The Many Facets of Economic Mobility

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Abstract

The literature on economic mobility is vast. Yet, the different indices used by different authors are not measures of the same underlying conceptual entity; rather, different mobility indices measure fundamentally different concepts. Using data for the United States and France, I address such fundamental mobility questions as whether mobility has been rising or falling over time and which groups in the population have more mobility than others. The results show that the answers to even these most fundamental questions depend on the mobility concept used. The implication is that before social scientists "do a mobility study," we need to be very clear about the mobility concept or concepts we wish to study. The choice can and does make a vital difference.

1. Introduction

The literature on economic mobility is vast. Surveys may be found in Atkinson, Bourguignon, and Morrisson (1992), Maasoumi (1998), Fields and Ok (1999a), and Morgan (2005).

The main point of this paper is to show that the different indices used in this literature are not measures of the same underlying conceptual entity. Think about what we've all learned in elementary statistics: the mean and median are both measures of central tendency but they are different measures of central tendency; the variance and Gini coefficient are measures of dispersion but they are different measures of dispersion; and central tendency and dispersion are fundamentally different concepts from one another. In much the same way, I shall maintain in this paper that the different mobility indices in common use are measuring fundamentally different mobility concepts from one another. It is in this sense that mobility really is multifaceted.

The term "mobility" connotes precise ideas to various researchers, but it connotes *different* precise ideas to different researchers. It is for this reason that we often have trouble communicating with one another. Furthermore, these differences remain even after agreeing on a number of other aspects of the mobility about which we are speaking. These other aspects, discussed in the following paragraphs, are whether the context is intergenerational or intragenerational, what is the indicator of social or economic status, and whether the study is at the macro-mobility or micro-mobility level.

One issue is whether the aspect of mobility of interest is intergenerational or intragenerational. In the *intergenerational* context, the recipient unit is the family, specifically a parent and a child. In the *intragenerational* context, the recipient unit is the individual or family at two different dates. The analysis in this paper applies equally to both.

Second, suppose that we have agreed on an indicator of social or economic status. This could be income, consumption, labor market earnings, occupation, education, or any of a number of other indicators for a given recipient unit. The recipient unit may be an individual, a worker, a family, a per capita, or an adult equivalent. For brevity, I shall talk about economic well-being (which I shall call "income") among recipient units (whom I shall call "individuals"), understanding that the analysis is equally applicable to any of the other status indicators and recipient units mentioned above.

Third, the mobility questions we ask and our knowledge about mobility phenomena may be placed into two levels, macro and micro. *Macro* mobility studies start with the question, "How much economic mobility is there?" Answers are of the type "a% of the people stay in the same income quintile," "b% of the people moved up at least $1,000 while c% of the mobility moved down at least $1,000," "the mean absolute value of income change was $d," and "in a panel of length T, the mean number of years in poverty is t*." The macro mobility studies often go beyond this question to ask, "Is economic mobility higher here than there and what accounts for the difference?" Answers would be of the type, "economic mobility has been rising over time," "A has more upward mobility than B because economic growth was higher in A than in B," and "incomes are more stable in C than in D because C has a better social safety net." *Micro* mobility studies, on the other hand, start with the question, "What are the correlates and determinants of the income changes of individual income recipients?" The answers to these questions would be of the type, "unconditionally, income changes are higher for the better-educated," and "other things equal, higher initial income is associated with lower subsequent income growth."

This paper addresses macro mobility. The issues raised here are applicable to both economic and social and mobility, to intergenerational and intragenerational mobility, and to mobility of individuals and of families. The plan is as follows.

I begin in Section 2 by showing that mobility, growth, and inequality are related but distinct concepts. Two simple examples are used to highlight the differences. I then demonstrate in Section 3 that in macro mobility studies, there are actually six fundamentally different concepts that are being measured. They are time-dependence, positional movement, income flux, directional income movement, movement of income shares, and mobility as an equalizer of longer-term incomes.

In Section 4, I then turn to the question, does it make a practical difference which income concept is measured? The most fundamental macro mobility questions are these: (1) Has mobility been rising or falling over time? (2) Which group has more income mobility than another? Using panel data drawn from the Panel Study of Income Dynamics in the United States and the Déclarations Annuelles de Données Sociales and the Echantillon Démographique Permanent in France, I demonstrate that the answers to even these most fundamental questions depend on the mobility concept used. In both countries, mobility has been falling for some mobility concepts but not for others. In both countries, women have more mobility than men for some concepts but men have more mobility than women for others, and likewise the better-educated have more mobility than others for some mobility concepts and less mobility for others.

Section 5 is a brief conclusion. My major point is that before social scientists "do a mobility study," we need to be very clear about the mobility concept or concepts we wish to study. As this work shows, the choice can and does make a vital difference.

2. Mobility, Inequality, and Growth: Two Examples

A. The rooms in a hotel

The famed economist Joseph Schumpeter likened an income distribution to the rooms in a hotel.[1] The rooms at the top are luxurious, those in the middle are ordinary,

[1] The original citation is Schumpeter (1955, p. 126). Schumpeter is cited in Sawhill and Condon (1992) and Danziger and Gottschalk (1995). Jarvis and Jenkins (1996) use the same analogy.

and those in the basement are substandard. On any given night, the occupants of the hotel experience quite unequal accommodations. Later, though, we find that the same people are in different rooms (or, equivalently, the same rooms have different people in them). The difference in the quality of the hotel rooms at each point in time is what we call *inequality.* The movement of hotel guests among different quality rooms constitutes *mobility.* The constant quality of each room means that there is no *growth,* positive or negative.

Schumpeter's hotel analogy raises some fundamental questions about what economic mobility is, how it relates to inequality, and how both relate to economic growth. There is no question that the movement of guests among rooms is an aspect of mobility. But is that *all* there is to mobility? If the existing furnishings are moved from some rooms to others, is there mobility then? What if the hotel is refurbished so that some of the rooms are made nicer? Do the lucky residents of these rooms enjoy upward mobility? As for those whose rooms are not upgraded, do they suffer downward mobility because they are now in a relatively worse position?

These are fundamental questions. In Section 3, I will present different answers to them. First, though, let us look at another example to make an additional fundamental point.

B. Anonymous and personalized data over time

In Schumpeter's hotel example, we know which guest occupies which room on any given night. Such information can be gotten only from panel data, in which each individual is observed at two or more points in time. If we have such data and can trace the guest-room pairings over a number of nights, we can compare the long-term equality of accommodations with the equality of accommodations on any given night. It is apparent in this example that the greater is the movement of guests among rooms of fixed quality, the greater is the long-term equality of accommodations.

Suppose we had not had such panel data but instead had had only comparable cross sections. We would not have been able to have said anything about mobility or about inequality in the longer run. We would only have been able to have compared the inequality of accommodations at each point in time. The only conclusion we could have reached is that inequality was unchanged.

Let us now consider another example. Suppose we were to draw samples of two persons from an economy in a base year and a final year and measure the incomes of each person in each of the two years. Assume the data are drawn from comparable cross sections in the two years but that the individuals sampled are not the same in the two years (or if they are the same, the surveys do not record who is who). Let the distribution of income in the base year be $y_1 = (1, 3)$ and in the final year $y_2 = (1, 5)$. In a very straightforward sense, we would be justified in saying that the change in the income distribution from $y_1 = (1, 3)$ to $y_2 = (1, 5)$ entails *economic growth* but the growth that takes place *raises inequality.*

What can be said about *economic mobility* from such anonymous data? Very simply, nothing. This is because the data are anonymous, and so we don't know which income recipient is which.[3]

In this little example, there are only two underlying possibilities: either the two individuals occupied the same positions in each period or they swapped positions. Adopt the notational convention of arraying income recipients in some order in the base-year distribution, keep these identified individuals in the same position in the final year, and

[3] It might be better to say nothing *believable* can be learned from such anonymous data. Some researchers have not been content to say nothing when only anonymous data are available, instead making assumptions how particular individuals' incomes change in comparable cross-sections. The answers merely reflect the assumptions maintained in deriving them. To me, the results of such exercises are literally unbelievable and should be given no credence.

denote the movement from a base-year personalized vector to a final-year personalized vector by $\rightarrow$. The two possible patterns of longitudinal income changes consistent with y_1 becoming y_2 may then be denoted:

I: $(1, 3) \rightarrow (1, 5)$

and

II: $(1, 3) \rightarrow (5, 1)$.

Do situations I and II have the same economic mobility as one another? In my experience, most observers have said they do not, and I agree.

More difficult, though, is the question, how specifically do the two mobility situations differ? To answer this question, we must have a clear idea of what we mean by economic mobility. We turn now to six mobility concepts that have been used in the literature.

3. Six Mobility Concepts

The mobility literature is plagued by people using the same term "economic mobility" (or "social mobility") to mean different things. As a consequence, we often talk past one another.

Six notions of mobility need to be distinguished. Briefly, they are: *time-dependence* which measures the extent to which economic well-being in the past determines individuals' economic well-being at present: *positional movement,* which is what we measure when we look at individuals' changes in economic positions (ranks, centiles, deciles, or quintiles), *share movement,* which arises when individuals' shares of the total income change; *income flux,* which is what we gauge when we look at the size of the fluctuations in individuals' incomes but not their sign; *directional income movement,* which is what we measure when we determine how many people move up or down how many dollars; and *mobility as an equalizer of longer-term incomes,* which involves

comparing the inequality of income at one point in time with the inequality of income over a longer period.

Let us now look at each of these in greater detail.

A. Time-independence

Time-dependence is the notion that incomes at present are determined by incomes in the past. Time-dependence is highest when income at present is *entirely* determined by past income. As we move further away from this deterministic situation, we get closer to the situation where current income is independent of past income. The notion of mobility as time-independence is that mobility is greatest when current and past income are unrelated to one another.

A common way of gauging time-dependence and -independence is by constructing a quantile mobility matrix. (A quantile mobility matrix classifies people in each year according to fixed categories such as five equal-sized quintiles or ten equal-sized deciles, with base-year quantile determining the row and final-year quantile determining the column.) If incomes were perfectly positively time-dependent, the quantile transition matrix would have all entries lying along the principal diagonal, and thus the transition matrix would be an identity matrix – for example:

$$P_1 = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

(A theoretical possibility, never observed in practice, is negative time-independence, the limiting value of which is when final-year quantile is inversely related to base-year quantile. If such a case were to be observed, the transition matrix would be a mirror image of P_2.)

Suppose that instead of perfect time-dependence, incomes were time-independent. Again taking the example of classifying people into income quintiles, perfect time-independence would mean that 20% of those in each base-year income quintile would be found in each final-year income quintile, producing the following quintile transition matrix:

$$P_2 = \begin{bmatrix} 0.2 & 0.2 & 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 & 0.2 & 0.2 \end{bmatrix}$$

In order to be able to implement the notion of mobility as time-independence, we need a way of measuring how close an actual transition matrix is to these theoretical possibilities. In the case of a quintile transition matrix, the number of people in cell i, j under time-independence is the P_2 matrix multiplied by an appropriate scaling factor such that the sum of the expected frequencies is the total sample size N:

$$P_3 = \begin{bmatrix} .04N & .04N & .04N & .04N & .04N \\ .04N & .04N & .04N & .04N & .04N \\ .04N & .04N & .04N & .04N & .04N \\ .04N & .04N & .04N & .04N & .04N \\ .04N & .04N & .04N & .04N & .04N \end{bmatrix}$$

We may then compare these expected frequencies under time-independence EXP_{ij} with the observed frequencies OBS_{ij} by calculating the standard (Pearson) chi-squared statistic

$$\chi^2 = \sum_i \sum_j \frac{(OBS_{ij} - EXP_{ij})^2}{EXP_{ij}} \ .$$

Note that the chi-squared statistic is highest the furthest we are from time-independence, and in this sense chi-squared measures *immobility*. In order to have a statistic that measures *mobility*, we need a measure that increases as we get closer to time-independence. One such measure is minus chi-squared; it is used below.

The chi-squared statistic is not the only measure of time-dependence. Standard statistical packages contain contingency table procedures that produce quite a number of independence statistics. For instance, in addition to producing a chi-squared value, Stata also generates the likelihood-ratio chi-squared, Cramer's V, gamma, and Kendall's tau-b. And, if the researcher has access to the micro data from which the quantile transition matrix has been constructed, s/he can also calculate the Pearson correlation coefficient or the Spearman rank correlation coefficient. Note that all of these indices take on higher values the more *immobile* the underlying situation is. Indices of this kind have been calculated by Friedman and Kuznets (1954), Schiller (1977), Atkinson, Bouguignon, and Morrisson (1992), Hungerford (1993), and OECD (1996, 1997), among others. In order to make higher values correspond to *greater* mobility, some authors have proposed using one minus the correlation between incomes (e.g., Department of Employment, 1973) or one minus the correlation between log-incomes (Hart, 1981).

B. Positional movement

According to this notion of mobility, an individual is deemed to have experienced mobility if and only if s/he changes position in the income distribution. Although the most commonly-used measures of economic position are individuals' quintiles or deciles in the income distribution, there is no reason why ventiles, centiles, or even ranks might not be used instead.

Positional-movement indices then gauge the extent to which positions change in a population or a sample. Many researchers have used the immobility ratio, viz., the fraction of cases lying along the principal diagonal, while others have used the mean number of quantiles moved (in absolute value), the mean upward jump, and the like (Boudon, 1973; Lillard and Willis, 1978; Gottschalk, 1982; Atkinson, Bourguignon, and Morrisson, 1992; and OECD, 1996, 1997). A sophisticated positional movement index was developed axiomatically by King (1983).

Observe that the notion of positional movement is thoroughly relative: a person can experience relative income mobility even if his/her own income doesn't change, provided that others' incomes change by enough that the person in question experiences a change in position. There is another way in which a person can experience relative income mobility even if his/her own income remains unchanged, and that is through share movement, to which we now turn.

C. Share movement

Some people, even thoroughgoing relativists, may not care which quintile, decile, or centile of the income distribution they are in – in fact, they may very well not even know their position. Some relativists are concerned about how their incomes compare with others'. Suppose your income rises by 50% but everyone else's rises by 100%. You may feel that you have lost ground, because your income share has fallen. If you are one of those who conceptualizes mobility as share movement, you may indeed judge yourself to have experienced downward mobility, not because your income has fallen (because in this example, it hasn't) but because your *share* of the total has fallen.

To gauge the extent of share-movement in a population, the mean share movement will not work as an index. This is because the income shares must sum to 100%, and therefore the changes in shares must necessarily average out to zero. What would work as an index of share movement is the mean absolute value of share changes.

To the best of my knowledge, this measure has not been calculated other than in my own work with co-authors (see Section 4 below).

Inadvertently, a measure of share movement is commonly calculated. It can readily be shown that the correlation between base-year and final-year *incomes* is the same as the correlation between base-year and final-year *income shares.* Thus, the correlation coefficient frequently calculated from micro data can be viewed as an (inverse) index of share movement.

Chakravarty, Dutta, and Weymark (1985) analyzed the issue of relative income mobility using ethical (welfarist) foundations. For them, an initial distribution of income exhibits complete relative immobility if and only if the income shares are the same for all individuals in all time periods. They then derived the following share movement index: $M_{CDW} = \frac{E(Y_a)}{E(Y_1)} - 1$, where $E(Y_a)$ is an index of equality of average incomes and $E(Y_1)$ is an index of equality of incomes in period one. For them, the mobility index is positive (negative), and therefore the mobility process is desirable (undesirable), if and only if average incomes are more (less) equally distributed than initial incomes were. Thus, Chakravarty, Dutta, and Weymark (1985) assign welfare significance only to the relative aspect of changes in incomes while ignoring whether incomes are rising or falling, a judgment that many including myself find objectionable.

What share-movement measures is *flux*, i.e., how much variation there is between base-year and final-year. Here, the aspect of flux that is being measured is *income shares,* whereas in subsection C, it was *positions in the income distribution*. For those observers who are interested in flux, but who are more concerned about *incomes* than shares or positions, the next class of measures may be appealing.

D. Income flux (also called "instability" or "non-directional income movement")

Consider two persons, one of whom experiences a $10,000 income gain and the other a $10,000 income loss. How much income movement has taken place? If your answer is $20,000 total or $10,000 per capita, you have used an income flux measure, in the sense that you have weighed gains and losses similarly without regard to the direction of change. Precisely this measure was devised and justified axiomatically by Fields and Ok (1996). Specifically, the first Fields-Ok per capita measure is

$$m^{(1)}{}_n(x, y) = \frac{1}{n}\sum_{j=1}^{n}|x_i - y_i|,$$

that is, the mean absolute income change. This index makes the implicit assumption that a dollar gain or loss is the same regardless of the income level of the person experiencing it. To the contrary, we may want to consider a dollar change differently depending on how rich or poor the person was initially – specifically, by regarding a given dollar amount of change as counting for less the richer is the income recipient. A measure that was derived axiomatically and shown to possess this property is the second per capita measure proposed by Fields and Ok (1999):

$$m^{(2)}{}_n(x, y) = \frac{1}{n}\sum_{j=1}^{n}|\log x_i - \log y_i|.$$

Income flux has also been gauged in studies by Abowd and Card (1989), Gottschalk and Moffitt (1994), and Stevens (2001).

E. Directional income movement

Many observers are likely to be more interested in the directions and magnitudes of income changes than they are in their absolute value. For these observers, the concept of interest is directional income movement.

Several ad hoc directional indices are in use, such as the fraction of upward or downward movers, the average amount gained by the winners, and the average amount lost by the losers. Moving beyond these ad hoc measures, Fields and Ok (1999b) axiomatized directional income movement and devised as a measure the mean change in log-incomes:

$$m^{(3)}{}_n(x, y) = \frac{1}{n}\sum_{j=1}^{n}(\log x_i - \log y_i).$$

This measure combines income gains and losses taking account of the income levels of each of the gainers and each of the losers.

F. Mobility as an equalizer of longer-term incomes relative to the base

The sixth and last concept is mobility as an equalizer of longer-term incomes. One of the primary motivations for economic mobility studies is to gauge the extent to which longer-term incomes are distributed more or less equally than are single-year incomes. Krugman (1992), for instance, has written: "If income mobility were very high, the degree of inequality in any given year would be unimportant, because the distribution of lifetime income would be very even . . . An increase in income mobility tends to make the distribution of lifetime income more equal." Similar statements have been made by, among others, Shorrocks (1978), Maasoumi and Zandvakili (1986), Atkinson, Bourguignon, and Morrisson (1992), Slemrod (1992), and Jarvis and Jenkins (1998).

What unites these and other authors is a concern with income mobility as an equalizer of longer-term incomes along with the judgment that the extent of such equalization is of ethical relevance. In Fields (2004), I show that although the established mobility measures do a good job of measuring other mobility concepts, they do not adequately gauge this one.[5]

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[5] In particular, the measure proposed by Shorrocks (1978) and generalized by Maasoumi and Zandvakili (1986) gauges the inequality of longer-term incomes relative to the weighted average of inequality *in each period*, not inequality in *the base period.*. On the other hand, while the index proposed by Chakravarty, Dutta, and Weymark (1985) does relate the inequality of longer-term incomes to inequality in the base

In the absence of a good measure of this concept, I worked out a class of measures representing it. One easily-implementable measure in this class is the equalization measure

$$\mathcal{E} \equiv 1 - (I(\boldsymbol{a}) / I(\boldsymbol{y1})),$$

where $\boldsymbol{a}$ is the vector of average incomes, $\boldsymbol{y1}$ is the vector of base-year incomes, and I(.) is an inequality measure.[6] When incomes over a longer period are distributed as unequally as base-year incomes are, $\mathcal{E} = 0$. When incomes over a longer period are distributed more equally than base-year incomes, $\mathcal{E} > 0$, signifying that the income mobility that took place caused longer-term incomes to be more equally distributed than were base-year incomes. Lastly, when incomes over a longer period are distributed less equally than base-year incomes, $\mathcal{E} < 0$, i.e., the pattern of changes has been in the disequalizing direction.

G. Summary

In this section I have presented six mobility concepts: time-independence, positional movement, share movement, income flux, directional income movement, and mobility as an equalizer of longer-term incomes relative to the base. Because each of these concepts is different from the others, a measure of one concept does not necessarily accord with the measure of another. Whether they give the same qualitative answers in practice is an empirical question, to which we now turn.

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period, when they put their index to use, they assign welfare significance *only* to the change in inequality and *not* to any change in the level of income. See Fields (2004) for further discussion.

[6] In the empirical work below, the Gini coefficient is used for the United States, and Theil's L index for France.

4. Comparing the Mobility Concepts

Consider how two or more mobility situations compare with one another. Which has more mobility? That different mobility *indexes* can produce different ordinal rankings is well-known; see for instance Dardanoni (1993), Maasoumi (1998), and Checchi and Dardanoni (2003). What is unclear, though, is whether the different indexes produce different ordinal rankings because they are gauging fundamentally *different concepts* (as, e.g., income inequality is a fundamentally different concept from poverty) or because they produce different ordinal rankings *for the same concept* (as, e.g., may arise for two different Lorenz-consistent inequality indexes when Lorenz curves cross).

This section compares the six mobility concepts, using one index of each. These indices are defined formally in Table 1. Statistical software for calculating a number of these indices (and others) is available in Van Kerm (2002).

A. How do the six mobility concepts compare in the two examples?

First, let us take the hotel example, in which guests move between rooms of different quality from one night to the next. Because guests are switching rooms and some rooms are better than others, we know that we do not have perfect *time-dependence*.[7] The movements among rooms of different quality means that *positional movement* takes place, as does *share movement*. There is *flux*, because some guests experience different rooms of different quality. Those who move up in the hotel experience *upward directional movement;* the opposite is the case for those moving down in the hotel. Finally, because the average quality experienced over a number of nights is distributed more equally than the quality on the first night or on any other night, mobility has *equalized longer-term outcomes* relative to any given night's distribution.

[7] Rejecting perfect *time-dependence* does not mean that we do or do not have perfect *time-independence*. Whether we do or not depends on whether all guests are randomly assigned to rooms night after night or whether the assignment one night is linked to the previous assignment.

Consider next the two-person income example. Either the personalized change was

$$\text{I: } (1, 3) \rightarrow (1, 5)$$
$$\quad \alpha\ \beta \qquad \alpha\ \beta$$

or it was

$$\text{II: } (1, 3) \rightarrow (5, 1).$$
$$\quad \alpha\ \beta \qquad \alpha\ \beta$$

Here, I have inserted the recipients' names (in Greek letters) so that we can talk more easily about who is who.

What has happened in Case I? There is perfect *time-dependence* in ranks but not in incomes. There has been no *positional movement.* There has been *share movement*, upward in the case of individual β and downward in the case of individual α. Incomes changed and therefore *income flux* took place; its average absolute value was $1. As for *directional income movement,* income growth took place for individual β but not for individual α. Finally, the distribution of average income over the longer term is (1, 4), which is more unequal than the base-year distribution (1, 3). Mobility therefore *disequalized longer-term incomes relative to base-year incomes.*

What if the underlying situation had been that of Case II? In this case, some of the preceding indicators are the same and some are different. Once again, there is perfect *time-dependence* in ranks but not in incomes, but this time the dependence is negative, not positive. Now, there has been *positional movement.* There also have been *share movements*. *Income flux* took place; now, its average magnitude is $3. *Directional income movements* took place for both individuals in this case, upward for individual α and downward for individual β. Finally, the distribution of average income over the longer term is (3, 2), from which we see that longer-term income is more equally distributed than *either* base-year *or* final-year income, and mobility therefore *equalized longer-term incomes relative to base-year incomes.*

In this sub-section, we asked: Was there mobility in the hotel? Was there mobility in the two-person economy? In each case, what was its nature? The answers to these questions have been shown to depend on which mobility concept is used. As we shall now see, different conclusions on the nature of mobility also arise in empirical applications for the United States and France.

B. How do the six mobility concepts compare in two country cases?

The first empirical application is from the United States. Measures of the six concepts are used to gauge five-year income mobility from 1970-75 to 1990-95. Data are drawn from the Panel Study of Income Dynamics on earnings (including overtime and bonuses) for men aged 25-60 in the base year who were not students, retired, or self-employed and who had positive earnings in both years. Further details are presented in Fields, Leary, and Ok (2000) and Fields (2004).

Figure 1 plots the time paths of five-year earnings mobility (in real dollars) for one measure of each of the six concepts, as presented in Table 1.[9] We see that the measures of time-independence, positional movement, share movement, and income flux all exhibit the same pattern: rising until 1980-85, falling thereafter. However, these time paths do *not* hold for the other two concepts. The measure of directional income movement exhibits a saw-tooth pattern. On the other hand, the measure of mobility as an equalizer of longer-term incomes exhibits a peak followed by a valley. Moreover, this last measure crossed over from positive values in the 1970's to zero or negative values in the 1980's and 1990's. In other words, earnings mobility among U.S. men acted to *equalize* longer-term incomes relative to base-year income in the 1970's and *stopped doing so* since. So, contrary to Krugman's conjecture and the others cited above, mobility

[9] In this figure and in those that follow, the base-year of the mobility period is indicated along the horizontal axis.

may *not* be making the distribution of longer-term income more equal in the United States any longer.

A second empirical applications is from France, drawing on work of Buchinsky, Fields, Fougère, and Kramarz (2003). The French data come from employers' declarations to the government of wages and salaries paid to each of their employees (now known as the Déclarations Annuelles de Données Sociales, formerly called the Déclarations Annuelles de Salaires). These data were merged with the information on sex, age, and education level from the government's demographic registry (Echantillon Démographique Permanent). Two-year mobility in real francs was calculated beginning in 1967-69 and ending in 1997-99.

The first question for France is the same as for the U.S.: how did mobility evolve over time for each of these six mobility concepts? In this case, we find in Figure 2 that measures of the first five mobility concepts all exhibit the same pattern: higher mobility at the beginning, followed by a sharp drop, and then a leveling-off at a new lower level. However, the sixth mobility concept – mobility as an equalizer of longer-term income – shows a different pattern. This type of mobility reversed course and has now reached its earlier levels. Note too that in France, unlike the United States, these values are always positive – that is, two-year average earnings have always been more equally distributed than base-year earnings were.

The second and third questions for France concern demographic differences. Who has more mobility: Women or men? Better-educated or less-educated workers? The data are presented in Figures 3 and 4. For both questions, *the answers differ depending on which mobility concept is used.* By gender, women have *more* time-independence and positional movement than men, *less* share movement than men, *about the same* flux and directional movement in logs, and about *the same* amount of mobility as an equalizer of longer-term incomes. By education, those with the highest educational attainments have *less* time-independence and positional movement, and if anything *more* share movement,

flux, and directional income movement in logs. Finally, mobility equalized longer-term incomes *less* for the best-educated and moderately-educated than for the least-educated in the early years but this difference appears to have disappeared more recently.

In summary, these results for the United States and France show that the different mobility concepts produce qualitatively different empirical patterns. For some mobility concepts, mobility has fallen over time; for others, it hasn't. For some mobility concepts, women have more mobility than men; for others, men have more mobility than women. For some mobility concepts, mobility rises with education; for others, it falls.

These different results imply that researchers must be very cautious before saying that mobility is higher here than there, for this group as compared with that group, or now as compared with before. In our mobility studies, we must specify *which* mobility concept or concepts we are speaking about. Rather than talking about "mobility," we would be able to communicate more effectively if we were to speak in terms of "positional movement," "income flux," or whatever. Let us decide which aspect(s) of mobility is (are) of greatest interest to us and choose the mobility indices we use accordingly. As these empirical results demonstrate, it *does* make a difference which concept(s) we choose to measure.

5. Conclusion

This paper demonstrated that economic mobility truly is multifaceted. The six facets are time-independence, positional movement, share movement, flux, directional income-movement, and mobility as an equalizer of longer-term incomes. These six concepts were explored, and it was shown that they can produce very different qualitative answers to such basic questions as whether economic mobility is increasing or decreasing over time, whether women have more or less economic mobility than men, and whether the better-educated have more or less mobility than those with less education.

It follows that mobility comparisons can only be made once the mobility concept under examination has been made precise. An unqualified statement of the form "Mobility is higher in *A* than in *B*" is as vague and meaningless as saying that "Income distribution is better in *X* than in *Y*." In the same way that we have learned to talk about *which aspect of the income distribution* is better in *X* than in *Y* (for example, location, dispersion, or economic well-being) according to a particular measure of that aspect, we need to learn to talk about *which aspect of mobility* is higher in *A* than in *B*.

The various mobility concepts used in the literature differ from one another in ways that are only imperfectly understood. Likewise, the various measures of a given concept also differ from one another in ways that are only imperfectly understood. A task for future research would be to explore these differences and systematize them.

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Table 1.
Measures of Six Mobility Concepts Used in the Empirical Work.

Time-independence is measured by $1\text{-}r(y_1, y_2)$, where r is the Pearson correlation coefficient.
Positional-movement is measured by $1\text{-}\rho(y_1, y_2)$, where ρ is the rank correlation coefficient.
Per-capita share movement is measured by $(1/n)\ \Sigma\ \lvert s(y_{2i}) - s(y_{1i})\rvert$, where s(.) denotes i's share of total income.
Per-capita flux is measured by $(1/n)\ \Sigma\ \lvert y_{2i} - y_{1i}\rvert$.
Per-capita directional movement in logarithms is measured by $(1/n)\ \Sigma\ (\log y_{2i} - \log y_{1i})$.
Mobility as an equalizer of longer-term incomes is measured by $\mathcal{E} \equiv 1 - (I(\boldsymbol{a}) / I(\boldsymbol{y1}))$, where $\boldsymbol{a}$ is the vector of average incomes, $\boldsymbol{y1}$ is the vector of base-year incomes, and I(.) is an inequality measure (either the Gini coefficient or the Theil index).

Figure 1. United States: Evolution of Earnings Mobility, 1970- 1995

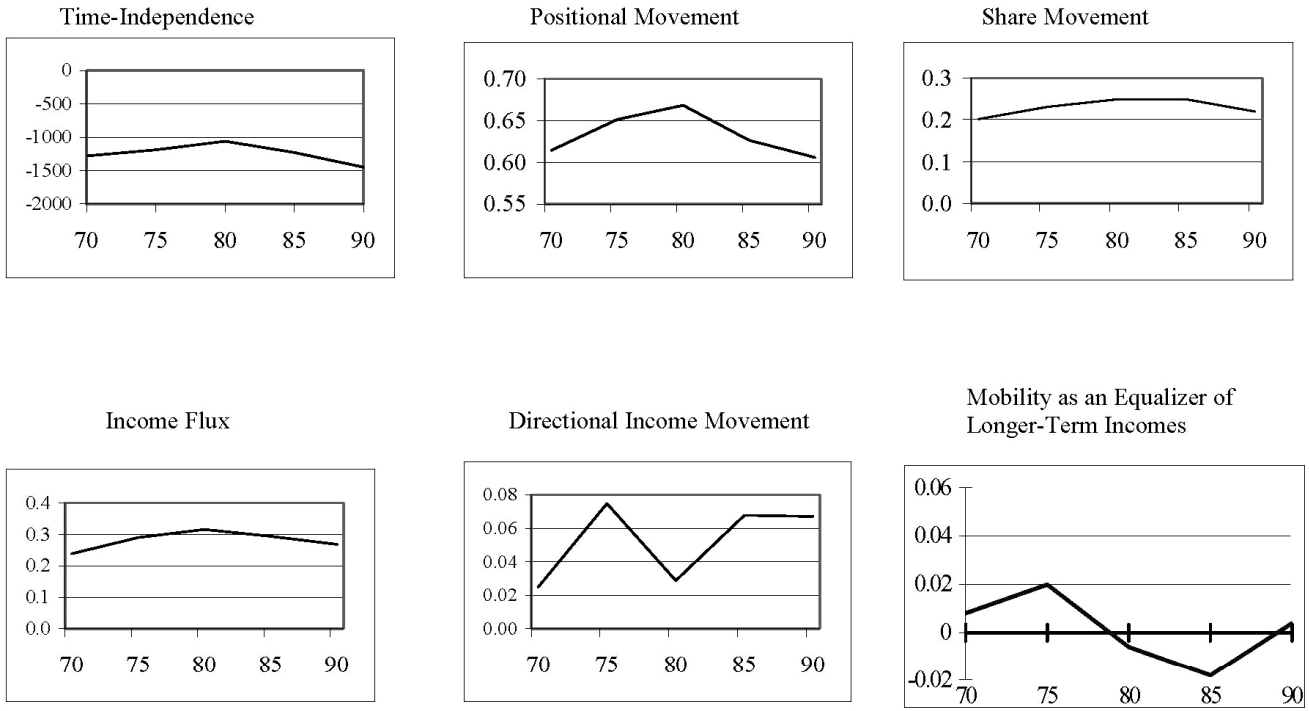

Figure 2. France: Evolution of Wage Mobility, 1967–1999, Overall
(with 95 percent confidence intervals)

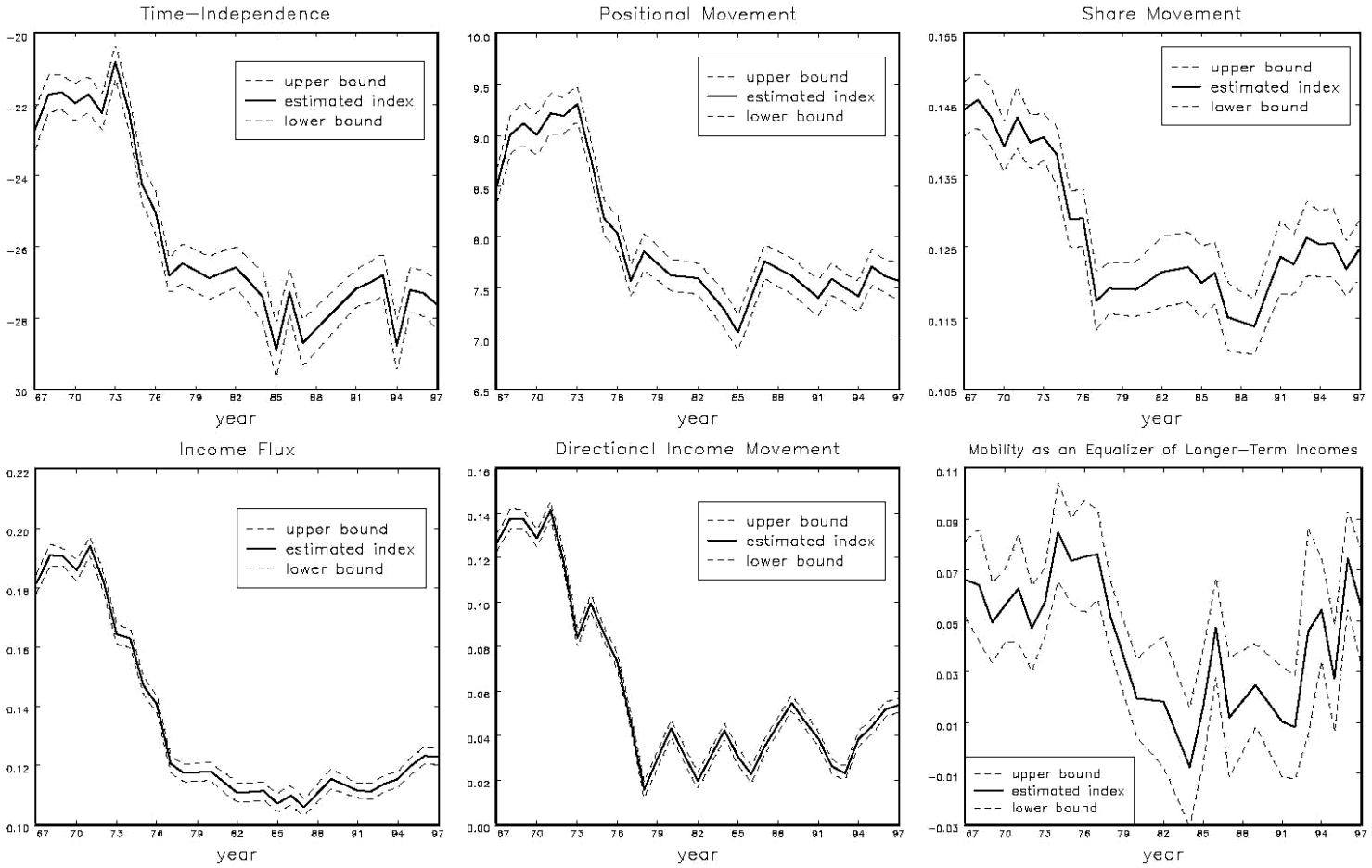

Figure 3. France: Evolution of Wage Mobility, 1967–1999, by Gender
(with 95 percent confidence intervals)

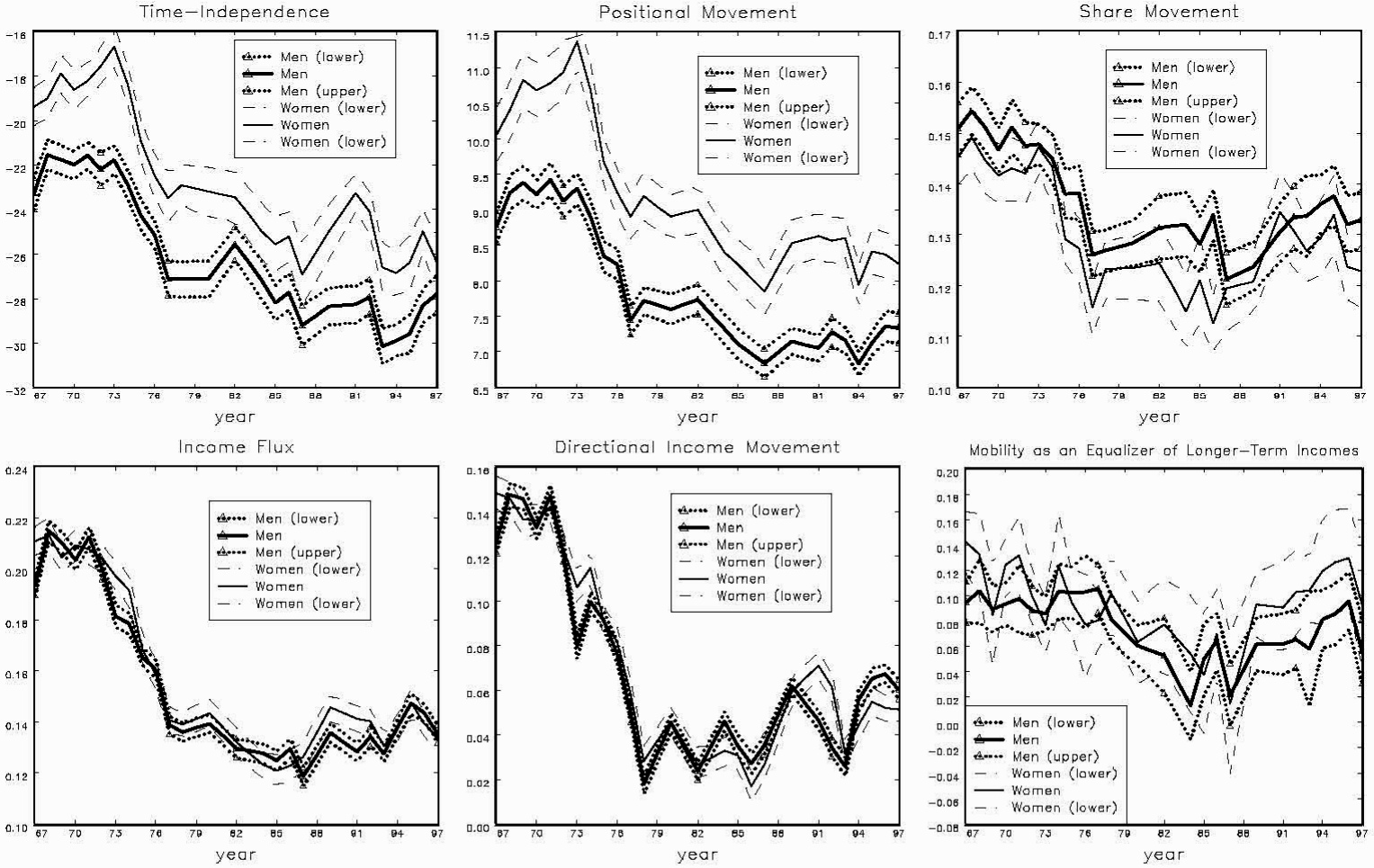

Figure 4. France: Evolution of Wage Mobility, 1967–1999, by Education

(low: primary or junior high sch.; medium: technical sch.; high: secondary dipl. (baccalaureat) and beyo