HOW HAS ELDERLY MIGRATION CHANGED IN THE 21ST CENTURY? WHAT THE DATA CAN – *AND CAN'T* – TELL US

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ABSTRACT

Interstate elderly migration is a central argument in state policy debates regarding tax incentives, and the 'return migration' of the elderly who need assistance has public health implications. Yet little is known about how patterns of interstate elderly migration have changed in the 21st century; our study attempts to fill that gap. The replacement of the Census Long Form (CLF) with the American Community Survey (ACS) requires us to devise a methodology for reconciling the differences between the two data sources and creating comparable migration measures. Two commonly used data sources for U.S. migration research -- the Current Population Survey (CPS) and Internal Revenue Service (IRS) -- prove inadequate for studying the migration of subpopulations such as the elderly. However, because they span 1980-2010, they aid in our methodology and help illuminate if detected changes in migration are genuine or instead an artifact of using the ACS. We find that the ACS can generate comparable migration data that reveals a continuation of previously identified geographic patterns plus changes unique to the 2000s. The small number of migrants the ACS yields, however, weakens its usefulness for analyzing annual migration patterns or for small population states. Most troubling, its changed definition of residence and survey timing leaves us unable to answer definitively the basic question of whether elderly migration has increased, decreased or stayed the same in the 21st century.

INTRODUCTION

The elderly are the fastest growing demographic group, and one that has been aggressively courted by state policymakers. In 2013 alone, laws to reduce income taxes on pensions have been proposed in at least three states (Nebraska, Montana and Minnesota), and the District of Columbia is currently considering reducing its estate tax, all with the over-riding concern that such taxes are encouraging the elderly to move out (DeBonis 2013; Schulte 2013). These actions suggest that policymakers, at least, believe that the elderly are mobile and responsive to tax incentives. Are they? Elderly migration has been long studied (Sergeant, Ekerdt, & Chapin 2008; Walters 2002) and, typically, each decennial census has brought with it a flurry of new research investigating who is moving where and how frequently (Conway & Rork 2010; Flynn, Longino, Wiseman, & Biggar 1985; Lin 1999; Longino & Bradley 2003). The general consensus from this research is that interstate elderly migration is relatively rare (less than 1% move per year) and that the geographic patterns have changed little over time. Not surprisingly, then, panel studies of elderly migration – which take into account this persistence – find little effect of state policies on migration behavior (Bakija & Slemrod 2004; Conway & Rork 2006, 2012a). Perhaps as a result of these studies, after decades of steadily expanding these tax breaks for the first time two states (Georgia and Michigan) have significantly pared down tax breaks for their elderly constituents and others are debating it ("2012 CCH Whole Ball of Tax" 2012; Conway & Rork 2012b; Goodman 2013).

To our knowledge, however, no update on interstate elderly migration has occurred since the replacement of the Census Long Form (CLF) -- and the individual-level, public-use data it provided – with the American Community Survey (ACS). Yet, many demographic, economic and societal changes have occurred since the 1995-2000 migration period covered by the final decennial census that could affect elderly migration. The elderly of the 21st century are more likely than earlier cohorts to have been dual earner couples who have defined-contribution rather than defined-benefit pension plans. The explosion of the internet and mobile devices – and the likelihood of the elderly to use them – has made long distance communication and commuting much easier and has greatly reduced the cost of gathering information about potential destinations. And then there was the Great Recession, which increased unemployment/early retirement and reduced retirement savings, two potentially key factors in migration behavior. All of these factors suggest that genuine changes in interstate elderly migration are plausible, if not likely.

Recent migration studies have instead focused on the effects of the Great Recession on the migration rates of working age adults or the population overall and have documented their steady declines (Cooke, 2011; Molloy et al., 2011; for evidence that the recent declines are overstated, see Kaplan & Schulhofer-Wohl, 2012). Such research finds that while the Great Recession contributed to the decline in the late 2000s, the pattern actually began in the 1980s and has been fairly steady over time. The aging of the population is often given as one possible explanation, since migration rates have historically tended to decline with age. Whether or not this downward trend extends to the elderly themselves is unclear; Molloy, Smith and Wozniak (2011, Table 2) report brief, descriptive evidence that elderly migration declined in the 2000s while Cooke (2011)'s multivariate analyses find that the relative propensity to move increased among the elderly between 1999 and 2009. Wolf and Longino (2005), whose data ends in 2003, find that interstate migration rates have generally been stable or declined since 1950, except for the near- and young-elderly. These studies all rely heavily on the Current Population Survey (CPS). While the CPS may be of sufficient size to study migration patterns of the overall population or large subpopulations with high migration rates, as shown shortly it yields a very small number of elderly interstate migrants (<300 observations) each year. Such a small sample strains its credibility in detecting changes in elderly migration over time and renders it infeasible for use in determining *where* the elderly are moving. These limitations are further magnified if one is investigating a subset of the elderly, such as high income households who are likely most affected by state tax incentives or those reporting a disability and may be moving to obtain assistance.

Investigating the relatively rare event of elderly interstate migration requires a large sample, which explains why researchers have relied heavily on CLF data.[1] It also highlights the critical need to find a way to use and make comparable the largest sample available for the 21st century – the American Community Survey (ACS). Using the ACS and comparing it to the CLF presents several choices and challenges (Franklin & Plane 2006; Newbold 2011; Rogers, Raymer, & Newbold 2003); several of them – such as the differing residence definitions and migration intervals – are especially acute when studying the elderly.

The purpose of our research is therefore twofold. Our overarching goal is to present evidence on whether and how elderly interstate migration patterns have changed since the end of the CLF in 2000. This research therefore extends the tradition of updating our knowledge on elderly migration with each new decade; however, we must now rely on a different data source, making comparisons difficult. Our second goal, then, is to develop a methodology for creating comparable migration measures from the ACS. This goal requires that we first identify the

[1](Ruggles 2013, p. 293) touts the importance of such data as well: "Consistent large-scale microdata that extend over many decades and span national boundaries with fine geographic detail provide a unique laboratory for studying demographic processes and for testing social and economic models." While his article offers many advances for migration researchers, such as the growth of historical migration data and international data and the promise of future data, the discontinuity in US data caused by the switch to the ACS is not discussed. Similarly, the problems caused by this discontinuity is not addressed in recent work that attempts to combine the two sources to study patterns over time (e.g. Iceland et al., 2012).

challenges in using the ACS and propose possible solutions. We then use a variety of empirical techniques and two alternative datasets to implement and measure the success of our proposed solutions. While our focus is on the elderly, these solutions can be applied to any subpopulation for whom alternative data sources are inadequate, such as potential welfare recipients or recent college graduates. Once the comparability of our ACS migration data is established, we provide evidence as to how elderly interstate migration has and hasn't changed. We close with a discussion of the challenges that remain – what the data *can't* tell us -- and a cautionary note about the ACS's limitations in further elderly migration research.

2. MIGRATION DATA, MEASURES AND CHALLENGES

Our primary data sources are the 1980, 1990, and 2000 Integrated Public Use Microdata Series (IPUMS) and the ACS from 2006-2010. We also use data from the CPS and the Statistics of Income Division of the Internal Revenue Service (IRS) in devising and measuring the effectiveness of our methods of constructing comparable data. We limit our study to the 48 contiguous states. Table 1 describes the key features of each data source. While others have discussed the challenges in comparing migration across different data sources (e.g., Franklin and Plane (2006), Rogers et al (2003), and National Research Council (2006)), we focus on the specific challenges of measuring elderly interstate migration and, importantly, explore possible solutions.

The IPUMS is individual-level data taken from the CLF and, representing approximately 5% of the US population, has been used extensively in past research (Conway & Houtenville 2001; Conway & Rork 2010, 2012a; Duncombe, Robbins, & Wolf 2001; Flynn et al. 1985; Lin 1999; Longino & Bradley 2003; Önder & Schlunk 2012). As such, it is the primary source for the current wisdom regarding elderly interstate migration and the 'updates' given over time. We therefore use it in our comparison as well. On census day, April 1st, the IPUMS/CLF asks respondents to compare their current 'usual' residence, which is "…the place where a person spends 'most' of his or her time," (Van Auken, Hammer, Voss, & Veroff 2006, p. 278), to where they resided five years ago. It therefore captures migration over five-year periods (i.e., 1975-80, 1985-90 and 1995-2000) and misses multiple moves that take place during the interval. It also captures migration that took place when the respondent was up to five years younger.

The IPUMS/CLF ended with the 2000 census and was replaced with the ACS, which became nationally representative in 2005. The ACS is conducted each year, with continuous sampling throughout the year, and its publicly available, individual-level data is based on 1% of the US population. It therefore takes five years of ACS data to approximate the sample size of the IPUMS. The migration question in the ACS compares current residence to that one year ago and so captures migration over only a 1-year period. For both reasons, in most of our analyses we use 2006-2010 ACS data (which captures migration during 2005-2010) to create a comparable counterpart and '2010 update' to the earlier IPUMS samples.

The other data sources we use, the CPS and IRS, are helpful in that they span the time period before, during and after the switch to the ACS. Both contain migration measures over a 1-year period; in addition, the CPS contains 5-year migration measures for some years. However, both suffer severe limitations. As noted above, the small sample size of the CPS strains its credibility to detect geographic patterns or the migration behavior of small or relatively immobile populations. The IRS contains no demographic information, providing only counts of taxpayers (i.e., exemptions), and thus cannot be further broken down into demographic groups. It also misses those who are not required to file federal income tax returns and so "under-represents the poor and the elderly," (Gross 2014). Likewise, it misses those who file late, which tend to be the more complicated returns of high income households, and so ‘may under-represent the wealthy as well,” (Gross 2014). The high income elderly seem especially likely to have complex returns, given their reliance on investment income and range of retirement accounts. The IRS data therefore seems very likely to substantially under-represent the elderly. These limitations must be kept in mind in interpreting our confirmatory analyses using these sources. They also further highlight the need to find a way to bridge the gap created by the switch to the ACS.

A. Migration Measures and Analyses

Three types of migration measures are calculated and analyzed:

1) National migration rate, M_t = the number of elderly moving to another state divided by total elderly population in year *t*. This measure is the one typically used in recent studies of the possible decline in migration (Kaplan & Schulhofer-Wohl 2012; Molloy et al. 2011) Section 3A reports and compares plots of elderly migration rates over time for the CPS, IPUMS and ACS. We formalize these comparisons with time series regressions,

(1) $M_{kt} = \alpha + \beta * time_{kt} + \theta I_{kt,} + \varepsilon_{kt}$,

where *t* denotes year, *k* denotes data source, *time* is a time trend and *I* is a dummy variable denoting source *k*. These regressions facilitate comparisons by adjusting for the different years observed and yield estimates of both the long-term time trend (β) and persistent differences across sources (θ).

2) State migration rate, R_{it} = the number of elderly migrants divided by total elderly population, for state *i* in year *t*. Three possible rates exist – i) in-migration rate, *IR* (using in-migrants), ii) out-migration rate, *OR* (using out-migrants) and iii) net in-migration rate, *NR* (in-migrants minus out-migrants). We focus on the net in-migration rate because it best summarizes the geographic

patterns of migration and their implications for state population growth. These rates are compared across the four years (1980-2010) both with correlation coefficients and by reporting the ranking of all 48 contiguous states in each year and highlighting major changes. We then investigate the veracity of these changes by checking if similar changes also exist in the IRS data.

3) State-to-state migration flows, F_{ijt} = the number of elderly moving from state *i* to state *j* in year *t*. It is the most detailed aggregate measure of interstate migration available and its log is the dependent variable in standard gravity models of migration (Conway & Houtenville 2001; Conway & Rork 2012a; Önder & Schlunk 2012). This measure generates 47x48=2256 values in each year and therefore is not reported directly. Instead, we report the top 30 flows for each year and, as a measure of how *concentrated* elderly migration is, the percentage of total migrants accounted for by these top flows. We search more formally for changes in migration by again calculating correlations between the years and by estimating gravity regression models similar to Conway and Rork (2010),

(2) $$\ln F_{ijt} = \alpha + \beta \ln elderlypopulation_{it} + \delta \ln elderlypopulation_{jt} + D_{ij} + d_t + \varepsilon_{ijt},$$

where D_{ij} are flow-specific fixed effects and d_t are year indicators.[2] This equation allows for persistence in the flows, as found by Conway and Rork (2010), adjusting for population changes and general time trends. Estimating this model for different time periods (e.g., 1980-2000 vs. 1990-2010) and comparing the R-squareds reveals if elderly flows continue to be stable or if 2010 appears different. If differences are found, repeating these exercises using the IRS data and, alternately, separating flows most likely to be affected by the switch to the ACS helps discern if they are genuine changes.

[2] The typical gravity model also includes the distance between the locations as an explanatory variable, which in equation (2) is subsumed in the flow fixed effects.

B. Challenges -- and Possible Solutions -- in Creating Comparable Measures

The unique features of the IPUMS versus the ACS create four challenges.

1. Obtaining a sufficient sample size of migrants. Given the historically low rate of interstate elderly migration (less than 1% a year), a very large data set is required to observe a credible number of migrants. While the overall sample size of the ACS over a five year period is comparable to the IPUMS, its shorter migration interval results in far fewer migrants being observed. This difference between the number of migrant observations (as opposed to the overall sample size) across the ACS and IPUMS is clearly evident in Table 1. As a result, although we are using five years' worth of ACS data, our inferences about *interstate migrants* are based on a much smaller number of observations (e.g., 76,237 in the 2000 IPUMS versus 20,685 in the 2006-10 ACS). This smaller number leads to greater irregularities in all migration measures, which has been documented elsewhere (Raymer & Rogers 2007). It also results in a much greater number of 'zero flows' ($F_{ij} = 0$) and begs the credibility of migration patterns calculated from one year of data.[3]

The CPS suffers even more in this regard, as it samples less than 23,000 elderly individuals annually and, in most years, employs a one-year migration question. The number of elderly migrants observed is therefore extremely low – typically fewer than 250 observations per year. This number may be sufficient to calculate the national migration rate (M_t) but it falls short of what is needed to discern geographic patterns. For those analyses, we therefore also look to the IRS data, which is based on the complete universe of tax returns and many more

[3] In estimating equation (2), we add 1.0 to all flows such that ln(F) for zero flows equals zero. Alternatively, we could drop such flows, but this would lead to an unbalanced panel and hinder a clear comparison across the years. We report the number of zero flows in each year, along with the top 30 and our concentration measure.

observations. However, as noted above, it suffers from the serious limitation that no individual-level data is available and the available aggregate measures under-represent the elderly.

We therefore conclude that the ACS is the best data with which to measure *elderly* migration in the 21st century.[4] However, its smaller sample and migration interval make annual and even biannual measures of geographic patterns of dubious value. We therefore emphasize results using 2006-2010 ACS data that would be most comparable to an updated IPUMS. Despite their limitations, the CPS and IRS data are useful in bridging the gaps between the ACS and IPUMS because they span the 1980-2010 period we consider.

<u>2. Choosing a comparable age group when migration intervals differ.</u> The typical elderly migration measure is constructed in the IPUMS by limiting the sample to those aged 65 and older at the time of the census. Given the 5-year migration question, this measure captures migration that could have taken place up to five years ago (e.g., 1995 in the 2000 census) – when the respondent was as young as age 60. What, then, is the appropriate age cut-off for a comparable exercise in the ACS? If we limit the sample to those aged 65 and over in the survey year, we miss moves undertaken by individuals aged 60-64 in the earlier years of the time period. If we expand the sample to include those aged 61 and over, we incorrectly add moves taken by younger individuals in the last years of the time period. Given that mobility is relatively high for the younger/near-elderly (Sergeant et al. 2008), these additions or omissions could prove important. We therefore propose a *multi-age approach (MAA).* The first year (2006) includes those over age 61; because of the retrospective nature of the question, this practice captures

[4] Some might argue that individual-level, longitudinal data would be even better. However, the largest available dataset of this kind for the elderly – the Health and Retirement Study, which began in 1992 – does not provide geographic identifiers unless for a federally funded project. Moreover, even though it currently surveys over 25,000 individuals (and substantially fewer households) every two years, the low rate of interstate migration results in a very small number of interstate migrants (< 250 per year). This small number makes discerning geographic patterns from this data – especially changes over time -- highly questionable.

moves taken by anyone over age 60 in 2005-6. The second year (2007) includes those over age 62, thereby capturing moves taken by those over age 61 in 2006-7. Similarly, we limit the sample to 63+ in 2008, 64+ in 2009 and 65+ in 2010. Note that this problem – and our proposed solution – could apply in any instance where a specific age group is being studied.

To explore the impact this issue has for studies of the elderly and also the gain achieved by using our multi-age approach, we compare all three migration measures using the standard age 65+ cut-off versus *MAA*.

3. Converting 1-year measures to 5-year measures. Converting 1-year rates into 5-year rates is not as simple as multiplying by five because individuals may move more than once in five years. The 5-year rate therefore misses some moves, such that it is 'considerably less than five times the corresponding number recorded over a one-year interval' (Rogers et al. 2003, p. 582). To our knowledge, no agreed upon adjustment exists for either the general population or specific subgroups. Instead, a range of two to four has been suggested, and Rogers et al (2003), using a less systematic approach than ours, comes up with adjustments ranging from 3.02 to 3.54. However, these ranges refer to *interregional* migration for the *entire population.* Our study provides the first estimated range for *interstate* migration or the *elderly*.

Our approach uses historical data on 1-year and 5-year interstate elderly migration rates to calculate a range of conversion factors. The CPS provides 1-year migration measures since 1981 for every year except for 1985 and 5-year migration measures for 1985, 1995 and 2005. The IPUMS provides 5-year measures for 1990 and 2000. We then calculate conversion factors for each of these years (1985, 1990, 1995, 2000 and 2005) by comparing the average 1-year rate over the preceding five years to the 5-year rate observed in that year. For example, the conversion factor for 1995 is calculated as

(3) $Conversion\ factor = (M5yr_{1995})/((M1yr_{1991} + M1yr_{1992} + M1yr_{1993} + M1yr_{1994} + M1yr_{1995})/5)$,

where *M1yr* and *M5yr* refer to 1- and 5-year migration rates and the subscripts refer to the CPS survey year. In 1990 and 2000, the IPUMS 5-year rates are used instead, and in 1985 the denominator includes only 1981-84 and is divided by 4 (because 1985 is unavailable). Note that the *MAA* can be used in constructing the 1-year rates (e.g., age 61+ is used for $M1yr_{1991}$). Because the CPS asks both questions in 1995 and 2005, we can construct an alternative measure for those years -- the ratio of 5-year to 1-year rates (e.g., $M5yr_{1995}/M1yr_{1995}$). This measure has the advantage that it uses the *same respondents* for both; it has the disadvantage that the 1-year rate is based on a much smaller number of observations. While none of these measures is ideal, calculating the full set provides a range of values that we can then apply to the 1-year rate calculated from the ACS. It also provides the first evidence of the frequency of elderly repeat moves and how it has behaved over time.

The differing interval widths may also affect the *spatial structure* of migration (Newbold 2011; Rogers et al. 2003) because certain origins and destinations may experience more repeat migration than others – for instance, the classic example of an elderly couple who moves to Florida after retirement only to return back to New York when becoming ill a few years later. Unfortunately, we judge the CPS sample size too small for geographic adjustments to be feasible.

Instead, we note that using *net* migration measures largely negates both biases. In the New York-Florida example, the couple would be captured twice by the 1-year question and not at all using the 5-year question. Thus, they would add to the in-migrants and out-migrants of both states if a 1-year measure is used and so *net* in-migrants would be unaffected. While it is unlikely that the same couple is actually surveyed, on average the principle still holds – repeat migrants should cancel out in net measures. We would therefore expect net measures of migration to be relatively more similar between the ACS and IPUMS than gross measures.

In our analyses, we adjust the national migration rate, M_t, via the conversion factor to obtain comparable rates. Because it is a simple scalar multiplication, the ranking and correlation/regression analyses of the state-level rates and flows is unaffected by this adjustment. Instead, an adjustment *by location* is required to make a difference. For analyses of the rates, we focus on the net rate (NR_{it}), which we argue is less affected, and compare it to the gross rates (IR_{it} and OR_{it}). We explore this issue for the flows in two ways. First, we repeat our flow analyses, eliminating those states found to experience high levels of return/seasonal migration (Florida, Arizona and Texas). Second, we calculate the correlations for 'net' flows ($F_{ij} – F_{ji}$) and estimate a 'net' counterpart to the gross flow equation (2) by subtracting the opposite flow from it,

(4) $$\ln F_{ijt} = \alpha + \beta \ln elderlypopulation_{it} + \delta \ln elderlypopulation_{jt} + D_{ij} + d_t + \varepsilon_{ijt}$$

minus

$$\ln F_{jit} = \alpha + \beta \ln elderlypopulation_{jt} + \delta \ln elderlypopulation_{it} + D_{ji} + d_t + \varepsilon_{jit}$$

which equals

(5)

$$\ln F_{ijt} - \ln F_{jit} = (\beta - \delta)(\ln elderlypopulation_{it} - \ln elderlypopulation_{jt}) + (D_{ij} - D_{ji}) + (\varepsilon_{ijt} - \varepsilon_{jit}).$$

This net counterpart specifies the difference in the log flows as a function of the difference in the log populations plus a flow fixed effect ($D_{ij} – D_{ji}$) and contains only one observation per state pair and year, instead of two.[5] Note that equation (5) suggests excluding year fixed effects. We

[5] A more intuitive approach is to model net flows, $F_{ijt} – F_{jit}$, directly. However, the fact that one cannot take the log of a negative number combined with our panel approach makes such a model conceptually challenging. For instance, the standard approach in cross-sectional data is to simply drop the net flows that are negative – since only

explore the validity of this model by including year fixed effects and testing their significance. Similarly, we also estimate models that include the two populations separately and test if their coefficients are equal and of opposite sign. Most importantly, we use equation (5) to see if the ACS is more similar to the IPUMS data when a measure of net flows is used.

4. Dealing with a new definition of residence. Perhaps the biggest challenge is the changed definition of residence in the ACS. The IPUMS, CPS and IRS all use a 'usual' or '*de jure*' (National Research Council 2006) residence measure and occur at roughly the same time of the year (the spring). The ACS deviates both by sampling on an ongoing basis throughout the year and by defining current residence as where one now resides and has lived – or will live – for at least two months, an 'actual' or '*de facto*' measure. It therefore is more likely to capture seasonal residents both because it surveys people during periods of extended stays (winter for 'snowbirds' and summer for 'sunbirds') and because of its *de facto* definition (Franklin & Plane 2006; National Research Council 2006; Van Auken et al. 2006). The respondent is then asked "where did this person live 1 year ago?" (ACS form), from which migration in the past year is inferred.

The effect of this difference on migration measures is unclear. Assuming that the respondent uses the same definition of residence for one year ago, the effect is likely small and arises mostly out of *changes* in seasonal migration behavior. For example, if a couple regularly moves to Florida for 3 months during the winter, then they will not be counted as migrants – they 'lived' in the same place 1 year ago regardless of when they are surveyed. Conversely, if they

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one pair should be included in the estimation (because the second is redundant). In a panel framework, however, the net flow that is negative for each pair of states may change from year to year, resulting in an unbalanced panel and an unbalanced number of flow fixed effects. Some state pairs would have two flow fixed effects estimated for them while others would only have one; moreover this differing treatment would depend on each state pair's historical migration experience (i.e., those whose net flows are close to zero or who have experienced large changes in their migration patterns).

just began – or stopped -- wintering in Florida then they could count as migrants if surveyed during the winter. It therefore has a similar effect to the shortened interval; it is likely to inflate the rate of migration and change its spatial structure. Because the elderly are one of the age groups most likely to be seasonal migrants, this difference is especially acute for measuring their migration behavior.

To explore the extent of inflation in the ACS migration rate, we again turn to the CPS, which has a similar residence definition and survey time as the IPUMS. Comparing the 1-year rates in the ACS and CPS in the years when both exist (2006-2010) and, similarly, the 5-year rates in the IPUMS and CPS during 1980-2000 provides insight into whether the ACS rates should be adjusted downward to be comparable to the IPUMS. This comparison is formalized by estimating equation (1) above, which yields estimates of the inflation (θ) that are used to create the adjustments.

The impact on the spatial structure is again more difficult to address but is similar to the interval issue. First, net migration rates and flows are less affected for the same reason as for the 1- vs. 5-year interval – e.g., those who become 'snowbirds' are canceled out by those who stop. Second, we again note that certain states in the Sunbelt, especially Florida, Texas and Arizona, are believed to experience the largest impact of seasonal migration (Happel & Hogan 2002; Smith & House 2006). We see if omitting heavily seasonal locations increases similarity.

3. EMPIRICAL RESULTS

We now explore all three migration measures using the data sources and methods described above, with the dual goals of 1) assessing how much elderly migration has changed since 2000 and 2) evaluating the severity of the challenges identified and our success in addressing them.

A. Elderly Mobility -- National Migration Rates

Figure 1 reports national migration rates from the CPS, IPUMS and ACS in each available year. Kaplan and Schulhofer-Wohl (2012) show that the CPS migration rates are dramatically (and falsely) inflated during 1999-2005 when Census imputation methods were briefly changed. We find a similar pattern and therefore follow their recommendation to omit imputed observations. This figure reveals two tendencies: 1) a slight downward trend in migration, and 2) *both* the IPUMS and ACS yield higher rates than the CPS. These tendencies have been documented for the general population. As noted in the introduction, Molloy et al (2011), Cooke (2011) and others have documented the downward trend in the migration rates for the general and working population, and Kaplan and Schulhofer-Wohl (2012) and Koerber (2007) have noted that the ACS tends to find more migrants – and thus has higher migration rates – than the CPS because of differences in survey procedures.[6]

We formally test these tendencies by estimating equation (1) for the IPUMS and CPS 5-year rates during 1980-2005 and, separately, the ACS and CPS 1-year rates during 2006-2010. The 5-year IPUMS/CPS regression (i.e., the upper two lines in Figure 1) yields the estimated equation,

(6) $M_{kt} = 3.541 – 0.0348*time + 0.8491*IPUMS\ dummy,$
(57.79) (-2.62) (18.74)

[6] Kaplan and Schulhofer-Wohl (2012, p. 1071, footnote 12) note that "(T)he ACS spends up to 3 months attempting to collect data from a given address, while the ASEC collects data only in a specific week, so if the address is vacant in a certain week but occupied in any of the next 12 weeks, the ACS will find a migrant where the ASEC would find vacancy." (The authors use ASEC as an abbreviation for their CPS data.) Presumably, the decennial Census also made greater efforts than the CPS to collect data from all households – and thus would capture more migrants.

where the t-statistics are listed in parentheses. These results suggest a decline of 0.0348 over each 5-year period, which represents less than a one percent change. They also reveal that the IPUMS rates are substantially higher – nearly 25 percent higher -- than the CPS rates. The same regression estimated for the ACS/CPS 1-year rates during 2006-2010 (the two lines in the lower right of Figure 1) yields

(7) $M_{kt} = 0.6876 - 0.0564*time + 0.5753*ACS\ dummy$.
(12.15) (-3.60) (18.74)

These results suggest a much steeper decline in migration, an almost 10 percent decline *per year*, which is also clearly evident in Figure 1.[7] They also suggest that the ACS rates are proportionately much higher than the CPS. This finding suggests that the ACS migration rates may indeed be inflated – even relative to the IPUMS – and lends support to our concern that the continuous sampling and 'usual' definition of residence of the ACS may inflate migration relative to census data.

We now turn to the task of creating an ACS 5-year migration rate that is comparable to the IPUMS rates from past years. The top panel of Table 2 reports the 5-year and average 1-year national migration rates from the CPS and IPUMS, and Panel B reports the resulting conversion factors calculated using equation (3) and the 5-year/1-year measures in the years when the CPS asks both (1995 and 2005). The factors range from 2.552 to 5.342, averaging around 4, and a few patterns suggest the true range is much tighter. First, the year responsible for both the minimum and second highest values – 1995 -- appears unreliable for several reasons. Kaplan and Schulhofer-Wohl (2012, p. 1066) note that the 1995 CPS migration measures are not comparable

[7] A less restrictive approach is to estimate separate regressions for each data source. In the case of the ACS/CPS 1-year rates, the results confirm that equation (7) is appropriate – i.e., the estimated intercepts are statistically significantly different between the data sources but the time trend coefficients are not. Because the IPUMS/CPS 5-year rate series contains only 6 data points in total (1980, 1990 and 2000 for IPUMS and 1985, 1995 and 2005 for CPS), such an exercise is not practical.

because the questions were asked in a different way; they therefore begin their analyses in 1996. Likewise, Molloy et al (2011) omit CPS 1995 migration measures from their analyses, and the IPUMS web site – which is designed to report census data in a comparable way over time -- does not report it. Its unreliability is suggested by our own analyses as Figure 1 clearly suggests that the 1-year rate in 1995 -- and perhaps the few years preceding it -- is an aberration.

Second, the tendency for the IPUMS' rates to be larger than the CPS' is again evident as the conversion factors are higher when the IPUMS 5-year rate is used (1990, 2000). However, if we subtract 0.8491 (the estimated inflation effect from equation 5) from the IPUMS 5-year rates, the conversion factors are more similar to those produced by the CPS in adjacent years, as shown in the table. Finally, the *MAA* factors are always smaller than those for 65+, which makes sense because the *MAA* 1-year rates are larger *by construction* (as they include more migrants). Because the 2010 *MAA* migration rates are larger than the 65+ rates for the same reason, the end result (the product of the conversion factor and the 1-year rate) is quite similar.

Excluding 1995 and adjusting the IPUMS years leads to 65+ factors that range from 3.389 to 4.381 with an average of 3.938; the corresponding numbers for the *MAA* factors are 2.830-3.712 and 3.325. Note that these factors are on the high end of those suggested by Rogers et al (2003) for inter-regional migration for the total population. This makes sense because one might expect less repeat migration among otherwise less mobile populations, such as the elderly. Conversely, however, past research has emphasized the prevalence of 'return migration' among the elderly, in which the elderly 'return home' to receive assistance when their health or wealth decline (Conway & Rork 2012a). However, it seems likely that such return migration would occur over a longer period of time than five years. Our results suggest that repeated moves -- *in a 5-year period, at least* -- are not widespread among the elderly but that multiplying by 5 (which assumes zero repeat moves) is inappropriate. One might also expect repeat migration to decline over time as information about potential destinations has become less costly. We see some evidence of this, as the conversion factors increased in both 2000 and 2005, but there is no obvious trend over the full period.

The first two columns of Panel C in Table 2 report the average 1-year rates from the 2006-2010 CPS and ACS, calculated from the raw data. The ACS rates are then converted to 5-year rates using the average conversion factors – i.e., being multiplied by approximately 4 (3.325 for the *MAA)*. These 5-year rates suggest that elderly migration has modestly *increased*, reported in the third column of numbers. This result bucks the trend suggested by the CPS annual data and the widespread belief that migration is declining.

Next we adjust these rates for the likely inflation of the ACS over the IPUMS by using the estimates of how each data source is inflated relative to the CPS. That is, we use the relationship ACS vs. IPUMS ≈ (ACS vs. CPS)/(IPUMS vs. CPS). The estimated coefficient on the IPUMS dummy in equation (6) suggests that the IPUMS is inflated over the CPS by a factor of 1.25.[8] A similar calculation for the ACS vs. the CPS yields a factor of 1.895. Combining these two suggests that the ACS is 1.51 times higher than the IPUMS (i.e., 1.895/1.25 = 1.51). We therefore adjust the ACS converted rates downward by 2/3rds (or 1/1.51), which yields the final column of rates and suggests that elderly migration has dramatically *declined* since the 2000 census.

Both sets of estimates are shown in Figure 1 and highlight how each provides a very different view of what has happened to elderly migration since 2000. Moreover, if we instead use the conversion factors from the most recent year, 2005, the story is even more mixed, if

[8] Specifically, using the average IPUMS 5-year rate of 4.225 and the coefficient estimate of -.8491, we obtain 4.225/(4.225-0.8491) = 1.25.

anything, as both estimates increase. Specifically, the converted (only) rate becomes 4.8 – a now sizable increase over 2000 – and the inflation-adjusted, converted rate is 3.2, still a notable decline. Using equation (1) to forecast the rate for 2010 yields an estimated rate of 4.146, which falls inside both ranges (2.9-4.3 and 3.2-4.8). These exercises therefore lead us to the uneasy conclusion that elderly interstate migration may have increased, decreased or stayed the same since the 2000 census – that is, whether elderly migration has become more or less common since 2000 is something the data appears *unable* to answer.

B. Spatial Patterns – State Migration Rates and State-to-State Flows

Next we compare state migration rates and flows between the three census years and our ACS estimates for 2010 via rankings, correlations and, for flows, regressions (equations 2 and 5). All analyses show that the *MAA* measures are more similar to the IPUMS measures than the 65+ measures and thus likely more comparable. We therefore emphasize the *MAA* results. All analyses also show that 2010 displays more differences than other years. Our challenge is discerning how much those changes are genuine versus an artifact of the survey differences, which we tackle by comparing across empirical approaches, data sources and gross versus net migration measures.

Table 3 reports the net in-migration rates for all 48 states in all four years, ordered from the top net-importer to top net-exporter. For 2010, we report it using both our *MAA* and 65+ measures. Large changes (when rank changes 10+ places) are denoted with arrows. This table suggests that most of the differences are relatively small and the larger ones are either connected with small population states or are credible, genuine changes. Florida continues to fall, having dropped in 2000 as well. Idaho's ascent from #13 to #4 is likewise a continuation from past censuses (it was #21 in 1990) and part of a well-documented influx of residents of all ages.

Georgia and the Carolinas have experienced a similar, less dramatic ascent. Big changes unique to 2000-2010 are Nevada's tumble from first to #11 and Louisiana's decline from #32 to 47 (likely corresponding to Hurricane Katrina). Virginia likewise dropped from #15 to 32. We establish the legitimacy of these specific changes by finding similar patterns in the IRS net rates; Nevada was #1 in both 1996-2000 and 2001-5, but fell to #7 in 2006-10. Louisiana and Virginia likewise experienced declines between 2001-5 and 2006-10, falling from #39 to 44 and #13 to 24, respectively.

Focusing only on 'large' changes, the same number occurred between 1990 and 2000 as between 2000 and 2010 (eleven; using 65+ leads to fifteen). Many involved smaller states, and three involved the same state where 2000 appears to be the outlier. In contrast, only four large changes occurred between 1980 and 1990, two involving very small states (North Dakota and Wyoming) and one well documented (out-migration from California). Thus, an increasingly changing pattern of net in-migration appears part of a longer trend.

A similar story emerges from the state-to-state flows. Table 4 reports the top 30 flows, the number of zero flows, and the percentage of all migrants accounted for by the top 30 flows – a measure of geographic concentration -- for all four years. Zero flows increase substantially in 2010, as expected from the ACS' shorter migration window; using 65+ exacerbates the problem as expected. The concentration of elderly migration declined in 2010 and appears a steady continuation of a longtime trend. De-concentration is evident in the top flows as well, as the prominence of Florida as a top destination has steadily declined and its prominence as a top *origin* continues to grow in both size and number of flows in the top 30 (from 3 in 1980 to 7 in 2010). Two especially notable flows are FL-GA and FL-NY; both have steadily increased, moving from #24 and #27, respectively, in 1980 to #4 and #8 in 2010. A similar but less dramatic pattern is evident in the growing out-migration from California, largely to Arizona and Nevada. Similar to the net in-migration rates, many of the changes suggested by the ACS 2010 flows are continuation of longer term trends.

Our last set of exercises formalize these comparisons by using correlations and regressions, and by comparing the gross measures, which are likely more strongly affected by the ACS' methodological differences, to their net counterparts. Table 5 reports the correlations across the four years (1980-2010) in the IPUMS/ACS for the gross rates (in- and out-migration) and flows, and their net counterparts. For 2010, we report correlations using both our *MAA* and 65+ measures (separated by the dashed line). For further comparison, we also report the same statistics using the entire span of the IRS migration measures, 1991-2010, similarly aggregated into 5-year periods for comparability (e.g., 1991-1995 is reported as '1995' in the table).

Examining the IPUMS gross migration rates first (the top left panel of Table 5), the dissimilarity of 2010 to the earlier years is immediately evident. For example, the correlation between the in-migration rate in adjacent census years is 0.978 (1980 vs. 1990) and 0.975 (1990 vs. 2000), compared to 0.914 for 2000 vs. 2010. The drop-off in correlation is even stronger for the out-migration rates – i.e., 0.943 and 0.936 vs. 0.774. Immediately below these numbers are the correlations for the IRS data, which show a substantially smaller drop-off.[9] Continuing down the left side of the table, the same pattern appears in the gross flows – the over-time correlations drop off more sharply in 2010 in the IPUMS/ACS data than in the IRS data.

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[9] Note that the IRS falloffs are not entirely comparable due to its limited time span. The most straightforward comparison – going down the diagonal of the correlation matrix and the one we emphasize here – considers time periods only 5 years apart instead of 10, as in the IPUMS/ACS. Unfortunately, it is not possible to construct even *two* comparable 10-year differences in the IRS because of its time span (only 20 years), compared to the 35 years (migration spanning 1975-2010) covered by the IPUMS/ACS. Using 10-year differences only 5-years apart (e.g., 1991-1995 vs. 2001-2005 compared to 1996-2000 vs. 2006-2010) – i.e., comparing the cells just off the diagonal -- yields similar conclusions.

As discussed earlier, we expect the net migration measures to help mitigate some of the methodological differences in the ACS. The right hand side of Table 5 therefore repeats these exercises for the net measures and reveals that the 2010 decline in over-time correlations is even stronger, if anything. However, this pattern also extends to the IRS data and, in fact, the correlations perform much more similarly across the two data sources. Specifically, in the IPUMS/ACS the correlation drops from 0.946 (1990 vs. 2000) to 0.628 (2000 vs. 2010) for the net rates and 0.973 to 0.860 for net flows. In the adjacent years of the IRS, the correlations drop from 0.85-0.91 to 0.63 for net rates and 0.93-0.95 to 0.80 for net flows. These results therefore suggest that the net measures do indeed help mitigate the methodological differences – since they behave more similarly than gross measures to other data sources that had no such change. At the same time, because even the net measures display strong differences in 2010 – across both data sources – these analyses suggest migration patterns genuinely diverged in 2010 from earlier years. It also makes sense that net measures would more clearly reveal genuine differences over time because they sweep away the long-run tendency of certain states to experience greater mobility, both in and out of the state.

Table 5 reveals one final insight. For all measures and years, with the exception of the in-migration rates, the 2010 *MAA* ACS measure is more highly correlated with previous IPUMS measures than the *65+* one. While the differences are modest, the consistent pattern suggests that adjusting the age groups included to account for the different migration intervals helps increase the comparability between the IPUMS and ACS measures.

Our analyses so far make no adjustment for population changes over time, nor do they explore whether certain states – small population states or those with heavy seasonal migration – are responsible for the differences we see in 2010. We explore these possible explanations by estimating the gravity model for gross flows, equation (2), and the net counterpart equation (5), and comparing the resulting R-squareds when certain years or states are excluded. The R-squareds are reported in Table 6. For the gross flows, the R-squareds are all quite high, which is consistent with past research that finds a strong persistence in migration flows. Dropping any one IPUMS year (1980-2000) does little to improve the overall fit of the equation, while dropping 2010 causes a marked increase, again revealing that 2010 is different. Dropping different sets of states (small states, states with high seasonal migration) does not affect this basic pattern; 2010 is the consistent outlier.

We again look to the net counterpart to explore if this difference could be genuine by estimating equation (6) and once again find evidence that it is – 2010 continues to be the outlier.[10] Dropping different sets of states again had no impact on this pattern. At the same time, compared to the gross flows, the difference for 2010 is relatively smaller, lending support to our argument that the net measures help mitigate the methodological differences and thereby better identify genuine ones.[11]

4. CONCLUDING REMARKS

The replacement of the Census Long Form (CLF) with the American Community Survey (ACS) poses substantial challenges to migration researchers, especially for those who focus on subsets of the population such that alternative data sources (e.g., the Current Population Survey, the Internal Revenue Service count data) are inadequate. Our focus is on the elderly, a group for

[10] Our specification tests, using less restrictive models than equation (6), lend support; the year dummy coefficients are not jointly statistically significant and we cannot reject that the coefficients on destination and origin population are equal and opposite sign. Moreover, the R-squareds are nearly identical in these less restrictive models to those reported in Table 6.

[11] Specifically, for the gross flows the improvement in the R-squared when 2010 is dropped is 3 to 4 times as large as when some other year is dropped. For the net flows, the improvement in the R-squared is typically at most twice as large.

whom these challenges are especially acute. Nonetheless, our analyses suggest that the ACS can be used to obtain migration measures that are reasonably comparable to the IPUMS. The differing migration intervals can be reconciled by using our multi-age approach (*MAA*) and multiplying the one-year rate by a conversion factor of 3.325 (long-run average) or 3.712 (from 2005) to obtain a comparable 5-year rate. The fact that these conversion factors are fairly stable over time lends credibility to their use and suggests that repeat elderly migration is also stable. These factors are slightly higher than those offered in past research for the entire population, suggesting that the elderly have fewer repeat moves in a 5-year period than other age groups.

The different residence definitions and sampling processes are harder to reconcile. This difficulty is especially evident in our construction of a national migration rate (recall Figure 1). Using only the 5-year conversion factors suggests that elderly migration has increased since 2000, bucking the long-term trend of a slight decline. However, further adjusting these rates for the likely inflation caused by differences in the ACS' methodology leads to the opposite conclusion – elderly migration has declined steeply. This decline is echoed in the short-term trends (2006-2010) found in both the ACS and the CPS, although both reveal a slight uptick in 2010. Time series regression estimates from historical data on 5-year rates forecast a slight decline that falls between these two scenarios. One could therefore conclude that interstate elderly migration has grown, declined or stayed the same in the 21st century, depending on the methodology and data used. Based on our analyses, we judge that it has likely decreased but concede that this is something the available data *cannot* tell us.

We find more success in detecting changes in spatial patterns, especially if net migration measures are used. We argue and provide multi-faceted evidence that the critical methodological differences between the ACS and the IPUMS are largely mitigated by using net measures.

While the 2010 ACS measures consistently display less similarity relative to past IPUMS measures, the dissimilarity found in the gross measures are unique to the ACS/IPUMS data. In contrast, the dissimilarity in the 2010 *net* measures is also found in the IRS data, a data source that experienced no methodological change. These results therefore suggest that the differences found in the 2010 net measures are reflecting genuine changes in behavior.

Our descriptive evidence reveals that these changes are a continuation of past trends, events unique to the 2000s confirmed by other data sources or limited to small population states. The first case includes the continuing fall of Florida as a destination and its growth as an origin, and the steady ascent of Idaho, Georgia and the Carolinas. Our analyses also show that while the same general set of states are gaining or losing the elderly during 1980-2010, elderly migration has steadily become less geographically concentrated over time.

An event that is unique to the 2000s, however, is the dramatic fall of Nevada from being the top net-importer (highest net in-migration rate) to #11. Given the especially harsh impact of the Great Recession and foreclosure crisis on Nevada in particular, this fall seems plausible. Whether this decline is a short-term phenomenon that is reversing itself as the economy improves remains to be seen. However, while it is tempting to take advantage of the 'timely' annual data from the ACS to study this issue, Table 1 reminds us that the number of migrants yielded is simply too small to provide a credible answer using only one or two years of data. For instance the number of Nevada in-migrant and out-migrant observations is 82 and 73, respectively, for 2010.

This 'smallness' of the ACS in terms of migrant observations is also evident in the volatility of migration measures for small population states. This problem manifests itself in our analyses with the increased number of zero flows and the widely fluctuating net rates for the smallest states. Our analyses suggest that even five years' worth of ACS data may not be enough to identify geographic patterns in such states.

Using the approaches offered by our study, the ACS therefore appears capable of detecting genuine changes in geographic patterns since 2000 for the elderly in larger population states. However, its methodological differences make it unsuitable for answering several other questions. Its shorter migration interval yields dramatically fewer migrant observations than the IPUMS, thereby straining its credibility to detect changes in small population states and/or over short periods of time. Even more problematic, its different sampling process and definition of residence likely confound seasonal (temporary) migration with permanent migration. This leaves us unable to answer definitively the basic question of whether elderly migration has increased, decreased or remained the same since 2000.

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FIGURE 1: Elderly Migration Rates Over Time and Across Data Sources

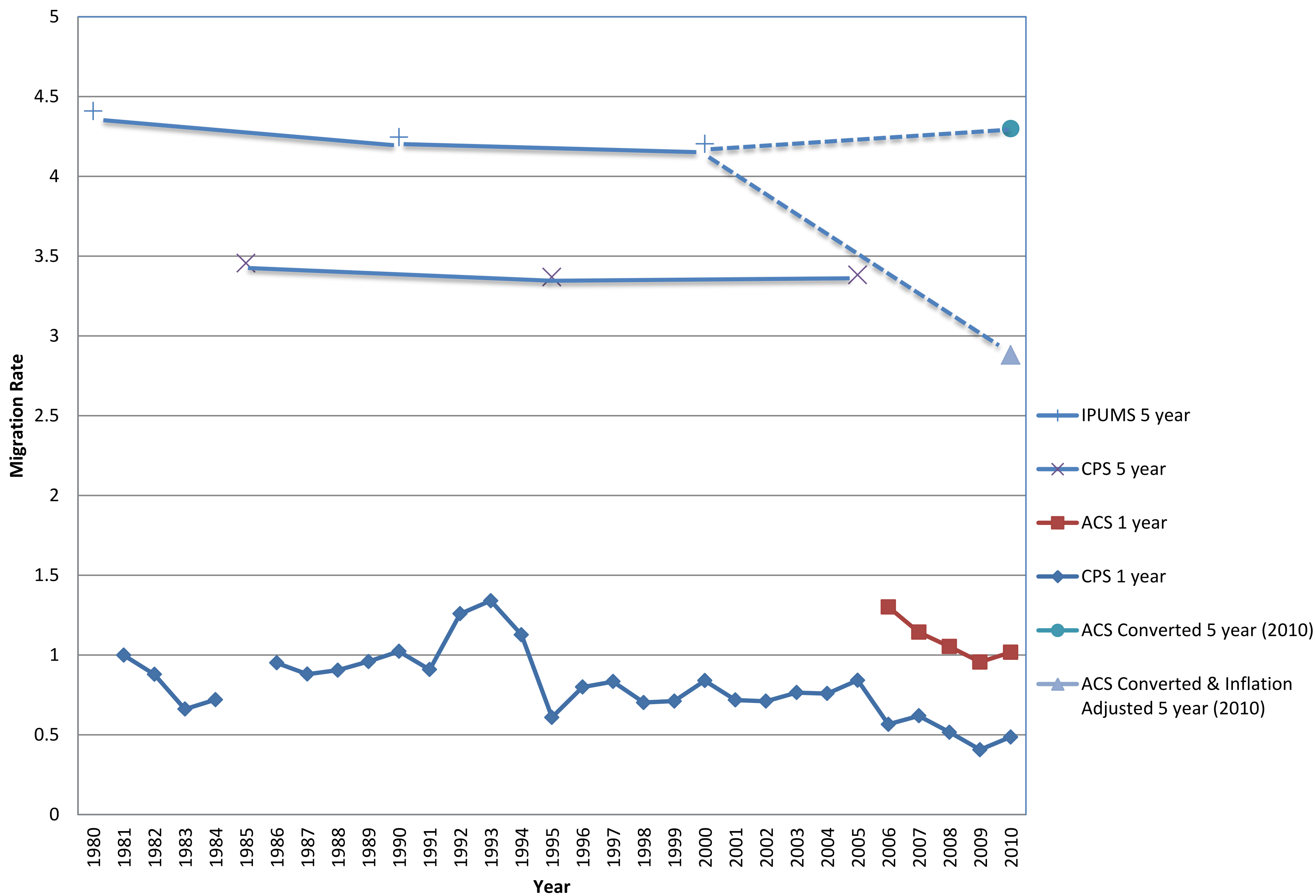

TABLE 1: Key Characteristics of Migration Data Sources Since 1980

I. PRIMARY DATA SOURCES

	IPUMS	**ACS**
1. Frequency	Every 10 years 1980-2000	Annually since 2000 Nationally representative since 2005
2. Migration Measure	5 year	1 year
3. # of Observations		
Elderly	1.4-1.85 million	450,000-480,000
Elderly Migrants	68,500-77,000	Averages < 1% of sample (4000-4600)
4. Residence Definition	Usual: Lived there at least 6 months Surveyed on April 1	Actual: lived or will live there at least 2 months Surveyed throughout year
5. Other Features	5% of US population Misses repeat/return movers Migrants can be 5 years younger when move occurs	1% of the US population May capture seasonal migrants Higher frequency

II. SECONDARY DATA SOURCES

	CPS	**IRS (SOI)**
1. Frequency	Annually since 1981	Annually since 1990
2. Migration Measure	1 year (1981-84, 1986-present) 5 year (1985, 1995, 2005)	1 year rate
3. # of Observations		
Elderly	15,530-22,507	95% of tax filing population
Elderly Migrants	125-270	
4. Residence Definition	Usual: Lived there at least 6 months Surveyed in March	Based on where tax returns filed Surveyed at time of tax filing
5. Other Features	Small sample sizes Nationally representative Contains 1 and 5 year migration Not strong follow-up with non-responders	Contains all taxpayers filing by September Under-represents very low and high income No age breakdowns No individual level-data

TABLE 2: 5 -and 1-Year Elderly Migration Rates, by Source, Approach and Year

	1985	1990	1995	2000	2005	
A. Migration rate (approach)						
5 yr rate	3.510 [c]	4.245 [i]	3.170 [c]	4.204 [i]	3.382 [c]	
% of 5 yr who moved in past year (both are reported in that year)			19.4 [c]		26.0 [c]	
Average CPS 1 yr rate (65+) [c] (over preceding 5 years)	0.874	1.002	1.034	0.787	0.772	
Average CPS 1 yr rate (*MAA*) [c] (over preceding 5 years)	1.126	1.200	1.242	0.914	0.911	
B. Conversion Factors by year & approach[1]						
5-yr rate/1-yr rate (65+)	4.016	4.237	3.066	5.342	4.381	
5-yr rate/1-yr rate (*MAA*)	3.117	3.538	2.552	4.600	3.712	
5-yr rate/1-yr rate in the same CPS year			5.155		3.846	
Adjusting for IPUMS' higher migration rates[2]						
65+		3.389		3.967		
MAA		2.830		3.671		
Final Conversion Factors						*Average*[3]
65+	4.016	3.389	3.066	3.967	4.381	***3.938***
MAA	3.117	2.830	2.552	3.671	3.712	***3.325***

C. Observed and then Adjusted Migration Rates for 2010

	CPS Observed (1 yr rate)	***ACS Observed (1 yr rate)***	***ACS Converted (5 yr rate)***	***ACS Converted (5 yr rate) with Inflation Adjustment***[4]
65+	0.660	1.098	4.324	2.883
MAA	0.720	1.300	4.332	2.888

NOTES:

[c] indicates CPS, excluding imputed observations for 1999-2005. The 1985 rate is based on 1981-84. [i] indicates IPUMS.

[1]Conversion Factors are calculated by dividing the 5-year rate by the 1-year rate.

[2]The conversion factors using the IPUMS 5-year rate are adjusted for the higher migration rates found in the IPUMS by using the estimated coefficient of -0.849 on the CPS dummy variable from equation (6). Specifically, 0.849 is subtracted from the IPUMS 5-year rates before dividing by the CPS 1-year rates. This estimate suggests the IPUMS is inflated over the CPS by a factor of 1.25 (4.225/(4.225-0.849), where 4.225 is the average IPUMS 5-year rate during the period.

[3]1995 is excluded.

[4]To adjust for the inflation of the ACS over the IPUMS, we use the inflation factor of the IPUMS over the CPS (1.25) and ACS over the CPS (calculated similarly, yielding a factor of 1.895). Using the relationship ACS vs. IPUMS = (ACS vs. CPS)/(IPUMS vs. CPS), the above factors yield an inflation factor of 1.51 (1.895/1.25) for ACS vs. IPUMS, suggesting the ACS is 51% higher than the IPUMS. We therefore adjust the ACS converted rates downward by 2/3rds (or 1/1.51).

TABLE 3: Elderly New Immigration Rate, by State, Year and Source

	1980 IPUMS		*1990 IPUMS*		*2000 IPUMS*		*2010 ACS(MAA)*		*2010 ACS(65+)*	
	state	rate	state	rate	state	rate	state	rate	state	rate
1	NV	11.12	NV	18.97	NV	12.25	AZ	7.33	AZ	5.69
2	AZ	9.36	FL	10.97	AZ	9.43	DE	5.89	SC	4.62
3	FL	8.57	AZ	10.69	FL	5.58	SC	5.85	ID	4.31
4	NM	2.26	OR	4.46	SC	2.85	ID	5.84	NC	3.85
5	DE	2.21	NC	3.59	DE	2.58	NC	4.74	DE	3.83
6	OR	1.72	SC	3.39	NC	2.44	GA	4.11	GA	3.74
7	AR	1.65	WA	2.48	GA	2.16	UT	3.68	UT	2.82
8	SC	1.48	GA	1.90	NM	2.01	FL	3.02	FL	2.25
9	NC	1.45	UT	1.84	TN	1.69	TN	2.28	TX	1.95
10	GA	1.18	NM	1.73	MT ↑	1.23	TX	2.18	WA ↑	1.86
11	TX	1.14	NH	1.67	UT	0.98	NV ↓	1.90	TN	1.60
12	WA	1.06	DE	1.43	TX	0.95	AL	1.79	OR	1.43
13	UT	1.02	AR	1.36	ID	0.74	AR ↑	1.77	NV ↓	1.31
14	MS	0.76	TN	1.09	CO	0.70	OR	1.72	AR ↑	1.25
15	NH	0.72	CO	0.73	VA	0.68	WA	1.70	CO	1.23
16	CO	0.71	TX	0.73	MS	0.60	NH	1.55	KY ↑	1.13
17	TN	0.55	MS	0.68	AL	0.54	CO	1.45	AL	1.07
18	AL	0.45	AL	0.43	ME ↑	0.51	MO	1.23	MO	0.99
19	OK	0.38	OK	0.39	OK	0.40	KY	1.19	OK	0.81
20	ME	0.25	VA	0.37	OR ↓	0.36	OK	0.71	NH	0.74
21	CA	0.23	ID	0.12	WA↓	0.20	MT ↓	0.57	NE ↑	0.65
22	VA	0.09	MO	0.03	NH ↓	0.18	ME	0.28	MT ↓	0.24
23	KY	-0.12	NE	-0.02	MO	0.14	NE ↑	0.12	RI	0.18
24	ID	-0.16	VT	-0.04	AR ↓	-0.04	IA ↑	0.00	KS	-0.09
25	LA	-0.24	KY	-0.19	SD	-0.17	KS	-0.19	NM ↓	-0.30
26	VT	-0.31	WV ↑	-0.29	KS ↑	-0.22	PA	-0.46	IA ↑	-0.39
27	KS	-0.33	MN	-0.33	VT	-0.25	VT	-0.56	VT	-0.40
28	MO	-0.37	ME	-0.65	KY	-0.34	NM ↓	-0.59	ME ↓	-0.45
29	NE	-0.42	IN	-0.67	WV	-0.39	RI	-0.61	PA	-0.47
30	MN	-0.51	ND ↑	-0.68	WI	-0.44	IN	-0.77	OH	-0.59
31	WI	-0.60	WI	-0.80	RI ↑	-0.45	OH	-0.85	IN	-0.84
32	SD	-0.76	PA	-0.82	LA	-0.50	VA ↓	-0.94	WI	-0.86
33	RI	-0.83	SD	-0.95	NE ↓	-0.56	WI	-1.00	CA	-0.88
34	IA	-0.88	LA	-0.96	PA	-0.79	CA	-1.25	VA ↓	-0.88
35	IN	-0.89	MT	-1.14	WY	-0.79	MN	-1.31	MN	-0.96
36	WV	-0.89	OH	-1.26	IN	-0.82	WV	-1.38	MD	-1.01
37	PA	-0.92	CA ↓	-1.35	CA	-0.99	MA	-1.76	MA	-1.32
38	MT	-0.93	KS ↓	-1.36	OH	-1.07	MS ↓	-1.94	CT	-1.54
39	MD	-1.12	MD	-1.44	MN ↓	-1.31	MD	-2.05	MS ↓	-1.64
40	MA	-1.14	IA	-1.52	IA	-1.34	CT	-2.08	WV↓	-1.74
41	CT	-1.24	RI	-1.67	MD	-1.35	MI	-2.43	MI	-1.82
42	WY	-1.31	WY	-2.26	MA	-1.51	NJ	-2.70	NJ	-2.19
43	OH	-1.48	MI	-2.77	ND ↓	-1.69	IL	-3.01	IL	-2.37
44	NJ	-1.51	MA	-2.84	MI	-1.82	ND	-3.90	NY	-3.28
45	ND	-1.58	IL	-3.37	CT	-1.98	NY	-3.92	ND	-3.55
46	MI	-1.95	CT	-3.91	NJ	-2.27	SD ↓	-4.87	LA ↓	-3.68
47	IL	-2.27	NJ	-4.04	IL	-2.92	LA ↓	-4.95	SD ↓	-4.79
48	NY	-3.59	NY	-5.61	NY	-4.68	WY↓	-5.33	WY↓	-6.50

↑/↓ indicates state has moved up/down 10 or more places from previous decade.

TABLE 4: Top 30 Elderly Flows, by Decade and Source

	1980 IPUMS			1990 IPUMS			2000 IPUMS			2006-10 ACS (MAA)			2006-10 ACS (65+)		
	from	to	flow	from	to	flow	from	to	flow	from	to	flow	from	to	flow
1	NY	FL	43700	NY	FL	74397	NY	FL	60612	NY	FL	54100	NY	FL	44520
2	NJ	FL	12840	NJ	FL	28727	NJ	FL	24892	CA	AZ	25385	MI	FL	20765
3	OH	FL	12240	MI	FL	21376	NY	NJ	19139	MI	FL	25115	CA	AZ	20470
4	IL	FL	10060	PA	FL	19295	MI	FL	18449	FL	GA	24340	FL	GA	19925
5	PA	FL	10060	OH	FL	19057	CA	AZ	18301	NJ	FL	22480	NJ	FL	19360
6	MI	FL	9120	IL	FL	18343	OH	FL	17158	CA	NV	21195	FL	NY	18240
7	NY	NJ	8800	MA	FL	17640	PA	FL	16994	PA	FL	21025	CA	NV	17515
8	NY	CA	6760	NY	NJ	17043	CA	NV	16446	FL	NY	20545	PA	FL	17385
9	MA	FL	6680	CA	OR	16937	IL	FL	15154	OH	FL	19805	OH	FL	17330
10	CA	OR	5760	CA	AZ	16226	MA	FL	14096	IL	FL	19690	FL	NC	16385
11	CA	AZ	5240	CA	NV	14202	CA	OR	12628	CA	TX	18565	IL	FL	16300
12	IL	CA	4700	CT	FL	13591	FL	GA	11876	FL	NC	18050	CA	TX	15790
13	IN	FL	4600	CA	WA	12243	FL	NY	11294	MA	FL	17830	MA	FL	14915
14	CT	FL	4340	NJ	PA	10586	CA	WA	9905	CA	WA	17465	NY	NJ	14265
15	IL	AZ	3980	CA	FL	9706	IN	FL	9753	CA	OR	17335	CA	WA	14195
16	PA	NJ	3980	IN	FL	9371	CT	FL	9476	NY	NJ	16745	CA	OR	14185
17	CA	WA	3720	FL	GA	8521	FL	NC	9424	LA	TX	16245	LA	TX	13725
18	NJ	PA	3680	NY	CA	8517	NJ	PA	9288	NY	NC	15570	AZ	CA	13505
19	FL	NY	3660	VA	FL	8427	AZ	CA	8811	AZ	CA	15305	NY	NC	13440
20	CA	NV	3560	FL	NY	7818	OR	CA	8155	NV	CA	15155	NV	CA	13380
21	CA	TX	3560	NY	PA	7729	CA	TX	7926	FL	TN	13475	FL	PA	12150
22	MD	FL	3460	MD	FL	7449	PA	NJ	7920	FL	TX	13250	OR	CA	11430
23	NY	PA	3320	CA	TX	7413	CA	FL	7743	FL	PA	13075	FL	TN	11200
24	FL	GA	3100	FL	OH	7275	NY	PA	7740	WA	AZ	13055	FL	MI	11150
25	AZ	CA	3080	AZ	CA	7184	GA	FL	7722	GA	FL	12770	WA	AZ	11115
26	NY	CT	2940	WI	FL	7085	FL	OH	7590	NJ	PA	12520	FL	TX	11020
27	FL	CA	2800	PA	NJ	6974	FL	PA	7493	OR	CA	12390	NJ	PA	10930
28	MI	CA	2740	FL	NC	6849	MD	FL	7406	WA	CA	12355	FL	OH	10895
29	NJ	NY	2700	NY	NC	6717	WA	AZ	7367	FL	OH	12340	WA	CA	10535
30	VA	FL	2680	GA	FL	6627	NY	NC	7245	CT	FL	12205	CT	FL	10330
Top 30 as % of all flows			35.13			31.92			27.10			22.98			23.11
# of zero flows			706			377			290			574			647

TABLE 5: Correlations for Gross and Net 5-Year Migration Measures, Over Time and by Data Source

IN MIGRATION RATE

IPUMS/ACS

	1980	1990	2000	2010
1990	0.978			
2000	0.963	0.975		
2010 MAA	0.832	0.835	0.914	
2010 65+	0.843	0.844	0.917	0.996

IRS SOI

	1995	2000	2005
2000	0.982		
2005	0.960	0.977	
2010	0.921	0.912	0.931

OUT MIGRATION RATE

IPUMS/ACS

	1980	1990	2000	2010
1990	0.943			
2000	0.903	0.936		
2010 MAA	0.740	0.750	0.774	
2010 65+	0.724	0.734	0.764	0.995

IRS SOI

	1995	2000	2005
2000	0.976		
2005	0.957	0.981	
2010	0.948	0.952	0.964

NET MIGRATION RATE

IPUMS/ACS

	1980	1990	2000	2010
1990	0.961			
2000	0.950	0.946		
2010 MAA	0.587	0.572	0.628	
2010 65+	0.561	0.549	0.591	0.982

IRS SOI

	1995	2000	2005
2000	0.855		
2005	0.837	0.910	
2010	0.751	0.592	0.634

GROSS FLOWS

IPUMS/ACS

	1980	1990	2000	2010
1990	0.972			
2000	0.937	0.978		
2010 MAA	0.800	0.876	0.934	
2010 65+	0.790	0.867	0.928	0.997

IRS SOI

	1995	2000	2005
2000	0.988		
2005	0.983	0.993	
2010	0.976	0.983	0.979

NET FLOWS

IPUMS/ACS

	1980	1990	2000	2010
1990	0.968			
2000	0.950	0.973		
2010 MAA	0.780	0.820	0.860	
2010 65+	0.750	0.790	0.840	0.995

IRS SOI

	1995	2000	2005
2000	0.931		
2005	0.901	0.953	
2010	0.868	0.855	0.805

TABLE 6: R-squareds from Gravity Flow Models with Year and Flow Fixed Effects

Gross Flows (Equation 2)	Total	no 1980	no 1990	no 2000	no 2010
Full sample	0.8121	0.8258	0.8234	0.8223	0.8610
Excluding FL, AZ & TX	0.7843	0.7993	0.7976	0.7966	0.8404
Excluding small states (DE, ND, SD, VT, WY)	0.8086	0.8197	0.8214	0.8179	0.8603
Excluding large states (CA, IL, NY, TX)	0.7728	0.7905	0.7880	0.7855	0.8284

Net Flows (Equation 5)	Total	no 1980	no 1990	no 2000	no 2010
Full Sample	0.3644	0.4081	0.4338	0.4344	0.4717
Excluding FL, AZ & TX	0.3481	0.3966	0.4199	0.4220	0.4512
Excluding small states (DE, ND, SD, VT, WY)	0.3829	0.4244	0.4581	0.4399	0.4941
Excluding large states (CA, IL, NY, TX)	0.3493	0.3990	0.4195	0.4252	0.4492