ECONOMIC RESEARCH REPORTS

A NOTE ON THE POLITICAL ECONOMY OF IMMIGRATION

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RR # 92-42

September, 1992

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A Note On the Political Economy of Immigration

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August 1992

* This paper was written after a stimulating conversation with A. Wenig. I am, however, responsible for errors and misconceptions. I thank the C.V. Starr Center for Applied Economics at New York University for technical assistance.

ABSTRACT

We study how immigration policies that impose capital and skill requirements would be determined under majority voting when natives differ in their wealth and vote for policies that maximize their income. We also consider political outcomes when the economy grows, immigration is continous and immigrants gradually aquire voting rights.

1. Introduction.

How does immigration affect the economic welfare of the native population? An early answer to this question has been given by Berry and Soligo [1969]. In the context of a representative agent economy, they found that irrespective of how much capital the immigrants bring with them into the country, the welfare of the natives, as measured by the welfare of the representative agent, must necessarily improve.[1] (For further elaborations and generalizations see Quibra [1988] and Meier and Wenig [1992].) With a native population that is heterogeneous in terms of wealth distribution, however, it is intuitively clear that free immigration will not benefit everyone. In this paper we will study how immigration policies that impose capital and skill (human capital) requirements on heterogeneous immigrants, would be determined under majority voting when natives vote for policies that will improve their economic well-being. Of course the preferences of natives concerning immigration policies will also be influenced by non-economic considerations. A desire to maintain cultural and ethnic homogeneity is surely at work in some societies. On the other hand, naturalized immigrant groups may want their relatives, friends and ex-compatriots to join them, irrespective of how an unrestrictive immigration policy would affect their welfare. Here we focus only on the purely economic considerations and try to isolate their impact on immigration policy. Our goal is to provide a simple model which may be used to address issues in the political economy of migration.

In the next section we consider the case of one-shot immigration with heterogeneous native and immigrant populations. We show that the native population will be polarized between those who would like an immigration policy to maximize the domestic capital-labor ratio and those who would like an immigration policy that would minimize it. We study the determinants of political outcomes

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[1] Except for singular cases.

when policies are set according to the preferences of the majority.

Section 3 attempts to deal with the case of continuous immigration. In this case immigrants gradually acquire voting rights and can influence decisions on immigration policy by changing the wealth distribution of the voting population. Simulations indicate that long periods of restrictive immigration policies will be followed by short periods of unrestricted immigration as the wealth distribution of the voting population evolves over time. However, allowing for growth in domestic wealth, relative to the wealth of the potential immigrants, tends to prepetuate restrictive immigration policies if the capital-poor are in the majority to start with.

2. The Model.

Individuals are indexed by the units of capital that they own, k. The density of individuals is given by the continuous density function $N(k)$, defined on $[0, \infty)$. The initial capital stock, $K(0) \equiv K_0$, is given by

$$K_0 = \int_0^\infty N(k)\,k\,dk \tag{1}$$

and the initial population size, $L(0) \equiv L_0$, is

$$L_0 = \int_0^\infty N(k)\,dk\ . \tag{2}$$

The median type, k_m, is the solution to the equation

$$\frac{\int_0^{k_m} N(k)\,dk}{L_0} = 0.5 \ . \tag{3}$$

The density function of potential (one-shot) immigrants is $I(k)$, defined over $[0, \infty)$ and continuous. An immigration policy $P(s\ q)$ restricts the types of potential immigrants to those with $s \le k \le q$, so that the total immigration flow is $\int_s^q I(k)\,dk$. Of course, $s, q \in [0, \infty)$. The post-immigration capital-labor ratio is given by

$$R(s,q) \equiv R_s^q = \frac{K_0 + \int_s^q I(k)\,k\,dk}{L_0 + \int_s^q I(k)\,dk} \ . \tag{4}$$

We denote the pre-immigration capital-labor ratio by $R_0 \equiv R(s, s)$.

We assume a constant-returns neoclassical production function $F(K, L) = Lf(K/L)$. The competitive wage rate, as usual, is $w = f(K/L) - f'(K/L)K/L$ and the interest rate is $r = f'(K/L)$. Let k_i be the type indifferent to the immigration policy $P(s, q)$, so that her pre-immigration and post-immigration incomes are identical. Then

$$f(R_0) - f'(R_0)R_0 + f'(R_0)k_i = f(R_s^q) - f'(R_s^q)R_s^q + f'(R_s^q)k_i \,. \tag{5}$$

Adding and subtracting $f'(R_s^q)R_0$ to the right of (5) and rearranging, we obtain (6.i); adding and subtracting $f'(R_0)R_s^q$ to the right of (5) and rearranging, we obtain (6.ii):

$$f(R_0) - f(R_s^q) - f'(R_s^q)(R_0 - R_s^q) = \left[f'(R_s^q) - f'(R_0)\right](k_i - R_0) \,, \tag{6.i}$$

$$f(R_0) + f'(R_0)(R - R_0) - f(R_s^q) = \left[f'(R_s^q) - f'(R_0)\right](k_i - R_s^q) \,. \tag{6.ii}$$

We can now immediately derive the following Proposition:

Proposition 1:

a) The average person of type $k = R_0$ obtains a higher income than his pre-immigration income under any immigration policy $P(s, q)$ if $R_0 \neq R_s^q$;

b) If $R_s^q < R_0$, then $R_s^q < k_i < R_0$ and all natives of type $k > k_i$ have a higher post-immigration income under policy $P(s, q)$;

c) if $R_0 < R_s^q$ then $R_0 < k_i < R_s^q$ and all natives of type $k < k_i$ have a higher post-immigration income under policy $P(s, q)$;

d) If we assume that natives vote against an immigration policy that reduces their income, then a policy $P(s, q)$ will be defeated in a referendum if

(i) $k_m \leq k_i$ when $R_s^q < R_0$

(ii) $k_m \geq k_i$ when $R_s^q > R_0$;

e) Any immigration policy P(s, q) such that $R_s^q \neq R_0$ will be approved if the median wealth, k_m, is sufficiently close to the average wealth, R_0.

<u>Proof</u>: (b) and (c) follow since the left-hand side of (6.i) is negative and the left-hand side of (6.ii) is positive under the strict concavity of f. (a) follows from (5) if we replace k_i with R_0 and note that the strict concavity of f implies that the left-hand side is smaller than the right-hand side. (d) is obvious and immediate. (e) is obvious from inspecting (d.i), (d.ii) is conjunction with (b) and (c). ■

We note that (a) above corresponds to the graphical result of Berry and Soligo [1969] if all individuals have the same wealth, that is if there is a representative agent.

Next we would like to investigate which immigration policy would defeat any other policy in a pairwise contest under majority voting. For this purpose we first characterize the policies for which the highest and the lowest post-immigration capital-labor ratios are obtained. Some elementary algebra shows that the maximum R(s, q) is attained by $R(\underline{s}, \infty)$ where $\underline{s}$ is the highest s such that $R(s, \infty) = s$. That is we can start by permitting the immigration from the highest end of the distribution I(k) and reduce s until the average capital-labor ratio $R(s, \infty)$ attained is equal to the marginal capital-labor ratio s. Any $s > \underline{s}$ obviously raises the capital-labor ratio and must be allowed to immigrate in order to attain the maximum R(s, q). Similarly to minimize the capital-labor ratio we must start at the bottom to allow the immigration of all types $[0, \bar{q}]$, where $\bar{q}$ is the lowest q such that $R(0, q) = q$.[2] Of course if $R_0 = 0$, $\bar{q} = 0$. We define the maximum attainable R as $\bar{R} = R(\underline{s}, \infty)$ and the minimum attainable R as $\underline{R} = R(0, \bar{q})$.

Consider now the preferred immigration policy of an arbitrary type k_p. The preferred capital-labor ratio R of type k_p is the solution to

$$\max_{R \in [\underline{R}, \bar{R}]} \; f(R) - f'(R)R + f'(R)k_p \; . \tag{7}$$

The objective function is convex with a minimum at $k_p = R$. Thus type k_p either prefers $\underline{R}$ or $\bar{R}$: The population will be polarized between those who prefer $\bar{R}$ and therefore immigration policy $P(\underline{s}, \infty)$ to all other policies, and those who prefer $\underline{R}$, and therefore immigration policy $P(0, \bar{q})$ to all other policies. To sort out what the majority prefers consider the type k_I who is indifferent between $\bar{R}$ and $\underline{R}$. We have

$$f(\bar{R}) - f'(\bar{R})\bar{R} + f'(\bar{R})k_I \;=\; f(\underline{R}) - f'(\underline{R})\underline{R} + f'(\underline{R})k_I \; . \tag{8}$$

Constructing the analogues of equations (6) with $\underline{R}$ and $\bar{R}$ replacing R_0 and R_s^q, it is easy to show that $\underline{R} < k_I < \bar{R}$. It follows that all types $k < k_I$ prefer $P(\underline{s}, \infty)$ and types $k > k_I$ prefer $P(0, \bar{q})$. We can summarize these points in Proposition 2:

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[2] There may of course be corner solutions if the support of $I(k)$ is bounded. Modifying the analysis for those cases is straightforward and therefore omitted.

Proposition 2: If $k_m < k_I$ ($k_m > k_I$), and voters care only about their income, $P(\underline{s}, \infty)$ ($P(0, \bar{q})$) defeats all other immigration policies under majority voting with pairwise alternatives.

While minimal capital requirements or skills may be required of immigrants, it may not be legally feasible to restrict immigration to $[0, \bar{q}]$: Once in the country immigrants may not be prevented from bringing in their wealth or they may pretend to be unskilled when they are not. If $\bar{q}$ must be ∞, the alternative feasible policy that minimizes R is free immigration, that is $P(0, \infty)$. Thus is Proposition 2 we may replace $P(0, \bar{q})$ with $P(0, \infty)$. The contest would then be between free immigration and restricted immigration with minimum skill or capital requirements.

We must be careful to define wealth appropriately so that skills and human capital are included as part of wealth. As the German and Swiss experiences of the last few decades indicate, a highly skilled population may well favor the immigration of a large number of unskilled workers rather than allow the unskilled wage rate to increase, at least for a limited amount of time.[3]

One possible way to model emigration instead of immigration would be to allow $I(k)$ to become negative (with $N(k) + I(k) \geq 0$ for all k) in the above analysis. The previous results should apply provided the definition of k_m, the median type, is appropriately modified. By comparing k_i, the type indifferent between the status quo policy $P(s, s)$ and the emigration policy $P(s, q)$, with the median type k_m, we could conclude that if $k_m < k_i$ ($k_m > k_i$) and $R_s^q < R_0$ ($R_0 > R_s^q$), the majority would be opposed to $P(s, q)$. Now we would have to check not that $k_m < k_i$, but that

[3] More recent events in Germany suggest that the time for a policy reversal may have arrived.

$$\frac{\int_0^{k_i} N(k)\,dk - \int_0^{z} I(k)\,dk}{\int_0^{\infty} N(k)\,dk} > 0.5 ,$$

where $z = \mathrm{Min}(k_i, q)$. This is because the prospective emigrants would support $P(s, q)$ irrespective of their type.[4]

2. Continuous Immigration: An Example.

When an immigration policy is in place, immigrants will continue to arrive into a country period after period, and if eventually they are accorded voting rights, they will influence subsequent immigration policies. We denote the wealth density of the immigrants by $cI(k, t)$ where c is a parameter, and t denotes the time period. We assume that the fraction of immigrants that acquire voting rights is given by a function $p(t - \tau)$ where τ is the arrival time of immigrants. At time t the immigration policy implemented is the most preferred policy of the majority of voting population. There is an element of myopia in this, since the voting population does not consider the effect of current policies on the composition of future populations, and their impact on the future immigration flows and policies. This may not be unrealistic if periods under consideration are sufficiently long (not years but decades) and if people discount the future sufficiently. Alternatively, a population with limited foresight may restrict immigration when the proportion of new immigrants gets too large, or when a myopic policy will swing the median voter in the subsequent period and

[4] Note that if $I(k) < 0$, the policy $P(\underline{s}, \infty)$ now minimizes R so that $\underline{R} \equiv R_s^{\infty}$, and $P(0, \bar{q})$ maximizes R so that $\bar{R} = R_0^{\bar{q}}$. If $I(k)$ crosses 0, characterizing $\underline{R}$ and $\bar{R}$ is cumbersome but still straightforward.

initiate a major policy revision, for example from $P(\underline{s}, \infty)$ to $P(0, \bar{q})$. The example below should illustrate these points.

To construct our example we assume a Cobb-Douglas production function, $f(k) = Ak^{\alpha}$. We set the wealth distribution densities of the initial and immigrant populations to be exponential:

$$N(k) = m_0 e^{-m_0 k} \quad ; \quad cI(k,t) = c m_1 e^{-m_1 k} \, . \tag{8}$$

The function defining the proportion of an immigrant cohort eligible for voting at time t is given by:

$$p(t - \tau) = \begin{cases} \dfrac{w(t - \tau)}{n} & \text{if } t - \tau < n \\ 1 & \text{otherwise} , \end{cases} \tag{9}$$

where $1 \leq \tau \leq t$, $0 \leq w \leq 1$ and n is some positive integer.[5] Therefore, given $K(t)$ and $L(t)$, the total stocks of capital and labor at time t, the immigration policies each period are set either to maximize or to minimize the capital-labor ratio in the subsequent period. As in Proposition 2, these policies at time t are given by $P(\underline{s}(t), \infty)$ and $P(0, \bar{q}(t))$, where for the exponential densities defined in (8), $\underline{s}(t)$ and $\bar{q}(t)$ are the unique solutions to equations (10):[6]

[5] $w = 0$ gives a delay of voting rights for n periods after immigration.

[6] It can be shown that such solutions are unique in general for densities $I(k) \geq 0$.

$$\underline{s}(t)L(t) - K(t) - cm_I^{-1}e^{-m_I \underline{s}(t)} = 0 \qquad \textbf{(10.i)}$$

$$(c + L(t))\bar{q}(t) - K(t) - cm^{-1} - cm^{-1}e^{-m_I\bar{q}(t)} = 0 . \qquad \textbf{(10.ii)}$$

We can then compute $\bar{R}(\underline{s}(t), \infty)$ and $\underline{R}(0, \bar{q}(t))$ which, given the production function allows us to determine the type $k_I(t)$ who receives the same income under $\bar{R}(s(t), \infty)$ as under $\underline{R}(0, \bar{q}(t))$.

Here we note that adding a multiplicative stochastic shock to the production function, with or without a time trend to account for technical progress, has no impact on the kind of immigration policy adopted: k_I is entirely independent of it. Wealth accumulation which changes the domestic distribution of wealth relative to the wealth distribution of the potential immigrants however may have an impact on immigration policy, and will be discussed further below. Stochastic shocks to factor shares, that is to α, may also affect k_I and may capture some of the effects of the business cycle on immigration policy. While in our simulations we did experiment with a stochastic α to allow some variability in factor shares, our results were unaffected.

Comparing $k_m(t)$ with $k_I(t)$ determines, as in Proposition 2, whether $P(\underline{s}, \infty)$ or $P(0, \bar{q})$ is to be implemented. This in turn determines $K(t+1)$ and $L(t+1)$, and the process is then repeated. The computation of $k_m(t)$ however is a bit tedious and is given by the solution to

$$\frac{\int_0^{k_m(t)} N(k)dk + \sum_{\tau=1}^{t} \mathrm{Max}\left[p(t-\tau)\int_{a(\tau)}^{b(\tau)} I(k)dk,\ 0\right]}{\int_0^{\infty} N(k)dk + \sum_{\tau=1}^{t} p(t-\tau)\int_{x(\tau)}^{y(\tau)} I(k)dk} = 0.5 \qquad \textbf{(11)}$$

where $a(\tau) = \underline{s}(\tau)$, $b(\tau) = k_m(t)$, $x(\tau) = \underline{s}(\tau)$ and $y(\tau) = \infty$ if $k_m(\tau) < k_l(\tau)$; and $a(\tau) = 0$, $b(\tau) = Min(k_m(t), \bar{q}(\tau))$, $x(\tau) = 0$ and $y(\tau) = \bar{q}(\tau)$ if $k_m(\tau) > k_l(\tau)$.

We can now simulate the dynamics of immigration flows. A common pattern is an initially increasing capital-labor ratio associated with restrictive capital or skill requirements on immigrants. Here the restrictive policies are the result of the exponential, or any other wealth distributions whose medians are lower than their means: the capital-poor are in the majority.[7] In time, however, immigration flows can alter the initial distribution, with the skilled and the capital rich eventually becoming the majority. An abrupt switch of immigration policy takes place to allow poor and unskilled workers into the country. Because the potential population of immigrants is skewed towards the poor and the unskilled, large numbers of immigrants can arrive very quickly, changing the population density and lowering the capital-labor ratio in a short time. Consequently, a restrictive immigration policy is reinstituted before long, and the capital-labor ratio starts to rise again. We observe a long and damped assymetric cycle.

Figure 1 illustrates the movements in the capital-labor ratio over 80 periods for a simulated economy.[8] We choose the production function parameters as follows: $\alpha = 1/3$; $A = 5$. The parameters for the densities of wealth distribution are $m_0 = 0.0167$, $m_1 = 0.034$ and $c = 1/10$.[9] In the function $p(t - \tau)$ we set $n = 3$ and $w = 1$.[10] There is a slow rise in the capital-labor ratio,

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[7] We also experimented with the two parameter Pareto distribution which, like the exponential, also has a decreasing density. Not surprisingly, we obtain very similar results.

[8] A Gauss program for the simulations is available on request.

[9] Note that if $k = 60$, $f(k) = 20$, and furthermore m_0 yields an average capital stock of 60. If units are measured in thousands of dollars, we are close to the U.S. economy.

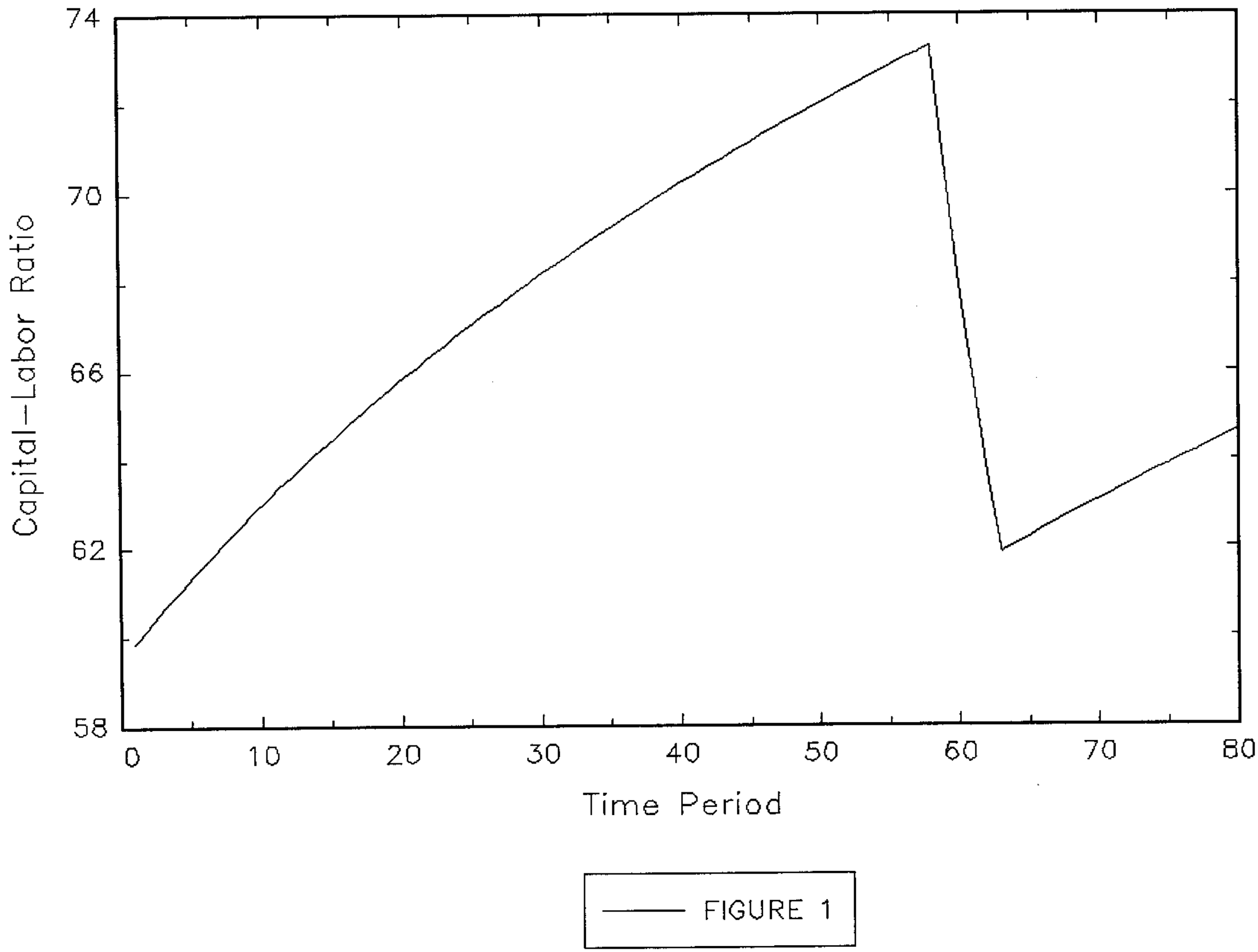
[10] We also tried a ten period voting lag by setting $n = 10$ and $w = 0$. The results were essentially the same except that the policy shift (see Figure 1), was delayed until period 90.

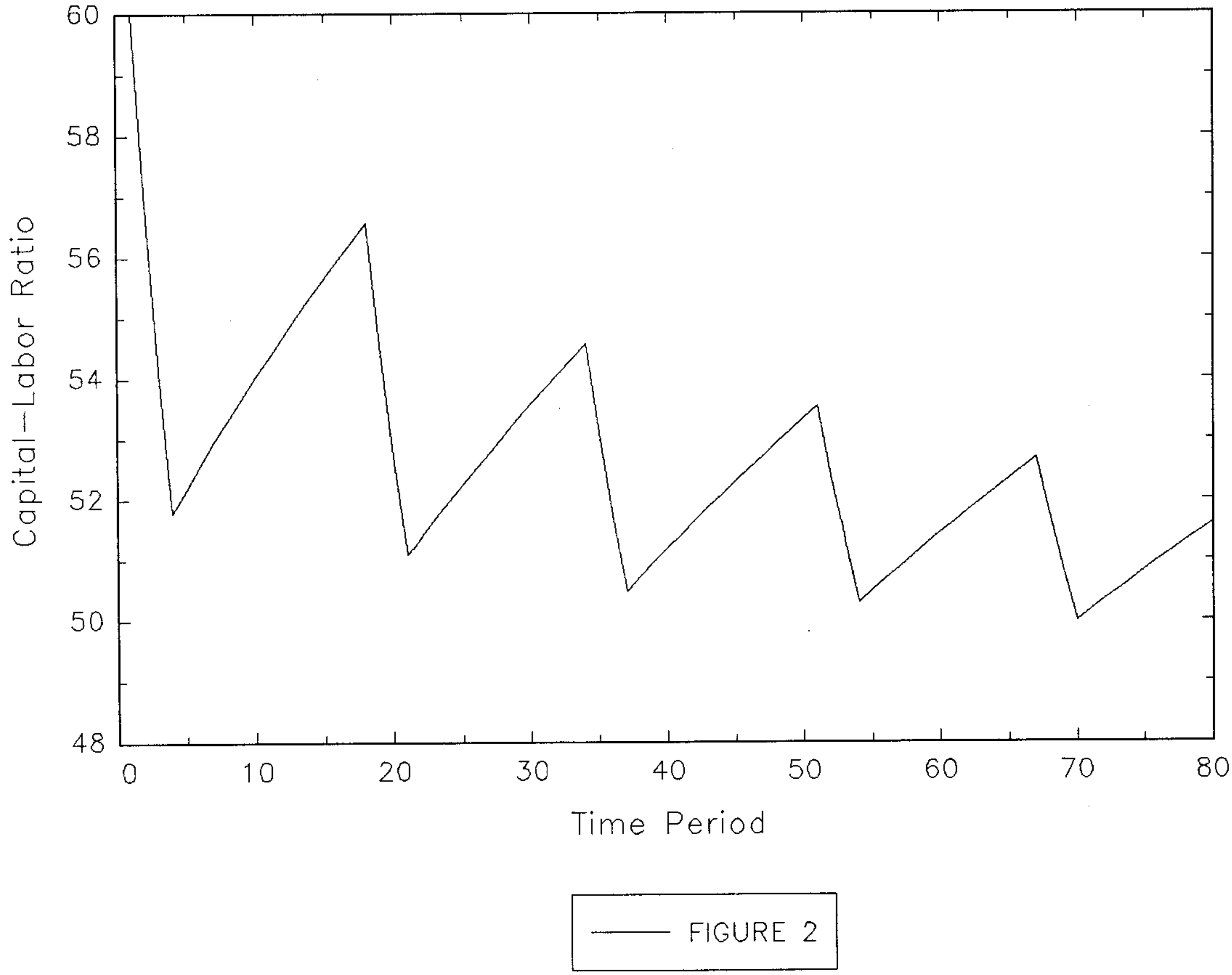
followed by a steeper drop that occurs when the "capital-rich" come to be the majority for a short duration (five periods). Typically, periods of free or unrestricted immigration do not last very long. These results are robust to parameter changes. It is also possible to construct parameter values for which there are no policy reversals and the capital-labor ratio is monotonic. Of course 80 periods can represent a very long time, and that for all practical purposes we may only observe periods of restrictive immigration policies.[11]

For comparison, in Figure 2 we present a simulation with a uniform density replacing the initial exponential distribution of the natives. Since for the uniform distribution the median equals the mean, immigration policy is more easily cyclical.

We also experimented with growth, allowing the domestic capital, including the part brought in by the immigrants, to grow at a constant rate, assuming that everyone's wealth in the country grows at the same rate. This is equivalent to a rightward shift in the domestic wealth distribution each period. Using the same parameters as those used to produce Figure 1, and setting the growth rate of domestic capital at 2%, we observe a monotonically increasing capital-labor ratio and no policy reversals. The reason is simply that relative to the domestic wealth distribution, the wealth of even the richer potential immigrants becomes insignificant, and immigration can no longer swing the majority to be capital-rich: k_m remains below k_I. We may conclude therefore that domestic growth in average wealth, relative to the wealth of the potential immigrants, may perpetuate restrictive immigration policies if initially the majority is capital-poor. The converse is less likely: if the majority is capital rich and free immigration policies are adopted, the abundance of poor

[11] The 1965 Amendments to the Immigration and Nationality Act in the U.S., by relaxing the strict country quotas in favor of a policy that favors family unification, made it much easier for large numbers of poor and unskilled workers to immigrate to the U.S.. But Congressional Testimony indicates that experts did not anticipate this in the least. See Borjas [1990], chapter 2.


Capital-Labor Ratio
74
70
66
62
58
0
10
20
30
40
50
60
70
80
Time Period
FIGURE 1


Capital-Labor Ratio
60
58
56
54
52
50
48
0
10
20
30
40
50
60
70
80
Time Period
FIGURE 2

immigrants may eventually swing the majority towards a restrictive immigration policy, unless public opinion against immigration does this even sooner.

For the parameters used to produce Figure 1, we can compute that by the 40^{th} period, only 70% of the population corresponds to the original natives of period 1. Under the circumstances, it is quite possible that the natives may vote to restrict immigration while they are still a majority. This may be for non-economic reasons or because newer immigrants require, or may eventually vote for, social services and public assistance that imposes a tax on the whole population. This last aspect is not modelled, but can easily be incorporated into our analysis.

Alternatively, voters may perceive that allowing a new cohort of poor immigrants may result in a change of policy in the very near future, as the composition of the voting population changes. For instance in terms of Figure 1, voters may, prior to the period in which the capital-labor ratio is at a peak, see that a policy change towards freer immigration is imminent. In that case the majority may vote to restrict immigration even further to prevent a policy change, as they anticipate that down the line they may loose more under a freer immigration policy. In earlier periods however, majorities may not have an incentive to restrict immigration beyond the level that maximizes their next period income, because they expect the voters in the period just prior to the policy reversal to bite the bullet.

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