)\). Total differentiation of (A4.5) with respect to \(\tau\) yields:

\[
\frac{dm_1}{d\tau} = F_L [(1 - \tau)F_{LL}]^{-1} < 0,
\]

because we assume that the marginal product of labor is diminishing (that is, \(F\) is concave).

Upon inspection of (A4.3) we can see that:

\[
\text{sign}\left(\frac{dm_2}{d\tau}\right) = \text{sign}\left(\frac{dR}{d\tau}\right),
\]

where \(dR/d\tau = \partial R/\partial \tau + (\partial R/\partial m_1)(dm_1/d\tau)\). Suppose that “supply-side economics” does not prevail, that is \(dR/d\tau > 0\). (This is always true for small \(\tau'\)s.) Then, \(dm_2/d\tau > 0\).

Thus, we have established that the labor supply of the migrants \((m_1)\) falls while their number \((m_2)\) rises, when the tax rate \((\tau)\) is raised. That is:
\[
\frac{dm_1}{d\tau} \equiv q \frac{dm}{d\tau} + \frac{dm_h}{d\tau} < 0,
\]

while

\[
\frac{dm_2}{d\tau} \equiv \frac{dm}{d\tau} + \frac{dm_h}{d\tau} > 0.
\]

This can happen, if, and only if, \(\frac{dm}{d\tau} > 0\) and \(\frac{dm_h}{d\tau} < 0\). Thus, more taxes and transfers attract more low-skill migrants but fewer high-skill migrants.
Table 4.1. Free Migration and Income Distribution Policy: Taxes, Transfers and the Gains from Trade

<table>
<thead>
<tr>
<th>Pre-migration(1)</th>
<th>Post-Migration(2)</th>
<th>Gains from Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\tau$</td>
<td>$b/Y$</td>
<td>$\tau$</td>
</tr>
<tr>
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<td>0.2434</td>
<td>0.4024</td>
</tr>
<tr>
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</tr>
<tr>
<td>0.60</td>
<td>0.4173</td>
<td>0.3737</td>
</tr>
</tbody>
</table>

$\tau =$ tax rate

$b =$ demogrant

$m =$ ratio of migrants to native-born individuals

$Y =$ GDP

(1) exogenously given tax rate

(2) endogenous tax rate: tax rate is determined so as to restore post-migration disposable income of low-skilled individuals to its pre-migration level, for each tax rate shown in the pre-migration cell. For example, $\tau = 0.4024$ is the endogenously determined tax rate corresponding to a post-migration disposable income of low skilled, which is equal to its pre-migration level at a pre-migration tax rate of 0.35.