ORIGINAL PAPER

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Disagreement over the immigration of low-income earners in a welfare state

Abstract This paper studies natives' economically motivated preferences over different levels of immigration of low-income earners. Immigration affects natives through both intra- and intergenerational redistribution programmes and in the labour market. Our analysis suggests, in a welfare state that looks after the poor and the aged, economic motivation does not necessarily lead a native to have an extreme opinion on the preferable level of immigration, although it causes disagreement among natives. We find, regardless of parameter values, high-income earners prefer at least as much immigration as low-income earners who, in turn, prefer at least as much immigration as pensioners. The median voter is then likely to be a low-income native.

1 Introduction

This paper contributes to the theoretical literature on the economic impacts of immigration of low-income earners on the receiving welfare state. Our aim is to shed some light on the causes of disagreement among natives over such immigration by examining their economically motivated preferences carefully. In existing studies, a welfare state is represented by either intra- or intergenerational redistribution that is financed by taxation. However, none of these existing models

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are suitable for our purpose because both intra- and intergenerational redistribution programmes are run in a typical welfare state. Immigration is likely to influence natives through both programmes.

In Razin and Sadka (2000) and Casarico and Devillanova (2003), the welfare state is represented by the pension system that taxes the young and gives benefits to the elderly, and the returns to two types of labour are endogenous.[1] Razin and Sadka imply that the elderly always gain from immigration because, given the contribution rate, the per capita pension benefit increases due to an increase in the number of taxpayers. Workers lose in the labour market because of a depressed wage: the heterogeneity of workers comes from the supplied quantity of perfectly substitutable labour in their model. Casarico and Devillanova also imply that pensioners gain for the same reason, but workers are split into two—those who gain and lose—because workers are heterogeneous in the quality of labour.[2]

Schmidt et al. (1994), Razin and Sadka (1995) and Epstein and Hillman (2003) concentrate on the cases where the welfare state is concerned only with unemployment. Schmidt et al. imply that unskilled workers oppose immigration of similar workers because it does not only increase the risk of unemployment but also depresses their wages due to the trade union's attempt to reduce unemployment among natives. Owners of skilled labour and capital are in favour of such immigration if it increases the returns to these factors of production more than the tax rate. Razin and Sadka imply that skilled natives oppose unskilled immigration because they must bear the burden of supporting the increased unemployed, while unskilled natives are indifferent because the welfare state compensates their loss of employment. Epstein and Hillman use an efficiency-wage framework and imply that workers may benefit from immigration that replaces natives for unemployed status if the net-of-tax wage income is higher than the unemployment benefit. Employers also benefit from the depressed wage and the increased return to capital.

The existing studies suggest economic impacts of immigration of low-income earners are different, depending on the position of a native in the economy. They also imply the existing models divide the native population into two extremes: no restriction to and a ban on immigration.[3] As economically motivated preferences of natives are simple in these studies, none of them provides a careful exposition of them. However, the simplicity and the corner solutions result from the partial nature of the welfare state in their models. That is, redistribution is either intra- or intergenerational, but not both.

The contribution of this paper is, therefore, to analyse natives' economically motivated preferences over different levels of immigration of low-income earners in the welfare state that distributes benefits to retirees as well as persons of the

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[1] Earlier contributions, i.e., Scholten and Thum (1996) and Haupt and Peters (1998), did not differentiate labour by skill, while they examined the cases of three-period overlapping generations: young, middled-aged and old. As there is only one heterogeneity dimension, i.e., age, three periods are required to obtain a median-voter group in their model.

[2] Kemnitz (2003) implies the same. Casarico and Devillanova additionally show that gaining and losing workers can be further divided into two respectively as a result of human capital investment decision-making. Tamura (2004) explicitly analysed individual preferences in their framework of endogenous human capital investment.

[3] Except Epstein and Hillman (2003) who imply interior solutions. Labour is, however, homogeneous in their model, though owners of capital can be seen as skilled workers.

working age who experience economic hardship. All benefits are financed by taxation.[4] In the literature, no study has explicitly analysed natives' preferences over immigration in a welfare-state model that is as general as ours.

We restrict our attention to the case where both benefits are given, i.e., taxation is endogenous in immigration. Our implicit assumption is that natives think the welfare state continues to provide the ongoing benefits to the economically weak regardless of immigration. Our interest is, thus, not in whether immigration can sustain or improve the welfare state, but how it affects different segments of the native population given the ongoing programmes.[5]

Our model with two types of welfare-state redistribution suggests natives' economically motivated preferences are not necessarily extreme. We find each individual may have an intermediate level of immigration that maximises his/her utility. This has not been implied in existing models with agent heterogeneity in both skill and age. We also find we can rank high-income earners, low-income earners and pensioners according to how much immigration they most prefer, and the order is not influenced by the values of model parameters within the assumed ranges. This ranking suggests the median voter is likely to be a low-income earner.

We describe the model in Section 2 and present the results in Section 3. Section 4 deals with the robustness of the results. We discuss our findings with reference to existing empirical studies in Section 5.

2 Model

Consider a country that is inhabited by overlapping generations of agents who live for two periods. Two redistribution programmes are run in the country. One is to support low-wage earners and the other to support the elderly. These are financed by taxing everyone in the country.

In the first period of life, each agent supplies one unit of labour to earn wage income and allocate it between current consumption and savings for post-retirement life. In the second period, an agent does not work, receives a pension benefit, withdraws all the savings with interest and uses up all the income.

Each generation can be split into two: the high- and the low-skilled. Let $H > 0$ denote the total amount of high-skilled labour in the country, and $L > 0$ that of low-skilled labour. Let $\bar{L} > 0$ denote the amount of low-skilled native labour. We assume the availability of low-skilled immigrants is unlimited. Hence $L \geq \bar{L}$. As we do not study the determination of the immigration level in the country, we assume immigration is unanticipated by natives in every period.

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[4] In Kemnitz ([2003](#)), both public pension and unemployment benefits are present, but redistribution via unemployment benefits is modelled in such a way that it takes place only within the circle of unskilled workers, i.e., unemployment insurance is not financed by taxation.
[5] While it matters to individual preferences whether the tax rate or the benefit is fixed in the government budget constraint, one of them is often arbitrarily fixed in the literature. The implied pro-immigration attitude of pensioners by Razin and Sadka ([2000](#)) and Casarico and Devillanova ([2003](#)) is, for instance, simply a result of assuming the contribution rate to be exogenous. The latter study and Tamura ([2004](#)), while arbitrarily fixing either the tax rate or the benefit in the main analysis, discuss alternative scenarios in their appendices. Haupt and Peters ([1998](#)) examined all cases thoroughly in Scholten and Thum's ([1996](#)) model, which is different from ours in nature.

To simplify the notation, we do not label variables determined in period t on which we focus. The preferences we study are of pre-immigration in the period. We use subscript -1 for period $t-1$ and $+1$ for period $t+1$. For instance, H is the total of high-skilled workers in period t, and H_{-1} is that of high-skilled pensioners in the period.

2.1 Production

The output Y is characterised by the following Cobb–Douglas production:

$$Y(H, L) \equiv H^\alpha L^{1-\alpha}$$

where the output share parameter $\alpha \in (0, 1)$ is exogenously given.[6] The wage rate for one unit of labour is defined as follows:

$$w_H(H, L) \equiv \partial Y/\partial H = \alpha H^{-(1-\alpha)} L^{1-\alpha} \tag{1}$$

$$w_L(H, L) \equiv \partial Y/\partial L = (1 - \alpha) H^\alpha L^{-\alpha} \tag{2}$$

where subscripts H and L label the high- and the low-skilled respectively.[7] It is the ratio between the stocks of high- and low-skilled labour that influences the wage rates. Immigration of low-skilled workers depresses the wage rate for the low-skilled and raises that for the high-skilled, i.e., $\partial w_L/\partial L < 0$ and $\partial w_H/\partial L > 0$. Hence, it benefits high-skilled workers and damages low-skilled workers in the labour market. We assume $w_L(\bar{L}) < w_H(\bar{L})$, or equivalently $H/\bar{L} < \alpha/(1 - \alpha)$. Low-skilled workers are then always low-income earners in this model.

2.2 Consumption

Let c_1 and c_2 denote the first- and the second-period consumption by an agent, respectively. A worker maximises the following Cobb–Douglas lifetime utility:

$$u(c_1, c_2) \equiv c_1^\beta c_2^{1-\beta},$$

where the intertemporal preference parameter $\beta \in (0, 1)$ is exogenously given, subject to the following period-specific budget constraints:

$$c_1 = (y - s)(1 - \tau) \tag{3}$$

$$c_2 = sr(1 - \tau_{+1}) + p, \tag{4}$$

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[6] We assume perfectly mobile capital.
[7] We assume full employment. In this analysis, it does not matter whether we use unemployment or a depressed wage because, in either case, perfectly substitutable natives receive a negative labour-market impact from immigration. The difference for them is that the effect is smooth with a flexible wage but discrete with unemployment.

where y denotes the first-period gross income, s the first-period savings, $r - 1 > 0$ the rate of interest, τ the tax rate and $p > 0$ the basic pension. Workers benefit from tax exemption in saving for post-retirement life during the first period. However, this private pension becomes part of post-retirement income that exceeds the tax-exempt basic pension and is, hence, subject to taxation in the second period.[8]

Note that τ is period-specific because we assume the level of immigration can differ in every period, while the tax rate is a function of immigration, i.e., see Eq. 7′ below. We also assume immigration cannot be anticipated. Hence, workers in period t must take immigration in period $t + 1$ as given. Equivalently, τ_{+1} is given for them in period t. To distinguish between given τ_{+1} in period t and actual τ_{+1} in period $t + 1$, let $\tilde{\tau}_{+1} \in (0, 1)$ denote the former.

The maximised utility for each worker is

$$u\big(c_1^*, c_2^*\big) = [\beta(1 - \tau)]^{\beta} \gamma (y + P). \tag{5}$$

where $\gamma \equiv [(1 - \beta) r (1 - \tilde{\tau}_{+1})]^{1-\beta}$ and $P \equiv p / r (1 - \tilde{\tau}_{+1})$.

2.3 Redistribution

The host country operates two redistribution programmes. Let us call these income support and basic pension. Income support is designed such that a given level of gross income is guaranteed to every worker in the country. Let $\omega > 0$ denote this level. We assume that when there is no immigrant worker, the wage rate for low-skilled labour is below ω, while that for the high-skilled is above it. We then have $\omega \in (w_L, w_H) \, \forall \, L \geq \bar{L}$ by construction, as implied by Eqs. 1 and 2. As each worker supplies one unit of labour, every low-skilled worker receives

$$b = \omega - w_L \tag{6}$$

to supplement the low wage income, whereas none of high-skilled workers receives such a benefit. Hence, we have $y_H = w_H$ and $y_L = \omega$ in Eq. 5.

As for basic pension, a fixed benefit p is given to every retired agent and is tax-exempt. Let us denote the total taxable income of the retired by $R \equiv r(s_{H_{-1}} H_{-1} + s_{L_{-1}} L_{-1})$. This welfare state faces the following budget constraint in each period:

$$[(w_H - s_H)H + (\omega - s_L)L + R]\tau = bL + p(H_{-1} + L_{-1}). \tag{7}$$

As we are interested in the impact of immigration, given the welfare programmes in the country, we take ω and p as given. By substituting the optimised savings, $s^* = (1 - \beta)y - \beta P$, we can reexpress Eq. 7 as follows:

$$\tau = \frac{(\omega - w_L)L + p(H_{-1} + L_{-1})}{\beta[w_H H + \omega L + P(H + L)] + R} \tag{7'}$$

We assume $\tau(\bar{L}) \in (0, 1)$. This equation implies the following:

Lemma 1 *There exists* $\arg\min \tau(L) = L^* > \bar{L}$ *if* $d\tau(\bar{L})/dL < 0$. *Otherwise*, $\arg\min \tau(L) = \bar{L}$.

Proof Equation 7′ implies the sign of $d\tau/dL$ depends on that of its numerator: $\beta\alpha Y(\omega + (1-\alpha)P) - (1-\alpha)w_L(R + \beta HP) - \beta p(H_{-1} + L_{-1})(\alpha w_L + \omega + P) + \omega(R + \beta HP)$. All the terms, except the last which is positive constant, are increasing in L. Hence, if $d\tau(\bar{L})/dL < 0$, τ is convex with a unique minimum over $(\bar{L}, \infty)$, and $\arg\min \tau(L) = L^* > \bar{L}$ exists. If $d\tau(\bar{L})/dL \geq 0$, $d\tau/dL \geq 0 \ \forall \ L \geq \bar{L}$.

The continuation of the income support programme requires more tax revenue because immigration of low-income earners not only increases the number of income support recipients but also depresses the low-skilled wage rate, which results in an increase in the per capita income support, as we can see in Eq. 6. On the other hand, immigration increases the number of taxpayers and also the returns to high-skilled labour.

Lemma 1 suggests that some positive level of immigration of low-income earners may ease the per capita tax burden of sustaining the welfare state. However, such a positive effect may not exist if there are already many low-income earners in the country, i.e., $d\tau(\bar{L})/dL \leq 0$ is more likely when $\bar{L}$ is high.

3 Results

Let us first look at the preference of pensioners. Their consumption is subject to Eq. 4. Their savings decisions are already made in period $t - 1$ with given $\tilde{\tau}$. This in turn suggests the skill type of a pensioner does not matter to her/his preference. Let $v_E \equiv c_{2,E}$ be the utility of the elderly in period t. We then have

$$v_E(L) = s_{-1}r(1 - \tau(L)) + p \tag{8}$$

which implies pensioners are affected by immigration through τ.

Equation 5 implies that low-skilled workers are also affected through τ. Their current gross income does not change, for each of them receives b to top up w_L so that $y_L = \omega$. Hence, in our welfare state, immigration of low-income earners does not affect native workers of the similar type directly in the labour market but only indirectly via the tax rate, i.e., see Eq. 7′. That is,

$$v_L(L) = [\beta(1 - \tau(L))]^\beta \gamma(\omega + P). \tag{9}$$

Lemma 1 then implies the preferences of pensioners and low-income earners are single-peaked.

Corollary 1 *Pensioners and low-income earners oppose immigration of low-income earners if* $d\tau(\bar{L})/dL \geq 0$. *Otherwise, they prefer any* $L \in (\bar{L}, \tilde{L})$ *to* $\bar{L}$ *where* $\tau(\tilde{L}) = \tau(\bar{L})$, *but most prefer* $\arg\min \tau(L) = L^* \in (\bar{L}, \tilde{L})$.

Proof Equation 8 implies $dv_E/dL = -s_{-1}r(d\tau/dL)$, and Eq. 9 implies $dv_L/dL = -\beta^{1+\beta}(1 - \tau(L))^{\beta-1}\gamma(\omega + P)(d\tau/dL)$. Hence the sign of $d\tau/dL$ determines the signs of both dv_E/dL and dv_L/dL, and Lemma 1 applies.

The noticeable difference from the existing studies is that pensioners are negatively affected by immigration in our model. In the literature, the utility of pensioners is either monotonically increasing in immigration or independent of it because they are not taxed.

Let us now look at the preference of high-income earners. Equation 5 implies

$$v_H(L) = [\beta(1 - \tau(L))]^{\beta}\gamma(w_H(L) + P). \tag{10}$$

Proposition 1 *High-income earners oppose immigration of low-income earners if* $dv_H(\bar{L})/dL \leq 0$. *Otherwise, they prefer any* $L \in (\bar{L}, \hat{L})$ *to* $\bar{L}$ *where* $v_H(\hat{L}) = v_H(\bar{L})$, *but most prefer* $\arg\max v_H(L) = L^{\circ} \in (\bar{L}, \hat{L})$.

Proof $\text{sign}[dv_H/dL] = \text{sign}[(1 - \tau)\alpha w_L/\beta(w_H + P)H - d\tau/dL]$ is implied by Eq. 10. The first term on the right is positive and decreasing in L. Lemma 1 then implies, if $dv_H(\bar{L})/dL > 0$, v_H is concave with a unique maximum over $(\bar{L}, \infty)$, and $\arg\max v_H(L) = L^{\circ} \in (\bar{L}, \hat{L})$ exists. If $dv_H(\bar{L})/dL \leq 0$, $dv_H/dL \leq 0 \ \forall \ L \geq \bar{L}$.

Therefore, each individual has a single-peaked preference in our welfare state. We also notice their best choices are not necessarily extreme. This latter result has not been obtained in a partial model of either intra- or intergenerational redistribution only.

Proposition 2 *For any given parameter values within the assumed ranges, high-income earners prefer at least as much immigration as pensioners and low-income earners.*

Proof As $\text{sign}[dv_H/dL] = \text{sign}[(1 - \tau)\alpha w_L/\beta(w_H + P)H - d\tau/dL]$, as implied by Eq. 10, $d\tau/dL = 0 \Rightarrow dv_H/dL > 0$. Hence $L^{\circ} > L^*$. If $dv_H(\bar{L})/dL \leq 0$, then $d\tau(\bar{L})/dL > 0$.

High-income earners are thus likely to be more supportive of immigration of low-income earners than the others. If none of the three groups can dominate the majority but any pair can, a referendum enables low-income earners and pensioners to choose their most preferred level of immigration of low-income earners in this welfare state.

4 Extension

We have so far looked at a case where one tax rate is applied to everyone to finance the two redistribution programmes. This may not be too unrealistic in a country such as the UK where the National Insurance Contribution is just another way of raising the tax revenue.[9] However, what if the sources of financing these programmes are separate? In particular, we look at a case where the younger generation is responsible for financing the pension benefits for the retired because this case is commonly analysed in the existing literature. We provide this section to generalise our results under the setting that is commonly used by the existing studies.

The budget constraint (Eq. 3) is accordingly replaced by

$$c_1 = (y - s)(1 - \tau - i), \tag{3'}$$

where i denotes the unfunded-pension contribution rate. Equation 4 does not change. The maximised lifetime utility (Eq. 5) is then modified as

$$u(c_1^*, c_2^*) = [\beta(1 - \tau - i)]^\beta \gamma(y + P), \tag{5'}$$

where i now enters negatively.

The welfare state faces two budget constraints. As all the revenue via τ is used to finance income-support benefits in each period, one constraint is

$$[(w_H - s_H)H + (\omega - s_L)L + R]\tau = bL. \tag{11}$$

The other is to sustain the pension system, namely,

$$[(w_H - s_H)H + (\omega - s_L)L]i = p(H_{-1} + L_{-1}). \tag{12}$$

As in the previous section, we assume the respective benefits are given. Therefore, we rewrite Eqs. 11 and 12 as follows:

$$\tau = \frac{(\omega - w_L)L}{\beta[w_H H + \omega L + P(H + L)] + R} \tag{11'}$$

$$i = \frac{p(H_{-1} + L_{-1})}{\beta[w_H H + \omega L + P(H + L)]} \tag{12'}$$

where we assume $\tau(\bar{L}) + i(\bar{L}) < 1$. These expressions imply the following lemmas:

Lemma 2 *Immigration of low-income earners increases the per capita burden of the income support programme.*

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[9] See, for example, the Institute for Fiscal Studies Briefing Notes 9 (Adam S, 2004, A Survey of UK Tax System) and 13 (Crawford C, Shaw J, 2004, A Survey of the UK Benefit System).

Proof Equation 11′ implies $d\tau/dL > 0 \quad \forall \ L \geq \bar{L}$.

Lemma 3 *Immigration of low-income earners eases the per capita burden of the pension system.*

Proof Equation 12′ implies $di/dL < 0$.

The model implies that when the finance of the public pension system is separated, the welfare-related arguments both for and against immigration become clear. Lemma 2 implies the positive effects of immigration in terms of the increased returns to high-skilled labour and the increased number of taxpayers are unable to offset the increased tax rate resulting from both the increased per capita income support because of the depressed low-skilled wage rate, as suggested by Eq. 6, and the increased welfare-dependent population. Lemma 3 results because immigration does not affect the pension outlay but increases the fund by boosting the high-skilled wage rate and increasing the number of contributors.

A pensioner's consumption is subject to Eq. 4, and Eq. 8 still applies. This implies the following preference:

Corollary 2 *Pensioners oppose immigration of low-income earners.*

Proof Lemma 2 is applied to Eq. 8.

Pensioners are now unambiguously against the immigration of low-income earners because they do not benefit from the possibility of immigration reducing the per capita pension contribution. They only face the increased burden of the income support programme. A comparison of Eqs. 7′ and 11′ implies an additional insight about the preference of pensioners.

Proposition 3 *Suppose $d\tau(\bar{L})/dL < 0$ in Eq. 7′. Pensioners then prefer the combination of no immigration and the pension system funded by the working generation to that of some immigration and pension benefits funded by the general taxation if $\tau(L^*)$ in Eq. 7′ is greater than $\tau(\bar{L})$ in Eq. 11′, and vice versa.*

Proof Lemma 1 showed $d\tau(\bar{L})/dL < 0 \Rightarrow \arg\min \tau(L) = L^* > \bar{L}$ in Eq. 7′, and $\tau(\bar{L})$ is greater in Eq. 7′ than in Eq. 11′.

The optimised lifetime utility (Eq. 5′) implies the following indirect utilities of workers:

$$v_L(L) = [\beta(1 - \tau(L) - i(L))]^{\beta}\gamma(\omega + P) \tag{9′}$$

$$v_H(L) = [\beta(1 - \tau(L) - i(L))]^{\beta}\gamma(w_H(L) + P) \tag{10′}$$

Lemmas 2 and 3 imply low-income earners might be more interested in allowing immigration than pensioners because of its positive effect via the pension system.

A comparison of Eqs. 9′ and 10′ implies high-income earners might be more supportive of immigration than low-income earners, for they benefit from not only a reduction of the pension contribution rate but also a higher return to their labour.

Proposition 4 (1) *If* $\mathrm{d}\tau/\mathrm{d}L \geq - \mathrm{d}i/\mathrm{d}L \ \forall \ L \geq \bar{L}$, *low-income earners oppose immigration of low-income earners.* (2) *If* $\mathrm{d}\tau/\mathrm{d}L \leq - \mathrm{d}i/\mathrm{d}L \ \forall \ L \geq \bar{L}$, *they most prefer free immigration.* (3) *If* $\mathrm{d}\tau/\mathrm{d}L$ *crosses* $- \mathrm{d}i/\mathrm{d}L$ *only once from below over* $L \geq \bar{L}$, *they most prefer* $L^\triangle > \bar{L}$ *such that* $\mathrm{d}\tau\left(L^\triangle\right)/\mathrm{d}L = - \mathrm{d}i\left(L^\triangle\right)/\mathrm{d}L$.

Proof Equation 9′ implies $\mathrm{sign}[\mathrm{d}v_L/\mathrm{d}L] = \mathrm{sign}[-\mathrm{d}i/\mathrm{d}L - \mathrm{d}\tau/\mathrm{d}L]$. Equation 12′ implies $\mathrm{d}^2i/\mathrm{d}L^2 > 0$ and $\mathrm{d}^3i/\mathrm{d}L^3 < 0$. Hence $- \mathrm{d}i/\mathrm{d}L$ is decreasing in L at an increasing rate. Equation 11′ implies the signs of $\mathrm{d}^2\tau/\mathrm{d}L^2$ and $\mathrm{d}^3\tau/\mathrm{d}L^3$ are ambiguous. See Appendix. Hence, the number of points where $-\mathrm{d}i/\mathrm{d}L$ and $\mathrm{d}\tau/\mathrm{d}L$ meet in $\mathbb{R}^2_+$ is ambiguous. (1) v_L is non-increasing in $L > \bar{L}$. (2) v_L is non-decreasing in $L > \bar{L}$. (3) $L^\triangle$ is stable: the case of single-peaked v_L.

Proposition 5 *For any given parameter values within the assumed ranges, high-income earners prefer at least as much immigration as low-income earners who in turn prefer at least as much immigration as pensioners.*

Proof $\mathrm{sign}[\mathrm{d}v_H/\mathrm{d}L] = \mathrm{sign}[(\mathrm{d}w_H/\mathrm{d}L)(1 - \tau - i)/\beta(w_H + P) - \mathrm{d}i/\mathrm{d}L - \mathrm{d}\tau/\mathrm{d}L]$ is implied by Eq. 10′. As Eq. 9′ implies, the first positive term on the right-hand side is absent in $\mathrm{sign}[\mathrm{d}v_L/\mathrm{d}L]$. Proposition 4 indicates low-income earners may benefit through i. Corollary 2 indicates pensioners do not benefit from immigration.

Proposition 4 suggests that workers' preferences are now ambiguous and depend on parameter values. In particular, the signs of the second and third derivatives of τ are not clear, and multiple equilibria can arise. Nevertheless, Proposition 5 suggests the values of parameters do not change the ranking of high-income earners, low-income earners and pensioners according to how much immigration they most prefer. The median voter is likely to be a low-income earner. Majority voting is then likely to result in the immigration level that is most preferred by low-income earners in both environments: consolidated and separated taxation for redistribution.

5 Discussion

The results of this paper (Propositions 2 and 5, in particular) have some empirical support. Low-income earners and/or those who face unemployment risk have been found to be less in favour of immigration in the UK (Dustmann and Preston 2004),

Switzerland (de Melo et al. 2004), the US (Citrin et al. 1997; Scheve and Slaughter 2001) and other OECD countries (Bauer et al. 2000). The elderly in the EU seem to be the least pro-immigration.[10]

Fertig and Schmidt (2002: Table 11) have found that German natives with low education tend to think immigrants are welfare-dependent and burdensome. On the other hand, Dustmann and Preston (2004: Tables 7 and 8) have found that welfare impacts of immigration are not very important for the formation of the attitude of white British persons with low education and/or low earnings. They have not found a significant contribution of labour-market concerns to anti-immigration attitude among unskilled workers either: their anti-immigration attitude seems mainly based on their racial prejudice.

Some studies directly relate individuals' opinions about the impacts of immigrants to their preferences about the level of immigration. Espenshade and Hempstead (1996: Table A8) have found that, in the US, the supporters of immigration are likely to be those who think immigrants take the jobs which natives do not want and contribute positively to the economy.[11] They have also found that the potential welfare dependency of immigrants is not a predictor of individual preferences about the immigration level. On the other hand, Citrin et al. (1997: Table 1) have found that anti-immigration is strongly related to both concerns about the worsened labour market and the increased tax burden caused by immigration.

Bauer et al. (2000: Tables 3 and 6) have found that, in the selected OECD countries, persons who think that immigrants increase the risk of unemployment tend to argue for a reduction in the number of immigrants. They have also found that being unemployed and low-educated are the characteristics that are correlated to the opinion that immigration results in increased unemployment.

While our analysis is limited to economic motivation, some of these empirical studies suggest our ranking of high-income earners, low-income earners and retirees in terms of their preferences seems to reasonably approximate what some survey data in developed countries imply. This might, in turn, suggest that rational economic motivation is important in the formation of individual preferences over the level of immigration.

The advantage of our framework, the one with one tax rate in particular, is that all utilities are unambiguously single-peaked (Corollary 1 and Proposition 1), which simplifies the analysis of the political economy of immigration. Peaks are not necessarily at the corners, implying the existence of a positive level of immigration in a welfare state. The model provides a platform for complex public choice analysis such as multidimensional majority voting that includes immigration.

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[10] See Tamura (2004: Fig. 7) for what the European Social Survey (Round 1) data imply.
[11] Their study could have given a better insight if we could see the relationships between individuals' opinions about the impacts of immigration and their characteristics, such as age, income and occupation of respondents.

Appendix: For Proof of Proposition 4

Let T denote the total taxable income, $\beta[w_H H + \omega L + P(H + L)] + R$. Since

$$\frac{d\tau}{dL} = \frac{[\omega - (1 - \alpha)w_L](R + \beta PH) + \beta\alpha Y[\omega + (1 - \alpha)P]}{T^2} > 0$$

for $L \geq \bar{L}$, we have $d^2\tau/dL^2 = X/T^3$ where $X \equiv$

$$\alpha(1 - \alpha)^2 H^\alpha L^{-(1+\alpha)}(R + \beta PH)^2$$
$$-\beta(R + \beta PH)\{[2\omega - (2 - \alpha)w_L]\alpha w_L + [2\omega - (2 - \alpha^2)w_L]\omega + 2[\omega - (1 - \alpha^2)w_L]P\}$$
$$- \beta^2\alpha Y[\omega + (1 - \alpha)P][\alpha w_L + (1 + \alpha)(\omega + P)].$$

The first term of X is positive, and the third negative. The third term may or may not be increasing in L, depending on α. The second term is negative for $L \geq \bar{L}$. It is also unclear whether this term is increasing in L or not.

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