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Modeling old-age wealth with endogenous early-life outcomes: The case of Mexico

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ABSTRACT

This paper contributes to the literature on the life course and aging by examining the association between early-life outcomes and late-life well being, using data from the Mexican Health and Aging Study. Empirical research in this area has been challenged by the potential endogeneity of the early-life outcomes of interest, an issue which most studies ignore or downplay. Our contribution takes two forms: (1) we examine in detail the potential importance of two key life-cycle outcomes, age at marriage (a measure of family formation) and years of educational attainment (a measure of human capital investment) for old-age wealth, and (2) we illustrate the empirical value of past context variables that could help model the association between early-life outcomes and late-life well being. Our illustrative approach, matching macro-level historical policy and census variables to individual records to use as instruments in modeling the endogeneity of early-life behaviors, yields a statistically identified two-stage model of old-age wealth with minimum bias. We use simulations to show that the results for the model of wealth in old age are meaningfully different when comparing the approach that accounts for endogeneity with an approach that assumes exogeneity of early-life outcomes. Furthermore, our results suggest that in the Mexican case, models which ignore the potential endogeneity of early-life outcomes are likely to under-estimate the effects of such variables on old-age wealth.

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Introduction

Over the last couple of decades, there has been a growing theoretical emphasis on the life-cycle approach in aging studies that investigate late-life well being, with a corresponding increase in studies that model late-life outcomes as a function of early-life factors (Corman et al., 2011; Palloni, 2006). This orientation considers aging as a life process, and gives a prominent role to decision-making, as well as to the timing of events and the historical time and place throughout people's lives (see summary provided in Settersten, 2003). From this perspective, individuals are viewed as experiencing events and making choices throughout the life cycle that impact significantly on their late-life well being. However, we know little about the relative importance of specific life-cycle paths as determinants of late-life outcomes. Particularly in societies with vast socioeconomic inequalities such as Mexico, the paths may diverge significantly due to cultural or socioeconomic contexts. Furthermore, in these societies the likely paths are changing rapidly due to economic and social development, thus it is important to understand the relative impact of one path or another for later life.

An example serves to illustrate this point. Following a home-maker path during adulthood for a woman can be significantly different from following a labor-market-oriented path. While these two paths obviously differ in terms of lifestyle and individuals' preferences, it is an empirical question whether they translate into much different well being in late-life as indicated by some measurable outcome variable, such as wealth. In this example, determining the relative importance of these two paths is of interest because the current generations of older-adult women in countries with low institutional support for old age, such as Mexico, are mostly women who devoted the majority of their adult life to family life, whereas the future generations of older women will increasingly spend a larger share of their life course in labor-market activities. How this transformation will impact their well being in old age is of particular importance as developing countries move through this transition in women's roles.

The theoretical orientations of the life course framework include not only trajectories but also transitions. Thus "turning points" in a person's life, such as decisions to marry or pursue higher education, are meaningful changes in the direction of the life course that have potentially important consequences for the individual's development and hence for their old-age (Rutter, 1996). Durations of events (the length of time spent in particular stages) also have salient implications. Through forces of habit or social commitment, long durations are associated with increasing

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propensity to continue in the same state and thus to follow a path with fewer changes in direction (Becker, 1965). Another theoretical orientation of the life course that is of interest to our work is that normative or culturally accepted social expectations regarding the timing of life events can be captured by 'appropriate' ages for transitions such as entry into marriage or retirement, leading to some people experiencing early or late transitions in contrast to the norm. Obtaining information at the individual level about what was the appropriate age for transitions (such as marriage) for each subject is difficult, but the average age observed among subjects in each context can convey this normative concept. Similar arguments can be made regarding appropriate durations for selected life experiences influencing outcomes such as years of education.

The value of accumulated assets, or wealth, at old age is a powerful indicator of economic well being, and it is natural to expect that this indicator would be affected by the specific path followed by individuals along the life course. However, while the life-course theoretical framework has continued to evolve, empirical analyses that attempt to establish causal relationships using this approach have been less common. This is partly because the ideal applications demand longitudinal data that are costly and require long periods of research observation. Furthermore, a key methodological issue is common in this line of work: endogeneity of the early-life behaviors. Taking an example from the health literature to illustrate, a model of late-life health as a function of earlier-life smoking makes analytical sense. However, the same unobserved factors that determined a person's propensity to smoke over the life course may contribute directly to determining the observed late-life health outcomes. In this case, if causality is of concern, the resulting estimators of the effect of smoking on late-life health may be biased.

One possibility to model this type of endogeneity is to find suitable instrumental variables that can help tease out the source of endogeneity of the early-life outcomes. The issue is whether there are factors from the individual's life that affect the propensity to smoke but not the late-life health outcome; finding such suitable factors at the individual level can be difficult. Instead, one can take advantage of the changing social environment, and use aspects of the historical social context as determinants of an individual's behavior. We adopt this approach and consider variables that capture the past context as the instruments for early-life behaviors in models of late-life outcomes.

This paper contributes to the literature on the life course and aging by examining the association between early-life outcomes and late-life well being. Our contribution takes two forms: (1) we examine in detail for the case of Mexico the potential importance of two key early life-cycle outcomes, age at first marriage (a measure of family formation) and years of educational attainment (a measure of human capital investment) for old-age wealth, and (2) we explore the empirical value of past context variables that could help model the association between early-life outcomes and late-life well being in any setting where the historical context is characterized by important changes. In what follows, we first discuss the theoretical life-cycle framework more fully and the integration of historical context into this framework. We then provide background on the historical context for the relevant cohorts and time periods in Mexico. Next we describe our data sources, the Mexican Health and Aging Study which is a detailed data collection project focusing on the elderly, and many years of census data. The next section presents our empirical methodology with an emphasis on the role of the historical data. The following discussion of empirical results focuses first on assessing the validity of the methodology, and then on the implications of the results for the determinants of old-age wealth in Mexico.

Life-cycle framework

We use the life-course perspective to study late-life well being in Mexico, following previous research (see, for example, Settersten, 2003 or Wong and DeGraff, 2009). This approach considers aging as a process, and late-life stocks are the results of lifetime investments. In particular, models of late-life financial wealth consider earlier labor force participation and income as determinants of late-life economic well being (Smith et al., 2003). The majority of this research, however, has been conducted in high-income countries because of the greater data availability. In addition, the research has focused largely on men because there tends to be an interest in the long-term effect of work and retirement decisions, and the information on such work-related factors is more available for men. In our previous work (Wong and DeGraff, 2009), we adapted this theoretical perspective to the context of developing countries and aimed to integrate more fully the experience of women. We argued that in order to apply this perspective to the case of Mexico, a country experiencing fast demographic and economic changes, the models not only need to include measures of engagement in the labor force as potential determinants of late-life financial wealth, but also factors that capture structural changes, such as in family formation behavior and human capital investment. Of particular interest is the timing of events such as first marriage and first job, as well as total accumulated outcomes such as number of children, the total years of education, and total years of labor force work. Our previous analysis, however, did not attempt to address the potential endogeneity of the early-life behaviors included in our model of late-life economic well being.

The main elements of our conceptual framework are illustrated in Fig. 1, building upon our previous work (Wong and DeGraff, 2009). The bottom of the figure outlines the stages of an individual life cycle. Educational attainment, age at first job and age at first marriage mark the early work and family trajectories followed by an individual. As mentioned, we focus particular attention in this analysis on educational attainment and age at marriage. Educational attainment serves as a measure of investment in human capital, and is widely used as an explanatory variable in models of earnings capacity in both industrialized and developing countries. We expect higher levels of education to contribute to greater labor market earnings and, thus, a greater potential to save and accumulate wealth. Higher levels of education could also be associated with access to higher returns on any savings or assets. Age at first marriage might, for example, influence old-age wealth through the timing of family formation and maintenance expenditures. Later marriage can postpone the onset of expenses associated with setting up one's own household and supporting children, and also may be indicative of being better established prior to marriage more generally. We expect age at marriage to positively influence wealth in old age. Importantly, both of these measures exhibit substantial variation in our sample of elderly in Mexico and, thus, are of substantive interest and well suited for our empirical methodology. Finally for this early stage of the adult life cycle, age at first job is associated with an earlier initiation of earning income which would contribute positively to the accumulation of savings.

Number of children, work attributes, and years worked are indicators of decisions throughout the early to middle adult years that impact late-life economic well being through their effects on income earning and consumption expenditures to maintain one's family. During middle and old age, the traits of adult children may turn into powerful determinants of financial well being, particularly for women in settings with low institutional support which are common in contemporary developing countries. The loss of a spouse may also influence the financial status of adults in old age.

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