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Review Article

Transition and duration in disability: New evidence from administrative data

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Abstract

Background: In recent decades demographic changes (low fertility rates, increased life expectancy…) in most OECD countries, have brought profound changes in the population pyramid, with several effects in the welfare of society. One of them is the increase in the number of people with disabilities, since age is a determining factor in the emergence of this dependency.

Objective/hypothesis: This paper studies the probability to enter and transit in and from a disability state, as well as its associated mortality, by attending to the distinction between the initial disability level and the process that leads on from it, and by addressing whether and how education, age and income affect this transition.

Methods: Applying a Markov model and a survival analysis to new Spanish administrative data set (Muestra Continua de Vida Laboral (MCVL)) we estimate the probability that a person changes the state of disability and the duration of her progression in each case.

Results: We find that people with an initial state of disability have a higher propensity to change status and take less time to transit amongst different stages than those who have no disability. Men do so more frequently than women and income have negative effects on the transition.

Conclusions: These results may help to incorporate into welfare programs some protection mechanisms for delaying transitions and target the most fragile population groups.

Keywords: Disability; Markov chain model; Transition probability; Survival analysis; *JEL classification:* J0; H0; I18; I10; H55

Demographic changes in recent decades in most OECD countries, basically as a result of increasing life expectancy and low fertility, have brought profound changes in the population pyramid, with several effects. One of them is the likely increase in the number of people with disabilities, since age is a determining factor in the emergence of this problem. Furthermore, increased longevity impels social and political institutions to adjust their objectives and programs to face new challenges.[1] In this context, in most developed countries, changes in the prevalence of severe disability among the elderly are likely to have important effects on demand, and therefore on expenditure on long-term care.[2,3] Before considering possible policy strategies to tackle problems related to disability or to long-term care, it is essential to understand the nature and characteristics of the disabled population, and in particular the composition of the individuals affected, what limitations they have and how severe their disability is. Furthermore, it is important to understand which factors (age, education, income, gender, etc.) may affect the disability for the first time and the transition mechanisms which lead disability from one state to another. To know the population's structure, and how this might change, provides crucial information on the current number of people with a disability and how this may evolve in the future, helping policy makers to take the appropriate decisions to prevent people from entering a disability state and tackle the high health care costs associated with it.[4,5]

Disability prevalence rates tend to be lower at the youngest ages and higher for the elderly.[6] However, other factors than age can influence the disability state. Studies have shown that lower socioeconomic status is related to the prevalence of poor self-rated health and disability[7] and to the onset of disability.[8,9] Level of income and education are often indicators of social economic status. In the OECD countries most of today's older population left school quite young, and their pension incomes today show a great disparity with high risk to disability for those in cohorts' lowest deciles.[10,11]

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Surprisingly little attention has been paid to the combined effect of these factors on the transition from one degree of disability to another,[12,13] with very scarce empirical evidence in Europe. This is due in part because most of panel data with information on disability have small size samples to analyze changes between states and it is therefore difficult to model probabilities and predict transitions from such small size samples.

We have the possibility to explore a new dataset that solves most of the above limitations and allows us to shed more light on the evolution of disability states and its consequences, not only for people of working age but also for the elderly.

With this paper we want to contribute to the field by analyzing disability trends among population; that is, what makes them entry into a disability state and, from this, the transition to other states. In particular, we calculate how this trend is affected by demographic factors (age, gender, income and so on) and the time to change their states. Moreover, we estimate the probability to death at each of the states, where very few studies have been able to incorporate it. We focus our analysis on Spain, an OECD country where very little is known about trends in disability due to lack of data since in the Lafortune and Balestat study[2] on disability trends in twelve OECD countries Spain was excluded.

In Spain, applied research on this topic is very scarce. Only Rodriguez[14] has analyzed the phenomenon of disability from a health perspective using the ECHP (European Community Household Panel) from 1995 to 2001. He finds that a high percentage of disabled people are disabled in the short term, and identifies significant differences in the probability of tracing a certain path according to the individual's socioeconomic characteristics. However, most health surveys (ECHP and EES, among others) as the one utilized by Rodriguez have the disadvantage that most of the questions on health are self-reported and are based on small size population samples, which increase the estimation bias[15] of the dynamic panels.

At a more international level, few works have analyzed disability over time.[16–20] Most of them are concentrated on the effects of disability on the labor market. One of the first studies undertaken from this dynamic perspective was published by Burkhauser and Daly[21] who, using data from the United States for 1970–1980, concluded that reductions in employment and income levels suffered by people with disabilities were less than initially expected. This was due to the fact that their situation in terms of employment and income was already poor before becoming disabled, strongly anchoring their evolution. In a later work,[21] these authors compared the situation of males with disability in the United States and Germany. The results again showed an increase of dependency highly associated with the type of employment and the income levels for those disabled in both countries. However, the situation was better for Germany than the US. Very similar conclusions were later obtained for Germany in a work carried out by Riphahn,[22] where it became explicit that the negative effects of disability transitions were greater among people suffering the most severe initial disabilities and among those groups with lower income levels.

Using the MCVL administrative data reported by the Social Security system in Spain from 2005 to 2010, we can follow up people with and without disability and analyze their transitions. The advantage of this data over the household panel is that the disability status is measured objectively and individuals are followed over the years.

The analysis was performed using a dynamic Markov switching model. By permitting switching between two states, this model is able to capture more complex dynamic patterns. In particular, the Markovian property regulates that the current value of the state variable depends on its immediate past value. In addition, we also consider also a survival analysis to calculate when an individual exits from one state to enter another and the time that it takes for him/her to make this change.

Our follow analysis is divided into three Sections. In the first Section we present the Markov model and the data we have used in our research. The second Section shows the main results. The final Section discusses and concludes these results.

Methods

Data

To conduct the analysis we use the Social Security records data (*Muestra Continua de Vidas Laborales*, MCVL).[c] The sample represents the entire reference population each year according to age, sex, residence region and nationality. The information of those individuals selected in the Social Security account for 4% of the Spanish people present in the Social Security system annually. The data are available in two versions: one with the tax data by the national Revenue Agency and one without it. The version with tax data includes both employees who are enrolled in the Social Security, as well as recipients of contributory and non-contributory pensions and unemployment benefits.[d] The tax data in the MCVL come from the information in form 190, which contains the summary for each fiscal year of all earned income, economic activities, prizes and income imputations for people and legal entities. All entities that pay salaries, pensions and unemployment benefits are required to present this form. This is submitted to the Spanish Government and does not allow for any exemption. In this form each employer needs to fill in information about employees (age, gender, income, marital status,

[c] All the estimations are performed by the statistics package: *Stata*®.

[d] Jobseekers who not receive benefits and the inactive population (as distinct from people who receive a pension) are not included. In Spain all individuals who have not reached 15 years of works are entitled to a retirement pension, in a non-contributory mode, at age 65 years old.