Immigrant Health Advantage in Functional Limitations in Midlife and Older Age: (How) Does the Age of the Onset Matter?

Zoya Gubernskaya, University at Albany, SUNY

Weihui Zhang, University at Albany, SUNY

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Zoya Gubernskaya, PhD, University at Albany, State University of New York, Department of Sociology, 351 Arts & Sciences Bldg., 1400 Washington Ave, Albany, NY, 12222, email: zgubernskaya@albany.edu

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Abstract

The paper uses data from the 2001-2015 Integrated Health Interview Survey (N = 198,003) to test whether the age of onset of functional limitations help explain the differences in old age functional impairment rates between the foreign-born and U.S.-born adults in the U.S. The results show that, adjusting for age, sex, race, marital status and education, immigrants age 50 and over have about 37% lower risks of developing functional limitations than the U.S.-born adults of the same age. Compared to U.S.-born, foreign-born have 18% lower risk of developing limitation before age 18 and 37% higher risk of developing a functional limitation after age 50 than developing a functional limitation between ages 18 and 49.The results point to the importance of selective in- and out-migration for understanding the causes of health disparities in functional limitations by nativity in midlife and older ages.

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Projected to increase to 20 million by 2050 (U.S. Census Bureau, 2012; Treas & Batalova, 2009), older immigrant population figure more and more prominently in our understanding of health and aging in America. An increasing diversity of this group calls for a better understanding of the health disparities by nativity and among the older immigrants, which is crucial for designing effective public policies to reduce health disparities and improve quality of life of the growing older immigrant population (Treas & Gubernskaya, 2015).

"Immigrant health paradox" research reports that despite their lower socio-economic status, foreign-born have lower mortality and better health on many indicators that U.S.-born whites (Angel, Angel, Diaz Venegas, & Bonazzo, 2010; Borrell & Lancet, 2012; Elo, Turra, Kestenbaum, & Ferguson, 2004; Garcia, Garcia, Chiu, Raji, & Markides, 2018; Lariscy, Hummer, & Hayward, 2015; Mehta, Elo, Engelman, Lauderdale, & Kestenbaum, 2016). The results are especially mixed on the nativity differences in disability in midlife and older age. Some studies find that older immigrants have lower rates of disability, but other studies conclude that an immigrant health advantage does not extend to disability, and that despite living longer, foreign-born spend a larger share of their life with disabilities (Elo, Mehta, & Huang, 2011; Engelman, Kestenbaum, Zuelsdorff, Mehta, & Lauderdale, 2017; Garcia & Reyes, 2017; Hayward, Hummer, Chiu, González-González, & Wong, 2014; Huang et al., 2011; Markides, Eschbach, Ray, & Peek, 2007; Mendes de Leon, Eschbach, & Markides, 2011; Mutchler, Prakash, & Burr, 2007).

This paper uses data from the 2001-2015 Integrated Health Interview Survey to test whether the age of onset of functional limitations help explain the differences in old age

functional impairment rates between the foreign-born and U.S.-born adults in the U.S. Because of migration selectivity, individuals with functional limitations would be less likely to migrate ("healthy immigrant effect") and more likely to return to their home countries if they experience health decline ("salmon bias"). Consequently, older immigrants will not only have lower rates of functional impairment but also will be more likely to develop limitations later in the life course. The later onset of functional limitations will be especially prevalent among the late life migrants (Treas & Gubernskaya, 2016) .

Data and Method

This study uses nationally representative data from the 2001-2015 National Health Interview Survey (NHIS) (Blewett et al 2018) . NHIS is a repeated cross-sectional household interview survey conducted each year by the U.S. Census Bureau. It is also the largest in-person household health survey representative of the non-institutionalized civilian US population. Unlike other surveys, NHIS provides information not only about the presence of functional limitations, but also about the specific causes and duration of each limitation, which is critical for the present study. To ensure the consistency and comparability of the variables, the analytic sample includes respondents age 50 and over interviewed between 2001 to 2015. The final sample consists of 198,003 respondents, including 170,175 U.S.-born and 27,828 foreign-born adults.

The main dependent variable is the earliest onset of a functional limitation. The presence of functional limitations was determined by positive responses to at least one of the questions asking whether a respondent is limited in any way in various specific activities (e.g., walking, lifting, standing, sitting, grasping) due to "any physical, mental, or emotional problem or

illness." The functional limitation may be caused by various reasons, such as bone fracture, hearing difficulty, hypertension, or depression. The earliest age of the onset of each functional limitation was determined by subtracting the duration the functional limitation (in years) from the respondent's age. If a respondent reported multiple functional limitations, the one with the longest duration was chosen to determine the age of the onset. The continuous age of the onset variable was then recorded into a 4-category variable: age unknown, younger than 18, age 18 to 49, and age 50 and older.

A respondent's nativity status was determined by his or her birth place. Those who were born outside of the U.S. or U.S. territories were considered foreign born. We control for basic demographic variables including age, sex, race, ethnicity, marital status, education, and survey year in this study. Age is a categorical variable broken down into 10 year categories: 50-59, 60-69 (reference), 70-79 and 80 and over. Sex is dichotomous variable with females as reference. Race is coded into 4 main categories: white (reference), black, Asian/American Indian, and others. A dichotomous variable distinguishes between Hispanic and no-Hispanic older adults. Marital status variable distinguishes between married (including married and cohabiting) and not married respondents (including single, widowed, divorced and separation). Education is measured as the number of years of schooling. We also include an indicator for the survey year.

We begin by examining the descriptive differences in the timing of the onset of functional limitations by nativity. Then we used multivariate multinomial regression models to test whether there are differences in the timing of the onset of functional limitations between the U.S.-born and foreign-born older adults. The multinomial logistic regression function is as this:

$$\text{logit}(p_1 + p_2 + p_3 + p_4) = \ln\left(\frac{p_1+p_2+p_3+p_4}{1-p_1-p_2-p_3-p_4}\right) = \beta_0 + \beta_1 x_1 + \sum_{j=1}^{m} \beta_{wi} x_i \quad + \mu_i \qquad \text{(i)}$$

where p_1 is the probability of age of starting functional limitation uncertain, p_2 is the probability of starting functional limitation before 18, p_3 is the probability of having onset of functional limitation between 18 and 49, and p_4 is the probability of having onset of functional limitation since 50 years old. The logit of these probabilities is modeled as a linear function of foreign status ($X_{1)}$ and a set of covariates (w), including age, sex, race, ethnicity, marital status, education, and survey year.

Results

Table 1 presents the descriptive statistics by nativity. About 53.3% of U.S.-born age 50 and over report having a functional limitation compared to 41.8% of foreign-born of the same age. These differences result from the lower rates of the onset of functional limitations at all ages. However, among those who have at least one limitation, the distribution of the age of the onset differs by nativity. The onset of functional limitation among the foreign-born, on average, happens at older ages compared to U.S.-born older adults. Only 3.8% of foreign-born with functional limitations report that their functional limitation developed before age 18 compared to 6.7% of U.S.-born. In contrast, 63.2% of immigrants with functional limitations developed it after age 50 compared to 55.4% of U.S.-born. But foreign-born adults are also, on average, younger, less likely to be white, more likely to be Asian or Hispanic, more likely to be married and have lower levels of education compared to U.S.-born adults.

[Table 1 about here]

Table 2 presents the results from multinomial regression models of the timing of the onset of functional limitations. Consistent with the descriptive results, foreign-born have lower risks of developing functional limitations at all ages. Compared to U.S.-born and adjusting for

socio-demographic factors, immigrants have 61% lower risk of developing a functional limitation before age 18; 55% lower risk of developing a functional limitation between ages 18 and 45; and 31% lower risk of developing a functional limitation after age 50.

[Table 2 about here]

Figure 1 presents predicted probabilities of the timing of the onset of functional limitations for U.S.-born and foreign-born adults age 50 and over. The predicted probabilities derived from the model presented in Table 2 holding all covariates at their means. The figure shows clearly that older immigrants not only less likely to have functional limitations, they less likely to develop them at all ages, especially during prime adulthood between ages 18 and 49.

[Figure 1 about here]

Table 3 presents the results from the multinomial regression models of the timing of the onset of functional limitations among those older adults who have functional limitations. Compared to U.S.-born, foreign-born have 18% lower risk of developing limitation before age 18 and 37% higher risk of developing a functional limitation after age 50 than developing a functional limitation between ages 18 and 49.

Discussion and Conclusion

The results show that, adjusting for age, sex, race, marital status and education, immigrants age 50 and over have about 37% lower risks of developing functional limitations than the U.S.-born adults of the same age. The onset of functional limitation among the foreign-born, on average, happens at older ages compared to U.S.-born older adults. Compared to U.S.-born, foreign-born have 18% lower risk of developing limitation before age 18 and 37% higher risk of developing a functional limitation after age 50 than developing a functional limitation between ages 18 and 49.

Selective migration is one of the possible explanations behind these differences. According to the "healthy immigrant effect", immigrants are positively selected on health. In other words, those who developed functional limitations at younger ages are less likely to migrate internationally. Another explanation points to selective return migration or "salmon bias." Because many immigrants come to the U.S. to work, developing health problems that precludes one from working may trigger return migration. Both of these mechanisms will lead to lower levels of functional limitations among the foreign-born and to the shift in the age profile of the onset of functional limitations toward older ages.

Despite later onset and overall lower rates of functional limitations among the foreign-born during midlife, older immigrants may experience accelerated health decline at older ages. On the one hand, early onset of functional limitation increases risk of mortality or developing other health conditions. But given the survival, earlier onset of functional limitation means that individuals were able to successfully adjust to a life with a limitation. This adjustment may be more difficult in later life, especially for immigrants, which may explain high rates of old age disability among the foreign-born found in some studies.

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Table 1: Weighted means and proportions by nativity: Adults age 50+, 2001-2015 IHIS

	U.S.-born	Foreign-born
Presence of functional limitation (FL) (%)	53.26	41.87
Onset of FL (%)		
No functional limitation	46.74	58.13
Has limitation but onset unknown	1.96	1.51
Younger than 18	3.57	1.61
Between ages 18 and 49	18.25	12.30
Age 50 or older	29.49	26.46
Onset of FL among those with FL (%)		
Has limitation but onset unknown	3.7	3.6
Younger than 18	6.7	3.8
Between ages 18 and 49	34.3	29.4
Age 50 or older	55.4	63.2
Age (%)		
50-59	41.29	46.7
60-69	29.66	28.66
70-79	18.26	16.27
80+	10.78	8.36
Male (%)	46.34	46.38
Race (%)		
White	87.34	66.67
Black	10.23	7.89
Asian/American Indian	1.37	23.86
Other	1.07	1.58
Hispanic (%)	3.33	41.51
Married (%)	63.72	69.82
Education (mean years)	13.49	11.95
N	170,175	27,828

Table 2. Relative Risk Rations from the multinomial regression models of the onset of functional limitations: Adults age 50+, 2001-2015 IHIS

Variables	Unknown vs. no FL	Before age 18 vs. no FL	Age 18-49 vs. no FL	After age 50 vs. no FL
Foreign born	0.65***	0.32***	0.48***	0.73***
	(0.05)	(0.02)	(0.02)	(0.02)
Male	0.66***	0.64***	0.74***	0.62***
	(0.03)	(0.02)	(0.01)	(0.01)
Age (Ref. age 60-69)				
50-59	0.58***	0.97	1.24***	0.33***
	(0.03)	(0.04)	(0.02)	(0.01)
70-79	2.23***	0.92*	0.79***	1.92***
	(0.12)	(0.05)	(0.02)	(0.03)
80+	5.68***	1.38***	0.76***	3.68***
	(0.32)	(0.08)	(0.03)	(0.10)
Race (Ref. white)				
Black	1.27***	0.74***	1.06**	1.08**
	(0.08)	(0.03)	(0.03)	(0.03)
Asian/American Indian	0.91	0.75**	0.70***	0.85***
	(0.10)	(0.08)	(0.04)	(0.03)
Others	2.02***	2.90***	1.85***	1.23**
	(0.33)	(0.31)	(0.12)	(0.09)
Hispanic	0.80**	0.70***	0.81***	0.86***
	(0.07)	(0.05)	(0.03)	(0.03)
Married	0.73***	0.59***	0.79***	0.88***
	(0.03)	(0.02)	(0.01)	(0.01)
Education (in years)	0.90***	0.85***	0.87***	0.90***
	(0.01)	(0.01)	(0.003)	(0.003)
Survey year	0.98***	1.03***	1.03***	1.02***
	(0.005)	(0.003)	(0.002)	(0.002)
Constant	0.18***	1.29**	3.80***	4.29***
	(0.03)	(0.16)	(0.26)	(0.24)
N			198,003	

Note: * p<0.1; ** p<0.05; *** p<0.001.

Table 3. Relative Risk Rations from the multinomial regression models of the onset of functional limitations: Adults age 50+ with functional limitations, 2001-2015 IHIS

Variables	Unknown vs. Age 18-49	Before age 18 vs. Age 18-49	After age 50 vs. Age 18-49
Foreign born	1.26***	0.72***	1.37***
	(.085)	(0 .04)	(0.04)
Male	0.87**	0.85***	0.82***
	(0.04)	(0.03)	(0.01)
Age (Ref. age 60-69)			
50-59	0.46***	0.78***	0.26***
	(0.03)	(0.03)	(0.01)
70-79	2.78***	1.17**	2.40***
	(0.17)	(0.06)	(0.06)
80+	7.34***	1.83***	4.74***
	(0.49)	(0.12)	(0.17)
Race (Ref. white)			
Black	1.22**	0.70***	1.04
	(0.08)	(0.03)	(0.03)
Asian/American Indian	1.33**	1.06	1.27***
	(0.16)	(0.11)	(0.08)
Others	1.13	1.57***	0.69***
	(0.19)	(0.16)	(0.05)
Hispanic	1.01	0.88*	1.08**
	(0.09)	(0.06)	(0.04)
Married	0.91**	0.75***	1.12***
	(0.04)	(0.03)	(0.02)
Education (in years)	1.03**	0.98**	1.02***
	(0.01)	(0.01)	(0.004)
Survey year	0.98***	1.03***	1.02***
	(0.005)	(0.003)	(0.002)
Constant	0.06***	0.34***	1.35***
	(0.01)	(0.04)	(0.10)
N		107,345	

Note: * p<0.1; ** p<0.05; *** p<0.001.

Figure 1. Predicted probabilities of the onset of the functional limitation by nativity: Adults age 50 and over, 2001-2015 IHIS