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Counterfactual identification of bounded rationality: job changing in Italy's labor market

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COUNTERFACTUAL IDENTIFICATION OF BOUNDED RATIONALITY: JOB CHANGING IN ITALY'S LABOR MARKET[1]

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Abstract

In this paper I question the hypothesis of bounded rationality against full rationality in the context of job changing behaviour, via simple explorations on microdata drawn from WHIP (Worker Histories Italian Panel). The task requires to face a deep identification problem, as the observables are coherent with both hypotheses of rationality.

The identification strategy builds on a quasi-counterfactual experiment in which the performance of each voluntary mover is compared to the average performance of a peer-group of stayers of the same skill group, co-workers in the firm from which the movers' job switch originated. Voluntary movers are identifiable in the WHIP dataset, while it is not possible to do the same among the stayers.

Full rationality suggests that the performance of voluntary movers should be superior to the stayers' (both voluntary and involuntary) as the involuntary stayers have a smaller decision set from which to choose. In this exploration I find a clear opposite result, which I take as evidence of bounded rationality of the movers.

1. Motivation

This paper is not on job changing behaviour *per se.* Nor do I explain the process by which choices take place. It is an empirical exploration on field data attempting to test bounded rationality against full rationality. As will be evident in what follows, this task requires to solve a deep methodological problem. In a different, unpublished paper of few years ago[3] I attempted to solve the identification problem using an analytical strategy that turned out to be unsuccessful: many of the results were in line with hypotheses of bounded rationality, but, although unlikely, they could have been generated also by fully rational individuals. The approach to identification followed here is completely different.

In this study I am not suggesting a theory of job change behaviour. Nor, I believe, is precision essential if the aim is to show that some forms of bounded rationality provide a more plausible explanation of behaviour than full rationality. I accept the notion that choice ought to produce a "satisficing" option (à la H. Simon), where the driving forces of job change are future real wages and expected job quality, and search

[1] I am grateful to the Editor and a referee of the J.E.P. for their thoughtful comments on an earlier version of this paper; to D. Card and C. Flinn for casual conversations at the lunch table that led me to readdress from scratch the identification strategy of this study. Thanks also to T. Putsch for useful comments.

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[3] B. Contini and M. Morini (2007)

takes place under limited information in a local environment. Recognizing the specific decision rules that lead individual choices is not my scope, nor is it within my reach.

In a sense, what I propose is a fuzzy interpretation of bounded rationality: fuzziness reflects the fact that bounded rationality may embody different factors, none of which is mutually exclusive.

2. Job changing and bounded rationality

Job changing is the context in which economic agents operate: worker histories are observed after a relatively long time since the decision to move or stay, and on such basis an *ex post* assessment on the agents' rationality is formulated.

The individual planning horizon is assumed to be a three-year window that starts when choices are expressed. Move-stay decisions are taken on the basis of individual subjective judgements on the future evolution of earnings and risk of job loss.

This exploration confronts a deep issue of identification. The test proposed here consists of a quasi-counterfactual comparison where the performance of voluntary movers is compared to that of a peer group of co-worker stayers at the end of a three-year time window that starts when choices are expressed, under the accepted notion that the main driving forces of job change are future real wages and expected job quality. As will be explained, full rationality theory predicts that the voluntary movers ought to perform better than the voluntary and involuntary stayers, but the opposite seems to hold. With all the necessary *caveats*, my conclusion is that workers seem to behave according to principles of bounded rationality rather than "full rationality".

In recent years various papers have provided evidence of bounded rationality in experimental studies as well as a variety of specific case studies reviewed below. The underlying idea here is along similar lines. The novelty of this paper is that I investigate the presence of bounded rationality on panel data that are currently used to test standard theories of job changing behaviour.[4] To my knowledge this attempt is the first of this kind.

3. Unobserved heterogeneity or bounded rationality?

Any theory of economic behaviour predicts that workers engaged in a dynamic environment may at some point consider mobility as a profitable alternative to their current position, and will evaluate options on the basis of future expected earnings and expected job safety.

In the world of utility maximizing agents, everything unrelated to the arguments of the utility function will be hidden within the black box of unobserved heterogeneity. Heterogeneity implies - *inter alia* – that any position in the wage growth – job safety space may correspond to optimal choices derived from some unobservable multi-objective individual preferences: for instance, agent X may renounce to a new job involving higher wage growth and job safety if "he/she loves the amenities of Taormina where he/she is currently working"; agent Y may switch to a new job simply because "he hates his former boss"; agent Z

[4] B. Contini and C. Villosio (2005), in B. Contini, U. Trivellato (eds.) "Eppur si muove. Dinamiche e persistenze nel mercato del lavoro italiano", Il Mulino, pp. 567-595.

does what she does because she is a fool. Alternative explanations of apparently foolish decisions may depend on the existence of unobservable constraints to individual actions (transaction costs, financial or family constraints, etc.). Unfortunately any of these arguments leads us trapped in a black box where any empirical argument aimed at understanding people's choices becomes irrelevant. Rationality is assumed and cannot be disproved. Even such "maestri" like A. Goldberger (1989) and K.J. Arrow (1986) noted that the utility maximization hypothesis has little empirical content without strong auxiliary assumptions on the utility function and other model ingredients. And, so they added, stating auxiliary assumptions is often little different from stating empirical predictions outright, as a sociologist might. In this sense, the utility maximization hypothesis merely "packages" the prediction.

4. Data

Data are drawn from WHIP (Work Histories Italian Panel), an employer-employee longitudinal random sample of all Italian employees of the private sector, observed at monthly frequency (at the time available from 1985 to 1998, now updated to 2003). The sample-population ratio is 1:90. I use a closed panel of male individuals working full-time in the private sector, aged between 30 and 40 in 1986 (over 7000 individuals), and observe their histories and job changes from 1986 through 1996. The choice of restricting observation to males aged 30-40 respond to the necessity to minimize heterogeneity of behaviour unrelated to job changing activities (maternity and child care, retirement choices, etc.). The post change performance of movers and stayers is recorded through a sliding three-year window ending in 1996.

4.1 *Movers and stayers*

Counterfactual analysis requires that the observable objects be as homogenous as possible. Here, among other things, it implies to contrast agents who have expressed choices under similar conditions. Therefore analysis must be restricted to workers who have made an explicit and voluntary decision to change or retain their job in the recent past: individuals currently at work who received no outside offers, whether after searching or otherwise, should not enter our sample. Upon receiving an outside offer all workers are faced with move or stay decisions. Information on job offers or other elements that help to distinguish between voluntary and involuntary decisions are usually missing in longitudinal data. Under plausible assumptions, however, it is possible to single out the voluntary movers from the involuntary ones. For the stayers, instead, the distinction between voluntary and involuntary decisions is prohibitive: for this reason I neglect the distinction among the latter. As will be explained such a decision provides the key for an appropriate identification strategy.

Stringent criteria are used to recognize the voluntary movers from those who switch job for different reasons. Collective layoffs have been frequent in the Eighties and Nineties in the course of industrial restructuring, and are recognizable in our dataset. All individuals who find a new job after such events are left out of the inquiry: in Italy the large majority will take whatever position is in sight, no matter how bad, rather than staying unemployed (Italy's unemployment benefits have been very modest until very recently). In addition I eliminate all individuals who have been, as it where, "forced" to leave a job in order to pre-empt a likely layoff when the industry or firm is facing a very unfavourable course. These are individuals at work

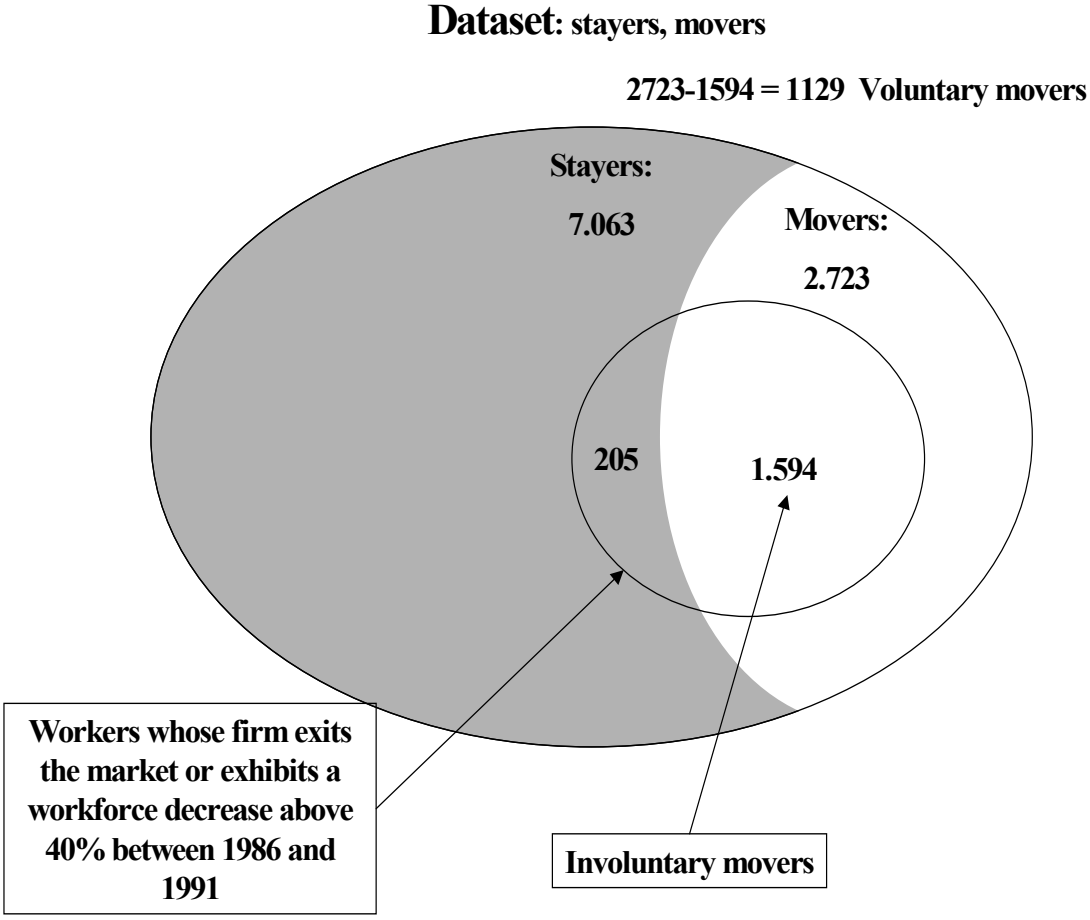

Fig. 1: Stayers and movers

on new jobs at the end of 1991, after having left firms that closed out or underwent major workforce reductions before 1991[5]. The movers are observed in one firm in 1986 and in a different firm in 1991, regardless of the number of job changes in the observation period: their performance is also observed through 1994. The stayers are observed in the same firm from 1986 to 1994, although their career may have been interrupted by short unemployment (or temporary layoff) spells in between.

4.2 Measuring wage growth and risk-on-the-job

The individual planning horizon is assumed to be a three-year window that starts when choices are expressed. We assume that move-stay decisions are taken on the basis of individual subjective judgements on the future evolution of earnings and risk of job loss.

Ex-post performance is observed in the 1991-1994 time window as follows.

Real (long run) wage growth (W). For the stayers it is the ratio between the average yearly real wage earned during the 3-year spell started in 1990 and the average real wage earned at the end of 1994. For the movers

[5] "Major" reductions are assumed to be those in excess of 40% of the 1986 workforce.

it is the ratio of the average annual real wage earned during the 3-year spell after the job switch and the average real wage at the end of the period preceding the job switch.

Risk-on-the-job (ROJ). It is measured by the ratio of two elements: a worker-specific factor, given by the predicted likelihood of dismissal in the past 1986-91 time window[6], calibrated by a firm-specific indicator of employment trend over the subsequent three-year period 1991-94. More precisely:

ROJ=[predicted i-th individual's likelihood of dismissal from j-th firm 1986-91] / [j-th firm employment trend 1994-91 for the stayers OR k-th firm employment trend 1994-91 for the movers, k being the firm of post-move destination[7]]

Suppose that the predicted likelihood of (past) dismissal is 0.30 for both Mr. X and Y. Mr. X is a stayer and his employer increases employment by 50% in the 1991-94 period. Mr. X's risk-on-the-job is thereby reduced to 0.30/(1+ 0.5) = 0.20. Mr. Y is a mover, and his current employer cuts workforce 20%: Mr. Y's risk-on-the-job increases to 0.375 = 0.30/(1-0.2).

For the purpose of comparing performance I introduce the following:

(1) y*: a two-dimensional vector of reference points on future real wage growth W and risk-on-the-job ROJ;
(2) a Cobb-Douglas utility function (U) in two arguments: real wage growth (W) and risk-on-the-job (ROJ). For simplicity, the utility function is the ratio of the two arguments, each weighted by two parameters *(n, m)* reflecting different degrees of preference for W or ROJ.[8]

$$U = [(W^n) / (ROJ^m)]$$

U denotes a linear trade-off between real wage growth and risk-on-the-job, whose slope depends on the parameters *m* and *n*. In many of the examples below *m = n = 1*. Under full rationality individuals are assumed to make "stay" vs. "move" decisions that will bring them at or near an appropriately defined efficiency frontier. Under bounded rationality - not only à la Simon - individuals search for options capable to attain "satisfactory" targets y*, based on conditions prevailing in their own local environments. Also the outcome of such decisions can be evaluated in terms of U.

5. Different performance of movers and stayers

Previous research on these data (B. Contini and C. Villosio, 2005) – relative to the 1986-91 period - established the following results; (i) the mean initial wage (1986) as well as the mean final wage (1991) of the stayers is higher than that of the movers; (ii) the wage growth of the movers is higher than the stayers'[9]; (iii) movers do better than stayers at young age (20-30), but the difference tends to vanish thereafter; (iv) mover-stayer differentials are larger among white-collars than among blue-collars.

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[6] The likelihood of dismissal 1986-91 was estimated in a previous paper by B. Contini and C.Villosio (2005). Additional findings are reported in: B. Contini, R. Leombruni, L. Pacelli and C. Villosio, "Mobility and wage dynamics in Italy", in E. Lazear and K. Shaw (eds., 2010).

[7] Some workers may have moved more than once in the observation period: the k-th employer is his last destination.

[8] In section 9 I show that the robustness of the hypothesis of bounded rationality may be tested by letting *n* and *m* take different values from 1.

[9] (i) and (ii) are widely accepted stylized facts on job changing performance. See Lazear (1998), Topel (1991), and many others who have followed.

The new longitudinal data show that two thirds of the observable firms reduced their workforce in the 1991-94 period that falls around the 1992-93 recession. About 25% of the movers who switched jobs around 1991 ended up in firms that exited the market before the end of 1994, but were able to find another job during our observation window. Many more were also exposed to a high risk of job loss: 40% of firms went through heavy restructuring in those years. While none of the firms employing individuals classified as stayers suffered from closure or liquidation, workforce reduction was widely practiced: 20% of the stayers exposed to dismissal would be an optimistic guess.[10]

Some results of this investigation are in accord with standard literature, some are not: movers do somewhat better than stayers in terms of wage growth. But movers are in a worse position in terms of risk-on-the-job. If performance is measured in terms of the benchmark utility function U the comparative outcome depends on the relative weight given to each argument. Unless risk-on-the-job carries a very small weight compared to wage growth, the stayers appear to be better performers than the movers. The implication (not surprisingly) is that the movers have a higher risk propensity than the stayers.

Fig. 2-4 depict the cumulative functions of wage growth, risk-on-the-job and utility for movers and stayers observed in the 3-year window following 1991.

- Wage growth (W)

The cumulative W of the movers lies above the stayers beyond the median. In the low tail of the distribution there is a slight prevalence of the stayers. The same pattern holds for both blue and white collars (fig. 3/A). The variance of the movers is slightly larger than the stayers'.

- Risk-on-the-job (ROJ)

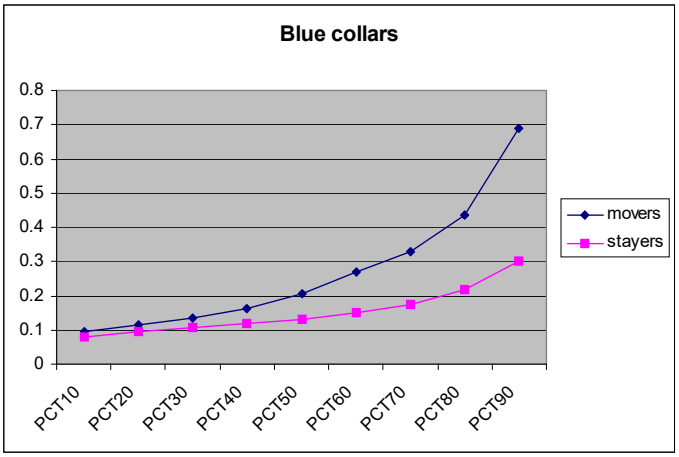
The situation is reversed, with the stayers dominating the movers throughout the whole distribution. Movers appear to be willing to accept a higher pay at considerable cost in terms of job safety. At P50 the stayers' ROJ is 0.12 against 0.16 for the movers among white-collars; and 0.12 against 0.20 among manual workers. At P75 the difference increases to 10 p.p. (0.18 vs. 0.28) and 14 p.p. (0.18 vs. 0.32) respectively. Beyond P75 the differences explode (fig. 2/B). The ROJ variance is much larger among the movers.

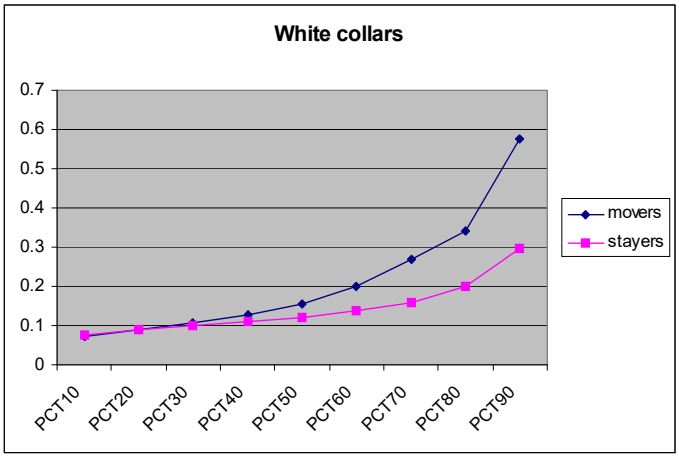
- Utility U (under various parametrizations)

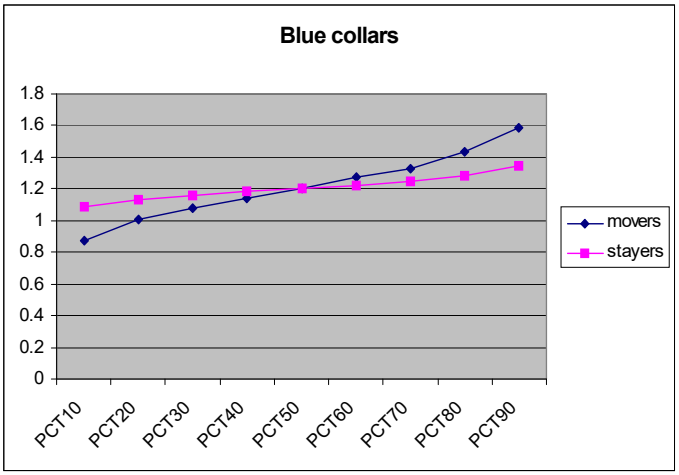
With unit elasticities ($m= n= 1$) the stayers dominate the movers, with the ROJ differential driving the result (fig. 4). About 43% of the movers are found in the first quartile of the U-distribution, against 22% of the stayers. Conversely, 26% of the stayers belong to the upper quartile against less than 20% of the movers. If more weight is given to ROJ, the stayers' dominance is complete among the blue-collars, and nearly complete among the white-collars. In the opposite case (more weight to W, with $m=3, n=1$), the stayers lie above the movers through P80 of the U-distribution among the blue-collars, and slightly P50 among the white-collars.

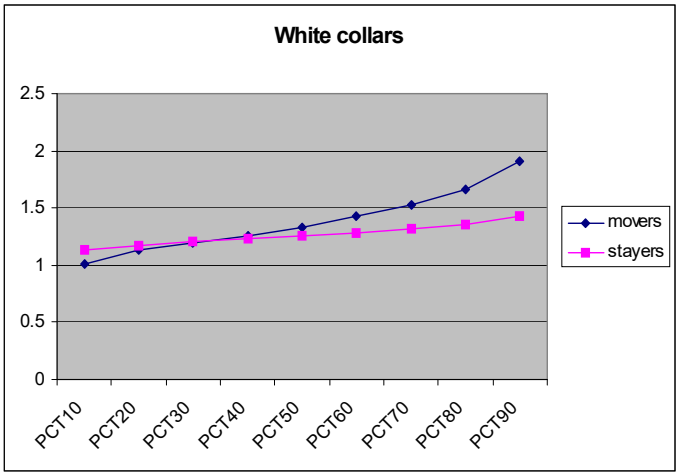
[10] Contini and Villosio (2005) indicate that in the 1986-91 window about 20% of the stayers were exposed to high risk of collective layoff, but escaped it. According to the criterion used here they would be identified as "involuntary" stayers. The peak of the 1992 recession falls in the midst of the 1991-94 observation period: therefore the number of involuntary stayers confronted in this study is presumably substantially higher.

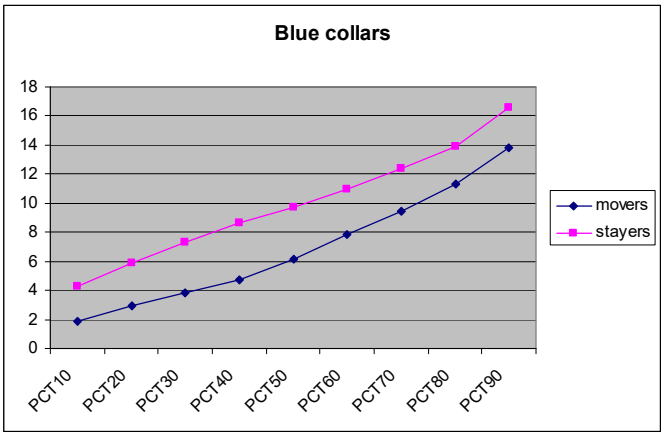
Fig. 2 - Risk-on-the-job = ROJ

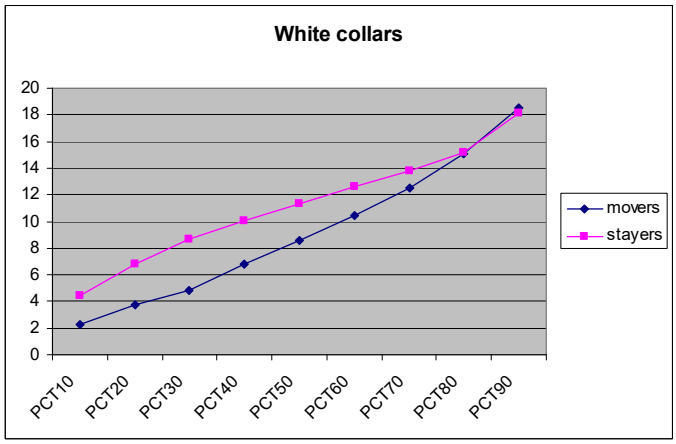












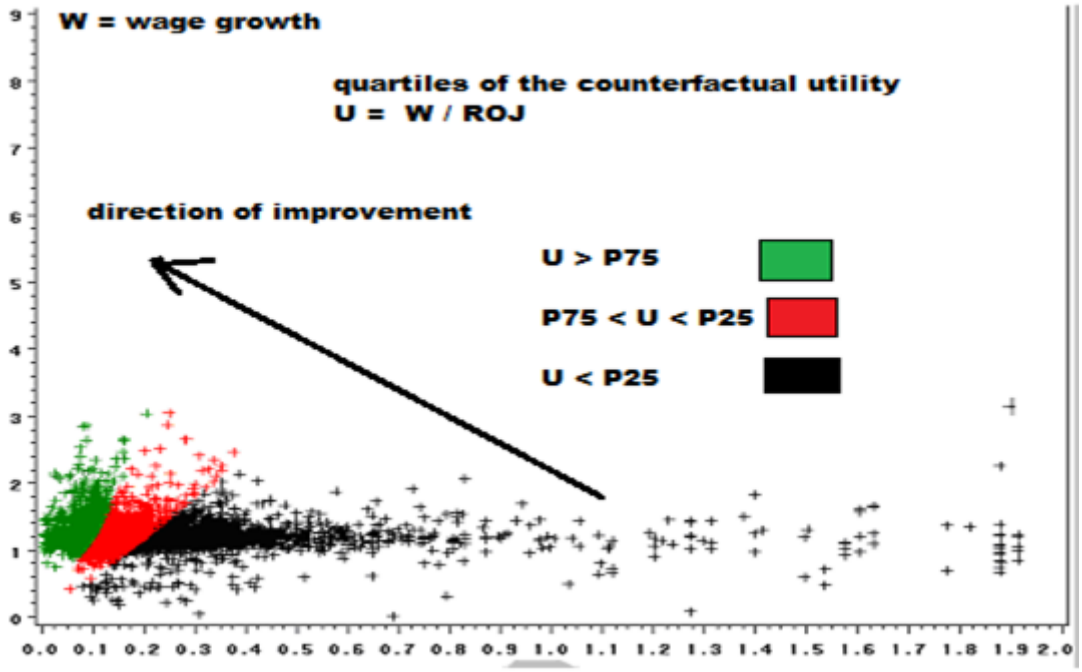


Fig. 5 depicts the scatter diagram of all the unconditional outcomes in the <W-ROJ> space, measured in terms of the U = W/ROJ counterfactual utility. There is an equal number of observations in the green and black areas corresponding to the upper and lower quartile of the distribution of U, and twice as many in the red area corresponding to the central half. The widely spread distribution reflects the differential performances observed across industries and firm size.

Specifying "local environments" where boundedly rational agents are supposed to restrict choice helps to interpret (and reduce) the large variance of the unconditional outcomes above (fig. 5). As a reasonable approximation, 198 cells are defined by the intersection of 11 industries, 3 firm sizes, 2 skill groups, 3 geographical areas. In order to have at least 10 individuals in each cell, only 42 cells are retained, leaving 978 workers out of 1086 in the original sample. Thus each cell yields the "local environments" for all 978 individuals, homogenous as possible in each cell in terms of their observable characteristics.

Reference points reflect one's past experience and, possibly, that of one's peer coworkers. It is reasonable to take as reference points moments of the distribution of wage changes and risk-on-the-job prevailing in each person's environment at the beginning of the 3-year time window that defines one's planning horizon. Reference points may be very ambitious or relatively modest, depending on one's personal characteristics and past history. Here I restrict attention to y* defined by the medians of the W and ROJ within-cell 1991 – distributions.[11]

Consider the position of the reference points y* in <W – ROJ> space: it reflects the unconditional scatter of individual observations (fig. 6). While wage growth is relatively clustered across cells (on the ordinates), ROJ is widely dispersed, suggesting that some industries have been exposed to much higher risk of job loss than others. The N-W reference points strongly dominate those placed in the S-E region of the plot: industries like banking or public utilities are at the top of the ranking, textiles at the bottom. Also within-industry firm size matter, with the large businesses in better position than the small ones, as they face

[11] Another plausible definition of y* could be in terms of individual earnings growth – say 10% - over each person's past salary W, in alternative to the cell W-median.

a smaller risk of closure.[12] Under bounded rationality the following would be expected: (i) individual outcomes to cluster around the respective reference points y*; (ii) a relatively large number to be found in the North-West quadrant of each cell, signalling the joint attainment of the y* reference points; (iii) intercell mobility to be modest as individuals search for new opportunities in their own specific environment.. Notice, however, that (iii) would be predicted also by the mainstream theory of specific human capital.

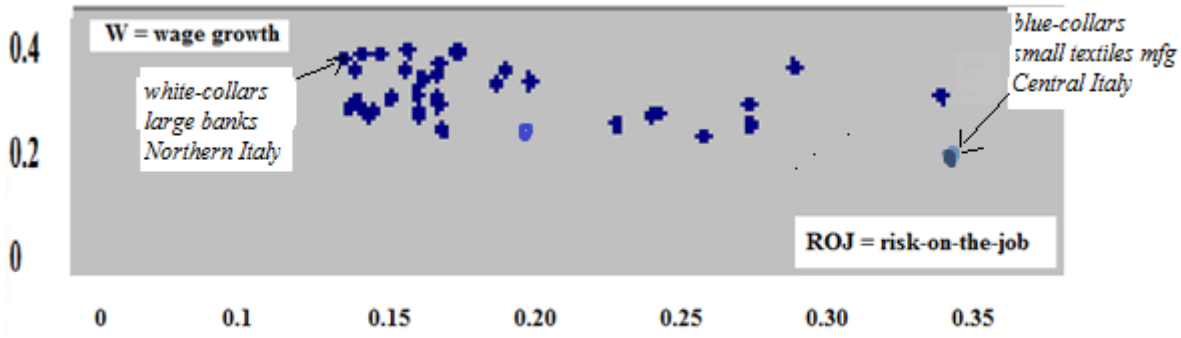


fig.6 - Reference points y* in the outcome space <W-ROJ> (42 cells with 978 individuals)

6. Identification

The basic structure of the individual decision making process may be roughly portrayed by the following diagram (fig.1). Under bounded rationality (à la Simon) one-shot decisions involve a mental process that takes place in two or three steps: (i) setting aspiration levels y* (or reference points) in terms of final outcomes; (ii) exploring the nearby environment in search of satisficing options; eventually (iii) observing the actions of peers in order to gain additional information and/or to adjust one's decision following or imitating the peers' decisions. In situations that involve repeated choices in time, two additional steps usually follow: (iv) comparing outcomes with previous aspirations; (v) learning and adaptation of aspiration levels if the gap between aspirations and outcomes is sufficiently wide, whether above or below. Under full rationality, instead, no mental process is activated: individuals make their choices as if they optimized some unobservable utility function, whose parameters may be usually estimated *ex-post* on the basis of observable outcomes. The constraints to the decision process, whether under full of bounded rationality, are subsumed into the "local environments" of each agent.

Let me be clear: the choice of a reference point within an appropriate local environment may be perfectly reasonable, but no less arbitrary than the choice of a specific utility function and efficiency frontier

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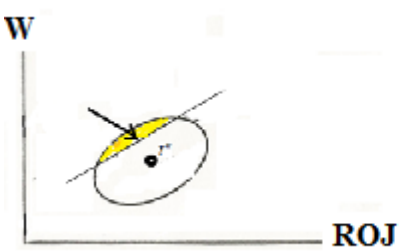
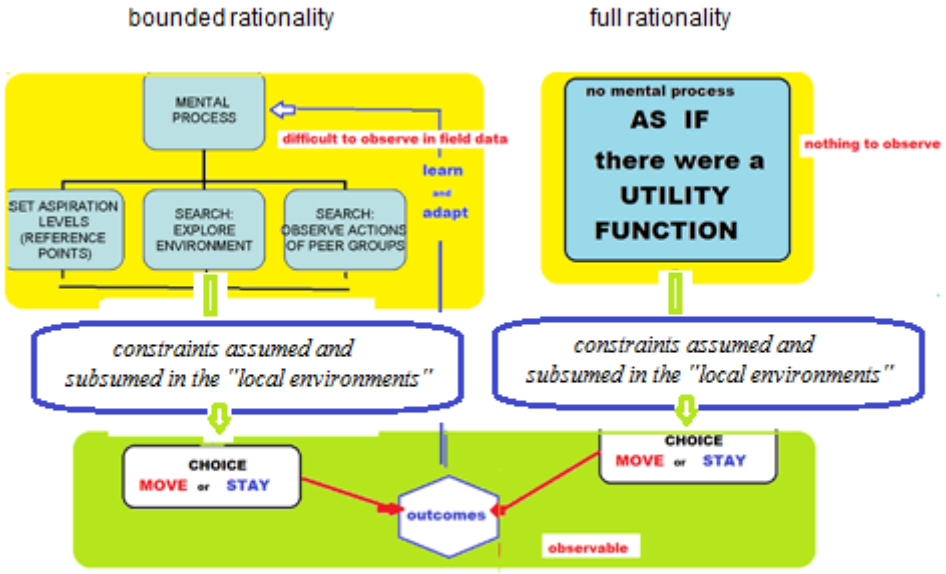


The "local environment" may be depicted by an ellipse centered at the reference point y*, with focus proportional to the interdecile range U(P90) - U(P10). The positive slope of the U-function is set at U[P90] and reflects the tradeoff between W and ROJ.

in the context of full rationality. Both decisions are driven by assumptions and not by empirically observations of reality.

With field data like the ones available in this study, none of the steps characterizing the decision process are directly observable (while, in principle, they could be observed in carefully designed experimental settings). Only the outcomes of decisions are observable.



OBSERVABLES are IDENTICAL under both hypotheses

Conlisk (1996) correctly suggests that mainstream empirical practice neglects the fundamental question: instead of testing the predicted effect of utility maximization against the predicted effects of competing theories, economists tend to test against the non-substantive null hypothesis of no effect: the former is assigned a tiny type-1 error, say of the order of 0.001, letting type-2 error increase out of control. Consequently, the alternative will never be accepted, and the hypothesis of full rationality will prevail by construction. In his words, this is "something like wrestling a rag doll; it doesn't prove anything, unless the ragdoll wins". This practice amounts to refuting the idea that a non-deniable statement is not "scientific". No paper based on the analysis of field data will ever be published, and no open and public discussion of one of the fundamental questions of economic theory will ever be possible.
In my opinion even Conlisk is optimistic on the prospects of empirical research. Indeed, we face a problem of deep identification: whatever is observable by means of field data is identical, whether the outcomes are consequences of bounded rationality or full rationality. Furthermore, any boundedly rational outcome may be embedded in a utility maximization framework, at times very simple, at times more sophisticated, which is often the cause of additional complications.[13]
As a consequence, it is often impossible to contrast a null hypothesis supporting one theory of rationality against any alternative theory because, in general, there exists no substantive effect subsumable in only one statistic or functional form that allows to accept one and refute the other.

Consider two examples: in each H(0) and H(1) represent respectively full and bounded rationality.
The first one (A) catches the essence of the dichotomy:

H(A-0): average distance of outcomes from the efficient frontier of U(y) < epsilon (epsilon small)

[13] Simple examples are those of Kahnemann and Tverski (1979), where the utility function is kinked in correspondence to the aspiration level; of Akerlof (1991) and Becker, Rayo (2007) who propose a quadratic loss function around the reference point. More sophisticated models are proposed by Gilboa, I., D. Schmeidler, and P. Wakker (2002)., "Utility in Case-Based Decision Theory", Journal of Economic Theory, 105 (2002), 483-502.-

against

H(A-1): attainment frequency of reference point y* > delta (delta large). [14]

The above cannot be statistically tested as the two hypotheses refer to different substantive events. Moreover both statements may be contemporaneously true.

The second one (B) is in appropriate testable form:

H(B-0): average distance of outcomes from the efficient frontier of U(y) < epsilon

against

H(B-1): distance from the efficient frontier of U(y) > gamma,

with gamma > epsilon.

Here while H(B-0) may reflect full rationality, H(B-1) is irrelevant for bounded rationality.[15]

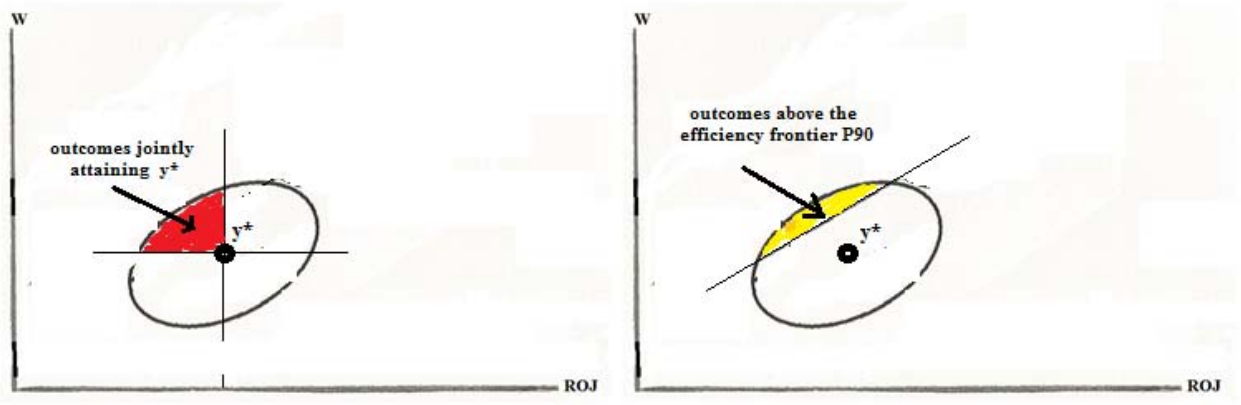


Fig. Configurations of outcomes under alternative hypotheses of bounded and full rationality. The ellipse represents the "local environment" around a given reference point y*.

The key to identification resides instead in the possibility to contrast the movers' performance with that of a peer group of stayers in a quasi-counterfactual experiment.

The hypothesis of full rationality suggests differences in the outcomes of voluntary movers (the ones to whom we restrict analysis) and of stayers (voluntary or not) that can be exploited to solve the identification problem. As explained in section 5.1, involuntary movers are those who switch jobs after the closure of their previous employer, or after a period of collective or otherwise numerous layoffs in the firm of origin. I restrict the analysis to the remaining ones, i.e. to the "voluntary" movers, who have, presumably, invested in search and examined a number of options in terms of predictable earnings and job safety, and have then taken a decision. The same selection cannot be performed among the stayers: some may have been saved from collective layoffs but have taken no action (or, if they have, they decided against the change); others may or may not have been offered the option to change, but expressed the desire not to change.

The decision set faced by the voluntary movers is therefore larger (more inclusive) than the one faced by the involuntary stayers, who may have had no options from which to make a choice. Full rationality suggests that the performance of the voluntary movers ought to be, on average, equivalent to that of the voluntary stayers. But the latter are not observable. It then follows that the performance of the voluntary movers ought to be, on average, superior to that of all stayers, voluntary as well as involuntary.

My quasi-counterfactual analysis, illustrated in section 9, indicates the opposite result: voluntary movers appear to do worse than peer groups of stayer coworkers. I interpret this result as evidence of the fact that the movers are not utility maximizers, but rather behave according to different principles of rationality, which I would describe as "bounded". A different line of interpretation (but is it really different?) suggests that the

[14] If W and ROJ were independently distributed (ellipses collapsing into circles), the expected frequency of outcomes jointly attaining y* (in the N-W quadrant) would be 25%. The larger the positive correlation of W and ROJ, the lower the expected frequency of joint attainment of y*.

[15] Or the other way around: H(0): attainment frequency of reference point y* > delta, against H(1): attainment frequency of reference point y* < gamma. Here H(0) may reflect bounded rationality, while H(1) is irrelevant for full rationality.

movers may have incurred in important forecasting errors in the course of their job search during the recessive observation period 1991-94, thus seriously underestimating the risk of job loss.[16]

7. A quasi-counterfactual analysis: movers vs. matching stayers

The quasi-counterfactual that unequivocally identifies bounded rationality vs. full rationality is extremely simple in this exploration. Consider the question "how would the (voluntary) movers have performed had they decided not to move ?". Should the answer be “they would have done better”, it would provide considerable support to the hypothesis of bounded rationality.

Direct evidence is, obviously, not available. But the data allow to observe the history and performance of a certain number of individuals of the same skill group, co-workers in the firm from which the movers' job switch originated.

I link each mover to his observable co-workers who have decided to stay. This can be done in two ways: firstly by linking to stayers in the same firm of origin; secondly by linking to stayers in the same cell of origin. In principle the first linkage is more correct than the second. But it leads to a smaller sample size: 220 groups with at least 3 individuals observed contemporarily (out of 1594 movers in the whole panel). The second is less accurate but the linkage can be done for each mover. We illustrate the results of the second linkage, which turns out to be very similar to the first one.

The stayer co-workers ("matching stayers") of the same skill group represent a good quasi-counterfactual: they are as similar as possible to the movers at the beginning of the observation period. Thus the counterfactual set of “matching stayers” includes both voluntary and involuntary stayers: under full rationality we expect their performance to be no better or possibly worse than the voluntary stayers’ alone as they face a smaller decision set. We are, therefore, comparing the performance of voluntary movers with peer co-workers whose performance is inferior to the one we would expect of a perfect comparative group. This will strengthen our conclusion.[17]

The PREMIUM for the i-th individual mover, defined as the ratio between his own performance indicator (benchmark utility, wage growth, risk-on-the-job) and that of his median (med) matching stayers:

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[16] Two thirds of the observable firms reduced their workforce in the 1991-94 period. 25% of the movers ended up in firms that closed before the end of 1994; 10% of the stayers were exposed to dismissal (but escaped it). In a different paper (2008) I estimated a 0.083 trade-off between wage growth and risk-on-the-job among the voluntary movers. The trade-off is positively sloped as expected, indicating that higher wage growth compensates for higher risk of job loss. It is, however, surprisingly small, implying that workers are willing to accept a great deal of ROJ for a very small W increase. In Contini (2011) I argued that such estimate reflects forecasting errors of the movers that preclude identification of the utility parameters.

[17] Also the following exemplifying statistics on all movers and stayers (without sorting the voluntary from the involuntary ones) indicate the superior performance of the stayers. 98% of the stayers entering in 1988 “survive” at the end of the 1991-96 window (i.e. have not dropped out of the labour market), against 86% of the movers entering in the same year. The real wage growth of the stayers in the same window is 4.3% against 4.9% of the movers. The movers do slightly better in terms of wage growth, and much worse in terms of survival. Restricting the count to the employees of large firms (1000 + workers) in the same observation period the superiority of the stayers is even more marked: the stayers’ survival rate is again 98% vs. 85% of the movers. The real wage growth of the stayers is 11% vs. 7.4% of the movers. Analogous results are obtained selecting different years of entry.

PREMIUM [U(i)] = U[mover(i)] / U[med (matching-stayers(i))]

PREMIUM [W(i)] = W[mover(i)] / W[med (matching-stayers(i))]

PREMIUM [ROJ(i)] = ROJ[mover(i)] / ROJ [med(matching-stayers(i))]

PREMIUM < 1 indicates that the i-th mover is doing worse than his median matching stayers. I choose the median matching stayers rather than the mean which is affected by extreme outcomes.

The following fig. 8-10 summarize the information derived from the PREMIUM-percentiles, computed separately for blue and white-collars. Among the manual workers, the median mover performs worse than his median matching stayer: in about 60% of the cases we observe PREMIUM < 1. Among the white-collars, instead, the comparative performance is split at the median (PREMIUM reaches 1 at P50).

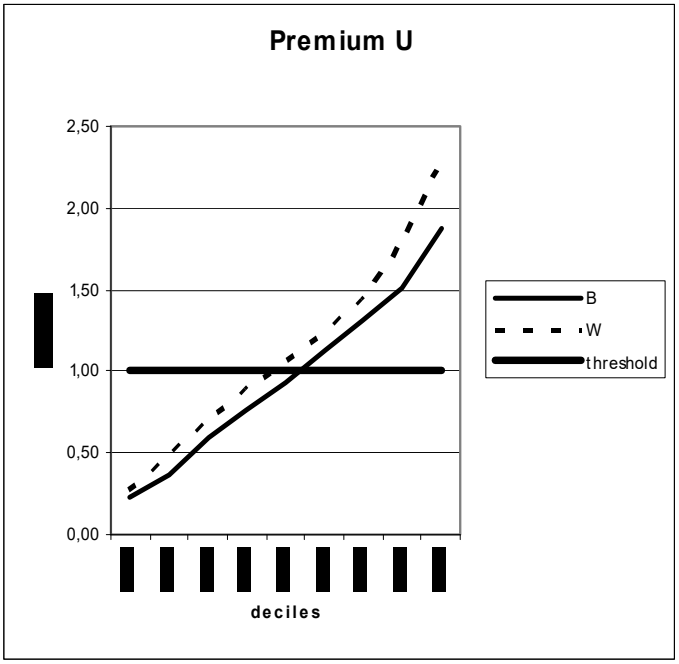
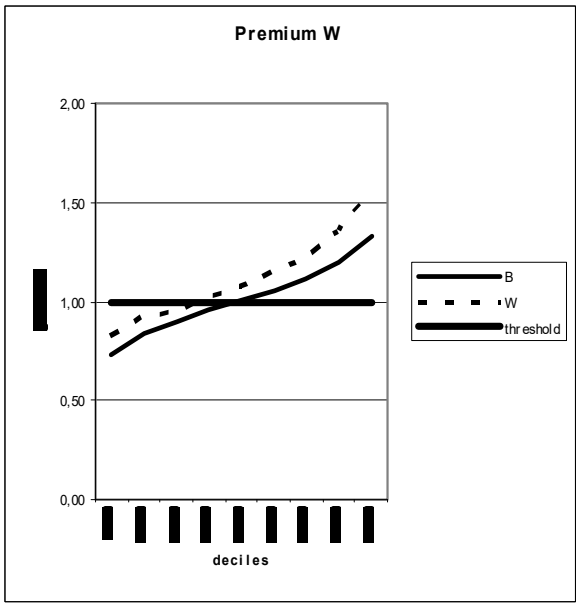


Figure 8: Premium U = W / ROJ

9/A



9/B

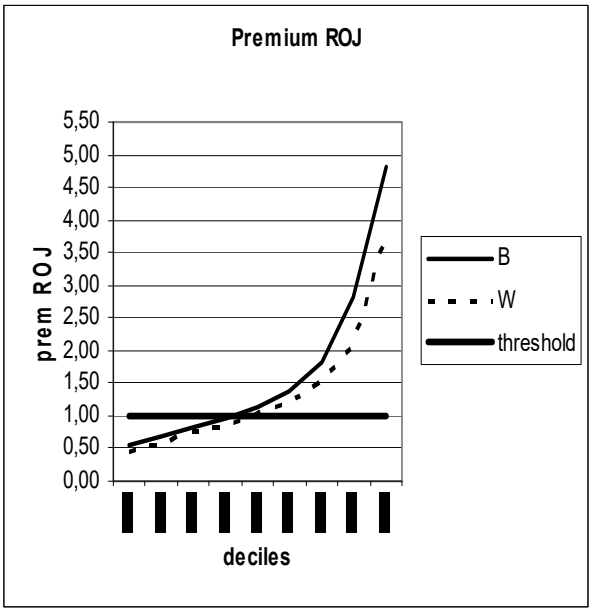
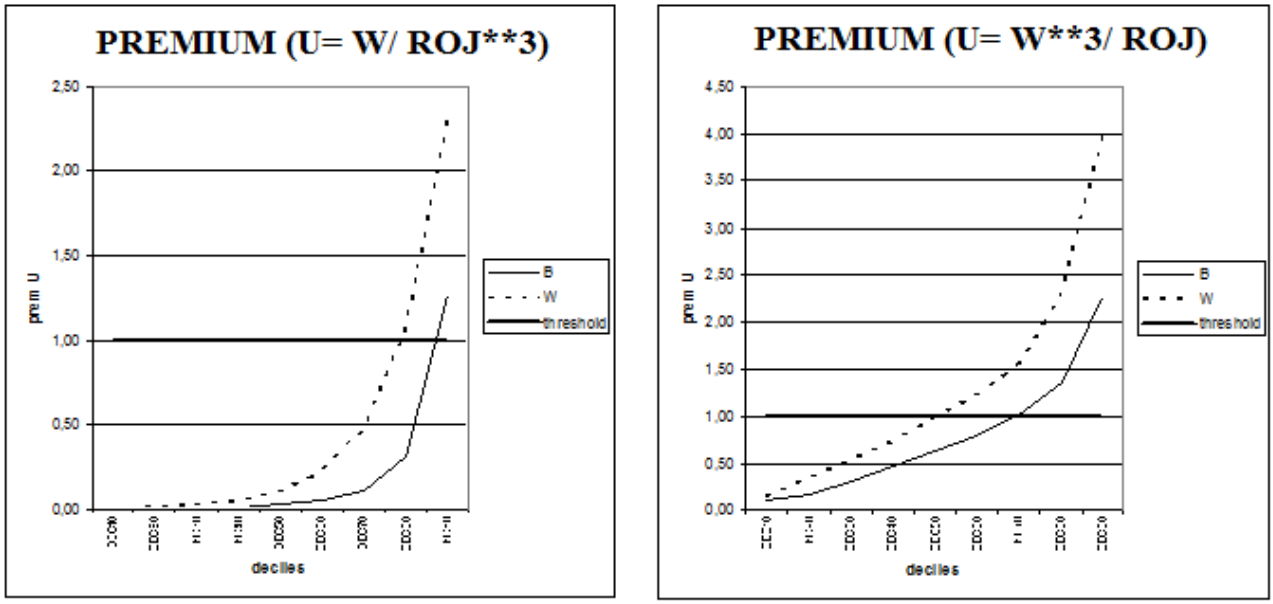


Fig. 9: PREMIUM (W) (9/A) and PREMIUM (ROJ) (9/B)

PREMIUM (U) with varying parameters *m* and *n*



matching stayers are better off than movers under alternative parametrization of the utility function

10.A 10.B

Alternative parametrizations of the benchmark utility either improve the relative performance of the matching stayers (fig. 10 A; *m*=1, *n*=3), or change it only marginally (fig.10 B; *m*=3, *n*=1).

According to the theory of full rationality the voluntary movers ought to do better than the stayers: the opposite appears to hold. This claim is reinforced by the fact that the matching stayers include the "involuntary" ones, i.e. those who had no choice other than sticking to their post. Therefore the median stayers' performance is lower than that of the median "voluntary" stayers who would provide a more precise counterfactual.

Under full rationality the answer to the question "how would most of the movers have performed had they decided not to move" would have to be "they should have performed worse". There are reasons to conclude, therefore, that the hypothesis of "fully rational" decisions of the (voluntary) movers, whether blue or white-collars, should be rejected in favour of the alternative hypothesis of bounded rationality.

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