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Abstract

As part of their efforts to pool individual risks, households consider spreading their members over a multiplicity of locations both within their country of origin and abroad. At the same time, the world has innumerable Chinatowns and Little Italies: when people move they tend to bunch in the same location. Bunching would appear to be fundamentally at odds with the desire for risk diversification. In this paper we provide a framework to reconcile spatial bunching and spreading of migrants, combining risk-aversion and concavity of mobility costs at the household level. Evidence from Southern Italy is consistent with the main predictions from our model.

Contents

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1. Introduction *

As part of their efforts of pooling individual risks, households consider spreading their members over a plurality of locations, both inside and outside their country of origin. At the same time, the world is ridden with Chinatowns and Little Italies: people, whenever they move, tend to bunch in the same location. Bunching would appear fundamentally at odds with the desire of risk diversification. In this paper we provide a framework to reconcile both spatial bunching and spreading of migrants, combining risk-aversion and concavity of mobility costs at the household level.

Much of previous 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. This allows us to investigate the conditions under which 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 new migration literature[1]. The general argument is that, if returns in different locations are less than perfectly correlated, households could indeed reduce total income risk by having some of their working members sent to different locations. Migration may then take place even in the absence of significant wage and unemployment differentials. Yet findings from this strand of literature can hardly replicate the observed strong tendency for migrants to spatially concentrate.

To discuss these issues in a unified framework, our model builds on the portfolio approach to the determination of the optimal demand for children developed by Appelbaum and Katz (1991) with three main innovations. First, we allow for non-zero correlation between incomes earned in different locations, which gives us room to study migration for risk diversification purposes. Second, we allow for concave mobility costs at the household level - an assumption which we find more palatable than

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[1] In the *new* migration literature, migration may come as a response to relative deprivation (if agents are concerned about their relative social status and can improve though migration their social rankings at home) or be the result of asymmetric information (low productivity workers may decide to migrate if employers in the receiving area are uninformed about individual workers' productivity and are therefore willing to pay each worker his average group productivity rather than his unknown marginal productivity). Finally, and most closely related to our paper, migration can be seen as an opportunity to diversify risk for the family. See Stark (1991) for a collection of the main contributions to this strand of literature.

convexity. 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.

If households are not too risk-averse, concavity of mobility costs drives all members of the same family to migrate to the same place or not to migrate at all. This is the bunching part of our story. At the same time, taste heterogeneity causes some migration from the community of origin to occur anyway towards any destinations. Then our answer to the initial puzzle is 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.

Some of the comparative statics predictions of our model lend themselves to empirical analysis using macro data. Based on our model, we expect the choice between moving abroad or moving to a domestic destination to be significantly affected, after controlling for income differentials, by risk considerations. In particular, if the correlation between incomes earned at home and at a potential alternative destination goes up, this should *(i)* discourage overall migration, as well as *(ii)* divert migration flows from that specific destination to a potential alternative.

This argument has some obvious implications for the choice between internal and international migrations. If the domestic economy is poorly diversified, the various sectors in the economy are likely to covary positively. Therefore, rural-urban migrations will be, *coeteris paribus*, an ineffective manner to diversify risk. In such circumstances, we would expect to see the pattern of migrations biased toward foreign destinations, even if the latter entails relatively higher migration costs. Conversely, if the domestic economy is sectorally and regionally diversified, agents will have fewer incentives to migrate abroad.

While past empirical work (e.g. Greenwood, 1981) has convincingly argued that both wage and expected employment opportunities are crucial factors in shaping the behavior of potential migrants, the empirical evidence on the relation between risk and migration is, instead, limited[2]. Overall, whereas it is widely recognized that risk considerations are likely to play a major role in affecting migrations, empirical evidence on these issues is still scant. As a contribution to widen the scope of empirical research in this field, we exploit and test for these implications using data from Southern Italian regions. While restricting our attention to Southern Italy only was mainly dictated by constraints on data availability on regional flows of emigrants to foreign and domestic destinations, our choice can be defended at least under one respect. Until very recently, the poor working of

[2] While Townsend (1993) uses the medieval village to test for the effects of a number of risk-related factors in closed rural contexts, no regard is given to labor movements in his book. Rosenzweig and Stark (1989) find 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.

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). Concentrating on migrations as a way to diversify risk appears then particularly appropriate just in regions like those of Southern Italy.

Our empirical results show that risk is a significant determinant of migration decisions, which is consistent with the main tenets of our model. After controlling for domestic wage and unemployment rates - which capture the usual Harris-Todaro effects - 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, while the opposite occurs when the correlation of Southern and Northern Italy's incomes goes up.

The paper is organized as follows. In the next section, we discuss a simple model where both expected income differentials and risk considerations play a crucial role in the migration decision and the migrant is presented with a plurality of possible destinations. In section *3*, the comparative statics of the model is spelled out so as to produce empirically verifiable predictions. In section *4*, we present some empirical evidence concerning Southern Italian regions. Section *5* concludes the paper.

2. A model of risk, mobility costs and migration

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[3]:

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

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, either randomly determined or certain, sources. Irrespective of locational decisions, the household is assumed to earn y, the return on non-tradable assets[4]. The variable y is randomly distributed, with mean μ and standard deviation equal to α:

$$y = \mu + \alpha e \tag{2}$$

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

Each non-migrating household member is assumed to earn the certain wage w at home. Migrants' incomes are instead assumed to be stochastic with mean μ_i, depending on their place of destination ($i= D,F$), and standard deviation equal to σ [5]:

$$y_i = \mu_i + \sigma\eta_i, \qquad i=D,F \tag{3}$$

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

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[3] Strategic and distributional issues which may arise within the family are not dealt with here.

[4] 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.

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

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 fixed and idiosyncratic to each household and destination.

The variable part of mobility costs is described by the function $c(n_i)$, with $c'(n_i)>0$, $c''(n_i)<0$ [6]. 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[7]. All of these features are compatible with the idea of concave mobility costs at the household level.

Mobility costs also include a fixed part $f_i(h)$ $(i=D,F)$, independent of the number of migrants, but indexed to both destination i and household h. Under these assumptions and 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 household members either remain home or migrate to a single destination outside their place of origin, so that $n_i=n$ for any destination.

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

$$Y_w = nw+\mu+\alpha e \tag{4}$$

$$Y_i = \mu+n\mu_i-c(n)-f_i+\left[\alpha^2+n(n\sigma^2+2\alpha\sigma\rho_i)\right]^{(1/2)}\epsilon \qquad i=D,F \tag{5}$$

where ϵ is a standard normal variable and Y_w, Y_D and Y_F represent family incomes when, respectively, nobody moves, everybody moves to location D, everybody moves to location F [8]. The actual household choice involves comparing expected utilities at home and at the two alternative destinations

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[6] 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.

[7] 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.

[8] In deriving equation (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 migrating to the same location) are identical. This implies that the incomes of household members migrating to the same location are perfectly correlated.

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:

$$U(Y) = -\exp(-aY) \tag{6}$$

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

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

and:

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

Then, from (7) and (8), we can conclude that the generic household h will not migrate if and only if the two following conditions hold:

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

and:

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

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. Inequalities (9) and (10) define two critical values of f_D and f_F ($\bar{f}_D$ and $\bar{f}_F$), which can be exploited to conclude that the equilibrium number of non-migrating household members (M_w) is equal to:

$$M_w = \int_{\overline{f_D}}^{+\infty}\left[\int_{\overline{f_F}}^{+\infty}\phi(f_D,f_F)\ df_F\right]df_D \tag{11}$$

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

$$M_F = \int_0^{\bar{f}_F} \left[\int_{f_F - g(.)}^{+\infty} \phi(f_D, f_F) \; df_D \right] df_F \qquad (12)$$

where $g(.) = n\ (\mu_F - \mu_D) - n\ a\ \alpha\ \sigma\ (\rho_F - \rho_D)$[9]. People migrating to F share two features. They must be characterized by 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 thresholds $\bar{f}_D$ and $\bar{f}_F$ delimit three regions in the (f_D, f_F) plane in figure *1*, which is drawn for the comfortably special case of $g(.)=0$. In order to ease the reading of the figure, point E is conveniently identified at the centre of the figure as the crossing point of the two thresholds. Those households characterized by excessively 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.

While our results hold for any distribution of the taste parameters (we have not committed ourselves to any specific functional distributions), it is anyway instructive to briefly investigate how varying degrees of differentiation within a given community tend to influence the extent of migration flows. Two polar cases can be distinguished, depending on how the taste parameters f_i are distributed in the population.

The first case is the one of uniformly distributed 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 end up possibly reverting their previous choices of location. But this occurs gradually.

The other polar case is one of a population split into two groups of households, those willing to move under any circumstances and those reluctant to move at all. If taste parameters exhibit a discrete bimodal distribution of this sort, then 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.

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

3. Comparative statics

Now we derive some comparative statics results on the effects of changes in the risk parameters (α, σ, ρ_i) on migration choices. Consider first the impact of a change in ρ_F on M_F:

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

$$-\int_0^{\bar{f}_F} \phi[f_F - g(.), f_F] \frac{\partial [f_F - g(.)]}{\partial \rho_F} df_F \tag{12}$$

From equation *(12)*, we can distinguish two effects of a change in ρ_F on migrations toward region F. 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)*. We label the first term the *gross migration* effect and the second term the *substitution* effect. The overall sign of equation *(12)* can be easily determined. Recalling the expression for *g(.)* and the fact that $\bar{f}_F = n \cdot \mu_F - c(n) - (a/2) \cdot [n\ \sigma^2 + 2\ \alpha\ \sigma\ \rho_F]$, we can easily check that $\partial M_F / \partial \rho_F < 0$. In words, an increase in the correlation coefficient between home incomes and earnings at a given destination will lead to a drop in migrations to that region. This is a fairly intuitive result. The rise in ρ_F means that migrating to region *F* becomes 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*. Both gross migration and substitution effects work toward a reduction in the flow of migrants toward *F*.

Now turn to the impact of a change in ρ_D on M_F. Following the same steps as in equation *(12)*, we can show that:

$$\frac{\partial M_F}{\partial \rho_D} > 0 \tag{13}$$

namely a rise in the correlation coefficient between home income and earnings in a given destination region will increase migrations to the other receiving area. 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). Finally, consider the effect of an increase in home riskiness, as measured by α, i.e. the standard deviation of y. If ρ_F is negative, a higher α will lead to more migrations on the account of the gross migration effect. The increase in home riskiness makes households more keen to find ways to diversify risk: migration to region F, where earnings are negatively correlated to home income, is effective in order to achieve this goal. Moreover, if $\rho_F < \rho_D$, region F will become an even more attractive destination with respect to region D. The substitution effect will also work toward an increase in migrations to F. In general, though, the impact of α on migrations to any region will be ambiguous and will depend on the signs and the relative values of the correlation coefficients.

The remaining comparative statics properties of this model are fairly standard. An increase in μ_F will foster migrations toward region F, while an increase in μ_D will reduce them. Conversely, a higher value of home wages will discourage migrations to all destinations. Finally, our set-up does not allow us to sign the effect of enhanced riskiness of earnings abroad. Given that $\sigma_F = \sigma_D = \sigma$, a rise in σ discourages migrations by making foreign income more risky, but also elicits a positive substitution effect where (provided that $\rho_F < \rho_D$) migrations to region F may become more attractive relative to region D.

In the next section, we will test this set of predictions using regional data for Southern Italy throughout the 1970-1989 period.

4. Migration and risk diversification: empirical evidence from Southern Italy

4.1 The Southern Italian case

The Italian Mezzogiorno provides a case for testing the predictions of a migration model. For many decades, the Mezzogiorno has been a steady source of migrants both towards foreign destinations and other Italian regions. Moreover, the composition of Southern Italian migrations has undergone some radical modifications over time. Initially, in the early fifties, Mezzogiorno migrants headed predominantly toward overseas and European destinations. The end of the fifties witnessed a radical shift in the migrants' choice, with Northern Italian destinations accounting for an increasingly larger share of the flow of Mezzogiorno's migrants. From Table 1, we see how the share of Mezzogiorno migrants moving to the North increased from about 36% in 1960 to roughly 66% in 1973. However, the pattern reverses itself in more recent years, with foreign (particularly European) destinations playing a steadily increasing role.

Overall, this fluctuating pattern appears to be consistent with the main predictions of our risk-diversification model. In the early fifties, Northern Italy was still a relatively backward area, at least compared to other European destinations. Its industrial sector was somehow undeveloped and the region offered scarce opportunities to potential migrants whose households were seeking to diversify their sources of employment and limit their exposure to risk as means to bettering their life prospects. Matters became somewhat different during the sixties. Rapid industrial growth in Northern Italy not only provided rural migrants from the Mezzogiorno with higher expected income prospects, but also with new ways to diversify agricultural risk. There is indeed some evidence that Mezzogiorno migrants to the North were mostly of rural origin.

Finally, the seventies were a period of rapid industrial growth in the Mezzogiorno as well. Structural differences between Northern and Southern Italy declined; incomes in the two areas tended to covary more closely. Under these circumstances, migrations to foreign destinations appeared once again as an effective way to lessen risk exposure. This remark is reinforced by the evidence recently provided by Helg, Manasse, Monacelli and Rovelli (1995) that sectoral outputs in Europe tend to be highly correlated within a nation, but that the behavior of the same sectors across nations shows little syncronization. In other words, shocks tend to be *nation*- rather than *sector-specific*.

4.2 The data

Data availability constrained our empirical exercise to be focussed on the most recent periods - the seventies and the eighties. This sub-section reports the sample means and pairwise correlations on gross emigration flows abroad, *per-capita* labor incomes, unemployment rates and, finally, risk indicators - our main focus here. All of these variables will be used in the estimated regressions in the next sub-section.

Southern Italy is made of eight regions (Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna). Between 1970 and 1989, an yearly average of about *0.17%* of total population left the South of Italy as a whole to foreign destinations - a figure of a much lower order of magnitude than previous secular data on Italy as a whole.

The downward trend in migration flows is further confirmed when disaggregating migrations over time, even within our period of analysis: migrations amounted to some *0.24%* of total population in the seventies while falling to a bare *0.11%* in the eighties.

Based on figures in table *2*, one can easily find out that expected *per-capita* labor income at home (computed as the product of average labor income per employee and the employment rate) has gone up in the eighties in the South. In line with the implications of the Harris-Todaro model, the rise in regional labor income per employee discourages migrations. This provides a first-hand candidate to account for the fall in emigration flows in the eighties.

A-priori ambiguous implications emerge instead from pairwise correlations on risk indicators.

Both coefficients of correlation of incomes have gone down over time - the domestic coefficient of correlation more sharply so. Certainly (see table *4*), the two coefficients are both very similar in size and tend to move together over time. This merely signals the well-known fact that incomes in the North of Italy tend to positively covary with German incomes. However, the observed decline in the average domestic correlation coefficient (from *0.93* to *0.75*) is consistent with the reduction in actual foreign emigration flows. According to our model, risk-averse migrants are expected to react to a diminished correlation of South-North incomes by switching from foreign to domestic destinations. However, by the same token, the decline in the correlation coefficient of Southern incomes with the German ones (from *0.90* to *0.78*) would be supposed to strengthen the incentives to search for risk diversification outside the borders of Italy. Unlike actual observations, a rise - rather than a fall - in foreign emigrations over time would be predicted. Then, a first sight at aggregate data leaves us with conflicting evidence as to risk indicators.

In the cross-section (see table *3*), Basilicata and Calabria appear as the most likely candidates for being migration-prone countries. These regions exhibit the lowest per-capita incomes, the highest unemployments rates, the highest share of construction employment and the lowest value for the coefficient of domestic correlation in the sample. People from Calabria and Basilicata should massively move abroad for a bunch of different - but all sound - reasons. Instead, the flows of migrants from Basilicata and Calabria is very close or slightly below the sample average. One possibility is that most people from these two poor regions cannot afford moving away from their place of origin or only afford moving to the closest destination. The most foreign-migration-prone region is Sicilia: yet the share of Sicilian migrants is too large, compared to the flow of migrants from, say, Campania, to be explained by the reported income gap. Instead, the presence of, respectively, high and low values of the coefficients of correlation with domestic and foreign incomes is consistent with the observed pattern of migrations.

4.3 Econometric estimation and results

The analysis in the previous section suggests the following estimating equation:

$$M_{wF}/P_w = a_0+a_1w+\sum_{j=D,F} a_{2j}y_j+\sum_{j=D,F} a_{3j}\rho_j+a_4\alpha_w+\sum_{j=D,F} a_{5j}\sigma_j \qquad (16)$$

where M_{wF} stands for migration from the home region to destination *F*. P_w denotes population in the sending region, *w* is labor income in the region of origin, y_F is income in region *F*, ρ_j represents the correlation coefficient between income in regions *w* and *j* (with $j=D,F$), whereas α_w and σ_j indicates the volatility of income in the home and the recipient regions, respectively. We expect *w* to discourage migration ($a_1<0$), whereas income in the destination region *F* and volatility of home income's should encourage it ($a_{2F}>0$ and $a_4>0$). Also, if either the correlation between y_F and y_h or income riskiness in region *F* increases, migration should decline ($a_{3F}<0$ and $a_{5F}<0$). The choice to migrate to region *F* is also affected by income and risk factors in the alternative destination, i.e. in region *D*. If the attractiveness of destination *D* increases, migration to region *F* should decline. We then expect migration to region *F* to be negatively correlated with income at *D* ($a_{2D}<0$) and positively correlated both with riskiness of income in region *D* ($a_{5D}>0$) and with the correlation between y_D and y_w ($a_{3D}>0$).

Short of individual data, equation *(17)* has been applied to 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. Emigration abroad is measured as the ratio between the (gross) number of people migrating abroad and total population in each region, as recorded by ISTAT (Italy's National Institute of Statistics). Regional unemployment rates are similarly obtained from ISTAT. Real labor income per employee is 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 measurement of risk factors is less straightforward. We take the share of construction employment in the sending region to measure income riskiness at home (the parameter α in our model). The construction sector is known to be the most immediately hit by upturns and downturns along the business cycle.

In order to obtain empirical measures of the ρ's, we have computed the coefficients of correlation of the gross domestic products of the two areas (each region in the South of Italy and, respectively, the North of Italy for ρ_D, and Germany - the main recipient country - for ρ_F) over the previous five years. Finally, we control for other 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.

Our econometric approach is as follows. We rely on a fixed effect model, where the slope coefficients are constrained to be the same across regions, but the intercepts are allowed to differ. Initially, we simply stack the regional observations and estimate a traditional fixed effect model. The results are presented in table *5*. Standard specification tests indicate that both regional and time dummies should be included in the regression[10]. In estimating equation *(17)*, home (expected) income is allowed to equal the wage level multiplied by the probability of being employed. We take the latter to be a function of the employment rate (i.e.one minus the unemployment rate). Under risk neutrality, the coefficient on the probability of being employed should be the same as that on actual wages. This will no longer be true, however, under the highly plausible assumption that the probability of being employed is not strictly equal to the employment rate. In column *1*, wages and the employment rate are not constrained to bear the same coefficients. As expected, we find that better labour market conditions in the home region discourages migration.

Risk factors as well appear to play a significant role in determining migrants' destinations. The correlation between income at home and income in the foreign destination has, as expected, a negative impact on foreign migration. Similarly, a higher employment share of construction is associated with larger migration. However, the coefficient of correlation between income at home and income in Northern Italy is not statistically different from zero. The regression results reported in column *2* reflect the constraint that the home wage and the employment rate have the same coefficient. The restriction is not rejected by the data, but imposing it does not seem to weaken previous results; notably, the relation between the foreign coefficient of correlation and migration stays virtually unchanged in size and significance. As a diagnostic tool we use a standard Lagrange Multiplier test. The test does not provide any indication of misspecification.

In order to check the robustness of our results (mostly with respect to the coefficient of domestic correlation), we also rely on an alternative econometric procedure. Rather than stacking 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, degrees of fredom constraints mean that we can no longer specify yearly time dummies. We rely therefore on variable time effects (1971-73, 1974-76, 1977-79, 1980-83, 1984-89). The choice of intervals is designed to capture common business cycles among receiving areas. The econometric

[10] The relevant values of the *F*-statistic are $F_{7,113} = 27.3$ and $F_{17,113} = 6.26$.

results are presented in columns *3* and *4* of table *5*. The constraints that the intercepts be the same across regions is clearly rejected by the data ($\chi^2(7) = 72.8$), as well as the hypothesis of zero time dummies ($\chi^2(4) = 14.9$). In column *3* the results of the regression where the coefficients on wages and the employment rate are unconstrained are reported. The signs of the coefficients are in line with our *a-priori* expectations. A higher domestic wage discourages migrations, as well as a large correlation between home and foreign income. Conversely, home unemployment and the share of construction in domestic employment are found to be positively related to migrations. Likewise, unlike above, the domestic correlation coefficient turns out now positively and significantly associated to migrations. All coefficients are now significantly different from zero at a *10%* level of significance. If we now impose the constraint that the home wage and the employment rate have the same coefficient, the restriction is not rejected by the data. Much like above, the results do not change much anyway.

As a diagnostic tool, we rely on the Lagrange Multiplier test for systems of equations. We rely on the maintained hypothesis that the error correlation coefficient is the same across regions. The t-statistic associated with the lagged residual is equal to *0.23*. The $\chi^2(1)$ version of the test is smaller but close to its critical value. Given that the actual size of the χ^2 test is known to be larger than its nominal size (Kiviet, 1986), we intepret the results from the testing procedure as not providing any symptom of mispecification in the estimated equation.

This drives us to conclude that overall, in addition to expected income, risk factors act as determinants of size and direction of migrations. The negative coefficient on the correlation coefficient between incomes at home and in the foreign destination, as well as the positive coefficient on the correlation coefficient between income in the sending regions and in other domestic destinations suggest that the desire to diversify risk plays a substantial role in affecting both the choice of whether to migrate and the decision of where to migrate.

5. 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[11], we focus on the *choice* between internal and international migration as alternative means for risk diversification.

Our starting point was 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 and appear consistent with our theoretical approach.

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.

[11] See however Hughes and McCormick (1994) for a significant exception. Their study is about the choice of where to migrate as well.

Appendix

Here we derive the conditions under which the household problem in section *2* bears a corner solution.

Total household income can be written as:

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

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

$$a'(n_i)\;E(U'(Z))\;+\;b'(n_i)\;cov(U'(Z),\epsilon)\;=\;0$$

where $a(n_i)=\mu+n_i\mu_i-c(n_i)-f_i$ and $b(n_i)=(\alpha+n_i(n_i\sigma_i^2+2\alpha\sigma_i\rho_i))^{.5}$. The second-order condition is:

$$a''(n_i)\,E(U'(Z))+a'(n_i)\,E(U''(Z))\,\frac{\partial Z}{\partial n_i}+b''(n_i)\,cov(U'(Z),\epsilon)+$$

$$+b'(n_i)\,\frac{\partial cov(U'(Z),\epsilon)}{\partial n_i}<0$$

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 $cov(U'(Z),\epsilon)<0$. 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.

Table 1

Migrations from Southern Italy (1960-1973)

year	(1) to foreign destinations	(2) to Northern Italy	(3) Total	(2)/(3)
1960	194813	109409	304222	0.360
1961	222540	174398	396938	0.439
1962	229899	203793	433692	0.470
1963	180822	183151	363973	0.503
1964	154757	140954	295711	0.477
1965	157407	90041	247448	0.364
1966	142214	91777	233991	0.392
1967	104129	127934	232063	0.551
1968	102682	148835	251517	0.592
1969	96853	156729	253582	0.618
1970	81345	159444	240789	0.662
1971	97668	147405	245073	0.601
1972	81815	136968	218783	0.626
1973	73487	119738	193225	0.620

Source: ISTAT, Compendio Statistico Italiano

Table 2

Emigration abroad from Southern Italy and its determinants: sample means

	FMIG	WAGE	UR	ρ	ρ^*	SHC
1970-89	0.17	17.0	0.11	0.84	0.84	0.11
1970-79	0.24	14.5	0.07	0.93	0.90	0.12
1980-89	0.11	19.5	0.15	0.75	0.78	0.11

Notes

FMIG = gross rate of emigration abroad from Southern Italy
WAGE = labor income per employee (1985 prices)
UR = unemployment rate
ρ = coefficient of correlation between per capita incomes in each region and Northern Italy
ρ^* = coefficient of correlation between per capita incomes in each region and Germany
SHC = share of construction employment in total employment

Primary source: ISTAT, Compendio Statistico Italiano

Table 3

Emigration abroad from the regions of Southern Italy and its determinants: sample means

(a) 1970-1989

	FMIG	WAGE	UR	ρ	ρ^*	SHC
Abruzzo	0.21	17.2	0.08	0.97	0.96	0.10
Molise	0.24	16.0	0.09	0.90	0.89	0.11
Campania	0.10	17.7	0.12	0.90	0.87	0.09
Puglia	0.19	17.6	0.09	0.88	0.90	0.09
Basilicata	0.14	15.9	0.11	0.63	0.67	0.14
Calabria	0.16	15.1	0.13	0.81	0.76	0.14
Sicilia	0.25	16.8	0.11	0.90	0.82	0.12
Sardegna	0.10	19.5	0.13	0.74	0.79	0.11

(b) 1970-1979

	FMIG	WAGE	UR	ρ	ρ^*	SHC
Abruzzo	0.31	14.8	0.06	0.97	0.96	0.11
Molise	0.35	13.1	0.05	0.95	0.92	0.11
Campania	0.13	15.1	0.07	0.97	0.94	0.10
Puglia	0.25	15.9	0.06	0.95	0.92	0.09
Basilicata	0.19	12.6	0.07	0.87	0.86	0.14
Calabria	0.24	12.9	0.09	0.86	0.82	0.16
Sicilia	0.31	14.3	0.06	0.95	0.90	0.13
Sardegna	0.13	17.2	0.07	0.94	0.91	0.12

Table 3 (cont'd)

(c) 1980-1989

	FMIG	WAGE	UR	ρ	ρ^*	SHC
Abruzzo	0.11	19.6	0.10	0.97	0.95	0.09
Molise	0.12	18.9	0.11	0.85	0.85	0.11
Campania	0.06	20.3	0.17	0.84	0.81	0.09
Puglia	0.13	19.2	0.13	0.81	0.89	0.09
Basilicata	0.09	19.3	0.16	0.39	0.48	0.14
Calabria	0.08	17.3	0.18	0.76	0.70	0.12
Sicilia	0.19	19.2	0.16	0.86	0.88	0.12
Sardegna	0.07	21.9	0.19	0.54	0.67	0.11

Notes

See table *2* for symbols.

Primary source: ISTAT, Compendio Statistico Italiano

Table 4

Emigration abroad from Southern Italy and its determinants:: pairwise correlations

(a) 1970-89

	FMIG	WAGE	UR	ρ	ρ^*	SHC
FMIG	1	-	-	-	-	-
WAGE	-0.58	1	-	-	-	-
UR	-0.40	0.75	1	-	-	-
ρ	0.18	-0.22	-0.36	1	-	-
ρ^*	0.19	-0.16	-0.32	0.93	1	-
SHC	0.19	-0.53	-0.23	-0.15	-0.18	1

(b) 1970-79

	FMIG	WAGE	UR	ρ	ρ^*	SHC
FMIG	1	-	-	-	-	-
WAGE	-0.06	1	-	-	-	-
UR	-0.17	0.46	1	-	-	-
ρ	0.18	0.09	-0.15	1	-	-
ρ^*	0.20	0.15	-0.18	0.94	1	-
SHC	0.03	-0.35	0.04	-0.36	-0.39	1

(c) 1980-89

	FMIG	WAGE	UR	ρ	ρ^*	SHC
FMIG	1	-	-	-	-	-
WAGE	-0.60	1	-	-	-	-
UR	-0.36	0.54	1	-	-	-
ρ	0.12	-0.01	-0.30	1	-	-
ρ^*	0.18	-0.09	-0.21	0.83	1	-
SHC	0.11	-0.54	-0.03	-0.26	-0.21	1

Notes See table *2* for symbols.
Primary source: ISTAT, Compendio Statistico Italiano

Table 5

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

Dependent variable: gross international migration rate

	(1)	(2)	(3)	(4)
ln w	-0.0010	-0.0013	-0.0008	-0.0009
	(1.75)	(2.50)	(3.78)	(4.07)
ρ_F	-0.00035	-0.00037	-0.00039	-0.00041
	(2.44)	(2.54)	(4.92)	(6.26)
ρ_D	-0.0004	-0.0006	0.0002	0.0002
	(0.43)	(0.54)	(3.05)	(3.41)
α	0.006	0.006	0.008	0.008
	(1.69)	(1.74)	(3.94)	(4.04)
ln (1-u)	-0.002	-0.0013•	-0.0008	-0.0009•
	(1.97)		(2.14)	
Lik. function	963.54	963.06	1000.2	1000.6
LM test $\chi^2(1)$	1.82		3.74	

(1) stacked regression
(2) stacked regression with equal coeff. on ln w and ln (1-u)
(3) SURE regressions
(4) SURE regressions with equal coeff. on ln w and ln (1-u)

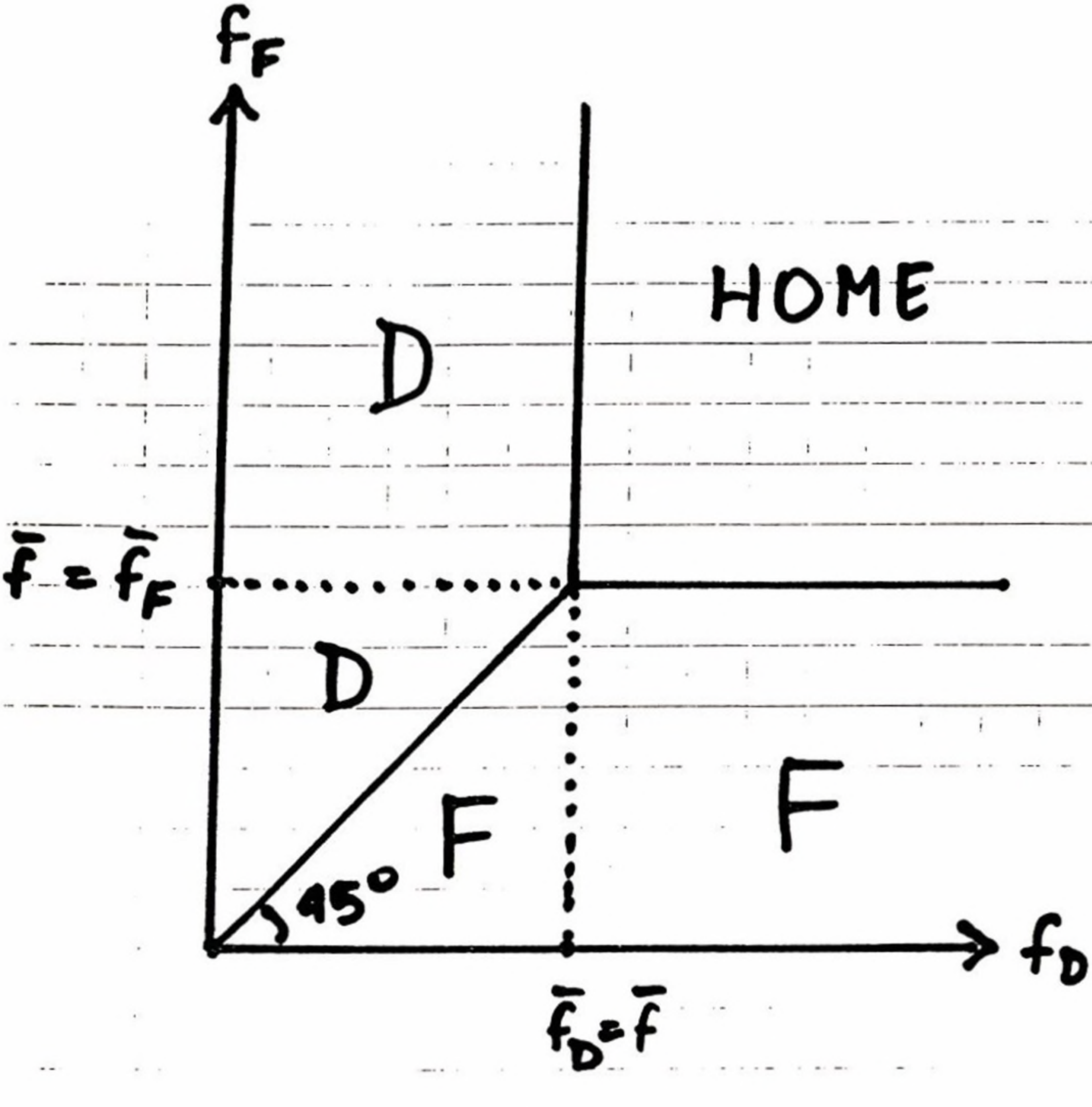
Legenda

The migration rate are 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 employment share of construction at home. u is the unemployment rate at home.

Notes

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

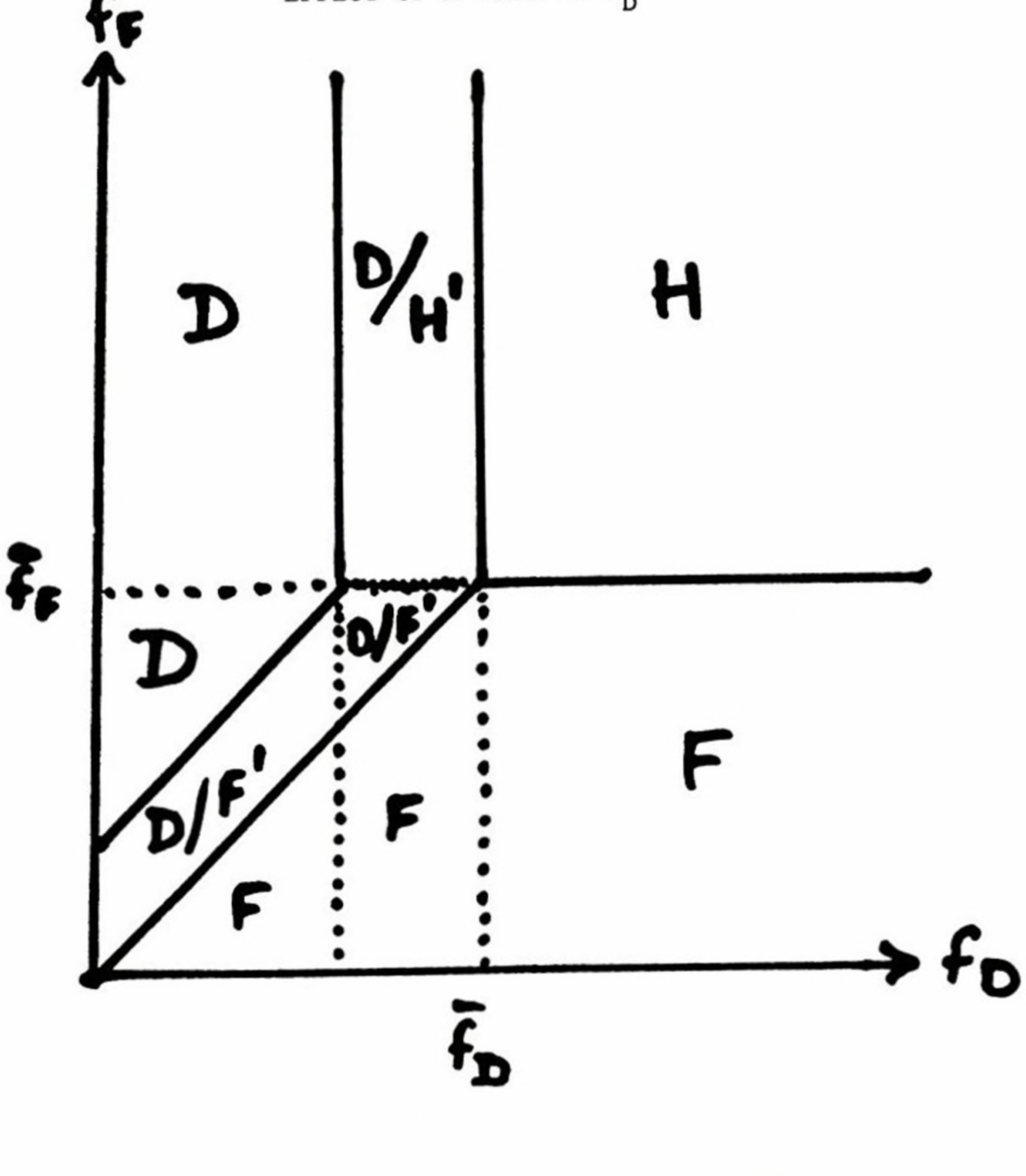
• Constrained coefficient



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

$$g(\cdot) = 0$$

EFFECT OF A RISE IN P_D



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