Should I Stay or Should I Go?
On Relative Deprivation and Migration Dynamics.

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Abstract

An overlapping generation model for rural to urban labour migration is developed. In the migration decision the possible migrants consider both the absolute income gain and the relative deprivation associated with moving to town. It is shown that the relative deprivation mechanism introduces a positive externality between generations of migrants that can generate dual equilibria.

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1 Introduction

Should I stay or should I go? is the question troubling millions of people in the developing world. Every year, many of them find it worthwhile to leave their village, and migrate to a bigger town. The decision to move is the result of a complex judgement where economic incentives play an important role. The bulk of economic literature on labor migration in less developed countries follows the pioneering work by Todaro (1969) and Harris and Todaro (1970) and explains migration exclusively by differences in expected income. As argued among others by Stark (1984) and Stark and Yitzhaki (1988), however, relative deprivation is also an important factor. The relative deprivation hypothesis states that an improvement in an agents *relative* income also improves his welfare. The importance of relative deprivation in explaining migration is supported by empirical studies by Stark and Taylor (1989; 1991).

The present work formalizes an idea from Stark (1984) by analyzing the dynamics of migration when relative deprivation matters. This is done by including relative deprivation effects, in addition to the standard income differential effect, in an overlapping generations model for rural to urban migration. Migration will alter the composition of the urban population and will therefore affect the urban income distribution. Changing income distribution, in turn, affects the welfare of migrants via relative deprivation mechanisms. This introduces an externality between migration decisions that has important implications for the migration dynamics. The article is structured as follows: A stylized model, highlighting the qualitative effects of relative deprivation on migration, is presented in Section 2. In Section 3 the equilibria and possible policy implications are explored. In addition a numerical example is provided illustrating the potential relevance of the relative deprivation mechanism. Section 4 contains some further topics and possible modifications. It is especially shown that inclusion of a so called "network effect" in several respects could have similar effects to those generated by the relative deprivation mechanism.

2 If I stay there will be trouble - If I go there will be double

The model considers rural to urban migration within a country. The agents are the potential migrants in a rural village. They can be thought of as unmarried young boys. The decision to migrate are theirs alone and not part of his family's coordinated strategy (as for example in Stark and Lucas 1988). The agents live for two periods. In the beginning of the first period they must decide whether to leave the village, and live the rest of their life in town, or to stay in the village and live the rest of their life there. Hence migration is assumed to be permanent. Total discounted welfare for a migrant moving to town in period i is given by

$$V_i = (1+\theta)\, w + a\left[\left(w - \bar{w}_i\right)/\bar{w}_i + \theta\left(w - \bar{w}_{i+1}\right)/\bar{w}_{i+1}\right] \quad 0 < \theta < 1, \quad a > 0 \tag{1}$$

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Welfare is increasing in the migrant's discounted income in town, $(1+\theta)\,w$, where θ is the discount factor. w is assumed to be constant and equal for all migrants and equal to the regular wage for unskilled workers in town. In addition, welfare is increasing in the relative income differentials between migrants and the town average in the two periods, $(w-\bar{w}_i)/\bar{w}_i$ and $(w-\bar{w}_{i+1})/\bar{w}_{i+1}$. These terms capture the relative deprivation effect. Reference group substitution is assumed, hence the reference group for a migrant in town is the total population in town. According to Stark and Yitzhaki (1988) and Stark and Taylor (1991) such reference group substitution is most likely a) when migration is within a country and b) when migration is permanent. Both these conditions are satisfied in the present analysis. An improvement in the migrant's wage, w, relative to the mean, $\bar{w}$, reduces the feeling of being relatively deprived. The strength of this effect is given by a.

$\bar{w}_i$ is given by total income in town divided by total population in town in period i. Let the number of non-migrant citizens in town, the townsmen, be fixed and normalized in size to 1. Let M_i be the number of migrants entering in period i. Let a fraction α of the townsmen be skilled earning π. The remaining fraction $(1-\alpha)$ are unskilled and earn w which is the same wage as the migrants. The average wage in town in period i is

$$\bar{w}_i = \left[w\left(M_{i-1}+M_i\right)+w\left(1-\alpha\right)+\alpha\pi\right]/\left(M_{i-1}+M_i+1\right)$$

where $(M_{i-1}+M_i)$ is the total number of migrants in town in period i, and $(M_{i-1}+M_i+1)$ is the total population in town. Hence, it follows that

$$\begin{gathered}\left(w-\bar{w}_i\right)/\bar{w}_i = \left(1-b\right)/\left(M_{i-1}+M_i+b\right) \\ \text{where} \quad b=\left(1-\alpha\right)+\alpha\pi w>1\end{gathered} \tag{2}$$

Given that the skilled wage is above the unskilled wage it follows that $b>1$. Inserting (2) in the welfare function (1) the welfare for a migrant in period i follows

$$V_i = w + a\left(1-b\right)/\left(M_{i-1}+M_i+b\right)+\theta\left[w+a\left(1-b\right)/\left(M_i+M_{i+1}+b\right)\right] \tag{3}$$

The option not to migrate implies getting the village wage and to remain having the village's population as reference group. Assuming egalitarian distribution and fixed wage, w^0, in the village there will be no relative deprivation effect. Hence, the welfare associated with not migrating is simply

$$V^0 = (1+\theta)w^0 \tag{4}$$

Combining (3) and (4) and abstracting from migration costs gives the *net* welfare gain from migration

$$\begin{gathered}U_i = V_i - V^0 = WD - RD_i \\ WD=\left(1+\theta\right)\left(w-w^0\right), \quad RD_i = a\left(b-1\right)\left[1/\left(M_{i-1}+M_i+b\right)+\theta/\left(M_i+M_{i+1}+b\right)\right]\end{gathered} \tag{5}$$

where WD captures the wage differential and the RDs capture the relative deprivation effects. The wage differential is assumed to be independent of the Ms and is thus not affected by migration.[1] When $b>1$, it follows that the relative deprivation effect is negative and represents a loss. For $b=1$ this relative deprivation effect cease to exist as $b=1$ implies that the migrants wage is equal to the average in town. Given the assumptions about $b>1$, however, it follows that

$$\partial U_i/\partial M_{i-1}>0, \quad \partial U_i/\partial M_i>0, \quad \partial U_i/\partial M_{i+1}>0 \tag{6}$$

This illustrates an important result:

- The relative deprivation mechanism represents a positive externality in migration, both within and between generations.

The migration decisions are therefore strategic complements. One implication of this strategic complimentarity is that there will be no interior solutions. Either everyone or none of the potential migrants within a generation will migrate.

Let the number of potential migrants within each generation be 1, hence in equilibrium $M_i \in \{0,1\}$. Ruling out coordination between migrants, the condition for generation i to migrate is that the first migrant finds it welfare improving to move. i.e. $WD>RD_i$ when $M_i=0$. Table 1 give the relative deprivation effect,

[1] The assumption about a fixed w, unaffected by migration, greatly simplifies the discussion of the relative deprivation effects. Implications from including of a more realistic wage formation is discussed in Section 4.

conditioned on M_{i-1} and M_{i+1}. In the table and in the following discussion generation i is referred to as *you*, generation $i-1$ as *uncles*, and generation $i+1$ as *nephews*.

Table 1 Relative deprivation effect for the first migrant ($M_i = 0$)

	$M_{i-1} = 1$ (Uncles in town)	$M_{i-1} = 0$ (No uncles in town)
$M_{i+1} = 1$ (Nephews follow)	$RD^1 = a\,(b-1)\left(\frac{1}{1+b} + \theta\frac{1}{1+b}\right)$	$RD^3 = a\,(b-1)\left(\frac{1}{b} + \theta\frac{1}{1+b}\right)$
$M_{i+1} = 0$ (No nephews follow)	$RD^2 = a\,(b-1)\left(\frac{1}{1+b} + \theta\frac{1}{b}\right)$	$RD^4 = a\,(b-1)\left(\frac{1}{b} + \theta\frac{1}{b}\right)$

The positive externality implies that your welfare unambiguously will increase if there are other generations of migrants in town. The reason is that your relative position in the income distribution increases the more poor migrants there are relative to the rich townsmen. Hence, RD^1, where you have your uncles in town in period i and your nephews in town in period $i+1$, has the smallest relative deprivation loss. RD^4 where you have neither uncles or nephews in town gives the highest loss. Given a discount factor $\theta \in \langle 0, 1\rangle$, it is also clear that having company in your first period is more important than having company in the second, i.e. $RD^2 < RD^3$. Thus, the complete ranking of relative deprivation consequences is $RD^1 < RD^2 < RD^3 < RD^4$.

3 So you gotta let me know - Should I stay or should I go?

Your decision to migrate or not, depends on whether the gain, U, from moving to town is positive or not. From eq. 5 it follows that U is positive if the wage differential WD is larger the relative deprivation effect RD. The size of WD depends on how the wage in the village compares to the wage in town. RD depends on the migration decision of your nephews and uncles. The problem is simple if the village wage w_0 is either very high or very low. For w^0 sufficiently high, WD will be negative and U will be less than zero, irrespective of other generations' migration decisions. Your choice is then clear: You should stay in the village. On the other hand when w^0 is very low WD will be high and dominate any relative deprivation effect. You should in that case definitely move to town.

If migration is neither strictly superior or inferior, the reasoning gets more complex. You now have to take the actions of your uncles and the expected action of your nephews into consideration. The following list comprises all the possible migration patterns

1. Stable non-migration, (i.e. the strictly inferior case $WD < RD^1 < RD^2 < RD^3 < RD^4$). Irrespective of your uncles' decision, you will not move. This will also hold for your nephews.
   Outcome: $M_i = 0\,\forall\, i \geq 1$

2. Stable migration, (i.e. the strictly superior case $RD^1 < RD^2 < RD^3 < RD^4 < WD$). You will move whether or not your uncles moved. This will also hold for your nephews.
   Outcome: $M_i = 1\,\forall\, i \geq 1$

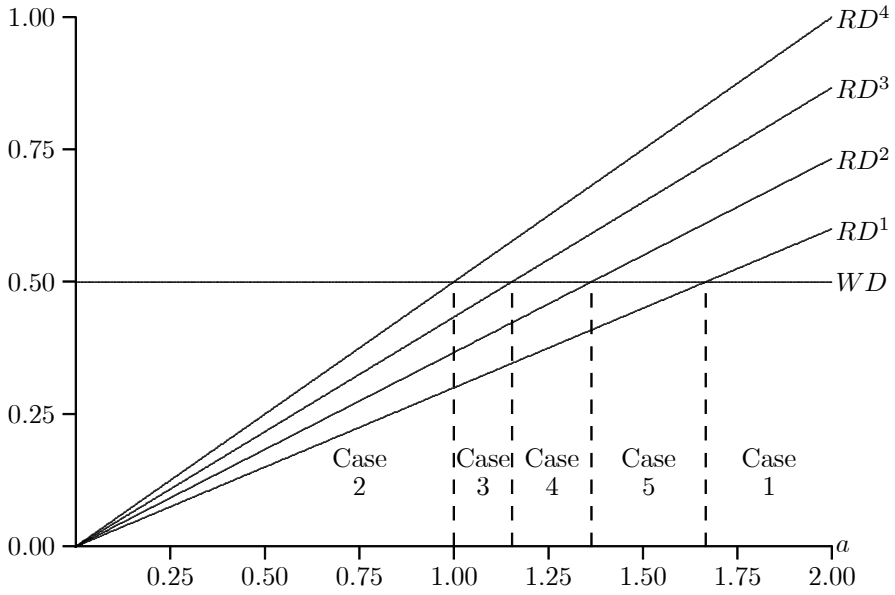
3. Conditional stable migration, (i.e. $RD^1 < RD^2 < RD^3 < WD < RD^4$). You will surely move if your uncles moved. If your uncles did not move, you will only move if you are sure your nephews will follow. However, you know that if your nephews maximizes welfare, they will move if you move. Thus, given that your nephews are rational, you will move irrespective of your uncles's decision.
   Outcome: $M_i = 1\,\forall\, i \geq 1$

4. Backward looking dual equilibria, (i.e. $RD^1 < RD^2 < WD < RD^3 < RD^4$). You will only move if your uncles moved. Your nephew will only move if you move, and so on.
   Outcome: $M_i = M_0\,\forall\, i \geq 1$

5. Backward and forward looking dual equilibria. (i.e. $RD^1 < WD < RD^2 < RD^3 < RD^4$). You will only move if your uncles did move *and* if your nephews will move. Your nephews in turn will only move if you moved and if *their* nephews move.
   If $M_0 = 1$, $M_i = M_{i+1} \quad \forall\, i \geq 1$
   If $M_0 = 0$, $M_i = 0 \quad \forall\, i \geq 1$

These cases show that history and expectations can be significant determinants of the migration pattern. How plausible are these different configurations? From Table 1 it is clear that if the relative deprivation effect a is weak then $RD^1 \approx RD^2 \approx RD^3 \approx RD^4 \approx 0$ and the wage differential will be the sole determinant of migration. Hence, there will be either 1: stable non-migration or 2: stable migration. When a is positive,

Figure 1: Relative deprivation versus wage differential



however, the effect of relative deprivation matters and the differences between the RDs widens. As the gaps between RD^1, RD^2, RD^3, and RD^4 widens the wage differential, WD, may well fall in between them generating either of the cases 3-5. This is illustrated in Figure 1 for the case[2] where $\theta = 1/2$, $w_0 = 1$, $w = 3/2$, $\alpha = 1/2$, $b = 3/2$.

When $a < 1$ WD is above the RDs for all configurations hence migration will definitely take place. At the other end, when $a > 5/3$, the relative deprivation effects are sufficiently large to deter migration, irrespective of other generations migration decisions. In the intermediate interval $1 < a < 5/3$ the intermediate cases 3 - 5 where $RD^1 < WD < RD^4$ will occur. Stark and Taylor (1989; 1991) find that relative deprivation effects matters for the decision to migrate in a case of international migration without reference group substitution. These results can not be directly translated into the present setting. In the present example the following conditional statement can be made: Given that the relative deprivation effect is sufficient to affect migration ($a > 1$) there will be a substantial range, $a \in \langle 1, 5/3 \rangle$, where other generations's migration decisions affect the present generation decision to migrate. Hence the configuration may well be one of the cases 3-5.

The presence of relative deprivation effects and the positive externality between migrants have important implications for the design of policy that affects migration. Rural to urban migration is a serious problem in many developing countries and in some cases policies are implemented in order to alter migration patterns. Consider first the migration equilibrium in case 4 or 5. Each generation finds it worthwhile to migrate, but only because there already are migrants in town.[3] Such an equilibrium can be called a *migration trap.* If the flow of migrants are stopped, only for one generation, the flow will halt and the equilibrium is shifted to no migration. Making it worthwhile for one generation to stay in the village can be done by reducing WD to a level below RD^1 for this generation only, i.e. temporarily realizing case 1. A temporary reduction in WD can for example be realized by subsidizing an increase in the rural wage w^0.

A similar argument can be made facing the stable migration cases 2 and 3. In these cases a permanent subsidy of the rural wage is needed to stop the migration flow. This permanent subsidy needs only to be big enough to realize case 4. A subsidy of this size is sufficient given that it is preceded by a temporary subsidy big enough to temporarily realize case 1. Hence, the general result is that the measures needed to stop a migration flow must be stronger than the one needed to sustain a non-migration situation.

[2] w_0 is set to 1 by normalization and the wage difference between the city and the village is assumed to be one third, hence $w = 1\frac{1}{3}$. Further the fraction of skilled townsmen, α, is assumed to be $1/2$ and their wage is assumed to be double the unskilled wage hence $b = 1\frac{1}{2}$. Finally assuming that, at the time of migration decission, the migrants's expected remaining life length is 40 years each period will be equivalent to 20 years. A year by year discount factor of $r = 3.5\%$ is then consistent with $\theta = 1/2$ since $1/(1+r)^{20} \approx \theta = 1/2$.

[3] Note that the migration equilibrium in case 5 implies that the agents also expect a lasting migration flow.

4 Further topics

It has throughout been assumed that the migrants's wage is fixed independent of the time spent in town. The evidence shows, however, that the earnings of migrants generally improve over time. Consider now the optimistic case where the migrants in the second period reaches the average wage of indigenous townsmen bw. In that case having your uncles in town will not affect your feeling of being relatively deprived as the uncles do not affect the average wage in town. Having your nephews following, however, will increase your utility as your nephews reduce the average wage in town. Hence $RD^1 = RD^3 < RD^2 = RD^4$. This configuration allows for an additional case where only expectations and not history matters.[4]

6. Forward looking dual equilibria, (i.e. $RD^1 \leq RD^3 < WD < RD^2 \leq RD^4$). You will only move if you expect your nephews to move. Your nephews will only move if their nephews move.
   Outcome: $M_i = M_{i+1} \, \forall \, i \geq 1$

The present work focuses on dynamics of migration and on how a relative deprivation effect generates a positive externality. One natural extension is to incorporate this mechanism in a standard Harris-Todaro model. In the Harris-Todaro model the urban wage decreases, while the rural wage increases, with migration. This plausible assumption represents a pecuniary externality through which one agents decision to migrate *reduces* other migrants's return. Adding this negative externality to the positive externality already explored, can give rise to interior solutions and will also affect the dynamics. If the relative dominance of the two conflicting externalities shifts for varying levels of migration, the system will be essentially nonlinear. As shown for example by Day (1994) such a system can exhibit multiple equilibria, stable and unstable cycles, and also generate chaotic dynamics.[5]

The relative deprivation effect exhibits what Massey et al. (1993) in their work on international migration labels *cumulative causation*. Network effects is another example of mechanisms also generating cumulative causation.[6] On the relevance for internal migration, i.e. within a country, Lucas (1997, p. 743) says: "A substantial amount of evidence indicates an empirical regularity: persons having access to kinship and other networks at a place of destination are more likely to choose that place". The network effect encompasses mechanisms such as risk reduction, easier access to information, or lowered psychological stress that are likely to be reduced when you have family/friends/villagers in the city. Effects such as these can be analyzed within the present framework. A network effect will be most relevant in the first period when the migrant arrives in the town. *You* will thus appreciate that your uncles are around when you arrive but you are likely to be indifferent as to whether your nephews follow or not (though they might induce a minor cost sleeping in your house.) Ignoring the relative deprivation effect, and letting RD for now capture the size of the network effect, it follows that

$$RD^1 \approx RD^2 < RD^3 \approx RD^4$$

Hence, depending on the wage differential the equilibrium will be either case 1: stable non-migration, case 2: stable migration, or case 4: backward looking dual equilibria
$\left(RD^2 < WD < RD^3\right)$. Cases 3 and 5 are ruled out as $RD^1 \approx RD^2$ and $RD^3 \approx RD^4$.

5 Conclusion

I have explored some consequences for migration dynamics by inclusion of relative deprivation effects in an overlapping generations model. I show that the relative deprivation effect represents a positive externality between migrants and that the agents decisions to migrate are strategic compliments. Hence, the migration will partly be a result of cumulative causation and dual migration equilibria may result. The presence of cumulative causation has implications for the effect of policy measures affecting migration; the measure needed to stop a migration flow must be stronger than the one needed to sustain a non-migration situation.

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[4] The $\leq$ and $\geq$ signs follows when allowing for the second period wage of migrants to take values in the interval $[w, bw]$. Only the higher part of this interval is relevant, however, as a second period wage close to w not alters the results already derived.

[5] Day et. al (1987) explores the possibility of complex dynamics in a Harris-Todaro model with backward looking agents. The present argument, based on perfect foresight, is thus fundamentally different.

[6] I am grateful to one referee for pointing out to me both the linkage to network theory and the relevance of improved income over time.

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