

# Come and go?

## How temporary visas might work

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### Abstract

This paper deals with recent proposals concerning temporary immigration visas as a means to combat the problem of illegal immigration. We set up a simple two-period model of international migration between a poor South and a rich North with temporary visas issued for one period. Because of capital market imperfections, immigrants from the South face additional capital costs when financing the visa fee. In this model we find that temporary visas can improve welfare in the North if capital costs of the immigrants are sufficiently low. For high capital costs, however, a welfare reduction can not be ruled out. We extend the model to the case of heterogeneous immigrants and asymmetric information. In this setting we show that the government in the North may have an incentive to issue temporary visas for those with low capital costs and to tolerate illegal immigration of the others.

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# 1 Introduction

Almost weekly the media reports about boats crowded with illegal immigrants who try desperately to get into the European Union. For example, in 2006 more than 31,000 illegal immigrants reached the Canary Islands, and in the first half of 2007 more than 15,000 migrants tried to reach the coast of Italy.<sup>1</sup> On their way to Europe, immigrants are put under enormous strain and risk their lives. For example, a major immigration route goes from the Senegal to the Canary Islands on the Atlantic Ocean. This passage, about 1,200-1,500 km, is done in small fishing boats, and according to estimates from Spanish agencies one of six immigrants dies on the way (see e.g. Migration-info.de (2007)).

In the light of these developments, the European Union has shifted its focus more and more to the topic of immigration, and on the question about the appropriate policy response. Recent proposals include a policy of allowing temporary immigration to Europe to offer a legal way of immigration.<sup>2</sup> Compared to permanent legal immigration, temporary programs may be politically more acceptable for the host countries, as they avoid some problems such as welfare migration (see e.g. Winters et al. 2003).

To ensure that temporary immigration does not become permanent, governments have to provide incentives for migrants to return after a specified time. To this end, several mechanisms have been proposed in the academic literature and in the public debate.<sup>3</sup> For example, the host country can refund social security taxes to the migrant if he (or she) returns, provide (financial or non-financial) assistance after return, set up special savings schemes for temporary migrants, or promise direct payments conditional upon return.

In the present paper we do not go into the details of these different proposals but analyze how a temporary visa scheme has to be designed in general to provide adequate return incentives to the migrants, and we discuss the

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<sup>1</sup>Sources: <http://news.bbc.co.uk/2/hi/europe/6213495.stm> and <http://news.bbc.co.uk/2/hi/europe/7564584.stm>.

<sup>2</sup>See Federal Ministry of the Interior 2007), Global Commission on International Migration 2005 and Commission of the European Communities 2005. Temporary programs have also been proposed to tackle the issue of illegal immigration in the Unites States (see Rosenblum 2005).

<sup>3</sup>See e.g. Brücker et al. (2002), Commission of the European Communities (2005), Commission of the European Communities (2007), Jandl (2005), Rosenblum (2005), Martin (2003), and Ruhs (2006). It should be noted, however, that some authors (e.g. Martin and Teitelbaum 2001) are quite sceptical concerning the prospects of temporary immigration programs. They point at past experiences, as for example with the *bracero*-program in the United States or the *Gastarbeiter*-scheme in Germany. For a thorough analysis of temporary migration in the past see Ruhs (2003).

welfare properties of such a policy. We consider a simple two-period model of international migration between the South and the North. The North is a small open economy with a neo-classical labor market. Without temporary visas, it is not possible to immigrate to the North legally. People from the South then have to spend monetary and non-monetary costs for their illegal immigration. These costs and the wage differential between North and South determine the number of illegal immigrants.

If temporary visas are implemented, it is possible for immigrants to reach the North legally. The temporary visa is valid for one period, and the government can control the number of legal immigrants by the quantity of issued visas. We set this number equal to the number of illegal immigrants in the initial situation, such that the total number of foreigners remains unchanged. The government in the North disposes of the following instruments to regulate immigration: The potential immigrant has to pay a fixed fee for the visa; additionally, the government can raise an income tax from the migrant, and it can issue a bond, which is paid to the migrant conditional upon departure back to the home country after the first period. The population in the South may only have imperfect access to the capital market. Therefore, paying the visa fee can cause additional capital costs to the migrants.

In this setting we arrive at the following conclusions: If the population in the South has no additional costs of raising capital, a temporary visa scheme is always welfare improving compared to the initial situation of illegal immigration. The government can issue a bond high enough to ensure a voluntary exit of the immigrants after one period. To finance the bond the government raises income taxes and charges an upfront fee from the migrant for the visas. The net revenue for the government is positive, and it is determined by the size of monetary and non-monetary costs of illegal immigration, which are saved by immigrating legally. This picture changes if costs of raising capital are considered. For high marginal capital costs it may happen that the North has negative revenues from the visa program. This is because the government has to issue a bond to ensure the exit of immigrants after the first period but – because of the capital costs – the visa fee that can be raised from the immigrants is not high enough to finance the bond. Therefore, negative revenues from the visa cannot be ruled out in this case and the North would fare better by not issuing temporary visas.

We then extend the model to the case of heterogeneous immigrants. More specifically, we consider different costs of raising capital. If the government in the North cannot distinguish immigrants according to their capital costs, people with low capital costs earn an information rent. To reduce this information rent, the government may design the visa scheme such that only those with low capital costs choose the bond, whereas the others immigrate

illegally.

Policies to fight illegal immigration are also considered in Ethier (1986). He analyzes border enforcement and internal enforcement policies to control the number of illegal immigrants, but does not deal with temporary immigration visas. More closely related to our analysis is a paper by Epstein et al. (1999) that also deals with temporary immigration programs.<sup>4</sup> In that model, employers bear the responsibility for the migrants' return. They have to provide a deposit to the government which is lost if their foreign employees do not leave the country on time. Epstein et al. (1999) show that employers may not be able to provide adequate incentives to all migrants for a timely return. Temporary immigration then typically results in an illegal overstay of some migrants. Then the government can in principle set adequate return incentives by promising a conditional payment to the migrants for their return which is sufficiently high. The open question remains, whether the North necessarily benefits from offering such a temporary visa contract.

Capital market imperfections for immigrants play a prominent role in our paper. Such financial restrictions are also dealt with in Mesnard (2004) and Friebel and Guriev (2006). In Mesnard (2004) temporary migration may be a way for foreign workers to overcome borrowing constraints in their home country. In her model, all return migration is voluntary, and the host country's government does not need to provide extra return incentives. Friebel and Guriev (2006) take capital market frictions as a starting point to focus on the role of human traffickers. These traffickers act as financiers for liquidity constrained illegal migrants who in turn enter a kind of a servitude contract to pay back the debt. Friebel and Guriev (2006) then show that amnesties for illegal immigrants and related policies may actually reduce the number of immigrants as they provide a means of escaping such a dependency relationship. Human traffickers are not considered as additional players in our paper. Instead, we concentrate on the relationship between the government of the host country and the immigrants. For legal immigration via temporary visas, these people smugglers do not play an active role anyway.

Our paper is organized as follows: The following section 2 derives the equilibrium number of immigrants in the benchmark setting in which all immigration is illegal. Section 3 then analyzes the properties of incentive-compatible temporary visas. Section 4 deals with the case of heterogeneous immigrants, and section 5 concludes.

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<sup>4</sup>Amin and Mattoo (2006) focus on the effects of guest worker programs on the size and composition of the group of immigrants. The optimal design of these immigration programs and the issue of return incentives in temporary schemes is not dealt with in their model.

## 2 Illegal Immigration without Visas

Point of departure is a small country in the North facing (illegal) immigration from a large South. Our model economy lasts for two periods, and there is no discounting. We assume a standard neo-classical labor market in which the real wage of immigrant workers equals their marginal product. The production function in each period is given by  $Q = F(D, I)$ , where  $D$  denotes the (exogenous) number of domestic workers and  $I$  are immigrants from the South. The marginal product of immigrant labor is positive and declines in the number of immigrants:  $F_I > 0$  and  $F_{II} < 0$ . In our benchmark case without visas all immigration is illegal. We can derive the equilibrium number of illegal immigrants in this situation from the following considerations: The decision to migrate is made in the beginning of the first period. Foreigners are willing to immigrate in the first period as long as their reservation wage  $w^r$  is covered, which is given by the following equation:

$$w^r = w^* + c + \frac{\tilde{m}}{2} + \frac{n}{2}. \quad (1)$$

In (1)  $w^*$  denotes the wage in the South,  $c$  are per period costs of staying illegally in the country, and  $\tilde{m}$  and  $n$  are the migration costs of migrating.<sup>5</sup> Because an illegal immigrant who enters the country in the first period can stay for two periods and as there is no discounting the migration costs per period are  $\tilde{m}/2 + n/2$ . The term  $\tilde{m}$  denotes monetary costs, and  $n$  are non-monetary costs of illegal migration. The most striking element of the non-monetary costs is the risk of injury or death on the journey to the destination country. Monetary costs comprise all payments necessary to reach the destination country, most notably the money paid to people smugglers and facilitators. As described in the introduction, we cannot expect immigrants to be able to bring up the money necessary for the trip on a perfect capital market. To model this incompleteness of the capital market in a straightforward and tractable fashion, we incorporate a term  $g(m)$  that measures additional costs of raising capital as a mark-up on the payments  $m$  a migrant has to make for the journey. The total monetary costs are then given by  $\tilde{m} = m(1 + g(m))$ . For these capital cost term we assume  $g'(m) > 0$  and  $g''(m) > 0$ .

From the condition  $w^r = F_I$  we can determine the equilibrium number of

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<sup>5</sup>As the supply of illegal immigrants is perfectly elastic, it does not matter whether the costs  $c$  accrue on the side of the migrant or on that of the employers (e.g. as a lower productivity of an illegal worker). In the latter case, employers reduce the wage for immigrants by the amount of these costs.

illegal immigrants  $I^e$  as

$$F_I(D, I^e) = w^* + c + \frac{\tilde{m}}{2} + \frac{n}{2}. \quad (2)$$

Quite intuitively, the equilibrium number of immigrants depends on the foreign wage  $w^*$ , the costs of staying illegally in the country  $c$ , and the immigration costs  $\tilde{m}$  and  $n$ . In the beginning of the second period, no immigrant has an incentive to leave the country. There are also no additional immigrants coming from abroad since they have only one period in the Northern country and therefore their reservation wage is correspondingly higher.

### 3 Temporary Visas

We now turn to the question whether the North can improve upon this illegal immigration benchmark by introducing temporary visas. We start from a very simple consideration: Suppose the government in the North issues temporary visas such that illegal immigration is replaced by legal immigration but the total number of immigrants is kept unchanged at  $I^e$ . The question is whether the North can gain from such a policy. We assume legal and illegal immigrants to be perfect substitutes in the production function. If the total number of immigrants is kept unchanged, replacing illegal by legal immigrants does not have any effects on firms in the North. Firms have the same labor costs and the same number of immigrants to work with. Similarly, wages of the domestic workers are not affected by this policy. We may therefore focus on government revenues as a welfare measure. As long as net revenues from introducing temporary visas are positive, a policy of temporary immigration is potentially welfare improving for the North compared to the benchmark of illegal immigration.<sup>6</sup> The temporary visa scheme consists of the following elements: First, the potential migrant has to pay a fixed visa-fee  $v$  upon entry to the North; second, as long as the migrant works in the official sector in the North, the government can raise an income tax  $t$ ; third, to provide a return incentive the government issues a bond  $b$ , which becomes effective if the migrant leaves the country after the first period. With such a temporary visa scheme in place, a potential migrant from the South has to make several decisions. They can be illustrated by a decision tree as in Figure 1. At the beginning of the first period the migrant has to decide

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<sup>6</sup>An obvious extension of our approach would consider differences between legal and illegal immigrants. For example, one might think of negative spill-overs which may arise from illegal immigration. Such spill-overs may provide an additional reason for allowing temporary immigration.

whether to stay in the South, to immigrate illegally or to take the visa. After immigration on a visa the immigrant may work in the official sector and pay taxes or immediately switch to an illegal status. If he opts to work illegally, then he loses the bond such that the government cannot set an incentive for returning home. If the migrant works legally, then at the beginning of the second period he may decide either to return home and to collect the payment from the bond or to overstay the visa period, losing the bond.

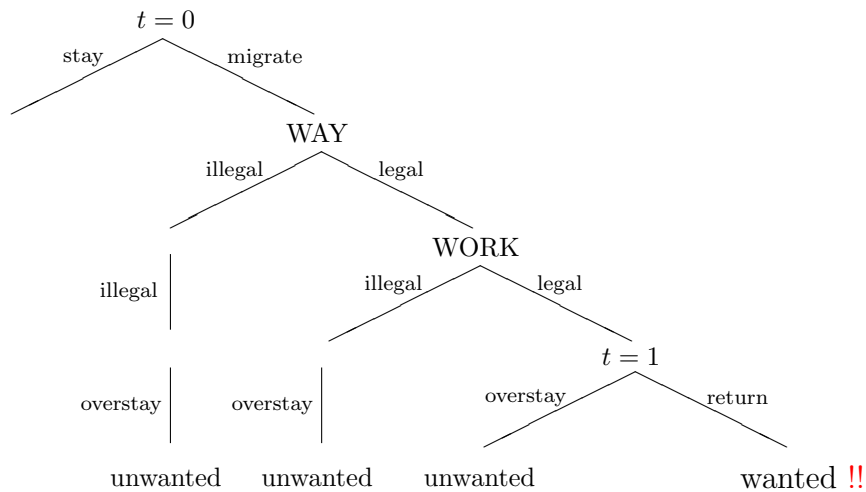


Figure 1: Decisions

To derive the conditions for the visa-policy, we assume that the government wants to introduce a visa scheme with the minimum possible costs or, equivalently, with the maximum possible revenue  $r = v + b - t$ . The government has to set  $v$ ,  $b$ , and  $t$  such that the immigrants choose the visa, work in the legal sector and leave the country after one period. More specifically, for a given immigration level of  $I^e$ , the following constraints have to be satisfied:

- (i) **return incentive constraint.**

To give the immigrants an incentive to emigrate voluntarily after period 1 the bond has to satisfy

$$b + w^* \geq F_I - c . \tag{3}$$

The l.h.s. of (3) is the income the immigrant receives after period 1 if he returns, the r.h.s. is the immigrant's payoff from overstaying illegally at the end of period 1.<sup>7</sup>

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<sup>7</sup>For simplicity, we neglect costs of legal migration for the migrant.

(ii) **legal employment constraint.**

The immigrant must not have an incentive to immigrate on the visa and then to switch to an illegal status immediately after immigration. The following condition prevents this:

$$F_I - t + b + w^* \geq 2(F_I - c) . \quad (4)$$

(iii) **participation constraint.**

Legal immigration on the visa has to be made at least as attractive as illegal immigration:

$$F_I - t - \tilde{v} + b + w^* \geq 2F_I - 2c - \tilde{m} - n ,$$

where  $\tilde{v} = v(1 + g(v))$  since the payment for the visa also causes capital costs for the migrant. Employing (2) yields

$$F_I - t + b - \tilde{v} \geq w^* . \quad (5)$$

(iv) **subsistence level constraint.**

We furthermore have to assure at least a minimum subsistence level for the legal immigrant during his stay in the country. For simplicity, we assume this subsistence level to be given by the foreign wage  $w^*$ . Then we have

$$F_I - t \geq w^* . \quad (6)$$

Without loss of generality we can set  $t = c$ <sup>8</sup> Then constraint (6) is satisfied as a strict inequality since  $F_I - c > w^*$ . Moreover, we can neglect constraint (4) as this inequality is identical to (3) for  $t = c$ .

For an interpretation of the remaining two constraints (3) and (5), let us begin by neglecting the additional capital costs, i.e. we assume  $\tilde{v} = v$ . In this case the return constraint (3) is not binding; the government just has to set the bond  $b$  high enough to ensure a return of the migrant, and it can balance expenditures for this bond by charging high enough visa fees  $v$ . The net revenue from the visa  $v - b + t$  is positive. This follows from  $v - b + t = F_I - w^* = (m + n) / 2$ , which can be derived from equation (2),

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<sup>8</sup>Inequality (4) can be rewritten as  $b \geq F_I - c - w^* + t - c$ . We see that this inequality is equal to inequality (3) for  $t = c$ . For  $t < c$  (4) does not bind as long as (3) holds. The government can therefore raise  $t$  without hurting condition (4). If (5) binds, the government can raise  $b$  by the same amount without changing government revenues. For  $t > c$  inequality (4) is stronger than (3). In this case the government can reduce  $b$  and  $t$  by the same amount without any effects on government's revenues or the constraints (4) and (5).

the participation constraint (5) and  $t = c$ . Thus, without additional capital costs a temporary visa scheme can always be welfare improving for the North as it saves the costs of illegal immigration.

With additional capital costs, both constraints are binding. The bond  $b$  then has to satisfy  $b = F_I - c - w^*$  and the visa fee is given by  $\tilde{v} = F_I - c - w^* + b$ . Employing (2), we obtain

$$\tilde{v} = \tilde{m} + n \quad \text{and} \quad b = \frac{\tilde{m} + n}{2}. \quad (7)$$

According to (7), the costs of illegal immigration and the capital costs determine the size of the visa fee and of the bond. For the bond we see that it increases proportionally with the non-monetary and the monetary costs of illegal immigration. As the monetary costs also include the costs of raising capital, the bond  $b$  is higher for high capital costs. Figures 3 and 4 illus-

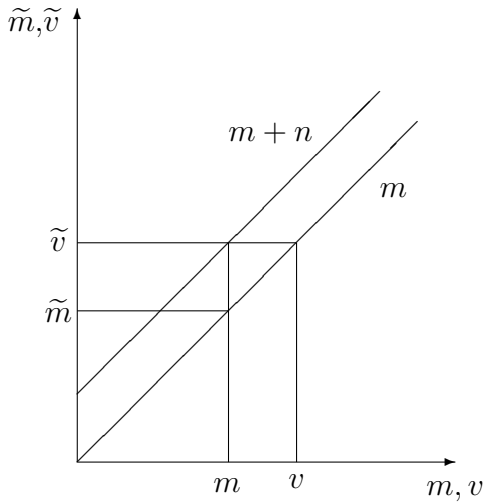


Figure 2: No Capital Costs

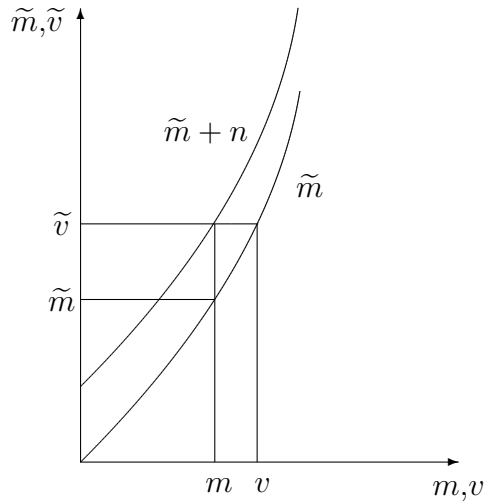


Figure 3: Visa Fee with Capital Costs

trate how the visa fee  $v$  depends on these factors. The abscissa in each of these figures shows the payments of the immigrants net of capital costs, and the ordinate depicts the resulting monetary costs (including capital costs). In figure 2 capital costs are assumed to be negligibly small. We then have  $\tilde{m} = m$  and  $\tilde{v} = v$ . The government in the North then charges a visa fee of  $v = m + n$  equivalent to the immigration costs an immigrant saves through the visa.

Figure 3 shows the influence of the capital costs,  $g(\cdot)$ . If the migrants have additional capital costs, their monetary costs are  $\tilde{m} > m$ . Immigrants are then willing to bear costs  $\tilde{v} = \tilde{m} + n$  for the visa. As figure 3 shows,

this leads to visa fees  $v$  which are lower than  $m + n$ . This result can also be derived analytically: With  $\tilde{v} = v(1 + g(v))$  and  $\tilde{m} = m(1 + g(m))$ , the visa fee is given by  $\tilde{v} = \tilde{m} + n$  or

$$v = m + n + m \cdot g(m) - v \cdot g(v) .$$

Since  $n > 0$  we have  $v > m$ ,  $m \cdot g(m) < v \cdot g(v)$ , and therefore  $v < m + n$ . Thus, the capital costs lead to a decline in the visa fee to a level below the cost savings of the migrants.

The net revenue of the government in the first period  $r = v - b + t$  can be written as

$$r = \frac{\tilde{v}}{1 + g(v)} - b + c .$$

Inserting yields

$$r = \frac{(1 - g(v)) (\tilde{m} + n)}{2(1 + g(v))} + c .$$

To complete the picture, we also have to determine the revenue of the government in period 2. In that period the government offers a visa to another cohort of migrants in the South but does not have to provide an incentive for their return. Therefore the bond can be set to  $b = 0$ . The tax has to be equal to  $t = c$ ; otherwise the immigrant does not work legally in the country after immigration. The visa fee in the second period can be derived from (2) and the participation constraint  $F_I - t - \tilde{v} \geq w^*$ . Taken together, these conditions imply  $\tilde{v} = \tilde{m}/2 + n/2$  for the highest visa-fee that can be raised in the second period. The revenue in the second period therefore is

$$r = \frac{\tilde{m} + n}{2(1 + g(v))} + c .$$

The aggregate revenues per immigrant from both periods is then

$$R = \frac{(2 - g(v)) (\tilde{m} + n)}{2(1 + g(v))} + 2c . \quad (8)$$

We see that, depending on the size of the capital costs  $g(v)$ , the North does not necessarily gain from issuing temporary immigration visas as it may make a negative revenue from it. Sufficient for a positive revenue is  $g(v) \leq 2$ , but we cannot exclude the possibility of a negative revenue for  $g(v) > 2$ .<sup>9</sup> Thus, legalizing immigration by introducing temporary visa not necessarily improves welfare in the North. Proposition 1 summarizes this result.

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<sup>9</sup>Welfare of the immigrants is unchanged from introducing visas as the binding participation constraint implies.

**Proposition 1** *A temporary immigration visa can improve welfare in the North if capital costs of the immigrants are sufficiently low. For high capital costs a welfare reduction for the North cannot be ruled out.*

## 4 Heterogeneous Immigrants

As shown above, the additional capital costs  $g(\cdot)$  determine the welfare properties of the visa program. In this section, we consider the case where these capital costs differ between immigrants. For some immigrants it may not be a big problem to finance visa fees whereas others face high barriers to bring up the necessary liquidity as they have to resort to high interest loans from unofficial sources. We therefore have to ask about the consequences of this heterogeneity for the temporary visa program.

We distinguish two groups of immigrants with different capital market access:

- ”Rich” (potential) migrants (”R”) with capital costs  $g_R(\cdot)$
- ”Poor” (potential) migrants (”P”) with capital costs  $g_P(\cdot)$

For simplicity, we set the capital costs for rich immigrants equal to zero, i.e.  $g_R(\cdot) = 0$ . With respect to all other characteristics, both types of immigrants are identical. While still considering a small open economy with respect to the supply of poor migrants, we assume that the number of rich migrants to be exogenously limited to  $\bar{I}_R < I^e$ . Otherwise, the visa-scheme would be equivalent to the case without capital costs as discussed in the previous section.

In the benchmark without the number of poor immigrants is determined by equation (2), with  $\tilde{m}_P$  instead of  $\tilde{m}$  and with  $I^e = I_R + I_P$ . Each rich immigrant obtains a rent of  $m \cdot g_P(m)$ .

Starting from this situation, the North again introduces temporary immigration visas, keeping the total number of immigrants unchanged. We first analyze a setting of full information, i.e. we assume that the government knows who belongs to the rich group and who to the group of migrants with a bad capital market access. For example, capital costs may be higher for immigrants from certain very poor countries or from rural areas within their country such that immigrants can be distinguished by their origin. The North has to take into account the incentives and restrictions (3) - (6) for each group. Again, we can set  $t = c$  for both groups. For the immigrant group  $R$  the incentive compatibility constraint is not binding. From this type of immigrants, the North obtains a net visa revenue in each period of  $v_R - b_R = (m + n)/2$  per head. For immigrants of the poor group the North

should set a visa fee in the first period that satisfies  $\tilde{v}_P = \tilde{m}_P + n$  and a departure bond of  $b_P = (\tilde{m}_P + n)/2$ . Define  $\alpha = I_P/I^e$  as the share of poor immigrants. The average revenue per immigrant with temporary visas is then given by

$$R = \alpha \cdot \frac{(2 - g_P(v_P))(\tilde{m}_P + n)}{2(1 + g_P(v_P))} + (1 - \alpha)(m + n) + 2c. \quad (9)$$

As in the previous section, government revenues are not necessarily positive because of the capital costs of the poor immigrants. However, as the rich group does not have to bear capital costs, the government in the North makes positive visa revenues from this group. If the share of the rich group  $(1 - \alpha)$  is sufficiently high, average revenues are positive even if revenues from visas of the poor group are negative.

This result changes in the case of asymmetric information in which the government of the North can not distinguish between the immigrants according to some observable characteristics. The optimal visa scheme then has to satisfy the following self-selection constraint:

$$v_p - b_p \geq v_R - b_R. \quad (10)$$

This constraint ensures that rich immigrants do not have an incentive to choose the visa arrangement designed for the poor. The optimal policy maximizes the revenues of the government subject to the constraints (3) - (6) and (10). Since shifting visa payments from the poor to the rich saves capital costs, the self-selection constraint (10) binds as an equality in the optimum, i.e.  $v_p - b_p = v_R - b_R$ . Then the government revenues from a rich immigrant are the same as the revenues from a poor immigrant. Average revenues are then  $R = v_P - b_P + c$  as in section 3. The participation constraint (5) binds only for the poor immigrants. The same holds for the incentive compatibility constraint (3). The optimization problem is therefore the same as in section 3 and consequently the total revenue from the immigration visa is

$$R = \frac{(2 - g_P(v_P))(\tilde{m}_P + n)}{2(1 + g_P(v_P))} + 2c. \quad (11)$$

Thus, in a situation of asymmetric information the government cannot take advantage of the fact that some immigrants have an imperfect access to the capital market. Instead, the visa policy has to be geared to the immigrants with a bad access to the capital market whereas immigrants with a good capital market access receive an information rent.

The question therefore arises whether the North can fare better by allowing illegal immigration of the poor to extract the information rent of the

rich. The government can do so by offering a visa contract with a high bond and a high upfront payment such that the participation constraint is not satisfied for the poor.<sup>10</sup> In this case, the average revenue per (legal and illegal) immigrant is given by

$$\hat{R} = (1 - \alpha) \cdot (m + n) + (1 - \alpha) \cdot 2c . \quad (12)$$

Comparing (9) with (12) shows that revenues  $\hat{R}$  with illegal immigration of the poor may be higher or lower than revenues with legal immigration of both groups  $R$ . First of all,  $\hat{R} > R$  as long as  $R \leq 0$ . For  $R > 0$  the relative size of both groups of immigrants determines which policy is better for the North. If the rich group is very small ( $\alpha \rightarrow 1$ ) then the government should offer visa to both groups. If the rich group is large ( $\alpha \rightarrow 0$ ), however, then  $\hat{R} > R$  and the government should tolerate illegal immigration of the poor.

**Proposition 2** *In a setting with asymmetric information and heterogeneous capital costs it may be superior to offer a visa contract that is chosen only by immigrants without capital costs and to tolerate illegal immigration of the others.*

## 5 Conclusion

Governments increasingly become aware of the problem of illegal immigration. This paper has analyzed whether temporary migration visas can be a part of a solution to this problem. The idea behind this approach is to replace illegal immigrants by a rotating stream of short-term legal immigrants. In a stylized 2-period model we have derived the optimal design of such temporary visas in order to provide incentives for the migrants (i) to choose these visas instead of immigrating illegally, (ii) to stay legally in the country, and (iii) to return voluntarily after a predetermined period of time. We have shown that in principle it is possible to set-up an incentive compatible temporary visa scheme. However, as this scheme includes upfront payments by the migrants, its welfare properties crucially depend on the migrants' access to a functioning capital market. If capital market access is not perfect and if migrants have to bear additional costs of raising capital, then the visa may not bring positive revenues. The host countries would then fare better without temporary visas. In a setting with heterogeneous immigrants, the

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<sup>10</sup>Another option would be to allow an illegal overstay of the poor immigrants. In this case the government may choose a visa scheme that violates the self-selection constraint for the poor.

immigration country may benefit from a policy of partially legalizing immigration by offering visas which are chosen only by a sub-group of immigrants – those with a good capital market access.

Our simple model may be extended in several directions to provide additional insights into the workings of a temporary visa program. First, welfare of the immigrants can be treated more generally. In our model, the utility function of the immigrants is assumed to be linear in all its arguments. Monetary payments then can be used to transfer utility between immigrants and the government in the host country. This assumption has greatly simplified our analysis and allowed us to derive some strong results. However, it excludes distributional considerations which may also influence the design of a visa program. In addition, an extended analysis may also include humanitarian motivations for fighting illegal immigration in addition to the cost-savings we have focused on.

Second, heterogeneity between immigrants may occur not only with respect to capital market access but also in other dimensions. For example, migrants may have different reservation wages, they may expect different wages in the host country, or they may face different costs of migrating and staying illegally. The question arises in what respect these differences influence the design of the visa program. A third issue that may be looked upon in future work is that of time consistency – on the part of immigrants and on the part of the government in the host country. During their stay in the host country the personal situation of migrants may change. For example, some migrants may receive an attractive job offer in the host country or they may start a relationship or family. These migrants possibly revise their original plans of returning home. Also the government of the host country may become interested in a longer stay of some of the migrants. Then the initial return bond provided to all migrants may become sub-optimal from the view of the decision makers in the host country. We leave these extensions for future research.

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