Where do migrants go?

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In this paper, we study migration decisions taken by risk-averse households. Aggregate data from the regions of Southern Italy are used to test whether risk is a significant determinant of the decision to migrate abroad or inside the country. This indeed appears to be the case for both foreign and domestic migrations, after controlling for unemployment and wage differentials and other plausible control variables. We interpret our results as evidence that, whereas financial markets are absent or malfunctioning, migration provides a shelter against uncertain income prospects.

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1. Introduction

The empirical work on migration determinants has mostly focussed on the role of wage and unemployment differentials under the Harris-Todaro (1970) hypothesis of risk neutrality of an individual migrant. In common with Harris and Todaro, we retain the assumption of rationality, but instead study the decision to migrate when it is taken at the household level by risk-averse agents. We use aggregate data from Southern Italian regions to test whether risk is a significant determinant of the decision of where to emigrate, abroad or inside the country. This indeed appears to be the case for both foreign and domestic migrations, after controlling for unemployment and wage differentials and other plausible variables, such as education, age and the employment share of agriculture. We interpret our results as evidence that, whereas financial markets are absent or malfunctioning, migration provides a shelter against uncertain income prospects.

The role of other factors than expected wages has already been emphasized in various contributions in the migration literature. In the *new* migration literature[1], migration may come as a response to relative deprivation, or be the result of asymmetric information.[2] Within the same strand of literature, and most closely related to our paper, migration can also be seen as an opportunity to diversify risk for the family. The general argument is that, if returns in different locations are imperfectly correlated, households could indeed reduce total income risk by having some of their working members sent to a variety of locations. Migration may then take place even in the absence of significant wage and unemployment differentials.

Our formal model develops these arguments, by allowing for non-zero correlation between incomes earned in different locations. We also postulate the existence of (concave) mobility costs and allow for a 'home bias' in the locational choice. We show that, under these assumptions, an increase in the correlation between incomes earned at home and a potential destination will discourage overall migration, as well as divert migration flows from that specific destination to a potential alternative. We also find that the impact of rising risk at home has an ambiguous effect on migration to any single destination. On the one hand, rising risk at home will encourage risk-averse people to move to any alternative destination. However, not all outside destinations are equally good for risk diversification purposes. Increasing risk at home may then result in larger migration to a specific outside destination at the expense of an alternative destination.

The second part of the paper offers some new empirical evidence. Past empirical work - surveyed in Lucas (1997) - has convincingly argued that both wage and expected employment opportunities are crucial factors in shaping the behavior of potential migrants. Evidence on the *new* migration literature is more limited. We argue that the choice between internal and international migration can provide an interesting testing ground to assess the role of risk as a determinant of migration. Stark and Taylor (1989, 1991) investigated the determinants of the decision to migrate abroad or inside the country within a sample of Mexican emigrants. Their study was mainly directed to test whether migrations are driven by relative deprivation, however, and therefore they did not look at risk[3]. The impact of risk was analyzed in Banerjee and Kanbur (1981). They showed that, when individuals are risk-averse and short-run income randomness is generated by employment fluctuations only, the estimated coefficient of the employment rate is predicted to be larger than the coefficient of wage in a short-run migration function. Drawing on Banerjee and Kanbur's result, Hatton (1995) found indirect evidence that risk was a determinant of UK emigration in 1870-1913. Neither of them looked at the choice between alternative destinations of emigrants, though. Finally, Rosenzweig and Stark (1989) emphasized that marital decisions and, in general, the pattern of inter-village marriages in rural India are strongly affected by the desire to reduce exposure to risk.

Overall, whereas it is widely recognized that risk considerations play a major role in affecting migrations, empirical evidence on the relation between risk and migration is scant. Ours is a contribution to bridge this gap. We exploit and test for the implications of our model using data from Southern Italian regions. Until very recently, the poor working of domestic financial markets made it hard for households living in the Mezzogiorno regions to borrow and insure against negative contingencies (at least in the official sector). Thus Southern Italy is a natural laboratory to analyze migrations as a means for diversifying risk.

Unlike previous studies, we use direct measures of risk - the coefficients of correlation between home and external incomes, and the variability of incomes at home - and we evaluate their significance in a standard migration function.

Consistently with our model, we find that risk is a significant determinant of migration decisions. After controlling for domestic wage and unemployment rates as well as for an array of other plausible control variables, foreign and domestic migrations turn out significantly related with the expected signs to risk variables. A rise in the correlation of Southern Italy's and foreign incomes reduces foreign emigration and increases domestic emigration. Conversely, an increase in the correlation of Southern and Northern Italy's incomes depresses domestic migration (but has no statistically significant effect on international migration). Finally, no clear pattern of correlation emerges instead for the variability of income at home. These findings are largely consistent with the main predictions of our simple model.

The rest of the paper is organized as follows. In the next section, we discuss a simple model where both expected income differentials and risk considerations matter and the migrant faces a variety of possible destinations. In the final part of this section we draw the empirically verifiable predictions that we test in a sample of 8 Southern Italian regions over 20 years. In section 3, we present sample means and pairwise correlations, as well as regression results. Section *4* concludes the paper.

2. A model of risk, mobility costs and migration

Our formal model builds on the portfolio approach to the determination of the optimal family size developed by Appelbaum and Katz (1991). We adapt their model to the analysis of migration with three main changes. First, allowing for non-zero correlation between incomes earned in different locations gives us room to study migration for risk diversification purposes. Second, we allow for concave mobility costs at the household level, an assumption to be discussed below [4]. Third, we allow for idiosyncratic tastes for location, another label for the 'home bias' which Faini and Venturini (1993) found consistent with the reversal of migration waves in Italy, Spain and Portugal.

Our model implies that, if households are not risk-averse, concavity of mobility costs drives all of the potential migrants from the same family to migrate to the same place or not to migrate at all. At the same time, taste heterogeneity causes some migration from the community of origin to occur anyway toward any destinations. Then diversification of destinations is achieved as a result of the combination of risk-aversion, concavity of mobility costs and taste heterogeneity.

We consider a one-period economy inhabited by a large number of households, each endowed with n members. Households draw utility from consumption. Consumption equals net income, i.e. gross income net of mobility costs. Total household net income Y depends on the locational choice of individual household members. In addition to staying home, the n household members can choose between two alternative destinations (say, D and F, where D stands for domestic and F stands for foreign). The number of household members moving to region D (F) is equal to n_D (n_F). The household locational choice for its members is designed to maximize, in an utilitarian fashion, the total expected utility of its members' net incomes[5]:

$$\underset{n_D, n_F}{\mathrm{Max}} \ EU(Y) \tag{1}$$

where $U'>0$ and $U''<0$. Then households are never satiated with consumption and risk-averse. As mentioned above, net income Y is computed as the difference between gross income and mobility costs. We discuss each component of net income in turn.

Gross income originates from various sources. Irrespective of locational decisions, the household is assumed to earn y, the return on non-tradable assets[6]. The variable y is randomly distributed, with mean μ and standard deviation equal to α:

$$y = \mu + \alpha e \qquad (2)$$

where e is a standard normal random variable with zero mean and unit variance.

Each non-migrating household member is assumed to earn the stochastic wage w at home. The wage w is normally distributed with mean μ_H and standard deviation equal by assumption to α. The home wage and the return on the non-traded assets are assumed to be perfectly correlated, thereby preventing the possibility of risk diversification of immobile households. Migrants' incomes y_i are also assumed to be stochastic with mean μ_i, depending on their place of destination ($i = D,F$), and standard deviation equal to σ [7]:

$$y_i = \mu_i + \sigma \eta_i , \quad i = D,F \qquad (3)$$

where η_i is again a standard normal random variable. The stochastic terms η_D and η_F are correlated with e, with correlation coefficients equal to ρ_D and ρ_F respectively. Imperfectly correlated incomes at home and at destinations allow the household to reduce its risk exposure by diversifying the locations of its members.

Migrations to any destination involve non-stochastic mobility costs, with two elements. The first one varies with the number of migrants but is identical across families and destinations. The second component is incurred by any individual migrant, but it is fixed and idiosyncratic to each household and destination.

The variable part of mobility costs is described by the function $c(n_i)$, with $c'(n_i)>0$, $c''(n_i)<0$ [8]. The assumption of concavity is a compact representation for an array of elements. The bunching of people from the same family to a given destination reduces both relocation and informational costs of migrations. It also lowers the psychological costs associated with the loss of social relationships at home, the need to adapt to an unfamiliar *milieu* as well as to different cultural and linguistic traditions. In addition to that, national legislations often admit family reunions as one of the few motives of eligibility for allocation of permanent visas[9]. All of these features are compatible with the idea of concave mobility costs at the household level.

Mobility costs also include a fixed part $f_i(h)$ ($i=D,F$), incurred by any individual migrant but independent of the number of migrants and indexed to both destination i and household h.

Then, if households are not too risk-averse or, which is the same, mobility costs are concave enough (see the Appendix), the household problem in (1) bears a corner solution, where all potential migrants either remain home or migrate to a single destination outside their place of origin, so that $n_i=n$ for destination i and $n_j=0$ for destination j ($j \neq i$).

Consequently, the household net income will take either of the following values, depending on which location is chosen:

$$Y_H = \mu + n\mu_H + [\alpha^2 + n(n\alpha^2 + 2\alpha^2)]^{(1/2)} \varepsilon_H \quad (4)$$

$$Y_i = \mu + n\mu_i - c(n) - n f_i + \left[\alpha^2 + n(n\sigma^2 + 2\alpha\sigma\rho_i)\right]^{(1/2)} \varepsilon_i \quad (5)$$

where $i=D, F$; ε_H and ε_i are standard normal variables and Y_H, Y_D and Y_F represent family incomes when, respectively, nobody moves, everybody moves to location D, everybody moves to location F.[10] The actual household choice involves comparing expected utilities at home and at the two alternative destinations and picking the utility-maximizing option.

Thus the household choice depends both on household-specific parameters, $f_D(h)$ and $f_F(h)$, and the shape of the utility function. We assume that $f_D(h)$ and $f_F(h)$ are distributed across households according to the generic joint density function $\phi[f_D(h),f_F(h)]$. For tractability, utility is assumed to take an exponential form:

$$U(Y) = -\exp(-aY) \quad (6)$$

where a is the constant coefficient of absolute risk aversion. Since ε_i and ε_H are normally distributed with mean zero and unit variance, we find that:

$$E(U(Y_w)) = -\exp\left[-a(n\mu_H + \mu) + \frac{a^2}{2}(\alpha^2(1+n^2))\right] \quad (7)$$

and:

$$E(U(Y_i)) = -\exp\left[-a[n\mu_i + \mu - c(n) - n f_i] + \frac{a^2}{2}[\alpha^2 + n(n\sigma^2 + 2\alpha\sigma\rho_i)]\right] \quad (8)$$

where i=D, F. Then, from (7) and (8), we can conclude that the generic household h does not migrate if and only if the two following conditions hold:

$$f_D \geq (\mu_D - \mu_H) - \frac{c(n)}{n} - \frac{a}{2}(n\sigma^2 + 2\alpha\sigma\rho_D - \alpha^2(1+n)) \equiv \overline{f_D} \tag{9}$$

and:

$$f_F \geq (\mu_F - \mu_H) - \frac{c(n)}{n} - \frac{a}{2}(n\sigma^2 + 2\alpha\sigma\rho_F - \alpha^2(1+n)) \equiv \overline{f_F} \tag{10}$$

where the left-hand sides of (9) and (10) obtain from the requirements that the expected utility of staying home be higher than the expected utility of moving to D and F, respectively. Note that in case of zero differential in average incomes (i.e. μ_F=μ_D), equal variability of incomes at home and outside (i.e. α=σ), and perfect correlation of home and outside incomes (ρ=1), there is no gain whatsoever to emigration and the inequalities (9) and (10) are always strictly satisfied. Migration will be nil since it entails no benefits and positive costs. In general, inequalities (9) and (10) define two thresholds, i.e. two critical values of f_D and f_F, which can be exploited to conclude that the equilibrium number of non-migrating household members (M_w) is equal to:

$$M_w = \int_{\overline{f}_D}^{+\infty} \left[\int_{\overline{f}_F}^{+\infty} \phi(f_D, f_F)\, d f_F \right] d f_D \tag{11}$$

The number of household members migrating into, say, region F (M_F) can be derived in the very same way. We find that:

$$M_F = \int_{0}^{\bar{f}_F} \left[\int_{f_F - g(.)}^{+\infty} \phi(f_D, f_F)\, d f_F \right] d f_D \tag{12}$$

where $g(.) = n\,(\mu_F - \mu_D) - n\,a\,\alpha\,\sigma\,(\rho_F - \rho_D)$. [11]

Equation (12) says that people migrating to F share two features. They are endowed with a low enough value of f_F to be willing to leave the homeplace in the first instance. Moreover, only a high enough level of

f_D makes those willing to leave the homeplace unwilling to move to destination *D* and go to destination *F* instead.

The fixed cost thresholds defined in equations (9) and (10) delimit three regions in the (f_D, f_F) plane in **Figure 1**. In order to ease the reading of the figure, point *E* is conveniently identified at the centre of the figure (which corresponds to the special case of $g(.)=0$) at the crossing point of the two thresholds. Those households characterized by high distaste for moving to either outside region are drawn in the *HOME* area in the figure. Area *F*, instead, delimits the (f_D, f_F) of those households with a high enough distaste for moving to region *D* and a low enough distaste for moving away from the homeplace to region *F*. [12]

Equations (11) and (12) can be exploited to derive the comparative statics properties of the model. The effects of changes in average incomes on migration flows are standard. An increase in μ_F fosters emigration towards region F, while an increase in μ_D reduces it. We are particularly interested in the effects of risk on migrations. We summarize the effects of changes in the risk parameters (ρ_i, α) on migrations in **Propositions 1** and **2**.

Proposition 1 (Incomes correlation and migration)

A rise in the correlation of incomes earned at home and at an outside region leads to a decline of migration to that region and an increase in migration to an alternative outside region.

Proof: see the Appendix.

This is an intuitive result. To be specific, suppose that ρ_F goes up. This makes migrating to region *F* a less attractive way to diversify risk. The marginal benefit of moving to region *F* falls, leading to an increase in non-migrating households and a rise in migrations toward region *D*. The same applies to the effects of a change in ρ_D on M_F. As portrayed in **Figure 2**, the set of (f_D,f_F) pairs compatible with migrations to destination *D* is now smaller than before: someone previously migrating to *D* now stays home (those with taste parameters lying in the *H'* region), while a few others still move away from home, but towards a foreign destination (those with *f's* in the *F'* region).

Instead, the effect of an increase in home riskiness, as measured by a variation in α, on total migration as well as on migration to a specific destination is less straightforward and its sign cannot be determined *a priori*.

Proposition 2 (variability of home incomes and migration)

A rise of home income variability has, in general, an ambiguous effect on total migration as well as migration to any destination *i*. However, the following two sufficient conditions hold:
(i) if ρ_D and ρ_F are both negative, then higher income variability at home results in higher total migration;
(ii) if $\rho_i<0$ and $\rho_i<\rho_j$, with $j\neq i$, then income variability at home results in a rise of migration to destination *i*.

Proof: see the Appendix.

Although the argument may appear involved at first sight, the basic points are easy to grasp. The increase in α makes home income riskier and migration to any destination becomes a relatively more attractive option for a risk-averse agent. However, any change in α, for a given value of ρ_i, affects the covariance between income at home and income in region *i* (equal to $\rho_i\sigma\alpha$). If ρ_i is positive, the increase in α is then associated to a higher covariance between home income and income in region *i*. This makes migration to that region less appealing. Overall, the impact of a higher α on total migration and on migration to region i cannot be determined.

Suppose, instead, that ρ_D and ρ_F are both negative. Higher values of α imply that incomes at home and in both destination regions have become more negatively correlated. Aggregate migration then rises both because more people tend to switch to less risky locations and because households can achieve a better diversification of risk by migrating. Indeed, as α goes up, the threshold in **Figure 1** is shifted to the right, which leads to more migrations. Migration to any individual destination may not rise, however, even if both ρ_D and ρ_F are negative. Take the case where $\rho_F<\rho_D<0$. Then, the rise in α means that region D becomes a less attractive destination with respect to region F and the people leaving their homeplace are more likely to migrate abroad. Migration to F will instead increase unambiguously. The opposite occurs if $\rho_D<\rho_F<0$. In general, the impact of α on migrations to any region is ambiguous and depends on the signs and the relative values of the correlation coefficients as well as on the other parameters in the model.

In the next section, we contrast this set of predictions with aggregate data for eight regions of Southern Italy in 1970-1989.

3. Migration and risk: empirical evidence from Southern Italy

3.1 Data

Southern Italy is made of eight regions (Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna). For many decades, the Mezzogiorno has been a steady source of migrants both towards foreign destinations and other Italian regions. Due to data availability on labor incomes, our empirical exercise concerns the most recent periods - the seventies and the eighties.

In this sub-section we describe our data and briefly summarize their sample means and pairwise correlations. These variables will be used in regression analysis in the next sub-section.

In our econometric analysis we pool the data for the eight Mezzogiorno regions. We consider both regional emigrations to richer areas within the Italian borders (the North of Italy) as well as migrations abroad. Emigrations abroad (FMIG) and to the North of Italy (DMIG) are measured as the ratios between the (gross) number of people changing their registered place of residence and total population in each region, as reported by ISTAT (Italy's National Institute of Statistics).

The determinants of migrations that we include in our regressions are a set of risk indicators and a group of control variables suggested by previous studies, like *per-capita* labor incomes, unemployment rates, the share of agricultural and construction employment, an index of human capital endowment and the share of young people (those aged 15-29) in the population.

Regional unemployment rates (*U*) are obtained from ISTAT. Real labor incomes per employee (WAGE) are given by average compensation per employee in nominal terms, inclusive of social security payments by employers and deflated by the Consumer Price Index in the main province in the region. The share of agricultural employment (SHAG) is also included, for migrations from the countryside are a major part of overall migration flows. Moreover, the agricultural sector is typically more exposed to risk, because of crop failures, price fluctuations, livestock diseases (Lucas and Stark, 1985). We also consider the share of construction employment (SHC) as an additional control variable. The construction sector is known to be the most immediately hit by upturns and downturns along the business cycle and therefore we want to control for likely the short-run response of migration flows to cycles. The index of human capital (HK) is simply the secondary enrollment ratio lagged five years, and AGE is the share of people aged 15-29 in the total population. Both variables are expected to be positively related to emigration flows: emigrants are usually younger and often more educated than the rest of the population [13].

Our variables of interest here are the set of risk indicators. To obtain direct empirical measures of ρ_F and ρ_D, we look at the coefficients of correlation between regional incomes in Southern Italy on the one hand and incomes in Northern Italy and Germany[14] on the other. More precisely, for each region of Southern Italy ρ_D (ρ_F) is equal to the correlation coefficient between the gross domestic products in that region and in the North of Italy (Germany) over the previous five years. As an indicator of α, i.e. the variability of home income, we have used the coefficient of variation of regional GDP's in Southern Italy over the previous five years.[15]

Now, before turning to the econometric analysis of section 3.2, the main cross-sectional and time series features of our data are reviewed.

As shown in **Table 1**, on average each year between 1970 and 1989 about 1% and 0.2% of Southern Italian population migrated to the North of Italy and to foreign destinations respectively.

Overall propensities to migrate exhibit substantial variation across regions, however. Molise is the most migration-prone region, since its emigration rates are systematically larger than sample and sub-period means. Correspondingly, Campania and Sardinia exhibit emigration rates below average. But even propensities to move abroad or within the country are subject to significant variations across regions and over time. Domestic emigration rates are above average and international emigration rates are below average for Basilicata and Calabria. The opposite holds for Abruzzo and Sicily, where migrants are more often destined abroad.

These cross-sectional features do not appear to have changed much over time. As shown in **Table 2**, emigration rates followed a declining trend. Domestic migrations fell from 1.24% during the seventies to 0.77% during the eighties, while the share of international migrants more than halved (falling from 0.24% to 0.11%) between the two periods. This holds for any of the eight regions in the sample. Moreover, the relative ranking of regions in terms of either their overall propensities to migrate or their propensities to move abroad or within the country did not change.

Are migration flows associated to the cross-sectional and time series variation in the determinants of migration ?

Table 3 shows that both domestic and foreign migrations are negatively related to real wages in sending regions, are positively related to the share of agricultural and construction employment (with domestic migrations exhibiting a stronger correlation) and more weakly correlated with the rest of the variables in the sample. Unemployment at home is, contrary to expectations, negatively related to both types of migration flows, with a correlation coefficient of about -0.5 for domestic migrations and -0.4 for international migrations. Yet expected *per-capita* labor incomes at home (computed as the product of average labor income and the complement to one of the unemployment rate - the probability of being employed according to Harris and Todaro) have gone up in the South in the eighties, which is in line with the declining trend in migrations.[16] Moreover, low (respectively, high) propensities to migrate in Sardinia (Molise) are associated to above-(below-)average expected incomes. Campania shows instead average labor incomes not very different from the sample mean (but definitely higher values of the coefficients of correlations).

Risk variables are not as strongly correlated as average incomes to migrations, with the exception of the indicator of home riskiness which is positively correlated to both domestic and international migrations (**Table 3**). Furthermore, the marked fall in the coefficient of variation of regional GDP between 1970-1979 and 1980-1989 shown in **Table 2** may help explain the decline in the propensity to migrate. Regarding ρ_D and $\rho_{F,}$ correlations with international migrations are stronger than with domestic migrations, although the correlation takes a sign opposite to expectations in two out of four cases. **Table 2** shows that , compared to the previous decade, both ρ_D and ρ_F fell during the eighties. The parallel decline of ρ_D and ρ_F over time has *a-priori* ambiguous consequences on migrations. The rise in ρ_D would boost FMIG and discourage DMIG whereas the opposite would apply for ρ_F. According to our model, risk-averse migrants are expected to react to a diminished correlation of South-North incomes (from 0.93 to 0.75, on average) by switching from foreign to domestic destinations. However, by the same token, the decline in ρ_F (from *0.90* to *0.78,* on average) would be predicted to strengthen the incentives to search for risk diversification outside the borders of Italy. Then, a first sight at aggregate data leaves us with conflicting evidence as to the impact of risk indicators. The net effect is an empirical matter to be checked in multivariate analysis to which we turn now.

3.2 Econometric estimation and results

We estimate two separate equations for domestic and international migrations. The estimating equations take the following form:

$$m_j = b_0 + b_1 \ln w + b_2 \ln(1-U) + \sum_{j=D,F} b_{3j}\, \rho_j + b_4\, \alpha + b_5 SHAG + b_6 SHC + b_7 HK + b_8 AGE + v_j \qquad \textbf{(13)}$$

where m_j is either DMIG or FMIG, depending on whether a domestic or an international migration function is being estimated. The dependent variable m_j is the number of migrants M_j from the home region to destination j *(j=D,F)* divided by the total population in the sending region; w is labor income in the region of origin; U is the unemployment rate in the region of origin; ρ_j is the correlation coefficient between income at home and in region j; α is the variability of income in the region of origin; SHAG and SHC are respectively the shares of agricultural and construction employment; HK is human capital and AGE is the proportion of people aged 15-29 over total population; v is the error term.

Based on our model, we expect DMIG and FMIG to be higher the lower w. Similarly, an increase in the employment rate, $1-U$, should be associated to lower migration to either destination. We also expect migrations to be related to other control variables which we did not discuss in our simple model. Then the estimated coefficients of SHAG, SHC, AGE should be positive in both DMIG and FMIG equations. The impact of human capital is *a priori* ambiguous. Migrants are often better educated, but the real reward to skills may be relatively higher in a backward region, prompting more skilled agents to remain home. Finally, our variables of interest: **Proposition 1** predicts DMIG to be higher the lower ρ_D and the higher ρ_F. Conversely, in the FMIG equation the estimated coefficients of ρ_D and ρ_F should be positive and negative, respectively. Last, **Proposition 2** does not constrain the sign taken by the estimated coefficient of home income riskiness α.

Finally, we also control both for potentially omitted regional characteristics, by allowing the intercepts to differ across regions, and for unobserved destination effects by time dummies. Yearly time dummies are bound to capture all factors which are common to all sending regions, including wage and employment conditions as well as the riskiness in the receiving areas. The use of time dummies therefore allows us to avoid the omitted variable bias which could arise if we tried to specify in detail the changing attractiveness of different destinations. Moreover, it greatly simplifies the empirical analysis.

Two equations like *(13)* have been estimated from the aggregate data for Southern Italy described in the previous section. Eight regions over a twenty-year period provides us with a total of *160* observations. Sample size falls short of 160 when we allow for some lagged instruments.

Our econometric approach is as follows. We rely on a fixed effects model, where the slope coefficients are constrained to be the same across regions, while the intercepts are allowed to differ. As an initial check, we simply stack the regional observations and estimate a traditional fixed effect model. We then follow an alternative econometric procedure. Rather than stacking all the regional observations, we estimate the eight regional equations with a seemingly unrelated regression (*SUR*) method, imposing the cross-equation constraints that the slope coefficients are the same. In this way, we allow for common shocks to the regional migration equations with an obvious gain in efficiency. The merits of this procedure for panel data analysis are discussed in Arellano (1985). However, in order to save on degrees of freedom, we use period time dummies (1971-73, 1974-76, 1977-79, 1980-83, 1984-89), instead of yearly time dummies [17]. The choice of intervals is designed to capture common business cycles among receiving areas and we obviously test whether the restricted specification of the time effects is not rejected by the data.

Domestic migration

In **Table 4** we present the results for domestic migrations. Column 1 reports the stacked regression results including yearly time effects. Some control variables may be endogenous, given that migration may affect the equilibrium value of wages and employment and the employment shares of agriculture and construction in the sending regions. We rely on a standard Hausman test to detect potential endogeneity. The test result indicates that an instrumental variable procedure is appropriate.[18] Standard specification tests also suggest that both regional and time dummies should be included in the regression.[19] The results in column 1 show that both expectd income and risk variables play a role in affecting migration. Regional wages enter the equation significantly with a negative coefficient as expected. The coefficients of risk variables also bear the expected sign, but are not or only marginally significant at conventional levels. The other control variables, including the employment rate, also do not appear to affect migration. In column 2, we use period time dummies, restricting the time effects as described above. The restriction is not rejected by the data ($\chi^2(12)=19.22$) and the results improve substantially. The correlation between income at home and income in the foreign destination has, as expected, a positive impact on domestic migration and is statistically different from zero at the 95% level of significance. Also the coefficient on ρ_D bears the expected sign and becomes more significant than in column 1. The coefficient on *ln(1-U)* is somewhat higher than in the previous specification, but still not precisely estimated. We could impose the restriction that the coefficients on wages and on the employment rate *(1-U)* are equal. Theoretically, the restriction would be appropriate under the joint assumptions that agents are risk-neutral and that the probability of being employed is strictly equal to the employment rate. Even under our maintained hypothesis of risk-aversion, however, the two coefficients could still be equal under the plausible assumption that the probability of being employed is lower than the employment rate. At any rate, we find that the constraint is not rejected by the data.[20] Overall, both expected income and risk considerations play a significant role in determining migration. The role of structural factors, in particular the sectoral composition of employment and the demographic structure in the sending regions, is more muted. A higher level of human capital has a negative impact on the flow of migrants. As discussed earlier, this probably reflects the fact that the real reward to skills is relatively higher in the backward regions of the South.

The statistical properties of the equation are satisfactory. As diagnostic tools, we rely on the Godfrey test (to check for residual autocorrelation in a IV framework) and on the Sargan test (to control for the overidentifying restrictions that the instruments should not be correlated with the residuals). The test values are $\chi^2(1)=3.20$ and $\chi^2(5)=7.01$, respectively. We conclude that diagnostic testing provides no indication of misspecification.

In column 3, we turn to system estimation. All the coefficient signs are consistent with our a priori expectations. Moreover, all coefficients are significantly different from zero at conventional statistical levels, with the exception of the employment share of agriculture and the employment rate. The restriction that the wage and the employment rate bear the same coefficient is now rejected by the data. We also see that the Hausman test for endogeneity is not statistically significant. This may reflect the low power of the Hausman test or alternatively indicate that an IV procedure is relatively inefficient. As a further check on our results, we therefore estimate the equation for domestic migration with a non-instrumental-variable procedure (column 4). The results however do not change much. The point estimates are somewhat lower (reflecting perhaps the downward bias of the non-instrumental variable estimator[21]), but the statistical significance of the coefficients stays fundamentally unchanged. Finally, comparing the coefficients between different estimators across the first three columns we see that the point estimates of SHAG and SHC exhibit some variability. We therefore re-estimate equation (13) excluding both variables from the list of regressors. Once again, the results are not much affected. Our findings on the role of risk and expected income do not appear to depend on the inclusion of potentially extraneous regressors.

International migration

In **Table 5**, we report the estimates for international migrations. We closely follow the approach used in estimating the domestic migration equation. Following the indications of the Hausman test, we report the IV estimates of the stacked regression with yearly time effects in column *1*. [22] The results are somewhat less satisfactory than for domestic migration. In particular, the correlation coefficients between home income and income in the two destinations are not statistically significant. Still, the statistical properties of the equation are satisfactory. The values of the Godfrey and the Sargan tests are equal to $\chi^2(1)=1.58$ and $\chi^2(5)=6.94$, respectively. In column *2* we consider the specification with period time effects. The constraint is rejected at conventional statistical level ($\chi^2(12)=37.6$). However, as shown by Kiviet (1985), the actual size of the Gallant-Jorgenson test can exceed its nominal size by a very large factor. If we consider the F-form specification of the Gallant-Jorgenson test, it is no longer possible to reject the constraint imposed by the restricted time effects ($F_{12,105} = 2.11$). Even in this case, however, results do not improve much. Both the wage rate and the employment share of agriculture play a significant role in affecting international migration. Similarly, an increase in home riskiness has a positive and statistically significant impact on migration toward foreign destinations. However, the coefficients on ρ_D and ρ_F are both imprecisely estimated.

In column 3, we consider system estimation. The Hausman test ($\chi^2(4)=23.3$) clearly indicates that an IV procedure is required. Here the results improve substantially. All coefficients take the expected sign and, with the exception of ρ_D and *ln(1-U)*, are significantly different from zero. To find a statistically significant role of the employment rate in affecting international migration we need to restrict the coefficients on *w* and *1-U* to be equal. The constraint is not rejected by the data [23], indicating a channel through which unemployment may affect migration toward foreign destinations. We also see from column 3 that young people are more likely to migrate. Similarly, a high share of construction is associated with a larger propensity to migrate. Contrary to the results for domestic migration, we find that educated people are more likely to migrate to foreign destination. The coefficient on HK is not well determined, however. Finally, estimating the equation with the exclusion of SHAG and SHC (column 4) does not substantially affect the results. The statistical significance of *w*, α, HK, ρ_F goes down slightly (except for the real wage coefficient, which is no longer significant), while the estimated coefficient of AGE becomes now significant, unlike in column 3.

Summing up

Overall, our results show that both income and risk considerations play a role in affecting emigration choices from Southern Italian regions.

The result that a higher home wage is associated with lower migration is quite robust, both across estimation methods and alternative destinations. It is, instead, more difficult to find a substantial effect of the employment rate. Only when the coefficients on *w* and *1-u* are constrained to be the same, does the employment rate become a significant determinant of migration.

Our main findings are that, in addition to expected income differentials, risk variables act as determinants of size and direction of migrations. The estimated impact is definitely more evident for domestic than for international migrations, and for the correlation coefficient of home and foreign incomes (ρ_F) than for the correlation coefficient of home and domestic incomes (ρ_D). These effects are most clearly appreciated when taking advantage of the efficiency gains of system estimation.

Finally, another risk-related variable is the extent of variability of home incomes. According to our estimates, an increase in home riskiness is associated with higher international migration flows and lower domestic migration flows. One way to interpret this result is to argue that domestic destinations are riskier than foreign destinations. Our model does indeed suggest that the relation can easily go both ways.

Most of these effects appear to be quantitatively significant. In **Table 6**, we use our estimated coefficients from column 3 in **Tables 4** and **5** to assess the effects on migration of a one standard increase in the value of expected income and risk variables. As expected, we find that changes in the home wage would lead to a substantial decline in both domestic (-13.1 percentage points) and international (-10.5 percentage points) migration. Home riskiness has a substantial (positive) impact on international migration, but a more limited (negative) effect on domestic migration. Turning to the correlation coefficients, we find that a change in ρ_F brings about a marked change in both international (-5.5%) and domestic (+ 5.1%) migration - an effect ranging between one half and one third of the effect of the home wage. The migration impact of a change in ρ_D is instead more limited.

4. Conclusions

Our paper builds and extends previous theoretical and empirical work on the determinants of migration. Whereas previous work on the determinants of internal and international migrations has proceeded along parallel lines, we focus on the *choice* between internal and international migration as alternative means for risk diversification.

Our paper casts some light on the empirical puzzle posed by the coexistence of migrants' spatial concentration and taste for risk diversification. We have proposed a rationale for this puzzle and argued that the forces of bunching are more likely to prevail at the household level, while diversification of destinations is instead achieved as a result of taste heterogeneity. Panel regression results from Southern Italian regions show that risk-related variables do play a significant role in shaping migration decisions. This is consistent with our theoretical approach. Our empirical findings show that, after netting out expected income variables and other standard control variables, correlation and variability indicators bear a systematic relation with migration flows.

Beyond the strict focus of this paper, our framework produces empirical implications which might deserve further investigation in future work. An implication we have not explored yet concerns the response of migration flows to the completion of the process of European unification. If European integration is going to be associated with enhanced specialization at the regional level (like in Krugman and Venables (1995)), countries are likely to become more diverse as to their economic structures. Based on our model, this should fuel, *coeteris paribus*, renewed emigration flows from Southern European regions. If, instead, economic integration ends up fostering intra-industry trade, this is likely to result in further declines in emigration flows, in line with experience in the last twenty years.

Appendix

1. Sufficient condition for the household problem to bear a corner solution.

Total household income can be written as:

$$\mu + (n - n_D - n_F)w + \sum_{i=D,F}\left[n_i\mu_i - c(n_i) - f_i(h) - \left(\alpha^2 + n_i(n_i\sigma_i^2 + 2\alpha\sigma_i\rho_i)\right)^{\frac{1}{2}}\right]\varepsilon \quad 1$$

where $f_i(h)$ is a household-specific taste parameter. The first-order condition for an interior solution can be written as:

$$a'(n_i)\,E(U'(Z)) + b'(n_i)\,cov(U'(Z),\varepsilon) = 0 \quad 2$$

where: $a(n_i)=\mu+n_i\mu_i-c(n_i)-f_i$ and $b(n_i)=(a+n_i(n_i\sigma^2+2\alpha\sigma\rho_i))^{.5}$.

The second-order condition is:

$$a''(n_i)E(U'(Z)) + a'(n_i)E(U''(Z))\tfrac{\partial Z}{\partial n_i} + b''(n_i)\operatorname{cov}(U'(Z),\varepsilon) + b'(n_i)\tfrac{\partial \operatorname{cov}(U'(z),\varepsilon)}{\partial n_i} < 0$$

Then, if mobility costs are concave, we have $C''<0$ and $a''(n_i)>0$, so that the first term is positive. The third term is also positive given that $b''>0$ and $cov(U'(Z),e)<0$. Only if $E(U''(Z))$ is very large will the second-order condition for an interior maximum be satisfied. In the text, we rule out this possibility (i.e. agents are risk-averse, but not too much) and assume a corner solution to hold.

2. Proof of Proposition 1

Proposition 1 (Incomes correlation and migration)

A rise in the correlation of incomes earned at the homeplace and at an outside region leads to a decline of migration to that region and to an increase in migration to an alternative region.

Proof.

Proposition 1 is in two parts. Take them up in turn. First we prove that a change in the correlation of incomes earned at home and at an outside region brings about a decline in migration to that region. To be specific, consider the impact of a change in ρ_F on M_F (but the same argument carries over to the effect of a change in ρ_D on M_D):

$$\frac{\partial M_F}{\partial \rho_F} = \int_{\bar{f}_F - g(.)}^{+\infty} \phi(f_D, \bar{f}_F)\, d f_D \frac{\partial \bar{f}_F}{\partial \rho_F} - \int_{0}^{\bar{f}_F} \phi[f_F - g(.), f_F] \frac{\partial [f_F - g(.)]}{\partial \rho_F}\, d f_F$$

We can distinguish two effects. On the one hand, the number of non-migrating households (and, therefore, the aggregate flow of migrants) will change; on the other, the flow of migrants toward region D will be affected as well. The two effects are captured respectively by the first and the second integral in equation *(12)*. The negative sign of the derivative follows from the definitions of the threshold for the fixed cost of moving abroad in equation (10), and recalling that: $g(.)=n(\mu_F-\mu_D)-na\alpha\sigma(\rho_F-\rho_D)$.

The second part of Proposition 1 concerns the positive effect of the change in the correlation of incomes at home and at an outside destination on the number of migrants to a third alternative destination. It follows from the same line of reasoning as above.

3. Proof of Proposition 2

Proposition 2 (Variability of home incomes and migration)

A rise of home income variability has, in general, an ambiguous effect on total migration as well as migration to any destination *i*. However, the following two sufficient conditions hold: (i) if either ρ_D and ρ_F are both negative or if $\alpha=\sigma$, then higher income variability at home results in higher total migration; (ii) if $\rho_i<0$ and $\rho_i<\rho_j$, with $j\neq i$, then income variability at home results in a rise of migration to destination *i*.

Proof.

Proposition 2 concerns total migration as well as migration to a specific destination *i*. The effect of a change in α on total migration is equal to the negative of the partial derivative of M_w, as defined in equation (11), with respect to α:

$$\frac{\partial M_w}{\partial \alpha} = -\left[\int_{\bar{f}_F}^{+\infty} \phi(\bar{f}_D, f_F)\, d f_F \frac{\partial \bar{f}_D}{\partial \alpha} + \int_{\bar{f}_D}^{+\infty} \phi(f_D, \bar{f}_F)\, d f_D \frac{\partial \bar{f}_F}{\partial \alpha} \right] \qquad \text{(A.1)}$$

In turn, the derivative of the threshold *i* (*i=D,F*) with respect to α is equal to: $- a\cdot[\sigma\rho_i-\alpha(1+n)]$.. It is then clear that (A.1) can take any sign, depending on how the increase in home income variability affects the two thresholds and on the values of the density function at the derivative points. However, two sufficient conditions for higher variability to result in higher total migration can be stated. If both ρ_D and ρ_F are less than zero, then (A.1) is always negative, i.e. migration is higher the higher variability of income at home. The same holds when $\alpha=\sigma$, that is when variability of income is the same inside and outside the region of origin.

Calculating the effect of a change in α on migration to a specific destination *i* proceeds along the same lines. E.g. evaluate the derivative of M_F (as defined in equation (12)) with respect to α:

$$\frac{\partial M_F}{\partial \alpha} = \int_{\bar{f}_F - g(.)}^{+\infty} \phi(f_D, \bar{f}_F)\, d f_D \frac{\partial \bar{f}_F}{\partial \alpha} - \int_0^{\bar{f}_F} \phi[f_F - g(.), f_F] \frac{\partial [f_F - g(.)]}{\partial \alpha} d f_F \qquad \text{(A.2)}$$

Equation (A.2) is the sum of two terms. The first term is positive as long the derivative of the threshold for destination F with respect to α is positive, i.e. if $[\sigma\rho_i - \alpha(1+n)]<0$. Sufficient conditions for this inequality to hold is that $\rho_i<0$. This term captures the increase in the number of migrants to destination F brought about by the change in the threshold. At the same time, however, the rise in α is associated to some substitution between locations D and F, depending on income correlations. This is captured by the second term in (A.2), which is positive if: $an\sigma(\rho_F-\rho_D)<0$, i.e. if $\rho_F<\rho_D$. Thus here is the last part of Proposition 2. Sufficient conditions for variability of income at home to be positively related to migration to say region F is that both conditions are satisfied: $\rho_F<0$ and $\rho_F<\rho_D$.

Table 1

Migrations from the regions of Southern Italy and their determinants

Sample means, 1970-1989

	DMIG	FMIG	WAGE	U	ρ_D	ρ_F	SHAG	SHC	HK	AGE	CV
South Italy	**1.00**	**0.17**	**17.0**	**0.11**	**0.84**	**0.84**	**0.26**	**0.11**	**42.6**	**23.6**	**0.51**
Abruzzo	**0.82**	**0.21**	**17.2**	**0.08**	**0.97**	**0.96**	**0.23**	**0.10**	**49.0**	**22.1**	**0.60**
Molise	**1.21**	**0.24**	**16.0**	**0.09**	**0.90**	**0.89**	**0.34**	**0.11**	**45.5**	**22.1**	**0.60**
Campania	**0.77**	**0.10**	**17.7**	**0.12**	**0.90**	**0.87**	**0.21**	**0.09**	**42.1**	**24.6**	**0.44**
Puglia	**0.86**	**0.19**	**17.6**	**0.09**	**0.88**	**0.90**	**0.25**	**0.09**	**39.4**	**23.3**	**0.49**
Basilicata	**1.51**	**0.14**	**15.9**	**0.11**	**0.63**	**0.67**	**0.34**	**0.14**	**41.8**	**23.6**	**0.58**
Calabria	**1.27**	**0.16**	**15.1**	**0.13**	**0.81**	**0.76**	**0.31**	**0.14**	**42.2**	**24.6**	**0.44**
Sicilia	**0.81**	**0.25**	**16.8**	**0.11**	**0.90**	**0.82**	**0.21**	**0.12**	**40.6**	**23.5**	**0.48**
Sardegna	**0.80**	**0.10**	**19.5**	**0.13**	**0.74**	**0.79**	**0.18**	**0.11**	**40.5**	**24.8**	**0.44**

Notes

DMIG = gross rate of emigration from Southern Italy to Northern Italy
FMIG = gross rate of emigration abroad from Southern Italy
WAGE = labor income per employee (1985 prices)
U = unemployment rate
ρ_D = coefficient of correlation between per capita incomes in each region and Northern Italy
ρ_F = coefficient of correlation between per capita incomes in each region and Germany
SHAG = share of agricultural employment in total employment
SHC = share of construction employment in total employment
HK = five-year lagged secondary enrolment ratio
AGE = share of population with age between 15 and 29
CV = coefficient of variation of regional GDP

Primary source: ISTAT, Compendio Statistico Italiano

Table 2

Migrations from the regions of Southern Italy and their determinants

Sub-period means

(a) **1970-1979**

	DMIG	FMIG	WAGE	U	ρ_D	ρ_F	SHAG	SHC	HK	AGE	CV
South Italy	**1.24**	**0.24**	**14.5**	**0.07**	**0.93**	**0.90**	**0.31**	**0.12**	**36.9**	**22.7**	**0.61**
Abruzzo	**1.01**	**0.31**	**14.8**	**0.06**	**0.97**	**0.96**	**0.28**	**0.11**	**42.5**	**21.3**	**0.78**
Molise	**1.44**	**0.35**	**13.1**	**0.05**	**0.95**	**0.92**	**0.42**	**0.11**	**39.9**	**21.3**	**0.64**
Campania	**0.99**	**0.13**	**15.1**	**0.07**	**0.97**	**0.94**	**0.24**	**0.10**	**36.5**	**23.5**	**0.52**
Puglia	**1.05**	**0.25**	**15.9**	**0.06**	**0.95**	**0.92**	**0.33**	**0.09**	**34.6**	**23.3**	**0.56**
Basilicata	**1.92**	**0.19**	**12.6**	**0.07**	**0.87**	**0.86**	**0.40**	**0.14**	**34.2**	**22.7**	**0.66**
Calabria	**1.54**	**0.24**	**12.9**	**0.09**	**0.86**	**0.82**	**0.35**	**0.16**	**36.4**	**23.6**	**0.54**
Sicilia	**1.00**	**0.31**	**14.3**	**0.06**	**0.95**	**0.90**	**0.26**	**0.13**	**35.6**	**22.5**	**0.63**
Sardegna	**0.99**	**0.13**	**17.2**	**0.07**	**0.94**	**0.91**	**0.22**	**0.12**	**35.4**	**23.8**	**0.59**

(2b) **1980-1989**

	DMIG	FMIG	WAGE	U	ρ_D	ρ_F	SHAG	SHC	HK	AGE	CV
South Italy	**0.77**	**0.11**	**19.5**	**0.15**	**0.75**	**0.78**	**0.21**	**0.11**	**48.4**	**24.4**	**0.40**
Abruzzo	**0.64**	**0.11**	**19.6**	**0.10**	**0.97**	**0.95**	**0.18**	**0.09**	**55.5**	**23.0**	**0.42**
Molise	**0.98**	**0.12**	**18.9**	**0.11**	**0.85**	**0.85**	**0.26**	**0.11**	**51.1**	**23.0**	**0.56**
Campania	**0.55**	**0.06**	**20.3**	**0.17**	**0.84**	**0.81**	**0.18**	**0.09**	**47.7**	**25.7**	**0.35**
Puglia	**0.67**	**0.13**	**19.2**	**0.13**	**0.81**	**0.89**	**0.17**	**0.09**	**44.2**	**23.2**	**0.42**
Basilicata	**1.10**	**0.09**	**19.3**	**0.16**	**0.39**	**0.48**	**0.28**	**0.14**	**49.4**	**24.6**	**0.49**
Calabria	**0.99**	**0.08**	**17.3**	**0.18**	**0.76**	**0.70**	**0.27**	**0.12**	**48.0**	**25.6**	**0.34**
Sicilia	**0.62**	**0.19**	**19.2**	**0.16**	**0.86**	**0.88**	**0.19**	**0.12**	**45.6**	**24.5**	**0.33**
Sardegna	**0.60**	**0.07**	**21.9**	**0.19**	**0.54**	**0.67**	**0.15**	**0.11**	**45.6**	**25.8**	**0.29**

Notes

DMIG = gross rate of emigration from Southern Italy to Northern Italy
FMIG = gross rate of emigration abraod from Southern Italy
WAGE = labor income per employee (1985 prices)
U = unemployment rate
ρ_D = coefficient of correlation between per capita incomes in each region and Northern Italy

ρ_F = coefficient of correlation between per capita incomes in each region and Germany
SHAG = share of agricultural employment in total employment
SHC = share of construction employment in total employment
HK = five-year lagged secondary enrolment ratio
AGE = share of population with age between 15 and 29
CV = coefficient of variation of regional GDP

Primary source: ISTAT, Compendio Statistico Italiano

Table 3

Migrations from Southern Italy and their determinants

Pairwise correlations, 1970-89

	DMIG	FMIG	WAGE	U	ρ_D	ρ_F	SHAG	SHC	HK	AGE	CV
DMIG	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
FMIG	**0.41**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
WAGE	**-0.84**	**-0.58**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
U	**-0.52**	**-0.40**	**0.75**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
ρ_D	**0.09**	**0.18**	**-0.22**	**-0.36**	**1**	**-**	**-**	**-**	**-**	**-**	**-**
ρ_F	**0.06**	**0.19**	**-0.16**	**-0.32**	**0.93**	**1**	**-**	**-**	**-**	**-**	**-**
SHAG	**0.88**	**0.45**	**-0.81**	**-0.56**	**0.11**	**0.05**	**1**	**-**	**-**	**-**	**-**
SHC	**0.65**	**0.19**	**-0.53**	**-0.23**	**-0.15**	**-0.18**	**0.50**	**1**	**-**	**-**	**-**
HK	**-0.66**	**-0.54**	**0.80**	**0.62**	**-0.22**	**-0.21**	**-0.55**	**-0.41**	**1**	**-**	**-**
AGE	**-0.36**	**-0.33**	**0.49**	**0.59**	**-0.21**	**-0.22**	**-0.40**	**-0.14**	**0.30**	**1**	**-**
CV	**0.57**	**0.46**	**-0.62**	**-0.57**	**0.39**	**0.42**	**0.51**	**0.28**	**-0.56**	**-0.39**	**1**

Notes

DMIG = gross rate of emigration from Southern Italy to Northern Italy
FMIG = gross rate of emigration abroad from Southern Italy
WAGE = labor income per employee (1985 prices)
U = unemployment rate
ρ_D = coefficient of correlation between per capita incomes in each region and Northern Italy
ρ_F = coefficient of correlation between per capita incomes in each region and Germany
SHAG = share of agricultural employment in total employment
SHC = share of construction employment in total employment
HK = five-year lagged secondary enrolment ratio
AGE = share of population with age between 15 and 29
CV = coefficient of variation of regional GDP

Primary source: ISTAT, Compendio Statistico Italiano

Table 4

The determinants of domestic migrations (1970-1989, *8* Southern Italian regions)

Dependent variable: gross domestic migration rate[1]

	(1)	(2)	(3)	(4)	(5)
	Stacked-IV[2]	Stacked-IV[3]	SURE-IV	SURE	SURE-IV
ln WAGE	**-1.11**	**-0.77**	**-0.59**	**-0.043**	**-0.65**
	(5.01)	**(3.57)**	**(8.62)**	**(10.16)**	**(10.09)**
ρ_F	**0.17**	**0.22**	**0.22**	**0.10**	**0.16**
	(1.59)	**(1.98)**	**(5.74)**	**(6.30)**	**(5.70)**
ρ_D	**-0.10**	**-0.14**	**-0.13**	**-0.022**	**-0.08**
	(1.02)	**(1.33)**	**(5.84)**	**(2.78)**	**(4.66)**
α	**-0.01**	**-0.008**	**-0.005**	**0.005**	**-0.005**
	(1.72)	**(1.66)**	**(1.77)**	**(3.05)**	**(1.57)**
ln (1-U)	**-0.026**	**-0.33**	**-0.17**	**-0.11**	**-0.44**
	(0.06)	**(0.94)**	**(1.43)**	**(1.06)**	**(3.32)**
SHAG	**0.078**	**-0.32**	**0.12**	**0.40**	**--**
	(0.16)	**(0.83)**	**(0.59)**	**(2.55)**	
SHC	**-1.12**	**-2.6**	**-1.42**	**0.16**	**--**
	(0.77)	**(1.96)**	**(2.76)**	**(0.40)**	
HK	**-0.016**	**-0.028**	**-0.025**	**-0.015**	**-0.023**
	(1.57)	**(2.95)**	**(8.46)**	**(5.91)**	**(7.43)**
AGE	**0.0031**	**0.007**	**0.0014**	**0.0012**	**0.0025**
	(0.83)	**(0.50)**	**(3.57)**	**(4.16)**	**(6.89)**
Adj. R	**0.96**	**0.95**	**n.a.**	**n.a.**	**n.a.**
Hausman test ($\chi^2(4)$)	**11.75**	**-**	**4.22**		

Legenda

The migration rate is computed as the ratio between the gross number of migrants to domestic destinations and population at home. The parameter ρ_F (ρ_D) is the correlation coefficient between incomes at home and at foreign (domestic) destinations. The parameter α is the coefficient of variation of home income. *u* is the unemployment rate at home.

Notes

[1] Regional and time fixed effects are not reported. T-statistics in parentheses.

[2] Full time effects: yearly time dummies

[3] Restricted time effects: period time dummies (1971-73, 1974-76, 1977-1979, 1980-83, 1984-1989)

- **Table 5**

The determinants of international migrations (1970-1989, *8* Southern Italian regions)

Dependent variable: gross international migration rate[1]

	(1)	(2)	(3)	(4)
	Stacked-IV[2]	Stacked-IV[3]	SURE-IV	SURE-IV
ln WAGE	**-0.22**	**-0.24**	**-0.08**	**-0.054**
	(2.22)	**(2.61)**	**(2.57)**	**(1.21)**
ρ_F	**-0.015**	**-0.031**	**-0.042**	**-0.037**
	(0.49)	**(0.86)**	**(2.91)**	**(1.97)**
ρ_D	**-0.025**	**-0.12**	**0.0088**	**-0.002**
	(0.96)	**(0.49)**	**(0.76)**	**(0.16)**
α	**0.007**	**0.009**	**0.008**	**0.007**
	(2.59)	**(4.26)**	**(8.31)**	**(4.40)**
ln (1-U)	**0.12**	**-0.003**	**-0.09**	**-0.066**
	(0.65)	**(0.02)**	**(1.08)**	**(0.72)**
SHAG	**0.79**	**0.66**	**0.39**	**--**
	(3.63)	**(3.37)**	**(4.50)**	
SHC	**1.51**	**0.61**	**1.11**	**--**
	(2.26)	**(1.06)**	**(4.23)**	
HK	**0.0042**	**0.0052**	**0.0027**	**-0.001**
	(0.91)	**(1.30)**	**(1.43)**	**(0.46)**
AGE	**0.00041**	**-0.0006**	**-0.00004**	**-0.0009**
	(0.54)	**(1.19)**	**(0.17)**	**(2.82)**
Adj. R	**0.74**	**0.68**	**n.a.**	**n.a.**
Hausman test ($\chi^2(4)$)	**11.99**	**-**	**23.30**	

Legenda
The migration rate is computed as the ratio between the gross number of migrants to international destinations and population at home. The parameter ρ_F (ρ_D) is the correlation coefficient between incomes at home and at foreign (domestic) destinations. The parameter α is the coefficient of variation of home income. *u* is the unemployment rate at home.
Notes
[1] Regional and time fixed effects are not reported. T-statistics in parentheses. [2] Full time effects: yearly time dummies. [3] Restricted time effects: period time dummies (1971-73, 1974-76, 1977-1979, 1980-83, 1984-1989)

Table 6

Income and risk effects on migration[1]

	International migration	Domestic migration
ρ_D	**1,346937**	**-3,546378**
ρ_F	**-5,502666**	**5,101175**
α	**10,48681**	**-1,209916**
ln w	**-10,51378**	**-13,07537**

[1] proportional impact on migration of a one standard deviation variation of the exogenous variable

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Endnotes

[1] See Stark (1991) for a collection of the main contributions to this strand of literature.

[2] Relative deprivation describes a situation in which agents are concerned about their relative social status. In this case, migration may improve their social rankings at home. Under asymmetric information, low productivity workers may decide to migrate if employers in the receiving areas are uninformed about individual workers' productivity and are therefore willing to pay each worker his average group productivity rather than his unknown marginal productivity.

[3] Hughes and McCormick (1994) focus on the choice among multiple destinations but do not consider risk factors.

[4] The idea that mobility costs are decreasing in the stock of migrants goes back to Myrdal (1944) and has recently been reappraised by Carrington, Detragiache and Vishwanath (1996), where a list of previous sociological and historical studies supportive of this idea is also quoted.

[5] Strategic and distributional issues which may arise within the family were analyzed in an important paper by Mincer (1978), but are not dealt with here.

[6] Alternatively, y can be taken to represent the income of those household members (not included in n) which, say for health or age reasons, will not migrate under any circumstances.

[7] The assumption of identical variances across locations can be relaxed. This would add some algebra with no further insights.

[8] While we assume that the mobility cost function is the same for the two destination regions (so that $c_i(.)=c(.)$ for any i), our argument does not crucially hinge on this assumption.

[9] The twofold (partly exogenous and partly policy-determined) nature of mobility costs is further discussed in Daveri and Panunzi (1996), where the effects of mobility costs on the relative desirability of decentralization *vs.* centralization in addressing soft budget constraint problems are investigated.

[10] In deriving equations (4) and (5), the term in brackets is computed as the sum of variance and covariance terms among $n+1$ random variables, n of which (the incomes of those living in the same location) are identical. This implies that the incomes of household members living in the same location are perfectly correlated.

[11] The expression f_F–$g(.)$ obtains after a little of manipulation of the weak inequality: $EU(Y_F)\geq EU(Y_D)$.

[12] While our results hold for any distribution of the taste parameters (we have not committed ourselves to any specific functional distributions), two polar cases can be examined, depending on how the taste parameters f_i are distributed in the population. First consider a uniform distribution of the f's. If this is the case, economic incentives, which determine the position of the threshold in the figure, smoothly operate. In the face of changes in means or correlations of incomes in different locations, taste thresholds change and more people which were borderline between moving and staying or moving to region D or F may revert their previous choices of location. But this occurs gradually. Now suppose that the population is split into two groups of households, those willing to move under any circumstances and those reluctant to move at all. When taste parameters exhibit such a discrete bimodal distribution, economic incentives may not work at all or work all of a sudden, depending on initial circumstances and on how far the two groups of families are distributed in the 'taste plane'. We conjecture that the more polarized tastes for migration are within a given population, the more migration, whenever it occurs, will take place through waves (in an '*exodus*'-like fashion) rather than by orderly flows in and out the region of origin.

[13] This is not always true, as we shall argue later.

[14] We pick Germany as a proxy for foreign destinations. Germany has been the main destination of Southern emigrants since the end of the World War II, and this tendency reinforced throughout our period of analysis. During 1970-89, the share of people migrating to Germany over those migrating abroad went up from 26% in 1970-74 to 39% in 1975-79 and 45% in the eighties. (In 1989, the US was still the second most important country of destination for Southern emigrants, but with a much smaller share (roughly equal to 13%) than Germany.) And this does not just reflect the increased appeal of Europe as a destination *vis-à-vis* the US, Australia and Canada. In fact, the share of migrants to Germany over total emigrants to Europe rose from 42% in 1970-74 to some 55% in 1985-1989. Moreover, Germany's income is highly correlated with income in other European destination countries (Eichengreen, 1992). Then, taking Germany as a proxy for foreign emigration flows from the South of Italy appears just natural to us.

[15] The shares of both agricultural and construction employment could be interpreted as indirectly capturing some additional long-run and short-run components of income riskiness. Yet both variables are likely used by prospective migrants to evaluate their future *average* incomes. Then, since we directly measure risk by computing variances and correlation coefficients, we are inclined to see employment shares as useful control variables, which may, but need not, provide some information on the issues we are exploring. As shown below, our results do not generally depend on the inclusion of these variables.

[16] This holds even if the employment rate is given a higher weight in computing the expected value, and in particular holds for a weight equal to 1.5, the same as in Hatton (1995).

[17] SURE estimates would break down if we used yearly time dummies since the number of explanatory variables in each equation would be larger than the number of observations.

[18] We use as instruments the lagged values of wages, employment rate, shares of agriculture and construction, and risk indicators.

[19] The relevant values of the tests are $\chi^2(7)=150.8$ and $\chi^2(16)=30.0$ for regional and time dummies respectively.

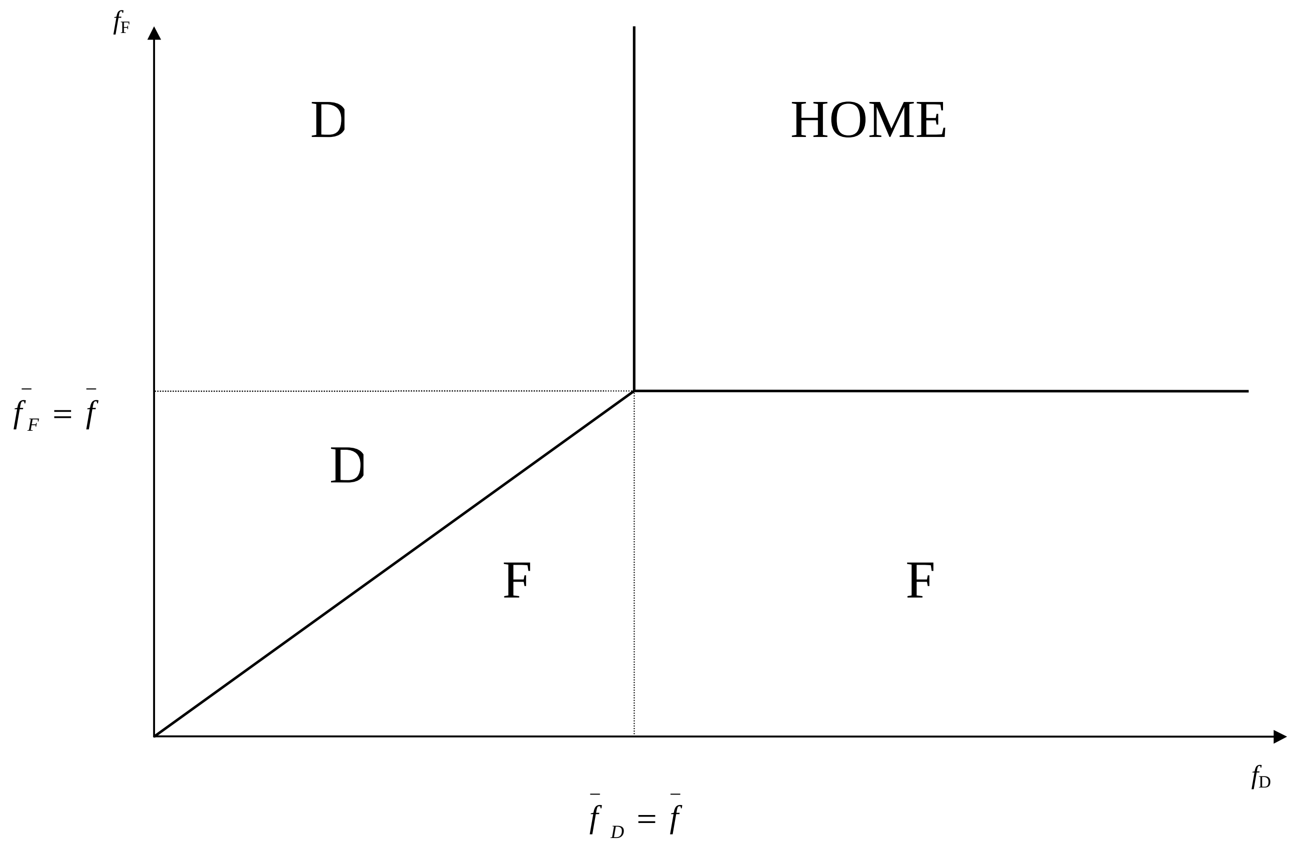
[20] We do not report the estimates where this constraint is imposed. The coefficient on the (expected) wage is highly significant and all other coefficients are virtually unchanged.

[21] Recall that the power of the Hausman test can sometimes be quite low. The test will then fail to reject the null hypothesis of exogeneity even if it is false. See Holly (1982).

[22] The Gallant-Jorgenson tests for the inclusion of regional and time dummies are $\chi^2(7)=121.3$ and $\chi^2(16)=58.5$ respectively.

[23] We do not report the estimates where this restriction is imposed.

Figure 1
Migration equilibrium



$g(.) = 0$

$\bar{f} = \bar{f}_D = \bar{f}_F$

Figure 2
Effect of a rise in ρ_D