

# **LIVING ARRANGEMENTS OF OLDER PERSONS**

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## INTRODUCTION

During the past decade, there has been a surge of interest in the living arrangements of older persons. The theme has been part of the demography and sociology of the family, but only as an outcome subordinate to the

transfers, and identifies the most important findings for both developing and developed countries. Section V offers an examination of the theoretical issues to be addressed, promising model formulations, and a synthesis of the kinds of data required to shed light on important issues with policy relevance. The concluding section poses three strategic themes to be considered for future research.

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take place before the social and economic conditions that facilitate and secure transfers of wealth towards the elderly have a chance to emerge, develop or consolidate. Instead, the institutional context is characterized by

of labour-force participation have historically stayed at very low levels. Their wage-earning history is precarious and leaves them totally dependent on others in their families for income.

*Health status of the elderly: where does the growth of the elderly population come from?*

At least in Latin America, the rapid growth of the older population that will take place between now and 2025 or so has two main sources: the transient increase in fertility that took place between 1955 and 1965 and, most important, the massive mortality decline that began in 1950. Thus, the cohorts that attain their sixtieth birthday between 2000 and 2025 are the beneficiaries of unusually large improvements in survival, particularly during early childhood. For example, individuals born in 1960 experienced lower levels of early childhood mortality than those born in 1955. This will increase the size of the cohort attaining age 60 in 2020 relative to cohorts that reach age 60 five years earlier.

*Empirical estimates of the contribution of mortality decline to the growth of the elderly*

To assess the importance of mortality decline as a contributor to the growth of the elderly population, we select three countries that roughly represent the diversity of regimes of mortality decline in the region. For each of them, we estimate the profile of mortality decline over the period from 1900 to 1990, and calculate a projected life-table to assess future changes during the period from 1990 to 2020. We then proceed to estimate the absolute magnitude of the contribution of mortality changes to the rate of increase of the population in several quinquennial age groups at various points in time and for the years 2000 and 2020. Figure II shows the estimated magnitude of these changes for age groups 50-54, 55-59 and so on for the year 2020. The vertical axis represents the total cumulated change of mortality rates experienced by cohorts reaching ages in the horizontal axis during the year 2020. Thus, for example, compared to those who will be in the age group 60-64, Chileans who attain ages 65-69 in 2020 will experience reductions in mortality rates after birth of the order of 0.0125. For Chileans aged 70-74 in 2020, the figure is about 0.028. Since the bulk of mortality decline, particularly during early childhood, occurred in the post-Second World War years, the peak is attained among the cohorts born during those years (who will be aged between 70 and 80 in 2020). Older cohorts also experience mortality changes but, since they are not the beneficiaries of the typically larger gains accruing to early childhood, the magnitude of the changes is smaller.

**(FIGURE II HERE)**

Graphs for other countries in the region look similar to that in figure II. The only difference is that in cases where mortality decline occurs later than in Chile or Mexico, the curves are displaced towards the left, and their peaks are associated with younger cohorts. Furthermore, in countries where mortality changes are

less gradual and more concentrated in time (as in Bolivia, Peru, Ecuador or Paraguay), the curves are narrower and more spiked.

The estimates plotted in figure II enable us to informally gauge the magnitude of the contribution of past

in early childhood during the decades following the Second World War. These cohorts will be increasingly dominated by individuals who, during their early childhood, may have been exposed to conditions that would have been fatal several years earlier. To the extent that exposure to and contraction of conditions early in life has a physiological effect that endures and plays out many years later (Fogel, 1986; Fogel and Costa, 1997;

Barker, 1997), we should expect that the 0(xI,wpg,u.1(atsuse 0(xI,so)921ateourepo)9.4condng,)9.4((coh)9.4(o)25(r w(ile dt  
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shown by gender and, in the case of the United States, by ethnic group. Table 2 includes data for four additional countries (Colombia, El Salvador, Jamaica and Venezuela), where the categories for self-reporting employed originally did not allow us to make a distinction between “poor” and “average” or between “good” and “very good”. In addition, results from two recent studies carried out in Sao Paolo, Brazil and Mexico City are included. In order to compare all countries, we merged “poor” and “fair” on the one hand, and “good” and “very good” on the other.

**(TABLE 2 HERE)**

While self-reported health status is not an ideal indicator of health conditions, it can be shown to be surprisingly accurate and a good predictor of subsequent ill health and mortality (Idler and Kasl, 1991; Idler and Benyamini, 1997; Mare and Palloni, 1988). Three features stand out in the table. First, in all countries of the region, except Argentina, the fraction reporting that they are not in good health status (“poor” or “fair”) is two to three times higher than comparable figures for the white population in the AHEAD study. It should be remembered that the sample studied in AHEAD corresponds to an older age bracket (70+), whereas those of HRS correspond to a younger age bracket (51-61). Thus, in the AHEAD study, the population reporting to be in poor/fair health is 33.5 per cent among white males and 34.0 per cent among white females. In the best case in the region (Argentina), the corresponding numbers are 37.4 per cent among males and 52.7 per cent among females. In all other countries, the percentages are much higher, from about 55.3 per cent among males in Colombia to about 86.0 per cent among females in Jamaica. As would be expected, the comparison is more favourable if one takes as reference the United States black population. But even then, only Argentina seems to fare better. Secondly, the heterogeneity within the region is substantial and appears to be only weakly correlated with mortality levels. Thus, the lowest percentage reported to be in average or worse health occurs in Argentina (37.0 and 52.7 per cent), while the highest occurs in Jamaica (79.7 and 86.0 per cent) and Venezuela (82.7 and 77.3 per cent). Thirdly, there are large gender disparities and, with the exception of Venezuela, all of them favour males. The differences can be as large as 15.2 percentage points in Argentina and as small as 1 or 2 percentage points in El Salvador. It should be noted that in the United States and other developed countries the male-female differences are insignificant or exhibit the opposite pattern. If these gender differentials in self-reports do indeed reflect unobserved differentials in underlying health conditions, the patterns displayed are of importance since, as suggested earlier, elderly women not only represent close to two thirds of the elderly population but are also at higher risk of experiencing worse economic conditions.

TRENDS IN OLDER PERSONS’ LIVING ARRANGEMENTS AND WELL-BEING

The living arrangements of the elderly are just one element among many others included in a package of transfers towards the elderly originating within the boundaries of the kin group or family. These are referred to

as familial or family transfers. In turn, these transfers are just one part of the totality of transfers towards the elderly that also include societal resources such as pensions, disability income, health payments and transfers in the form of subsidies for institutionalization, home care and housing. These are referred to as social transfers. Thus, co-residence of the elderly with their children (or other kin) is just one among many transfer flows involving the elderly. Social transfers and family (kin group) transfers are the most important sources of support for the majority of the elderly. Other sources include assets, wages and private pension plans.

The observed prevalence of co-residence with children may be related to the magnitude of other flows, but the exact direction of causality is not always clear. The demand for co-residence with children or other kin is probably heightened in societies with a precarious institutionalization of social transfers, with traditionally low levels of human capital investments, and where the health and disability of the elderly require large expenditures on care and health services.

#### *Trends in co-residence of the elderly*

The availability ratio is the ratio of the population aged 60 and over to the population between ages 15 and 59. The latter population is the pool of available individuals with whom the elderly could co-reside. Two dimensions of co-residence of the elderly are of interest: the overall levels of living alone, and the age patterns of living alone. Each of these is discussed below.



higher levels of living alone among those who do not have a spouse. Since the fraction of all elderly over 60 or 65 who are unmarried ranges between one third and one half, the fraction of all unmarried elderly who live alone cannot be much higher than 0.20 in the countries of Asia and Latin America, and less than 0.40 in the Caribbean.<sup>2</sup>

Current levels of living alone among the elderly in the United States of America and in Western and Northern Europe are the result of changes that may have begun in earnest before 1900 but whose full effects

### *Age patterns of living alone among the elderly*

Age patterns of living alone among the elderly are a somewhat less studied aspect of the phenomenon. With a few exceptions (see Liefbroer and de Jong Gierveld, 1995), the prevalence of the elderly co-residing with children (or kin) decreases from about age 50 to about age 75 or 80 and then increases again (Kinsella, 1990). This age pattern is clearly exhibited among all the elderly in the United States microcensus data from 1880 on (Ruggles, 1994), and among elderly widows in the 1960-1990 Current Population Survey (CPS) time-series (Macunovich and others, 1995). Over time, the increase in living alone has been proportionately higher among the oldest old (over 85) than among the young old (Ruggles, 1994; Tuma and Sandefur, 1988). This age pattern of living alone is less pronounced but still detectable in Canada (Légaré, 1998) and in data for Japan (Hiroshima, 1997) and a number of European countries (Kinsella, 1990).

Furthermore, in most cross-sectional studies, the estimated effects of parental age on the probability of co-residence are either increasing or display the non-linear form present in the United States data. Let us assume for a moment that these patterns remain constant. Since the difference between the minimum and maximum values of the fraction co-residing by age can be fairly large (of the order of 10 to 15 per cent in the United States), modest changes in the age distribution of the elderly could have non-trivial effects on the overall fraction living alone, even in the absence of changes in the age-specific probabilities of living alone. The direction and magnitude of these effects will depend on the relative size of consecutive cohorts of elderly. In turn, the overall magnitude of the difference between them will be a function of the past history of fertility and mortality. In the developing world, the size of the first few cohorts attaining age 60 by 2020 will create a bulge that will surely inflate the overall proportion living alone. This effect will increase for a number of years before it reverses or is attenuated as the same cohorts attain ages 75 or 80, the age interval where the age-specific rates of living alone begin to decrease again.

It is unlikely that observed age patterns will remain constant for too long. For one thing, they may reflect cohort effects: the oldest old of today belong to cohorts with less education and more modest wage-earning history. This makes them less likely to have a wide variety of choices available other than co-residence with children. Also, the oldest old have a higher prevalence of disability and chronic illnesses and are more likely to be offered care by kin or children (see below). If the age of onset of the most prevalent forms of disability increases (or decreases), age patterns of co-residence could experience a downward (or upward) shift at younger ages. Finally, there is a relation between length of generation and co-residence (see below). If the age difference between parents and the youngest of their children changes—as a result of delaying or anticipatory fertility tactics—the age patterns of co-residence will also be affected.<sup>4</sup>

### *Co-residence and levels of well-being*

A concentrated research focus on the living arrangements of the elderly is a relatively new theme. It is driven by concerns raised around the world in general, and in developed countries in particular, about consequences of rapid ageing. To the extent that co-residence with adult children or other family members is seen as a fundamental strategy to bolster the overall levels of well-being of the elderly, trends pointing to a

may itself have reduced even further the need for and discouraged the continuation of family transfers, including co-residence. In addition, through investments in human capital, older individuals are able to command higher levels of income while, as insurance or as a complement, they are open to and actively pursue the option of continuing to participate in the labour force. Competing with other needs and demands, the efficiency and sufficiency of compensatory social transfers, however, has been questioned in the United States (Preston, 1984), and are even less likely to be seen as a feasible solution in the less developed world.

In developing countries, older people's access to sources of income is usually far below what is necessary to secure self-sufficiency, while their continued participation in the labour force, for a long time a necessity rather than an option, may be endangered by rapid economic change and growing obsolescence of human capital. Furthermore, in both the developed and the developing world, the overall demand for care and attention for the elderly will be a function of the prevalence of illness and disability, and of the amount of time lived in good health at older ages. Recent research suggests that disability and ill health have not worsened over time in some developed countries (Crimmins, Hayward and Saito, 1994; Crimmins, Saito and Ingegneri, 1997; Manton, Corder and Stallard, 1993). But this may be a transient phase and, as suggested above, may not hold true at all in developing countries, where the available evidence suggests that the elderly could be far worse off than their counterparts in developed countries. Thus, even if there were compensatory changes in

Let us say that a satisfactory indicator of well-being is some demarcator enabling us to distinguish the older population living in poverty. Suppose the fraction of the elderly living below poverty level is  $\Delta$  and the fraction below poverty level and living alone and co-residing are  $\Delta_a$  and  $\Delta_c$ , respectively. Let the probability of living alone among those above and below poverty be  $B_r$  and  $B_p$  respectively. The following equalities are straightforward:

$$\Delta_a = (1 + \Delta / (1 - \Delta)(B_r / B_p))^{-1}$$

and

$$\Delta_c = (1 + \Delta / (1 - \Delta)((1 - B_r) / (1 - B_p)))^{-1}$$

Thus, differences in the values of  $\Delta_a$  and  $\Delta_c$  over time (or across countries) depend on the overall levels of poverty among the elderly as well as on the relative magnitude of the probabilities of living alone among those above and below the poverty level. A decrease in poverty among those who live alone could be the result of either a decrease in the overall poverty rate (independently of living arrangements), an increase in the probability of living alone among those who are not poor, or a combination of the two. As a result, even under conditions guaranteeing strict comparability of the poverty measure, changes over time or over units of observations, cannot be interpreted unequivocally. Admittedly, these elementary equalities assume the analytic problem away since we implicitly assumed that decision making about co-residence— $B$ —is correctly estimated as a function of poverty rather than the other way around.

Very few studies provide information on the values of  $\Delta_a$  and  $\Delta_c$  at one point in time and, even more rarely, over several periods of time. In some cases, one can obtain estimates of  $\Delta$  but little or no information on anything else. Most studies report estimates of the  $B$  values but say nothing about  $\Delta$ ,  $\Delta_a$  or  $\Delta_c$ . In these cases, the values of  $B$  are usually not directly observed but can be retrieved indirectly by converting estimates of the effects of measures of wealth on the probabilities of living alone, while controlling for a host of other quantities. A complicating problem is that measures of socio-economic conditions—which we take as proxies for well-being—vary a great deal. Often, the indicator is income, and, in some cases, researchers use property ownership or “soft” proxies such as education levels, occupation and occupational status. Rarely, if ever, are estimates of  $B$  obtained using a dichotomous indicator of poverty as we have argued here. In sum, inferences and comparison across studies are hindered by a number of factors, even if one could agree on the rather dubious proposition that levels of well-being are indeed well captured by using only measures of socio-economic standing.

The longest string of evidence the author knows of is the United States microcensus samples starting in 1880. These data appear to corroborate the existence of a direct relation between indicators of wealth for the elderly in different co-residential statuses. Indeed, the data show that in the past it was among the better-off that one found the highest probability of co-residence with children or kin, whereas living alone was more likely among the poor, the propertyless and the destitute. The relationship reverses, however, after 1950 or 1960, just at the time of onset of the sharp upturn in the prevalence of living alone. Thereafter, the association between the probability of living alone and measures of wealth or socio-economic status among the elderly

*Europe, United States, Canada and Australia*

In a study of microdata for nine countries from the Luxembourg Income Study, Smeeding and Saunders find that the fraction of elderly women below the poverty line (defined as 50 per cent of the median disposable income) is substantially higher among elderly women living alone than among all elderly women in all countries in the sample (Smeeding and Saunders, 1998). The ratio of elderly women who live alone and are below the poverty line to those co-residing who are below poverty ranges from 1.2 in Hungary to about 2.0 in Canada. In the United States, the ratio is about 1.6, a figure rather difficult to reconcile with our previous conclusion, though not necessarily inconsistent with it.<sup>8</sup> Overall, this information supports the idea that living alone among the elderly is accompanied by more widespread poverty, although it is not clear whether poverty is triggered by solitary living or vice versa.

In a cross-national study of European countries spanning the years from 1975 to 1989, Pampel (1992) shows that the fraction living alone among the unmarried has increased over( hi)-7hcre.6(n)-0.9b0.5(e1.4(P)-12.9(a)-0)S6(n)

that is, largely composed of the infirm, poor and destitute. But the evidence available for the most recent period is remarkably elusive on this score. The summary of various studies that follows shows that the empirical evidence from several countries is not always consistent with this imagery. The first two studies summarized below provide estimates of quantities analogous to  $\Delta_a$ , whereas all the others only enable us to retrieve values of  $B_r$ .

The Luxembourg study cited above includes information for Taiwan Province of China, where the ratio of women living alone and below poverty level to those co-residing and below poverty is in the neighbourhood of 2.8. This is by far the largest ratio, and its magnitude is all the more remarkable since levels of poverty among all elderly Taiwanese are higher than in countries such as Canada or Germany, two of the countries where high ratios of poverty among those living alone were identified.

In a recent study of nationally representative data in Thailand, Knodel and colleagues uncover a more mixed picture that, although not entirely inconsistent with the belief that the elderly living alone may be worse off, suggests that the relations are more complicated. Thus, Knodel and colleagues conclude that the image of the elderly being increasingly deserted to live on their own or being neglected if they do live with their family is reinforced by media conveying the same idea. Unfortunately, it appears to be based more on preconceptions and anecdotal evidence than on hard facts (Knodel, Amornsirisomboon and Khiewyoo, 1997). In fact, their data reveal that while there are some differences in indicators of well-being (income, perceived sufficiency of income, recent financial problems, and household possessions), these are hardly large enough to substantiate the idea that those living alone are a particularly fragile group. It is only in rural areas where the differences are sufficiently strong to merit special attention.

Table 5 summarizes the information regarding the effects of indicators of well-being (socio-economic status) in a number of Asian and Latin American countries. The best way to characterize these results is that they are somewhat inconclusive, even though positive relations are more common than negative ones. The studies define different focal populations (unmarried versus unmarried and married elderly), and they differ in terms of indicators of socio-economic standing and types of controls used. Overall, and perhaps unsurprisingly, the estimated effects are somewhat inconsistent. In some cases (Brazil, Malaysia, Mexico and the Republic of Korea), the effects of income or home ownership are equivalent to those already verified in the United States and Europe. In other countries, the effects of indicators of well-being can be in the opposite direction, or statistically insignificant, as is the case of home ownership in Brazil.

**(TABLE 5 HERE)**



Finally, there are studies focusing on the effects of children's characteristics on the probabilities of co-residence with their parents. If one assumes that indicators of wealth across generations are strongly correlated and that the within-family (across offspring of the same parents) variance in wealth is trivial, then a high probability of not living with parents among children above the poverty line would suggest that parents above poverty are more likely to live alone. This is a fragile inference, particularly since often key parental characteristics are not controlled for. One of these studies (Martin and Tsuya, 1991) shows that in a sample of JapTw[r8 ,0b )-11.3( of)1(ese .8(er)-9cWJT\*Twcp)1ge911.3(Tsuy)2chat pa

not been properly focused to make a connection that indeed exists. Thus, understanding the factors responsible for trends in living arrangements will help us to identify conditions that are, at least in theory, related to the elderly's well-being, and thus clarify not just the theoretically interesting issue of family and household transformations, but also some of its more concrete and practical implications.

To identify factors that explain past trends of intergenerational co-residence and the possible relation to the well-being of older persons, the paper first locates the theme within the broader and distinguished tradition of studies of families and households. There is then a discussion of a general framework to sort out conditions that could account for observed trends. Finally, the paper reviews some of the empirical evidence available to adjudicate between alternative explanations.

*Living arrangements of the elderly, living arrangements of children and household types*

The study of levels, patterns and changes of living arrangements among the elderly has been an important though not always central feature of sociology and demography of the family. The literature on transformations of the family and household living arrangements that accompany or follow industrialization and modernization is dense with references to a transition entailing drastic reductions of joint co-residence of members of different generations. The debate on whether such a transition has indeed taken place, rather than being an illusion created by demographic constraints, has generated a vast literature directly or indirectly documenting a number of changes of living arrangements of older persons (Wall, 1989a, 1989b; Smith, 1993;

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A number of recently developed frameworks link intergenerational transfers to formulations based on evolutionary theories. These suggest that strong kin networks, familial bonds and the prevalence of household extension were dominant in pre-industrial societies where they operated as mechanisms to spread the high costs of childbearing and sustain a high fertility regime that offset high infant and childhood mortality. These arguments stress the role of the grandparental generation as an important source of support to younger relatives (Turke, 1989, 1991; Fricke, 1990; Lee, 1997; Kaplan, 1994, 1997; Stecklov, 1997; Kobrin, 1976). To the extent that children and grandparents (and other kin) were able to support the care and nurturing of siblings and grandchildren, they maximized reproductive potential under precarious conditions. Strong family bonds

dominating over the consumption needs of the elderly (Lee, 1994a, 1994b, 1995; Lee and Paloni, 1992; Stecklov, 1997). Instead, in industrialized societies, the direction of transfers is upward, from the younger to the older generation (Lee and Palloni, 1992).

Three qualifications are in order. First, the effect of these factors is tightly related to the nature of each good appropriated or consumed in a household. Shelter, for example, is a public good “produced” by the household that is very sensitive to changes in private income. Not so domestic service or recreation. Thus, fine-tuning the definition of goods to establish their relations and classifying them as public versus private, as



In developing countries, most studies are of the cross-sectional variety and have not shed any light whatsoever on the nature of changes. We do know, however, that cross-sectional data are not always consistent with the hypothesis that higher income promotes living alone (see above), at least in the simplified



literature that a central motive for the maintenance of a net flow of family transfers and co-residence with the elderly is associated with needs emerging in social contexts with poorly developed capital markets, precarious private savings rates, high levels of risk and uncertainty, and devoid of institutionalized mechanisms for social transfers. In view of this, one would expect that accounting for social changes that alter such contexts and for the presence and strength of social transfers would provide some leverage to explain observed changes in levels of living alone. But this is not the case. In the study by Pampel (1992) in Europe, his study of United States data (Pampel, 1983), and in one by Keilman (1988) on European countries, the role of social transfers is of trivial importance and cannot account for the observed diversity in levels of co-residence across countries in Europe and over time in the United States.



Lesthaeghe has argued in favour of the hypothesis that a number of demographic changes, including low

respect are embedded in many other behaviours. Their findings suggest that, far from being neglected, traditional feelings for the elderly are very much in place.

Similar work with focus groups by Knodel and colleagues in Thailand points to a widespread norm of support for the elderly and the elderly's preferences of co-residence with children. They conclude that fertility decline, and the entire ethos that accompanies the change, may have limited effects on co-residence, largely owing to the relative flexibility among Thais with respect to the gender of co-resident adult children and particularly with respect to the gender of the child who eventually remains with the elderly parents once all others have left the parental household (Knodel, Chayovan and Siriboon, 1992, p. 96). Opinions by participants in their focus groups reflect that young adults and the elderly alike seem to hold co-residence and other forms of support in high esteem, and they are not about to abandon them even if smaller families are accepted as the norm.

In apparent stark contrast, a study of the elderly in the city of Sao Paolo, Brazil carried out by Ramos finds that multigenerational arrangements are not necessarily appreciated by the elderly. In fact, he confirms the existence of a positive gradient between the probability of living alone and levels of poverty but also discovers



developing countries. With a few exceptions, the observed desired family size in many countries and across all cohorts of women does not suggest a future of sharp increases in voluntary childlessness.

The literature on co-residence, however, systematically shows that the number of surviving children does matter for the probability of the elderly to co-reside. In particular, it suggests that elderly persons with a larger number of surviving children are more likely to co-reside. In a thorough review, Wolf (1994a) shows that in most studies carried out before 1993 in the United States and European countries, the probability of living alone is negatively related to the availability of children. Similarly, in an interesting study of United States historical patterns, the authors venture a prediction of future increases in living alone based solely on

This finding has a few implications. The most important one is that as the length of generations rises—childbearing becomes increasingly concentrated at older ages—the proportion living alone will systematically vary by age of parents: it should be lower at younger ages (young old) and will increase thereafter (oldest old).

least in the United States, the effects are unequivocal: availability of unmarried children matters more than sheer availability (Wolf and Soldo, 1988). Recent work has begun to explore this theme in depth but from the point of view of parents, namely, assessing the effects of parental marital history on the patterns of exchanges flowing from children to parents (Pezzin and Schone, 1999). In most countries in Asia and Latin America, marital status matters less as co-residence seems to take place equally among parents and unmarried and married children.<sup>15</sup>

The issue has importance if trends towards a new form of family organization involving high levels of divorce and consensual unions materialize throughout the developing world. This is because the budgetary, spatial and social constraints imposed by these new types of family arrangements of children are bound to affect their (and their parents') preferences for co-residence, and constrain (or enhance?) shared living even more than the reduction in sheer availability of surviving children.

#### *Health status of the elderly*

In virtually all cross-sectional studies of the probability of living alone (or co-residing with children or kin) there is mention of the role of the health status of the elderly. The conjecture is simple: since the needs of elderly persons who are disabled or ill are greater, co-residence should be more likely (keeping everything else constant). The empirical record is not at all clear on this score; although the effects are usually in the expected direction (for example, Haaga, Peterson and DaVanzo, 1993), their magnitude pales relative to the magnitude of other determinants. In a few studies, the findings are inconsistent with those expected and no relation at all is found (Martin, 1989). In yet others, the effects are as expected for some elderly (married) but not for others (unmarried) (DaVanzo and Chan, 1994).

If health status and disability status do have an independent impact, their role in the overall reduction of the probability to co-reside should be investigated. In view of the conjecture posed earlier about the possible increase in disability and chronic illnesses among the elderly in Latin America, one would expect that the trend towards solitary living promoted by other factors would be counterbalanced by the expected deterioration of health status.

Finally, most studies that use health measures rely heavily on self-reports. These are subject to some



### *Residential arrangements as a coping mechanism*

As is plain from the theoretical framework reviewed earlier, patterns of co-residence of the elderly have traditionally been studied with excessively static lenses, as if they were part of inflexible social arrangements or exchanges and lacking in plasticity. As a consequence, we know little about the social use of co-residence as a transient adjusting mechanism to cope with crises, however short-lived, triggered by income or property loss, death of a spouse, or health deterioration, or as a defensive resource to offset deleterious consequences of shifts in social conditions that suddenly alter demographic profiles, institutional settings or property regimes. In all these cases, living arrangements may be temporarily adjusted and tinkered with until conditions in existence before the adjustment are restored, a point in which they may return to their initial state.

An important example of this type of phenomenon is taking place in countries in Africa, as a consequence of the HIV/AIDS epidemic. About 10 years ago, simple simulation models suggested that a major adjustment in patterns of co-residence would need to occur to accommodate not just for the steep increases in adult mortality, but also for the completely changed adult health profile that would ensue (Lee and Palloni, 1992). This has proved to be true, but the author knows of only one effort to assess what the adjustments are for the elderly in the case of Thailand (Wachter, Knodel and VanLandingham, 1999) and none in Africa.

A second example of short-term changes in co-residence patterns of the elderly in response to social shifts may be occurring in a number of countries in Latin America. The most demographically advanced among them (Argentina, Chile and Uruguay) are also the ones where the ageing process is proceeding most rapidly and where currency and inflationary crises and draconian restructuring programmes have undermined the earnings of the elderly population. They are also those in which reforms of traditional pension systems and publicly funded health insurance programmes have been thoroughly dismantled. Although there is abundant anecdotal evidence indicating that there are significant increases in co-residence of the elderly, I know of no study assessing the impact that these changes have had on the elderly's living arrangements. This may undermine our ability to predict what will inevitably occur in other countries, such as Brazil and Mexico, that could rapidly join the ranks of countries such as Argentina, Chile and Uruguay.

### MODELLING LIVING ARRANGEMENTS OF THE ELDERLY

The present section reviews several classes of models for the study of the living arrangements of the elderly. Some of them have been conventionally used in the literature and will continue to be used for a time to come. Others are less developed and their use is much less widespread, but they offer a great deal of

promise and their properties and implications should be studied further. The section also contains a discussion of the role of simulation and data needs to shed light on issues that remain poorly understood.

The review is necessarily selected and driven by two rather narrow concerns. First, as mentioned above, one of the central motivations for studying the living arrangements of the elderly is a practical one, namely, the belief that they have a bearing on the elderly's levels of well-being. We are normally content with assessments about what the prevalent living arrangements are, an examination of the nature of time trends, and the identification of key factors that determine them. Most of the time, however, we neglect to consider related issues regarding residential preferences of parents and children alike, or whether they suffice for satisfying basic necessities. It seems fair to ask whether our models enable us to pass judgements about the extent to which the welfare of the elderly is affected by living arrangements.

Secondly, as reiterated several times in this paper, the living arrangements of the elderly are just one among many other alternative resources, and may not even be the most important one. Furthermore, the availability of other resources may condition the role played by living arrangements, when they play a role at all. Yet, as noted earlier, living arrangements are studied as an outcome in itself, neglecting the entire bundle of resources that the elderly "consume", including savings, bequests, assets and rents, wages and family and social transfers. Thus, an important question to ask is whether the models we use enable us to understand complementarities, substitutability and contingencies of living arrangements and other resources, particularly those associated with other family and social transfers.

### *Types of models*

Five classes of models are distinguished: reduced forms for co-residence (simple and complex), structural forms for co-residence (conditional and unconditional) and structural forms for intergenerational transfers.

#### *Reduced forms for co-residence: simple representations*

The conventional way of studying the living arrangements of the elderly is to use observable information at one point in time or from pooled time-series data, and then to model the observed probabilities of living alone versus a number of alternative options. If the alternatives are just two, a logit (or probit) model is used. If there are more than two, a multinomial logit is the preferred choice.

The specification of the models usually proceeds by including co-variates in the model that are considered to be good indicators of properties identified in a number of alternative theories about co-residence (old-age security hypothesis, parental repayments, risk and insurance, altruism, exchange motive and so on). In

addition, appropriate controls are included. Often, empirical specifications include characteristics of the elderly but only on rare occasions do they also include selected characteristics of a sample of their surviving children.

The estimation of these models results in a set of regression coefficients, usually in the form of estimates of effects on the log odds of living alone (versus one or a number of alternative co-residential arrangements). The validity of a theory is then judged by examining the statistical significance of the regression coefficients of the set of indicators associated with it.

The shortcomings of this kind of modelling are many. The paper focuses on three of them that are closely related to the two main concerns stated at the outset of the present section.

*(a) Lack of a decision-making model*

Perhaps the most important drawback of these models is that they never explicitly pose a representation of what the decision-making process for co-residence is. Even if one neglects the existence of other transfers and ignores their influence on co-residence, the estimated coefficients are largely uninterpretable since we do not know what they refer to, other than to an empirically found association. It is certainly not enough to say, for example, that the effects of the variable income or property ownership are statistically significant and properly assigned as we have no theoretical model within which they are assigned some meaning. One consequence of this lack of theoretical specificity is that endogeneity problems plague these studies and, frequently, the researcher pays only passing attention to them. The second drawback is that to the extent that the decision-making process leading to observable co-residential patterns is opaque, comparability of estimated effects over time or over units of analyses is impossible, for one does not know how differences in estimates should be interpreted. They may simply reflect changes in the importance of the degree to which a variable is endogenous to the process, or be the result of shifts in the social contexts where decisions about co-residence are made. Finally, individual preferences are never explicitly introduced, and frequently the whole issue of preferences is hardly mentioned at all. The result is that these models cannot even begin to address whether the elderly's residential arrangements increase, decrease or are neutral with respect to their well-being.

*(b) Absence of representation of entire sets of options*

An equally troublesome feature of these models is that, more often than not, there is no consideration of alternative co-residence options offered by the array of children and kin available to the elderly. This is not just a difficulty that can be solved by controlling for the demographic availability of children (using the number of children surviving) or kin (using frequencies of available close kin). The problem is that what

matters for co-residential arrangements has more to do with the joint characteristics of children vis-à-vis their parents than with the sheer number of surviving children. Their marital status, their labour-force status, their education and their income are all of considerable importance and should to be taken into account in suitable ways.

(c) *Lack of consideration of other family and social transfers*

A final shortcoming is that the role of other family and social transfers is overlooked. In the rare examples when this is not the case, they are represented as co-variables that enter the specification of the model in the same way as any other co-variate. Instead, the actual utilization of other transfers could be a function of co-residence (rather than the other way around) as children and the elderly may substitute one for the other. More generally, the availability and feasibility of alternative transfers may be an integral part of the decision-making process that leads to living alone or to co-residence. They should then be considered as joint outcomes about which individuals make decisions. The lack of a solution to this problem leads to difficulties analogous to those described earlier regarding the availability of children. This is not surprising since they are tightly related to each other. For example, accounting for children's educational effects on the probability of the elderly's co-residence has relevance for assessing the validity of the hypothesis according to which increased co-residence with the more highly educated among the children reflects the existence of repayment of parental investments in children's education.

*Reduced forms for co-residence: complex representations*

To resolve the problem summarized in (b) above, Wolf and Soldo (1988) formulate a more nuanced model that incorporates all co-residential arrangements that are possible with surviving children. This formulation consists of a multinomial model simultaneously considering all options available to the elderly and making them functions of both the elderly's and, potentially, all of their children's characteristics. It can be applied in cases where there is substantial simultaneous co-residence with children, or when the prevailing rule is one of co-residence with a single child. Estimates of such models can be interpreted more freely than can the conventional reduced logit (or probit) approach as they are potentially informative about the influence of all possible parent-children pairings and about their relevant characteristics. So far, however, the actual estimation of these models has been carried out in the absence of a theoretical formulation that makes explicit the underlying

other social transfers. In this sense, the model also opens the door to solve problem (c). However, since it still does not solve (a), it is unlikely that one could interpret meaningfully the effects of variables measuring the existence of other family (via child) transfers.

*Structural forms for co-residence: conditional model*

Kotlikoff and Morris (1990) were the first to derive an estimable model of co-residence from a stylized yet



The second step consists of the implementation of the two-sided logit approach proposed by Logan and others (1999) to determine the equilibrium (stable) solution to the matching problem and to estimate the effects of vectors of parental and children's characteristics. The TSL approach was designed to increase the tractability of problems involving a match between two sides. Each side is assumed to have preferences that are functions of the characteristics of each member of the pair. The empty set option (no pair formed) is equivalent in our case to choosing the option of living apart.

Estimation of the TSL model is numerically very difficult when the set of pairs that can be formed is large. However, in the case of co-residence, we have a rather small number of possible pairs per family, unless the number of surviving children is extremely large. Therefore, the numerical estimation problems should be considerably reduced.

#### *Structural forms for intergenerational transfers*

The main disadvantage of the extension of Kotlikoff-Morris type models is that they are not designed to deal with the totality of intergenerational transfers, of which co-residence is a part. An admittedly ad hoc solution that preserves the main properties of the model is to include family or social transfers as part of the vector of parent-child characteristics. However, this is unappealing and unlikely to get us too far in assessing theories regarding joint motives for co-residence and other transfers between parents and children.

The only feasible solution is to build models for overlapping generations such as those proposed by Lillard and Willis (1995), and the richer ones suggested and estimated by Rosenzweig and Wolpin (1993). They are, in principle at least, well designed for addressing the problem of decision-making about co-residence as part of the bundle of intergenerational exchanges, but are difficult to specify, are data demanding, and complicated to estimate, all of which limits their more generalized application.

#### *Further developments*

While the modelling issues discussed above and their implications for data collection could mean significant advances in the field, more modest undertakings can also improve our understanding of the living arrangements of the elderly. The present section concludes at a lower level of abstraction, with a brief discussion of desirable analyses of easily obtainable aggregate data. Also identified are some improvements in our existing analytic schemes and their application to extant longitudinal data.

### *Aggregate data analysis*

A number of interesting issues discussed earlier could be studied with data already available to us, particularly those in the form of microsamples from national censuses. For example, it is not difficult to create comparable (across time and social settings) measures of poverty from census data, and to cross-tabulate the elderly population by poverty status and a number of relevant characteristics. This will enable us to establish levels of poverty by living arrangements and, when two or more censuses are available, to assess time trends. Modelling of these data for causal inferences is difficult but a subordinate goal, that of understanding the status quo as well as anticipating where future trends are heading, could be attained.







## NOTES

<sup>1</sup>The availability ratio is the ratio of the population 60 and over to the population between ages 15 and 59. The latter population is the pool of available individuals with whom the elderly could co-reside.

<sup>2</sup>It is suspected that the prevalence of living alone among the elderly in Africa, though varying widely across countries, is at lower levels than in Asia and Latin America. This could be changing rapidly, particularly in countries with high levels of HIV prevalence.

<sup>3</sup>Co-residence regimes in sub-Saharan Africa are undergoing sustained stress and may quickly become destabilized as a consequence of the massive effects of the HIV/AIDS epidemic.

<sup>4</sup>For a view imputing changes in age patterns of living alone to past oscillations in fertility, see Macunovich and others, 1995.

<sup>5</sup>The eighth five-year plan in Thailand makes this explicitly a governmental concern (NESDB, 1995, cited in Knodel, Amornsirisomboon and Khiewyoo, 1997). See, also, Reher (1998) for a statement regarding the consequences, and state of affairs they reflect, of co-residence in Europe.

<sup>6</sup>i1(r8333 50a)1c1.9 Tc Tw22

<sup>9</sup>There is another possibility, which is to measure expectancies rather than distributions. Thus, for example, Schoeni (1998) shows that the fraction of the elderly living alone and the expected duration of living alone behave in somewhat different ways. But, since the differences between the two are hardly consequential and the latter is harder to compute, I will choose to focus on the distributional measure.

<sup>10</sup>This statement refers to overall transfers. Family transfers in industrialized societies are still downward but are more than offset by large social transfers mostly realized through the public sector.

<sup>11</sup>An interpretative problem of a different nature from that posed by endogeneity has to do with model specification. Thus, Kotlikoff and Morris (1990) show that the interpretation of income effects at one point in time is highly sensitive to the nature of the underlying decision process about shared living. They show, for example, that effects of increase of parental income on the probability of co-residence are a function of both parents' and children's preferences for shared living.

<sup>12</sup>However, in the study by Lesthaeghe and Meekers (1986), the authors find that short-run oscillations in the inflation rate have a visible impact on value judgements associated with preferences.

<sup>13</sup>A noteworthy exception is the analysis of Malaysian data carried out by Haaga and colleagues where they verify that, at least among those in poor health, family transfers are larger in the absence of co-residence. Similarly, Rosenzweig and Wolpin (1993) explicitly develop a model where co-residence and other transfers are considered simultaneously. The estimates they derive from United States data, however, do not provide a basis for assessing the relations between one and the other since they do not investigate the latter stages of the life cycle.

<sup>14</sup>In reference to the previous discussion on the relation between co-residence and well-being, it should be noted that areas of high migration may be among those where parents' and children's co-residential status is a misleading indicator of quality of living and well-being of the elderly.

<sup>15</sup>In their study in Malaysia, however, DaVanzo and Chan (1995) find that there are important differentials according to marital status and gender.

<sup>16</sup>In a generalization of this approach to continuous but truncated variables, Wolf and colleagues suggest using a simultaneous tobit equation model (Wolf, Freedman and Soldo, 1997).

<sup>17</sup>A more complicated alternative is to consider a unique but composite family utility function including all children and the parents.

TABLE 1. PROPORTION OF THE POPULATION OVER AGE 60 (P) AND AVAILABILITY RATIOS (AR), 1990-2025<sup>a</sup>

Region	1990		2020-2025	
	P	AR	P	AR
Sub-Saharan Africa	0.047	12.8	0.048	11.8
Eastern Africa	0.044	12.3	0.048	13.6
Central Africa	0.049	10.9	0.046	12.7
Northern Africa	0.059	10.4	0.093	7.9
Southern Africa	0.055	11.5	0.066	10.6
Western Africa	0.047	11.6	0.051	12.1
Eastern Asia	0.103	7.2	0.178	4.6
South Central Asia	0.067	9.4	0.101	7.3
South-eastern Asia	0.067	9.9	0.112	6.8
Western Asia	0.068	9.3	0.097	7.2
Eastern Europe	0.171	4.6	0.236	3.6
Northern Europe	0.202	4.0	0.204	3.2
Southern Europe	0.206	4.1	0.278	3.1
Western Europe	0.202	4.1	0.278	3.1
Caribbean	0.093	7.4	0.141	5.4
Central America	0.062	10.1	0.106	6.9
South America	0.077	8.7	0.126	6.0
Northern America	0.163	4.8	0.235	3.5
Oceania	0.132	5.6	0.184	4.2

<sup>a</sup>AR is the ratio of population aged 15-59 to the population aged 60+. A more precise indicator of availability requires establishing average length of generations,  $t(x)$ , between the elderly aged  $x$  and their children aged  $x-t(x)$ . One can then form the age-specific availability ratio for age  $x$ ,  $AR(x)$ , as the ratio of population aged  $x$  to the population aged  $x-t(x)$ . The adjusted availability ratio is the weighted average of  $AR(x)$ .

Source: United Nations, World Population Prospects, 1998 Revision.

TABLE 2. PROPORTIONAL DISTRIBUTION OF POPULATION 60+ ACCORDING TO SELF-REPORTED HEALTH STATUS:  
SELECTED COUNTRIES IN LATIN AMERICA AND THE CARIBBEAN, AND THE UNITED STATES, 1980-1995

<i>Country</i>	<i>A. Unabbreviated categories</i>			
	<i>Poor</i>	<i>Fair</i>	<i>Good</i>	<i>Very Good</i>
	<i>Males</i>			
Argentina	3.4	33.6	53.4	9.7
Brazil	22.2	-	62.2	15.6
Chile	20.2	37.9	36.3	5.6
Costa Rica	17.7	38.5	33.1	10.6
Mexico	19.6	47.0	27.8	5.6
Trinidad and Tobago	26.6	32.6	32.6	7.9
USA black population (HRS)	12.6	22.5	30.6	39.3
USA black population (AHEAD)	20.4	30.0	28.0	21.6
USA white population (HRS)	7.7	12.3	28.8	51.2
USA white population (AHEAD)	12.5	21.0	32.0	34.6
	<i>Females</i>			
Argentina	10.0	42.7	40.8	6.6
Brazil	34.9	-	50.6	14.5
Chile	27.6	42.9	34.7	4.9
Costa Rica	20.7	42.8	27.8	8.7
Mexico	22.6	48.5	24.8	4.1
Trinidad and Tobago	37.6	37.1	19.8	5.3
USA black population (HRS)	12.0	22.7	33.1	32.2
USA black population (AHEAD)	19.7	29.7	27.6	22.9
USA white population (HRS)	6.7	14.3	25.8	54.6
USA white population (AHEAD)	11.5	22.5	30.4	35.8

TABLE 2. (continued)

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*B. Abbreviated categories*

TABLE 3a. PROPORTION OF UNMARRIED ELDERLY (65+) LIVING ALONE IN THE UNITED STATES, 1910-1990

<i>Year</i>	<i>Unmarried elderly living alone</i>	
	<i>White</i>	<i>Non-white</i>
1910	0.12	0.16
1940	0.21	0.15
1960	0.39	0.30
1980	0.66	0.47
1990	0.70	0.49

*Sources:* Ruggles (1994). Estimates for 1990 calculated from Kramarow (1995).



TABLE 3b. PROPORTION OF UNMARRIED ELDERLY (60+) LIVING ALONE IN EUROPE, 1975-1990<sup>a</sup>

<i>Country or area</i>	<i>Year</i>	
	<i>1975</i>	<i>1990</i>
France	0.74	0.86
Belgium	0.72	0.85
Netherlands	0.72	0.87
West Germany	0.60	0.77

TABLE 3c. PROPORTION OF ELDERLY POPULATION LIVING ALONE IN OTHER COUNTRIES OR AREAS

Brazil: unmarried elderly 55+		Mexico: all elderly 65+	
1960	0.11	1976	0.07
1980	0.20	1994	0.07
Chile: unmarried elderly 60+		Argentina: unmarried elderly 60+	
1970	0.06	1970	0.10
1982	0.08	1982	0.11
Japan: unmarried elderly 65+		Thailand: all elderly 65+	
1970	0.15	1986	0.06
1980	0.27	1994	0.08
1990	0.35		
Taiwan Province of China: all elderly 65+ (living alone or with spouse)			
1976	0.09		
1989	0.23		

*Sources:* For Argentina, Pan American Health Organization (1989a); for Brazil, Agree (1993); for Chile, DeVos, (1990); for Japan, Hiroshima (1997); for Mexico, Solis (1999); for Taiwan Province, Hermalin , Ofstedal and Chang (1992); and for Thailand, Knodel, Amornsirisomboon and Khiewyoo (1997).

TABLE 4. PROPORTION OF ALL ELDERLY AND OF UNMARRIED<sup>a</sup> ELDERLY (60+) LIVING ALONE, BY SEX, , (ATD118 -1.328 (A)87.24 Table U

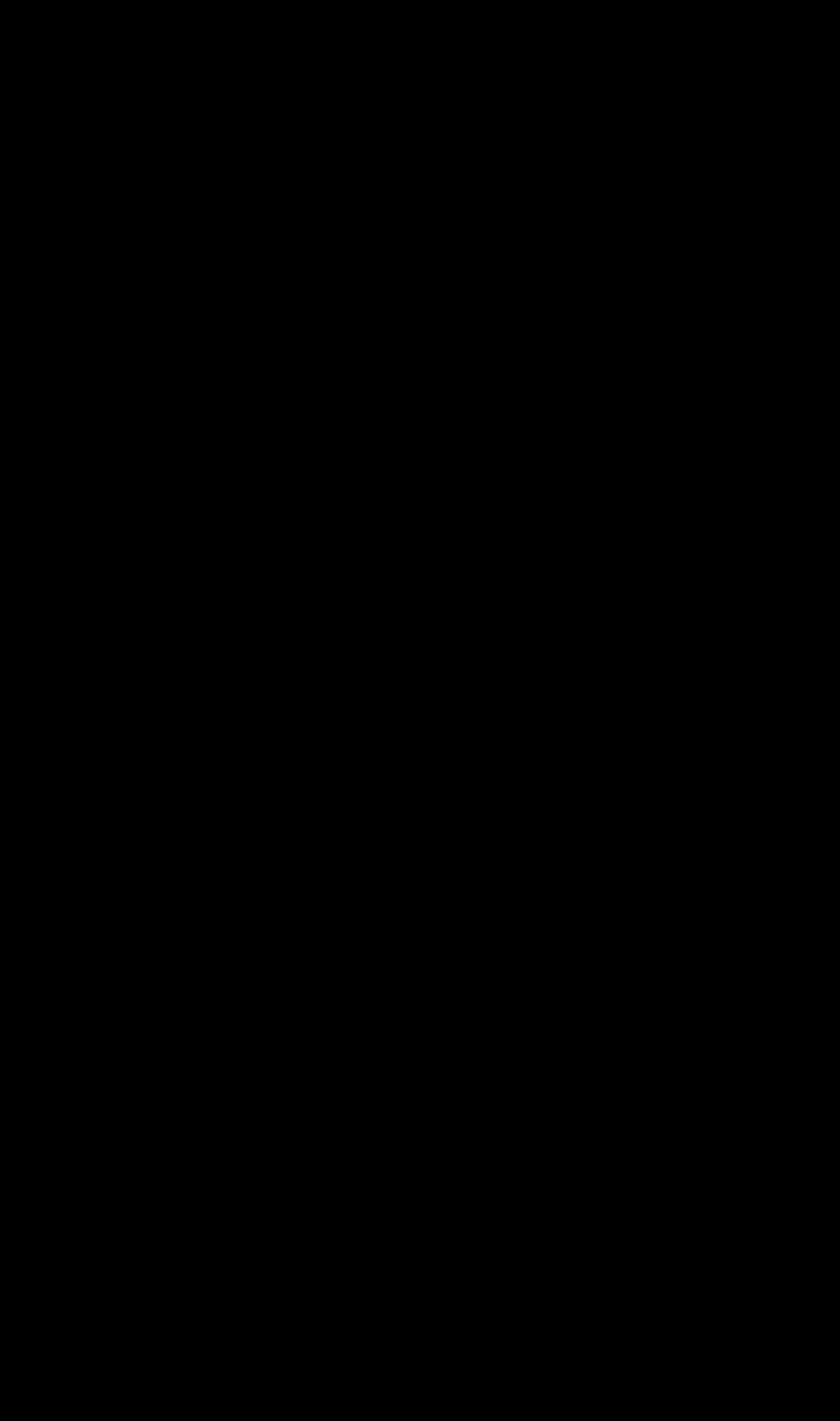
	<i>Year</i>	<i>Total</i>	<i>Men</i>	<i>Women</i>	<i>Total</i>	<i>Men</i>	<i>Women</i>
Argentina	1970	10	10	11	21	31	17
	1980	11	9	12	22	29	20
Bolivia	1976	12	10	13	23	28	21
Brazil	1970	7	5	9	17	24	14
	1980	8	7	10	21	31	17
Chile	1970	6	7	6	12	18	9
	1982	8	7	8	15	22	13
Colombia	1973	6	6	6	10	15	8
	1985	6	6	6	12	19	9
Costa Rica	1973	6	5	6	12	18	9
	1984	8	8	8	17	25	13
Dominican Republic	1970	7	8	6	12	21	8
	1981	7	9	6	15	26	9
Ecuador	1974	8	8	7	15	23	12
	1982	9	9	8	19	27	14
Guatemala	1981	5	5	6	12	20	9
Mexico	1970	8	6	10	17	23	15
Nicaragua	1971	8	9	7	14	27	10
Panama	1970	12	15	9	21	35	13
	1980	12	15	9	24	38	15
Paraguay	1972	7	7	8	14	23	11
	1982	7	5	8	14	20	12
Venezuela	1981	8	9	7	14	23	9

<sup>a</sup>Unmarried refers to individuals not in a union.

Source: Microsamples of decennial censuses.

TABLE 5. EFFECTS OF INDICATORS OF WELL-BEING ON THE PROBABILITY OF LIVING ALONE,  
ASIA AND LATIN AMERICA

<i>Study</i>	<i>Country or area (year)</i>	<i>Indicator of well-being<sup>a</sup></i>	<i>Direction of effect<sup>b</sup></i>
Martin (1989)	Republic of Korea (1984)	Ownership	Positive
	Malaysia (1984)	Ownership	Positive
	Philippines (1984)	Ownership	Not significant
	Fiji (1984)	Ownership	Not significant
Casterline and others (1991)	Philippines (1984)	Education	Not significant
	Singapore (1986)	Education	Not significant
	Taiwan Province of China (1989)	Education	Positive
	Thailand (1986)	Education	Not significant
Chan and Da Vanzo (1996)	Malaysia (Malay) (1988/89)	Income	Positive
	Malaysia (Chinese) (1988/89)	Income	Positive
	Malaysia (Indian) (1988/89)	Income	Positive
	Malaysia (Malay) (1988/89)	Education	Not significant
	Malaysia (Chinese) (1988/89)	Education	Not significant
	Malaysia (Indian) (1988/89)	Education	Not significant
Da Vanzo and Chan (1994)	Malaysia (1988/89)	Income	Positive
Solis (1999)	Mexico (1994)	Income/education	Not significant
Agree	Brazil (1960)	Income	Positive



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