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Migration, effort, and voter sentiment towards temporary migration

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Abstract

The sentiments felt by capital owners and local workers and consumers towards migrants may improve when temporary migration policies are adopted. The observed level of exertion of effort by migrants, which decreases during their duration in the host country, positively affects production, real wages and capital owners' profits. We show that the acceptance of job offers by migrants results in the displacement in employment of national workers by immigrants, but it increases the exertion of effort by workers, reduces prices, and acts as a counterweight to anti-immigrant voter attitudes.

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1. Introduction

Migration is a never-ending problem in modern society. The debate on the best immigration policy has been ongoing since the colonial period, and it grew increasingly intense in the past century as the countries of destination started to control immigration. The core issue in this debate is the effect in the destination market of foreigners: do they compete with natives? should policies be more restrictive or are they complement to natives? should policy be more open? Studies of the political economy of immigration policy investigate voters' attitudes to immigrants (see for example Mazza and van Winden 1996, Benhabib 1996, Hillman and Weiss 1999, Zimmermann 2002 Dustmann and Preston 2004). Such studies require an underlying basis that explains why a voter might personally support or object to immigration. One basis, which identifies personal gains and losses from immigration, is the standard full-employment model of international trade and factor movements (see Kai-yiu Wong, 1995), where voter sentiment in regard to immigration is derived from changes in real incomes, with some persons (generally described as factor owners) gaining from immigration and others losing. Fuest and Thum (2001) on the other hand propose, for example, that immigration may result in a skill upgrading that is beneficial for all domestic workers.²

Alternatively, all members of a local population may benefit when immigration reduces the domestic per capita tax burden for financing collective goods (Arad and Hillman 1979). Or more generally there may be benefit for a local population when immigration expands the domestic tax base and, for example, allows the public financing of intergenerational transfers that might otherwise be unsustainable owing to demographic imbalance in the local population (see Lee and Miller 1998, Bonin et al. 2000, Storesletten 2000, Hillman 2002). Epstein and Hillman (2003) consider employed workers who pay the taxes that finance income transfers to the unemployed, and find that immigrants at first displace national workers from the unemployment pool. The real wage declines because of immigration, but the probability of a local worker being employed increases. Although employed workers finance the income transfers to the unemployed,

² On general problems of the welfare state, see Hans-Werner Sinn (1995).

immigration within designated bounds increases the expected utility of local workers. Since employers benefit from immigration, there are immigration policies that are beneficial for all voters whether voters are local employees or employers, although employers will want more immigrants than workers.

In our paper we take a different view by examining the effect of immigration in the labour market and in the goods market and taking account of the effort exerted by migrants during their stay/work in the host country. We suggest a possible interpretation of why migrants, at least at the initial period in the host country, extract more effort than the local population. When immigrants arrive in the host country they accept jobs which frequently involve long working hours. For example, female immigrants employed in family services often work around the clock. This implies that migrants have uncertain working hours and enjoy little freedom and free time. The longer they stay in the destination country, the more they are reluctant to accept such jobs. They prefer normal hours with opportunities for leisure consumption. The pattern is similar for other types of service jobs. Moreover, migrants employed in agriculture accept long working hours; or migrants are willing to take on the heaviest tasks in the industrial sector. Not only are they willing to work overtime, but they are also very flexible and will accept last-minute changes.

The choices of local and migrant workers regarding the exertion of effort at the workplace is analysed using an efficiency wage model. The level of effort expenditure affects the consumption patterns of both groups. When deciding their level of consumption, individuals take the price of consumption into account. When immigrants arrive, they consider a weighted average of the local price level and the price level in their home country. With time, the weight of the price level in the home country decreases and the weighted price converges to the local price level. Hence the consumption patterns and the exerted effort converge to those of the local population.³

³ Low effort and a high unemployment rate among immigrants remaining a long period of time in the host country are evidenced by data on first- and second-generation migrants and has become one of the most challenging problems for integration. In France, in 1993, the unemployment rate among natives was 10% while among foreigners it was 20.6%; moreover, the unemployment rate among natives aged under 25 was 25.2% while among foreigners of the same age it was 32.3%. In the Netherlands, in the same period of time, the unemployment rate was 5.7% among natives and 19.6% among foreigners, and respectively 9.8% and 25% among young natives and foreigners. In Germany, the unemployment

High exertions of effort and low consumption patterns have two different effects on the local population. Greater exertion of effort by immigrants will displace natives in the jobs market. However, the lower consumption by migrants increases the benefits for the local population.

Over time, both consumption patterns and effort exertion converge to those of the local population. The sentiments of capital owners and the local population towards migrants may improve when temporary migration policies are adopted. In the presence of such policies, temporary migrants will enter for short periods of time, expend a high level of effort in the workplace,⁴ and at the same time reduce the cost of consumption to the local population. These temporary migrants leave at the end of the period, to be replaced by new temporary migrants.⁵

Section 2 presents the model of effort decision; Section 3 specifies the consumption patterns of immigrants; Section 4 determines the equilibrium wage and the level of effort exerted in the case of homogeneous or heterogeneous human capital with or without inelastic supply of immigrants. Section 5 analyzes the implications of the effort supply of immigrants for the local labor and products markets. The paper closes with policy implications

2. The model

Consider a population that consists of owners of capital and workers. Workers consist of N_L nationals and N_F immigrants. All workers are risk neutral and averse to effort and have the same level of productivity.⁶ The utility of the workers, $U(.)$, is a function of consumption, C : $U(C)$. As is common in such cases we assume that $U(C)=C$. Consumption is time consuming. To simplify, we assume that on average each unit of consumption needs one unit of time. Each worker has a total of T units of time to consume. However, if a worker exerts effort in the workplace, s/he has less

rates were 4.9% and 12.7% for all natives and foreigners while for under-25s they were 4.8% and 14.1% respectively (see, Böhning 1995).

⁴ See also Engelland and R. Riphon (2003) for empirical evidence on the higher exertion of effort by temporary workers..

⁵ On other benefits and costs of temporary migration and how optimally to create such a policy see Epstein, Hillman and Weiss (1999) and Boeri, Hanson and McCormick (2002).

⁶ For the sake of our analysis, assuming that the level of productivity of the migrants is lower would only enhance our results.

time to consume (there are many possible explanations for this, for example, the more effort exerted in the workplace, the less strength the worker has to consume at the end of the day; or the more time/effort the worker expends in the workplace, the less time s/he has left for consumption). Denote the effort exerted in the workplace by e , and the price of an average unit of consumption with P . Therefore, the constraint facing the worker will be: $P(T - e) \leq w_N$, where w_N is the nominal wage of the worker. As the worker's objective is to maximize his/her utility (consumption), s/he will always set the total cost of consumption equal to the wage: $P(T - e) = w_N$. If the worker does not exert any effort at all in the workplace, $e = 0$, then his/her utility will equal $U(C, e = 0) = \frac{w_N}{P}$. However, if the worker will exert effort at a level of e , then his/her utility will equal $U(C, e) = \frac{w_N}{P} - e$. Thus exerting effort reduces the consumption level. As effort in the workplace increases, the worker will be able to consume fewer products because of the time restriction. We therefore obtain, as assumed by Shapiro and Stiglitz (1984), Epstein and Hillman (2003) and others, that the utility is separable and linear in the private consumption made possible by expenditure of a real wage w ($w = w_N / P$, where w_N is the nominal wage and P is the price level), and in the level of effort e ,

$$U(w, e) = w - e. \quad (1)$$

Effort is dichotomous, at zero or positive. If positive, it can be at one of the two levels e_L or e_H , where $e_L < e_H$.⁷ An unemployed worker receives benefits w_o from the state and exerts no effort, so that $e = 0$. Welfare payments are the same for nationals and immigrants (immigrants are legal). An immigrant has greater expected income than in the country that s/he has left.

⁷ One could also imagine that migrants do not consume leisure when they arrive - they do not go to the cinema or have family meetings, so that the upper bound of their effort devoted to work is higher. A weakness in this argument may be that when immigrants arrive, they may have problems in finding accommodation, good meals, etc., and thus consume more time than the local population.

A worker has a probability p of becoming unemployed for exogenous reasons that do not depend on the employer. All workers maximize present discounted utility, with a rate of time preference $r > 0$.

The model is set in continuous time. The only choice that a worker makes is the selection of effort $e \in (0, e_L, e_H)$. A worker who does not shirk performs at a customary level of effort for the job, e_H , receives the wage w , and retains his/her job until s/he exogenously becomes unemployed. Employers monitor effort imperfectly. Workers who shirk ($e \in (0, e_L)$) are detected and fired with probability per unit of time q_i where $i=0, L$, for $e = 0$ and $e = e_L$ respectively $q_0 > q_L$.

$V_e(s, j)$ and $V_e(n, j)$ are the expected lifetime utilities of an employed worker of type j (immigrant or local) when shirking (s) and when not (n). V_u is the expected lifetime utility of an unemployed person.⁸ For a shirker,

$$rV_e(s_0, j) = w - (p + q_0)(V_e(s_0, j) - V_u) \quad (2)$$

$$rV_e(s_L, j) = w - e_L - (p + q_L)(V_e(s_L, j) - V_u) \quad (3)$$

and for a non-shirker,

$$rV_e(n, j) = w - e_H - p(V_e(n, j) - V_u) \quad (4)$$

teaches that immigrants with permanent residency permits who receive unemployment benefits prefer to remain in the destination country because they can enjoy greater well-being than in the origin country.

From (2), (3) and (4), we have:

$$V_e(s_0, j) = \frac{w + (p + q_0)V_u(j)}{r + p + q_0} ; V_e(s_L, j) = \frac{(w - e_L) + (p + q_L)V_u(j)}{r + p + q_L}$$

and (5)

⁸ The disutility for immigrants of being unemployed is not considered here. Migrants are usually averse to being unemployed because they risk expulsion, the loss of legal residency permits, etc. The introduction of the disutility of immigrants's unemployment status only strengthens the results.

$$V_e(n, j) = \frac{(w - e_H) + pV_u(j)}{r + p}.$$

No shirking takes place if and only if $V_e(s_O, j) \leq V_e(n, j)$ i.e.,

$$w \geq rV_u(j) + \frac{(r + p + q_0)}{q_0} e_H \quad (6)$$

A low level of effort (a high level of shirking) will not occur if and only if $V_e(s_L, j) \leq V_e(n, j)$, i.e.,

$$w \geq rV_u(j) + \frac{(r + p + q_L)}{q_L} e_H \quad (7)$$

It is clear that, as $q_0 > q_L$, if (7) is satisfied then (6) is also satisfied, but it is not the case otherwise.

Production functions for firms are $\tilde{f}(\bar{K}, Lz)$, where \bar{K} is available capital, L is the number of employed workers, and z is the productivity of the workers' function of their human capital h and of their effort e ($z = f(h * e)$). The incomes of owners of capital (or employers) increase when the number of workers in employment increases.⁹ Demand for workers is given by their value of marginal product, and it is a decreasing function of the wage w . An equilibrium is defined as an outcome where owners of capital – taking wages and employment levels at the other firms as given – find it optimal to offer the going wage rather than a different wage; that is, when there is a Nash equilibrium in wages paid by employers.

It is assumed that all workers receive the same wages. We are therefore considering a pulling equilibrium where all workers, local and migrant, receive the same wages. Hence the only variable determining employers' decisions is the disciplining of employed workers through V_u , the expected utility of an unemployed worker.

⁹ Because of the diminishing marginal product of labor.

Since all unemployed workers receive the same welfare benefits w_o , V_u is common to all employees. An unemployed person's utility is thus independent of the identity of his or her previous employer. Hence

$$rV_u(j) = w_o + k_j (V_e(j) - V_u(j)) \quad (8)$$

where k_j is the rate at which unemployed workers find jobs, and $V_e(j)$ is the expected utility of an employed worker of type j , which in equilibrium equals $V_e(n,j)$. Substituting (8) into (5), we obtain

$$rV_e(j) = \frac{(w-e)(k_j+r) + w_o p_j}{k_j + p_j + r} \text{ and } rV_u(j) = \frac{(w-e)k_j + w_o(r+p_j)}{k_j + p_j + r} \quad (9)$$

Then, substituting (9) into (6) and (7), we determine that worker j will not shirk if

$$w \geq w_o + e_H + \frac{e_H}{q_L} (k_j + p_j + r) \quad (10)$$

or

$$w \geq w_o + e_H + \frac{e_H}{q_o} (k_j + p_j + r) \quad (11)$$

The *efficiency wage* is defined as the lowest wage that satisfies either (10) or (11).

As stated above, we are concerned with a pulling equilibrium, so that the wages for natives and local workers are identical. In equilibrium, the wage will be the one that satisfies the condition of being the lowest wage of either (10) or (11).

3. Benchmarks for locals and migrants

We assume that both locals and the migrants earn the same income w .¹⁰ Wages in industrialized countries are usually determined by the type of job, and employers

¹⁰ If wages differed between the local population and migrants, it would be more costly for migrants to be unemployed. However, the local population's reservation wage would be higher than that of the migrants; therefore, in equilibrium, we would obtain that both groups had more or less the same wages.

cannot easily discriminate on the remuneration paid to workers: this practice is generally forbidden by law. By contrast, workers are free to be more productive or less productive. Thus, in principle there is no wage discrimination between locals and migrants.

We earlier defined the utility of workers as separable and linear in the private consumption that is provided through expenditure of a real wage w . Real wages are thus defined as $w = w_N / P$. Note that the wages in equilibrium paid by employers are in nominal terms. Moreover, to simplify matters, we assume that prices in the host country are constant. The price level used to normalize wages differs between local and foreign workers. Denote with P_N the national price index and with P_F the prices in the migrant's home country (to simplify, we assume that there is only one type of migrant coming from the same home country,¹¹ so that they all discount wages with the same price level).

When immigrants enter the host country, they have little or no knowledge about the host country and its cost of living. Over time, this information is revealed to them.¹² Many migrants send a large part of their incomes back to their families as remittances. Therefore, the cost-of-living benchmark for migrants – the price level at which they discount the nominal wages – will be in the large majority of cases the price level in their home country. However, as the migrant stays longer in the host country, s/he starts to adopt the local population's lifestyle and obtains more information about the cost of living in the host country.¹³ Older migrants (those with longer tenure in the host country) consequently place greater weight on the local price index when making calculations regarding real wages. The price level by which the migrant normalizes his/her wage is a function of three parameters: the price level in the home country, the price level in the host country, and the weight assigned by the migrant to each of these prices. The weight is therefore a function of the time that the

¹¹ If we assumed more than one country of origin, the main results would not change.

¹² It may also be the case that the speed and level of information revealed to the migrant is a function of the size of the network of immigrants from the same origin country.

¹³ The assimilation literature shows that the most important variable in explaining the foreign wage's assimilation to the native one is the duration of stay in the host country. The duration of stay in the host country is also the most important variable in explaining migrants' consumption assimilation, as well their housing assimilation, etc.

migrant has already spent in the host country, and it is given by the following function:

$$P_f = \alpha(t)P_N + (1 - \alpha(t))P_F \quad (12)$$

where $0 \leq \alpha(t) \leq 1$ and $(1 - \alpha(t))$ are respectively the weights assigned to the local price level and to the home country's price level, and t denotes the length of time spent by the migrant in the host country. It is assumed that $\frac{\partial \alpha(t)}{\partial t} \geq 0$ and for $t > \underline{t}$, $\alpha(t) = 1$. Hence, with time, the migrant places more weight on the local price level and less weight on the price level in the home country.¹⁴ It is also assumed that if the migrant spends a sufficient amount of time in the host country, s/he will use the only host country's price level to normalize his/her wages. We may therefore conclude that even if all migrants (and local workers) earn the same nominal wages, newly-arrived migrants will earn a real wage different from that of migrants who arrived before them.¹⁵

As we are analyzing migration of low-skilled workers, many of whom come from less-developed countries (LDC), we assume that the price level in the home country is lower than that of the host country: $P_N > P_F$. Given (12), it is clear that, over time, the price level used by the migrant to normalize his/her wages will approach that of the host country: $P_f \rightarrow P_N$.¹⁶

¹⁴ Remittances decisions by migrants have the same effect as described above. As soon as migrants arrive in the destination country, they remit a large amount of their income to their home country, valuing part of their income with respect to the price level? in the country of origin. The longer they stay in the destination country, the less they remit and the more they consume in the destination country. This myopic behavior, however, is also adopted by foreigners that do not remit. Italian engineers who have moved to Geneva (SW) in order to work at CERN have the same attitude to their wages. They value them with Italian prices at the beginning, and they work night and day. They do not send money home, but they feel that their wages are very high. The longer they stay in the destination country, and the more they start to lead a normal life in the host country, the more they consider their wages to be not particularly high in purchasing power terms and consequently reduce their effort.

¹⁵ However, two migrants with the same time duration, one with a family at home, the other reunited with his/her family, may have different levels of effort.

¹⁶ There are numerous examples: such as female immigrants, who frequently work in family services around the clock. This implies that migrants have uncertain working hours and enjoy little freedom and free time. The longer they stay in the destination country, the more reluctant they are to accept such jobs. They prefer normal hours with opportunities for leisure consumption. A similar pattern is apparent in other types of service jobs. In agriculture, for example, migrants accept long working

Thus $W_n/P_n < W_n/P_f$.

We would add that this is not a matter of money illusion. Fraction α of total consumption may be sent to the country of origin as remittances, or it may be saved with the intention of consuming it in the country of origin. Let us imagine that migrants want to buy houses in the home country, or buy products which they know are much cheaper than in the host country.

4. Labour market: wage equilibrium and the level of effort exertion

We now return to the equilibrium wage and to the level of effort exerted by workers.

Because the price level at which migrants discount their wages is lower than that of local workers, the real wage received by local workers is lower than that received by migrants (and the real wages received by newly-arrived migrants are higher than those of migrants that arrived earlier). As migrants stay longer in the host country, their real wages start to converge to those of the local population. If the wages in equilibrium are set so that the local worker will exert a high level of effort, e_H , it is clear that migrants will also make a high level of effort. However, if wages are set in equilibrium so that local workers make a low level of effort, e_N , it may well be the case that migrants will exert a high level of effort.

Assume that in the absence of foreign workers, the wage is set so that local workers exert a high level of effort. Denote the number of workers employed in equilibrium as L_N^0 . The profits of the capital owners will thus be:

$$\pi(L_N^0) = \tilde{f}(\bar{K}, L_N^0 z) P_x^0 - C(L_N^0 w^0) \quad (13)$$

where \bar{K} is the capital level, total output is given by $\tilde{f}(\bar{K}, Lz)$, and the price of the product by P_x^0 , equilibrium wage w^0 and total cost of production $C(L_N^0 w^0)$.

When migrants enter the country, the equilibrium wage level will change as a result of a change in the population of individuals willing to work (and consequently the price level of products will change as well). Thus, the wage that induces?

hours; or migrants are willing to take on the heaviest tasks in the industrial sector. Not only they are willing to work overtime, but they are also very flexible and will accept last-minute changes.

level of effort by the local population will decrease (see Epstein and Hillman, 2003). Therefore, if firms continue to pay wages that induce a high level of effort by the local population, then at this wage level the migrants will also exert a high level of effort.

4.1 Fixed and equal human capital

In this section we assume that human capital is equal and fixed for all workers. We can thus concentrate on worker's productivity as a function of their effort.

Now let us consider three different cases of equilibrium in an economy comprising both natives and migrants: *a.* both migrants and natives make a high level of effort; *b.* natives make a low level of effort while the migrants make a high one; and *c.* all workers make a low level of effort:

Case 1a: wages are set at w^1 , both locals and migrants make a high level of effort e_H ,

$$\pi(L_N^1, L_F^1) = \tilde{f}(\bar{K}, (L_N^1 + L_F^1)e_H) P_x^0 - C((L_F^1 + L_N^1)w^1) \quad (14)$$

Case 1b: wages are set at w^2 , the locals make a low level of effort, e_N and the migrants make a high level of effort e_H ,

$$\pi(L_N^2, L_F^2) = \tilde{f}(\bar{K}, L_N^2 e_N + L_F^2 e_H) P_x^0 - C((L_F^2 + L_N^2)w^2) \quad (15)$$

Case 1c: wages are set at w^3 , both locals and migrants make a low level of effort e_N ,

Case 1c:

$$w^3 \text{ is such that } \pi(L_N^3, L_F^3) = \tilde{f}(\bar{K}, (L_N^3 + L_F^3)e_N) P_x^0 - C((L_F^3 + L_N^3)w^3) \quad (16)$$

where $w^0 > w^1 > w^2 > w^3$ and, of course, the numbers of workers employed in equilibrium in all three cases are not identical. All three equilibriums are possible. We shall consider the second case where wages have fallen as a result of migration, and in equilibrium the level of exertion of effort by the foreign population is higher

than that by the local population. As assumed above, all workers receive the same nominal wages. Therefore the local population receives in real terms a lower wage than do the migrants. However, the employer receives a higher level of effort at the same nominal wage level. It is obvious that case 2 may well be an equilibrium outcome. However, it should be noted that the profits of the firm and the level of exertion of effort are functions of time.

4.1.1 *A fully inelastic supply of immigrants*

Assume that the number of migrants is fixed in the economy; then, over time, case *b* will converge to case *a* or case *c*: $\pi(L_N^2, L_F^2) \rightarrow \pi(L_N^1, L_F^1)$ or $\pi(L_N^2, L_F^2) \rightarrow \pi(L_N^3, L_F^3)$. It is therefore not clear whether the migrants are increasing their average level of effort or whether they are decreasing it. The reason for this is that, over time, the migrants' real wages converge to those of the natives. As the real wages converge, the level of effort extracted by workers also converge, and so too does their productivity. At the same time, the labor force has increased and wages have fallen, so that wages may decrease to a level such that both groups put in a high or low amount of effort.

We therefore conclude that,

Migrants may well make more effort than the local population. However, with time, the levels of effort exerted by migrants and locals will converge.

Note that the level of effort exerted by a worker is a function of the unemployment level. If in addition to the above we consider that migrants do not know, on their arrival, the level of employment and unemployment, over time this knowledge is revealed to them and will affect their level of exertion of effort.¹⁷ Their level of effort will converge over time to that of local workers. Thus, if we incorporate this lack of information about the unemployment level directly into the above model, it only enhances the results presented above.

¹⁷ The information level may also be a function of the size of the network existing at the time of the migrant's arrival in the host country. The reason for this is that, as the size of the network increases, the newly-arrived migrant receives more information and adapts more readily to the local population.

4.1.2 *Constant inflow of immigrants.*

If there is a constant inflow of migrants, there are ‘old’ migrants and ‘new’ ones. A direct result of this is that the longer migrants stay in the host country, the more they come to resemble the local population, and over time employers will employ newcomers instead of old migrants and the local population. The rate at which hirings and firings occur will depend on the costs and on the rate at which the effort of migrants changes over time.

4.2 *Heterogeneous human capital*

Let us consider the case where human capital is an important component of total worker productivity. Assume that immigrants and the local population have only two types of human capital: High, h_H , and Low, h_L . Total productivity can thus be written as $z(h, e)$, and the production function can be written as $\tilde{f}(\bar{K}, L, z(h, e))$. We therefore assume that human capital and effort exerted in the workplace are substitutes. In other words, if a worker with low human capital increases his/her effort in the workplace, he will be identical to a worker with high human capital but low exerted effort. Let us consider the following cases:

a. Natives and foreigners have the same level of productivity $z(h, e)$. As described above, the migrants' real wage decreases over time (see eq. 12), and as a result the workers may exert less effort in the workplace. If the migrants make less effort as a result of the decrease in real wages, and if this is not offset by an increase in human capital, employers will fire foreigners and employ recently-arrived migrants or locals.

b. If foreigners and natives have the same amount of human capital, and it is at a low level, $h_{f_L} = h_{n_L}$, and if at the same time the effort invested by foreigners is greater than that of the local population: $e_{n_L} < e_{f_H}$, then the foreigners' productivity level will be higher than that of the local population: $z_f(h, e) > z_n(h, e)$. In this case, employers will prefer to hire foreigners in the first period. If in the second period the effort of foreigners declines without any increase in human capital, employers will be

indifferent between natives and second-period foreigners but will prefer first-period immigrants. If on the other hand the human capital of the foreigners increases over time, while the effort exerted reduces to the extent that it offsets the reduction in exerted effort, then employers will prefer foreigners also in the second period.¹⁸

Although this is a very interesting issue, discussion of it would take us too far from the main finding of this paper: namely that if migrants have the same effort behaviour, but belong to different waves with different levels of human capital, even in the first period migrants with high human capital and high effort may displace migrants with low human capital and as well high effort – for instance, Romanian newcomers displace Albanian and Moroccan old migrants but also new inflows into the same occupations (construction and domestic work).

5. *Goods market equilibrium, local workers and employers*

As defined above the utility of workers is given by

$$\begin{aligned}
 U(C) &= C \\
 \text{s.t.} & \\
 P(T - e) &\leq w_N \\
 C &= P(T - e)
 \end{aligned}
 \tag{17}$$

Total consumption by workers is a function of the level of effort exerted by the workers. e .

If immigrants exert more effort than the local population, the total amount of consumption by local workers will be greater than that by immigrants.

Let us denote the aggregate demand by production as $D(e_f, e_n, P)$, so that demand by production is a function of the effort exerted by the various groups and of product prices. Moreover, as the levels of exerted effort increase, the demand for products decreases. Let us denote the supply as $S(z_n, z_f, P)$, so that it is a function of

¹⁸ Introduction of human capital produces another possible scenario, namely that as a migrant's effort

the productivity levels of the various groups and of the price level (which in equilibrium is a function of the wage level). It is clear that as the productivity level increases, the supply increases.

We now consider the effect of changes in the effort exerted by the various groups on the equilibrium quantity and prices. In equilibrium, the quantity demanded equals the quantity supplied. Let us consider the following benchmark: $e_n = e_l = e$ and $z_n = z_l = z$. In this case, $D(e, e, P) = S(z, z, P)$ and we obtain that the quantities demanded and prices in equilibrium equal:

$$q_b^f + q_b^n = q_b^* ; \quad p_b^* \quad (18)$$

where q_b^j and p_b are the quantities of goods demanded and the prices group $j = n, f$ in equilibrium. q_b^* and p_b^* denote the total quantity and price at equilibrium.

Case 1: Let us consider the case in which both locals and migrants have the same productivity levels, while migrants invest more effort than the local population: $e_n < e^f$ and $z_n = z_f = z$.¹⁹ In this case, there is no displacement effect in the labour market, only an effect in the goods market. As a result of migration, denote the new quantities and prices as q_1^j and p_1^j . In this case, we obtain that

$$q_1^f < q_b^f ; q_1^n > q_b^n \quad q_1^* < q_b^* \quad (19)$$

and

$$p_1 < p_b^*$$

As immigrants spend more effort in the workplace, we see from (17) that they will have a lower consumption level. This will reduce total demand for products and therefore the prices of products. Because the price level has fallen, demand by the local population will increase. This result can be seen in Figure 1: because of the increase in effort by immigrants, total demand will fall from D_b to D_1 . In this new

declines, his/her human capital increases, keeping his/her productivity high.

equilibrium, the total quantity has decreased from q_b^* to q_1^* . However the price level has fallen, and as a result the share of consumption by the local population has risen from q_b^n to q_1^n . The reason for the increase in the quantity demanded by the local population is the increase in real wages resulting from the fall in prices. Note that in equilibrium nominal wages have decreased; however, since supply has increased, it is clear that the real wages of migrants have increased.

Case 2: In this case there is an effect in both the labour and the goods market. We now take the analysis one step further. Let us assume that the above finding is true for second-period immigrants. Here employers decide to replace second-period immigrants with newly-arrived ones. In this case we obtain: $e_n < e_f^1 < e_f^2$ and $z_n < z_2$. The supply of goods will increase because employers have more efficient workers. As newly-arrived immigrants make more effort in the workplace, the labour demand for newly-arrived immigrants will decrease relatively to that for second-period ones. At the same time the demand for goods by the local population will increase because the price level has increased, and therefore the real wage has increased. This is depicted by Figure 2: the supply increases from S_0 to S_1 as a result of increasing efficiency. At the same time, the demand for goods by migrants has decreased because new migrants make more effort in the workplace and thus have less time to consume (see eq. 17). These two effects reduce the price level and increase the total amount of products produced. Because the price level has decreased, the real wages of local workers have increased, and thus their quantity demanded has risen from q_1^* to q_2^* .

The benefits to local workers: *As we can see, local workers are better off, their real wages have increased, and their consumption has increased. Although it may well be that some of them are worse off because they have been replaced by newly-arrived migrants, this is not clear, given that the decrease in prices has increased the quantity of goods demanded and this may have also increased total*

¹⁹ This implies that migrants have less human capital.

labour demand. The unemployed are also better off, because their real unemployment benefits have increased.

The benefit to capital owners: *each firm takes wages and the price level as given, and it is assumed that each firm is small and has no market power. Thus, capital owners benefit from replacing 'older' migrants with newly-arrived ones.*

The reason for this is that employers obtain better workers: they extract more effort in the workplace while they pay these workers at the same rate as the 'older' ones. At the same time, the price is given for employers, so that their profits have increased. However, in equilibrium it is not clear if firms' profits increase or decrease, because real wages rise and production increases. It is evident, however, that it is optimal for each firm to replace its 'older' migrants with newly-arrived ones.

6. Concluding remarks and policy implications:

We have shown that newly-arrived legal migrants exerted more effort than the local population.²⁰ Moreover, newly-arrived migrants exert more effort than 'older' ones. Let us consider the policy implication of the fact that migrants make a higher level of effort than the local population does, and that over time the level of effort exerted by the local population and migrants converge.

If immigrants have the same human capital as natives, firms prefer new immigrants to old ones, and if they are able to fire old immigrants and employ new ones they do so. This implies that employers always prefer newly-arrived migrants. On the other hand, as shown above, the local population also benefits from newly-arrived migrants. However, both the local population and employers may have disutility if migrants stay too long in the host country, because of their possible greater use of welfare benefits. The policy to remedy this situation would be:

²⁰ Our model has considered only legal immigration. On illegal immigration, see for example Djajić (1997). For a perspective on efficiency wages with illegal immigration in a dual labor market model, see Carter (1999).

Limit the time that migrants are allowed to stay in the host country and replace migrants with newly-arrived migrants. This policy is a temporary migration policy.

A temporary migration policy of this kind would benefit both employers and workers. Under this policy, migrants would enter the host country for a given period of time and then return to their home countries. If the host country still needed migrant workers, the old workers would be replaced by newly-arrived ones, who make a high level of effort.

The question is how could such a policy be implemented? The answer is that it could be implemented by devising a contracted temporary migrant policy. The main idea behind such a policy would be to limit the period of time that migrants would be allowed to stay in the host country. When migrants left the host country, new migrants would enter and would exert a high level of effort at the work place.

Theoretically, we would want to have a new migrant entering and one leaving the home country every day; however, there are costs involved in training migrants and teaching them new jobs. Also to be considered are transportation costs, which may well accrue to capital owners. Hence, the policy should also take the costs of changing migrants into account, and it should calculate the optimal amount of time that a migrant should be allowed to stay in the host country. Temporary contracted migration raises numerous problems, the principal one being to ensure that legal migrants leave the host country on expiry of their contracts. There are many ways to ensure this, however (see Epstein, Hillman and Weiss (1999) and chapter 7 in Boeri, Gordon and McCormick (2002)). Temporary migration may well benefit the sending country because the temporary migrants are likely to increase their human capital in the host country and thus return to the home country with greater human capital.²¹

Note that capital owners will benefit from migration. Their level of benefit will be a function of the length of the contract. On the other hand, the native labor force made jobless by such a policy will be harmed. Nevertheless, the **native**

²¹ See also the economic case for broad benefit from immigration based on human-capital upgrading of domestic unskilled labor made by Schmidt, Stilz, and Zimmermann (1994).

population, or better **native consumers** (which include the unemployed), will prefer to have a large turnover of migrants with higher effort and lower consumption.

The sentiments of capital owners and the local population towards migrants may improve if temporary migration policies are adopted because the level of effort extracted from migrants is optimized, prices decrease, real wages fall, and welfare increases.

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Figure 1

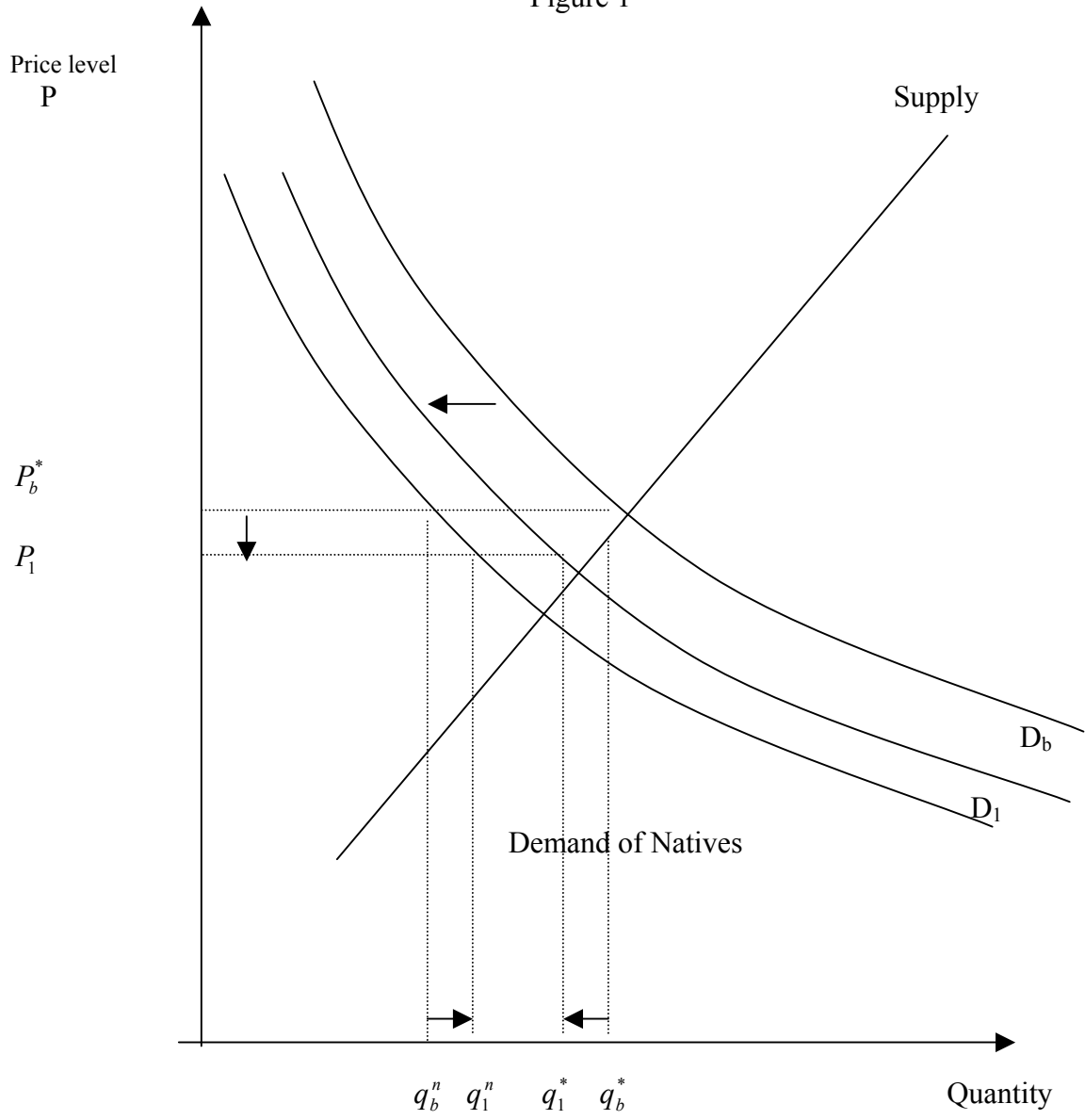


Figure 2

