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HOW MIGRATION CAN CHANGE INCOME INEQUALITY?

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ABSTRACT

Motivated by the unique experience of Israel of a supply-side shock of skilled migration, and the concurrent rise in disposable income inequality, this paper develops a model which can explain the mechanism through which a supply-side shock of skilled migration can reshape the political-economy balance and the redistributive policies. First, it depresses the incentives for unskilled migrants to flow in, though they are still free to do so. Second, tax-transfer system becomes less progressive. Nonetheless, the unskilled native-born may well become better-off, even though they lose their political clout.

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I.   Introduction

Motivation for this paper arises from the unique laboratory-like experience: robust supply-side shock, triggered by the collapse of the Soviet Union, and a concomitant sharp rise in Israel's income inequality. To explore how the shock alters immigration patterns, and, at the same time, reshapes the political-economy balance we develop a stylized political-economy model with free migration.

We flash out the working of important political-economy mechanisms:

First, the influx of skill-immigrants depresses the incentives for unskilled migrants to flow in, though they are still free to do so. Second, the fiscal burden of redistribution policies diminishes from the viewpoint of the decisive voter. That is, the influx of skilled labor raises overall productivity of the labor force; consequently it also raises the tax revenue needed for shouldering a redistribution policy. However, counteracting this pro-distribution force is the rebalancing of the political coalition, because the share of the increase in the skilled in the population. Therefore, the emerging decisive voter reverses pre-existing the redistribution regime, notwithstanding the fall in the fiscal burden. Third, nonetheless, the unskilled native-born may well become better-off, even though they lose their political clout.

I.1 Unique Episode

Immigration has been long known to have far and wide reaching economic and social consequences. These include the labor market, international trade, economic growth, the social and political structure, etc. (see, e.g., Lucas (2014) for a recent treatise). In Razin, Sadka and Swagel (2001b) we studied the way immigration may affect policy by reshaping the political balance of powers. In this paper we focus on how this reshaping affects the economic policy of the receiving country on income inequality.[1]

However, we greatly simplified the structure of the political forces at play and could only generate a limited degree of change in the political balance of powers.

Unique to Israel, the Law of Return not only enabled free immigration but also grants these immigrants immediate citizenship and consequently voting rights. Nevertheless, an early study by Avner (1975) finds that the voting turnout rate of new immigrants had been markedly lower than that of the established population. This means that immigrants did not fully exercise their voting rights and

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[1] Ben Habib and Jovanovich (2007) consider world-welfare perspective. Our analysis focuses on an individual state.

did not therefore influence the political economy equilibrium in Israel as much as the established population.

A similar migrant low voting turnout pattern is reported also by Massina (2007) and Bird (2011) for Western Europe. However, a later study about voting turnout pattern of new immigrants to Israel in the 2001 elections, conducted by Arian and Shamir (2002) reverse this finding for 2001. The new immigrants in this study are pre-dominantly from the FSU. Arian and Shamir find no marked difference in the voting turnout rates between these new immigrants and the established population. This is indeed a unique feature of the 1989-2001 immigration waves from the FSU. We therefore focus here on this case.

There is yet another unique feature of the 1989-2001 immigration waves that distinguishes it from earlier post-state waves. Immigrants came mostly from urban areas, with fairly advanced education systems. Thus, the skill (education) composition of the immigrants is biased towards high education levels, relative to the skill (education) composition of the established population. This bias is reflected in their relatively higher labor income (see Table 1). Their share in the population was sizable - 14.5%. Their average family size (2.32 standard persons) is lower than the national average (2.64 standard persons). This indicates a fewer number of dependents. Most important is their higher education level and consequently their higher labor income. The average number of schooling years of the new immigrants is 14.0, compared to the national average of only 13.3.

Table 1: The Skill, Age and Income of Immigrants from the FSU and the National Average, 1990-2011

	Immigrants from the FSU	National Average2
Share in Total Population (%)	14.5	100
Household Size (numbers of standard persons)	2.32	2.74
Schooling Years Of Head of Household (no.)	14	13.3
Head of household with a bachelor degree (%)	41.1	29.5
gross monthly labor income per standard person (2011 NIS)	4,351	4,139

Source: Eilam (2014)

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[2] Including immigrants

Even more striking is the percentage of the head of the household with a bachelor degree: 41.1% among the new immigrants, compared to a national average of just 29.5%. The higher education level and the lower family size can presumably explain the income gap: the average labor income per standard person of the new immigrants is NIS 4,351, compared to a national average of only NIS 4,139. Noteworthy, this gap exists even though the new immigrants have presumably lower work seniority than the established population.

The educational achievement figures of the immigrants from the FSU are strikingly impressive compared to the EU-15. Relying on data from the International Organization for Migration (IOM) and the OECD, Razin and Sadka (2014) report that only 18% of the stock of immigrants in the EU-15 in 1990 and 24% in 2000 have tertiary education.

I.3 Organization

Naturally, countries receiving immigrants are typically welfare states, Israel included. Putting it differently, in a typical welfare state disposable income inequality is significantly lower than the market income inequality. That is, transfers and the taxes of a typical welfare state serve to reduce disposable income inequality. Israel is not an outlier in the OECD countries with respect to the market-triggered (pre-tax-cum-transfer) income inequality. The 1989-2001 immigration sharply reduced the scope of the welfare state.

We endeavor to study analytically the political economy interactions between immigration and the welfare state, through majority voting within a rich political economy structure that enables a variety of formulations of coalition. Specifically, we have in mind the wave of immigration from the FSU to Israel in 1989-2001.We construct a minimalist model for our analysis. It has a simple redistribution system and human capital accumulation, and production structure. There is heterogeneity of the established and migrant population, and free migration.

The organization of the paper is as follows. Section II describes the model, and Section III presents the policy setup. In Section IV we discuss the numerical simulations of the model. Section V provides concluding remarks.

II.   The Model

We provide a stylized general equilibrium model with free migration, where policy is determined by majority voting.[3]

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[3] The model is based on Razin, Sadka and Swagel (2001a,b)

II.1 Human Capital Investment

There are just two types of workers: "skilled" (with a symbol S) and "unskilled" (with the symbol U). The wage per unit of labor of a skilled worker is w, whereas an unskilled worker earns a wage of ρw per unit of labor, where, $\rho < 1$. All native-born (N) are initially unskilled. But, a native-born can acquire education at some cost (c) and becomes skilled. Individuals differ from one another through their cost of education: there is a continuum of native-born individuals, distinguished only by their cost of education. For notational simplicity, we normalize the number of native-born individuals to 1. An individual is identified by her cost of education, so that an individual with a cost of c is termed a c-individual. We assume for simplicity that the cost of education is uniformly distributed over the interval $[o, \bar{c}]$.

All native-born individuals are endowed with E units of a composite good, the single good in this economy. All individual inelastically supply one unit of labor. If a c-individual acquires education and becomes skilled, her income[4] is (denoted by I_S^N)

$$I_S^N(c) = (1 - t)w + b + (E - c)(1 + r)$$

, where t is a flat wage tax rate[5]; b is a uniform (lump-sum) per capita social benefit; and r is the interest rate – the return to capital. If a c-individual decides not to acquire education and remain unskilled, her income (denoted by I_U^N) is

$$I_U^N = (1 - t)\rho w + b + E(1 + r) \tag{1}$$

(Note that $I_S^N(c)$ depends on c, whereas I_U^N does not)

Thus, there is a cutoff level of cost, c^*, so that all c-individuals with $c \leq c^*$ will choose to become skilled, and all the others (with $c \geq c^*$) will remain unskilled. This c^* is defined by

$$(1 - t)w + b + (E - c^*)(1 + r) = (1 - t)\rho w + b + E(1 + r).$$

Upon some re-arrangement, the cutoff level of the cost of education, c^*, becomes:

$$(1 - t)(1 - \rho)w = c^*(1 + r).$$

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[4] Note that this specification assumes that capital does not depreciate at all.
[5] In an unpublished version we extended the tax to apply to capital income as well.

That is, c^* is solved from the equality between the return to education and its cost. A c^*-individual is just indifferent between acquiring education (and thereby becoming skilled) or staying unskilled. Upon further re-arrangement, c^* is defined by

$$c^* = \frac{(1-t)(1-\rho)w}{(1+r)}.$$ (2)

Note that c^* may well exceed E, which means that those c-individuals with c below but close to c^* (which is endogenous) actually <u>borrow</u> in order to acquire education. Naturally, the payoff in terms of the higher wage would more than offset the borrowing cost. For those individuals $E - c$ is negative.

Also, note that we are employing a static framework within which all economic and political processes occur simultaneously with no time dimension.[6] For instance, we do not distinguish between the time in which the education is acquired, and the time when the earnings occur. Similarly, capital earns its return r at the same time it is employed.

The number of c-individuals with $c \leq c^*$ is the number of native-born skilled individuals. Denoting this number by n_S, it follows that

$$n_S = \frac{c^*}{\bar{c}}.$$ (3)

Then, the number of native-born unskilled individuals, n_U, is thus given by

$$n_U = 1 - n_S.$$ (4)

Aggregate investment in human capital (education), denoted by H, is then given by

$$H = \int_0^{c^*} c \cdot \frac{1}{\bar{c}} dc = \frac{(c^*)^2}{2\bar{c}}.$$ (5)

Therefore, the aggregate stock of physical capital, K, is equal to

$$K = E - H.$$ (6)

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[6] Such a framework is akin to a steady state in a dynamic model with rational expectations.

There are also two types of migrants: the skilled who can earn a wage w in the host country, and the unskilled who earn a wage of ρw in the host country. None of them has any initial endowment. The migrants come to the host country after they have already made and implemented the decision whether to acquire or not acquire education. Thus, it is exogenously given who is skilled and who is unskilled. In other words, the economy benefits from the skilled migrants because it does not have to pay for the cost of investment.

II.2 Income Groups

The income of skilled and unskilled migrants, respectively, is:
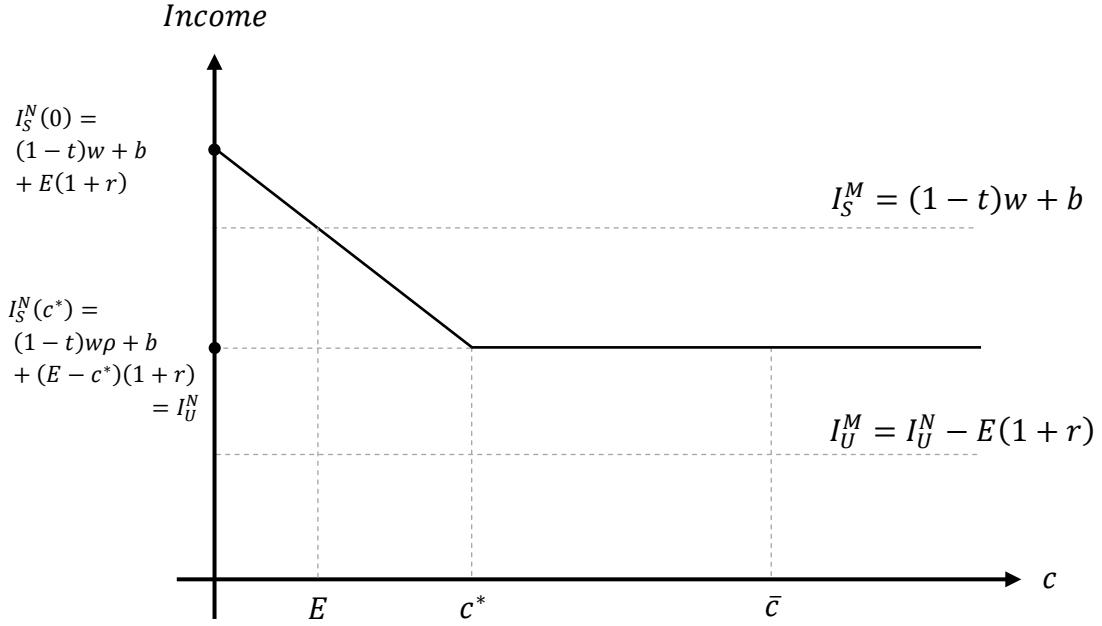
$$I_S^M = (1-t)w + b \tag{7}$$

, and

$$I_U^M = (1-t)\rho w + b. \tag{8}$$

The income of the native-born as a function of c is depicted in Figure 2. Note that $I_S^N(c)$ declines in a straight line until it reaches c^*, where

$$I_S^N(c^*) = (1-t)w + b + (E - c^*)(1+r) = (1-t)\rho w + b + E(1+r) = I_U^N.$$

The labor income of the unskilled native-born and the unskilled migrants is the same, but the total income of an unskilled migrant which is $(1-t)\rho w + b$ is definitely below the income of an unskilled native-born, the difference being the capital income enjoyed by the unskilled native-born, namely $E(1+r)$. The total income of a skilled migrant is definitely higher than the total income of the unskilled migrant, because of the higher wage earned by the skilled, whereas both have no other income. The income of the skilled migrants exceeds the income of the skilled native-born with $c > E$, but falls short of the income of the skilled native-born with $c < E$.

Figure 1: Income Groups as function of Cost of Education

$Income$

$I_S^N(0) =$
$(1-t)w + b$
$+ E(1+r)$

$I_S^M = (1-t)w + b$

$I_S^N(c^*) =$
$(1-t)w\rho + b$
$+ (E - c^*)(1+r)$
$= I_U^N$

$I_U^M = I_U^N - E(1+r)$

E c^* $\bar{c}$ c

The income of a skilled migrant is $I_S^M = (1-t)w + b$, whereas the income of a skilled c-individual is $(1-t)w + b + (E - c)(1+r)$. Therefore, as long as $E - c$ is positive (i.e. the c-individual does not borrow in order to invest in human capital), then $I_S^N(c) > I_S^M$. But if $E - c < 0$ (i.e. the individual borrows in order to invest in human capital), then the income of the skilled migrant (I_S^M) is greater than the income of the skilled native-born (I_S^N). In sum, we have the following ranking of incomes:

$$I_U^M < I_U^N = I_S^N(c = c^*) < I_S^N(c > E) < I_S^N(c = E) = I_S^M < I_S^N(c < E).$$

II.3 Supply of Immigrants

Recall that the country employs an unrestricted migration policy. We envisage an economy that allows any migrants to come. Thus, the decision whether to immigrate or no rests solely with the migrant. Each potential migrant has some reservation income, so that she will migrate if and only if she will be accorded a higher income in the destination country.

Due to various factors (such as skill, family ties, age, etc.) this reservation income is not the same, but there is rather a continuum of such reservation incomes. Distinguishing between the two skill groups, we then assume that there is an upward sloping supply function for each skill group,

depending on the income accorded to immigrants in the destination country. Denoting the number of skilled migrants by m_S, the supply function of skilled migrants is given by an iso-elastic function:

$$m_S = B_S(I_S^M)^{\sigma_S} \tag{9}$$

,where B_S and σ_S are some positive parameters. Similarly, the supply function of unskilled migrants is given by

$$m_U = B_U(I_U^M)^{\sigma_U} \tag{10}$$

, where m_U is the number of unskilled migrants and B_U and σ_U are some positive parameters.

II.4 Production and Factor Prices

We employ a Cobb-Douglas production function

$$Y = AK^\alpha L^{1-\alpha}, \quad A > 0, 0 < \alpha < 1 \tag{11}$$

, where Y is gross domestic product, A is a total factor productivity (TFP) parameter, and α is the capital-share parameter (and $(1 - \alpha)$ is the labor-share parameter). Symbol L indicates the total labor supply in efficiency units and is given by

$$L = n_S + \rho n_U + m_S + \rho m_U \tag{12}$$

The competitive wage per efficiency unit of labor (w) and the competitive interest rate (r) are given by the marginal productivity conditions

$$w = (1 - \alpha)A\left(\frac{K}{L}\right)^\alpha \tag{13}$$

, and

$$r = \alpha A\left(\frac{K}{L}\right)^{1-\alpha}, \tag{14}$$

, where we assume for simplicity that capital does not depreciate.

II.5 Income   Redistribution System

We employ a very simple system of redistribution. Wages are taxed at a flat rate of t. The revenues are distribution by a uniform per-capita transfer b.

We assume that the migrants qualify for all the benefits of the welfare state, and they are naturally subject to the state taxes. Therefore, the government budget constraint is as follows:

$$twL = b(1 + m_S + m_U) \qquad (15)$$

, assuming that the government has no other revenue needs, except for redistribution.[7] Note that it follows from equation (16) that t and b must be of the same sign. A positive wage tax (t) allows the government to accord a positive transfer (b) to all. A subsidy to wages (namely, a negative t) requires the government to impose a lump-sum tax (negative- b) on all. When t and b are positive, the tax-transfer system is progressive. When they are negative, the system is regressive.

III.   Policy Setup

With unrestricted migration the flows of migrants m_S and m_U are determined by the migrants themselves according to their reservation incomes (embedded in the supply functions, (11) and (12)), and the income accorded to them in the host country. There are therefore only two policy variables – the tax rate t , and the social benefit b. But as the government is constrained by a balanced budget (condition (16)), it follows that there is essentially only one policy variables; once t is chosen, all the other economic variables are determined in equilibrium, including the tax revenue (twL), the number of migrants (m_S , and m_U), and b. Or, alternatively, once b is chosen, all the other economic variables are determined in equilibrium.

Choosing t as the single policy variable, we note that there remain 15 endogenous variables –

$$w, \ b, \ r, \ c^*, \ I_S^M, \ I_U^M, \ n_S, \ n_U, \ I_S^N, \ m_S, \ m_U, \ H, \ K, \ Y, \ L.$$

There are also 15 equations in the model – (2)-(9) and (10)-(16) from which the endogenous variables get solved[8].

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[7] One may wonder why there is no tax on the initial endowment (E). In a distortive. But in a dynamic setting which we preferred to mimic in a static framework, E represents accumulated savings, and taxing it will be distortive. Furthermore, because all native-born possess the same initial endowment, taxing it in our static model does not distribute income across native-born income groups; but taxing E amounts to transferring income from the native-born to the migrantsstatic model such a tax is not.

[8] In addition, equation (1) defines I_S^N as a function of c.

The policy variable is chosen by some natural and plausible version of a majority voting, as described below.

Upon observation, we can see from equations (2) and (3) that the direct effect of the tax-transfer policy on the incomes of the unskilled native-born and the unskilled migrants is the same, and works through the net wage income $(1 - t)\rho w + b$. For the unskilled migrant this is the only effect of the tax-transfer system. However, for unskilled native-born, there is also an indirect effect through capital income $I(1 + r)$ (note that r depends on t); but this indirect effect is of a second-order magnitude compared to the direct effect.

Similarly, the direct effect of the tax-transfer policy on the incomes of the skilled native-born and the skilled migrants is the same and works through the net wage income $(1 - t)w + b$. Here again, there is also and indirect effect on the income of the skilled native-born (but not on the income of the skilled migrants) through the capital income $(E - c)(1 + r)$. Here again the indirect effect is of second-order magnitude.

Thus, all unskilled (both native-born and migrants) are affected by the tax-transfer policy mainly through $(1 - t)\rho w + b$, whereas all skilled (both native-born and migrants) are affected mainly by $(1 - t)w + b$. It is therefore natural that all the unskilled whose wage is only ρw would rather prefer to tax wage income and take advantage of all the skilled whose wage is higher – w. Thus, the most preferred policy of the unskilled entails a positive tax and a positive transfer. Therefore, if the unskilled (both native-born and migrants) constitute a majority, then the political economy equilibrium tax and transfer will be positive – a progressive tax-transfer system. However, due to the indirect effect which applies only to the unskilled native born, the most-preferred tax and transfer policy is not necessarily the same for the unskilled native-born and the unskilled migrants. We then postulate that when the unskilled form a majority, then the tax-transfer policy chosen is the most-preferred policy by the larger of the two sub-groups (the unskilled native-born or the unskilled migrants).

Similarly, the skilled (both native-born and migrants whose wage is higher than the unskilled) would opt to grant a subsidy to the wage, financed by a lump-sum tax. That is, they opt for negative t and b – a regressive tax-transfer policy. In this case too, there is also an indirect effect which applies only the skilled native-born. Thus, the most-preferred tax-transfer policy is not the same for the two sub-groups of skilled native-born and skilled migrants. In this case too we postulate that the political-economy tax-transfer policy is the most-preferred policy of the larger sub-group.

Note that indirect effect of the tax-transfer policy which works through the capital income $(E - c)(1 + r)$ is not the same for all members of the skilled native-born sub-group (because it depends on c). In this case we assume that the median voter within this group prevails.

IV. Results

Our purpose, motivated by the Israeli experience with the wave of skilled migration from the FSU, is to examine the effect of a supply shock of skilled migration on the political economy equilibrium tax-transfer policy.

We start with parameter values that entail the unskilled (both native-born and migrants) as a majority: $x_U + m_U > x_S + m_S$. This case is described in the first row in Table 2. As predicted, the political-economy tax-transfer policy is progressive: t and b are positive. Also, the unskilled native-born form a majority of the unskilled: $x_U > m_U$. The political-economy tax-transfer policy is the most-preferred policy by the unskilled native-born.

Table 2: The Effect of a Supply Shock of Skilled Migration

	m_U	m_S	x_U	x_S	I_U^M	I_U^N	I_S^M	$\overline{I_S^N}$ *	w	r	t	b
Unskilled Majority (Unskilled Native-Born the Larger Sub-Group)	0.89	0.14	0.97	0.03	0.063	0.194	0.237	0.281	0.312	1.55	0.32	0.03
Parameter Value of $B_s = 1.2$												
Skilled Majority (Skilled Migrants the Larger Sub-Group)	0	1.11	0.97	0.03	0	0.202	0.263	0.334	0.228	2.94	-0.41	-0.06
Parameter Value of $B_s = 8.2$												

* Since the income of the native skilled population is not constant but a linear function of c, we report this group's average income. Notice that since the minimal income of a skilled native is equal to that of an unskilled native, we have that the income of the skilled migrants lies in between them.

Other (Common) Parameter Values:

$$B_U = 56, \quad \rho = 0.18, \quad \bar{c} = 2, \quad E = 0.05, \quad \alpha = 0.33, \quad \sigma_S = \sigma_U = 1.5, \quad A = 1$$

We now keep all other parameter values constant and increase the parameter value of B_S. That is, we give a positive shock to the supply of skilled migrants. The results are shown in the second row of Table 2. The number of skilled migrants (m_S) rises sharply from 0.14 to 1.11. The skilled constitute now the majority: $x_S + m_S > x_U + m_U$. As predicted, the political-economy tax-transfer policy becomes now regressive: t and b are negative. That is, there is a wage subsidy financed by a lump sum tax. Also, the skilled migrants form the larger of the two skilled sub-groups, (i.e. $m_S > x_S$) and their most-preferred tax-transfer policy becomes now the political-equilibrium tax-transfer policy. Furthermore, as can be seen from the second row of Table 2, the politically dominant sub-group of skilled migrants drives out all unskilled migrants ($m_U = 0$), by according them zero disposable income ($I_U^M = 0$).

Noteworthy, the unskilled native-born were initially the politically dominant sub-group and dictated their most-preferred progressive tax-transfer. Following the supply-side stock of skilled migration, the unskilled native-born lose their dominance to the skilled migrants who are now dictating their most-preferred regressive tax-transfer policy. Nevertheless, the unskilled native-born are better off, because the return to their capital income (namely, r) rises sharply from 1.55 to 2.94 (in unit of the all-purpose composite good). Even though the wage per efficiency unit falls (from 0.312 to 0.228), the sharp rise in the rate of interest (from 1.55 to 2.94) more than compensates the native-born unskilled for the wage decline. For the same reason, the skilled (native-born and migrants) are all better off. Thus, except for the unskilled migrants, who are driven out, all other income groups gain from the skilled-migration supply shock.

Note that the influx of skilled labor raises overall productivity of the labor force; consequently, it does also raise the tax revenue needed for shouldering the pre-existing redistribution policy. This force works towards more generous redistribution, since it is fiscally less burdensome. Counteracting this pro-distribution force, however, is the rebalancing of the political coalition triggered by the increased share of higher-income skilled in the voting population. The result in Table 2 is that the emerging decisive voter *reverses* the pre-existing redistribution regime.

It is worth explaining the model specific forces that totally drive out the unskilled migrants in the wake of the skilled-migration supply shock. The model assumes perfect substitutability between skilled and unskilled labor in production: each unit of time of an unskilled worker is equivalent to ρ units of time of a skilled worker. Thus, unskilled migrants provide no productivity benefits to the skilled. At the same time, they constitute a fiscal burden Therefore, the new skilled-dominant coalition drive them out altogether by pushing their disposable income all the way to zero. The assumed perfect substitutability in production does serve to highlight the anti-unskilled-migration forces within the ruling skilled coalition.

V.   Concluding Remarks

The motivation arose from the unique experience of Israel which within a short time period in the early 1990s received scores of migrants from the Former Soviet Union. This sizeable migration wave had an exceptionally   large proportion of skilled migrants. Following this wave one could detect a sharp new upward trend of disposable income inequality without a parallel change in market income inequality.

This paper explores how migration can reshape immigration patterns that are jointly being determined with the political balance of power. We distinguish between skilled and unskilled immigrants, and between native-born and migrants. We explore the how jointly the redistributive policies, skilled and unskilled immigration, and political coalitions, are all being jointly determined.

There are important political-economy insights   about the interaction between   free migration and political rebalancing that our analysis brings out. The rise in the share of skilled in the labor force diminishes the heavy weight of the redistribution-fiscal burden, from the viewpoint of the decisive voter That is, the inflow of skilled labor raises the labor-force overall productivity, thereby raising the tax revenue that is   needed for shouldering the income-distribution regime. This pro-distribution force is counteracted. The increased share of the skilled in the voting- population triggers political re-balancing. The emerging decisive voter reverses the pre-existing the redistribution regime, notwithstanding the fall in the fiscal burden.

 The influx of skill-immigrants also depresses the incentives for unskilled migrants to flow in, though they are still free to do so. Notwithstanding the political rebalancing, the unskilled native-born may well become better-off, even though they lose their political clout.

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