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Divesting for the Future? Foregone Human and Health Capital Services among Transition-Age SSI Participants

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## Abstract

Supplemental Security Income (SSI) is a means tested program designed to help the elderly and people with disabilities. Those with disabilities who are under 65 must meet certain income and health eligibility requirements to receive SSI benefits. For a child, health eligibility requirements depend only on the state of the child's impairing condition. For an adult, health eligibility requirements are further determined by considering whether the health impairment prevents the individual from performing a substantial gainful activity. These health-related eligibility requirements lead individuals and/or their families to make a tradeoff between procuring health services and foregoing them, so as to avoid losing the benefits due to an improvement in health. The adult's health-related eligibility requirement introduces an additional trade-off between the accumulation of human capital (schooling and job-related activities) and the prospect of participation during adulthood. To explore the potential consequences of the program on the health, labor force participation, and schooling outcomes of children and transition age youth, I develop a three period model to explore the dynamics of health and human capital investments of families of children with disabilities from childhood into early adulthood when the SSI is available to them. Using data from the National Longitudinal Transition Study (NLTS-2), and taking advantage of the different rates at which SSI benefits are granted or terminated depending on the type of the disability of the participants, I plan to estimate a set of equations for the family's labor supply, the health and human capital investments of the family, and the SSI participation decision to empirically test the implications of the proposed model.

# 1 Project Description

## Statement of the Problem

SSI is a means tested program established to help people with disabilities and the elderly in the U.S. When protecting people with disabilities, the program has two components, one for children (Children-SSI), and one for adults (Adult-SSI). In general, eligibility for the SSI program requires the existence of an impairing health condition and limited income. Both of these requirements need to be satisfied at all times, meaning that income increases and health improvements might potentially result in a loss of benefits among current beneficiaries. Similarly, health improvements hinders the possibility of future participation among prospective beneficiaries. In addition to the income requirement, the adult eligibility requires not only the existence of a health impairment, but also a consideration of the ability of the individuals to support themselves through work activities. This relationship between work and disability highlights a subtle relationship between a person's human capital (education and work experience) and SSI eligibility, in which given a health impairment, a high stock of human capital might disqualify individuals based on their earning potential.

The objective of this research is to examine whether underage youths with disabilities and their families consider two factors, SSI participation, and the prospect of SSI adult eligibility when making decisions about health investments, labor supply, schooling, and early work activities. In order to explore these potential effects, I present a three period model to explore the dynamics of health and human capital investments of children with disabilities (and their families) when the SSI is available. Using data from the National Longitudinal Transitional Study 2 (NLTS-2) I plan to jointly estimate a series of equations regarding the labor supply, health investments, schooling, and working choices of the children with disabilities and their families, along with SSI participation using the model as a theoretical guide. I plan to exploit the different rates at which SSI benefits are granted (or terminated) depending on the type of the main disability of the individuals, to observe the role that SSI eligibility likelihood plays in the choices of the individuals and their families.

## Background and Significance

Economists and policy makers have long discussed the impact that welfare programs have on the behavior and choices of beneficiaries. On the one hand, it is well accepted that the availability and generosity of some of these assistance programs negatively impact the labor supply of some of their beneficiaries Moffitt (2002) and that this lack of participation in the labor force has adverse consequences on the human capital stock of beneficiaries (Miller and Sanders, 1997)<sup>1</sup>. On the other hand, there is also evidence that these programs have positive consequences, such as decreasing the mortality rate later in life of former participants (Aizer et al., 2014), or by promoting the accumulation of human capital (Kosar, 2014).

When it comes to welfare programs designed to assist people with disabilities, the general consensus is that these programs have a negative impact on the labor decisions of their adult participants (Autor and Duggan, 2003) and tend to promote the diagnosis of health conditions required to qualify for benefits (Singleton, 2009). However, whether these programs and their rules lead participants to make certain health or school related choices in order to benefit from them is a question that has remained partially unanswered. Some of these concerns have pointed at the Supplemental Security Income (SSI) program and its potential effects on the health outcomes and schooling decisions of children with disabilities and their families.

Some of these concerns regarding the SSI program have been vocalized by the mainstream media and include questions about the negative relationship between SSI eligibility during childhood and literacy course attendance (Kristof, 2012), as well as the possibility that some parents might seek to have their children be prescribed behavior-controlling drugs so as to increase their chances of SSI eligibility (Wen, 2010). When it comes to transition-age youth, policy makers and program evaluators have also expressed concerns about the possibility that some of the Child-SSI participants modify schooling and vocational training activities in order to remain eligible status during adulthood, (Wittenburg and Loprest (2007);Wittenburg (2011)).

As of December 2014, the SSI program was serving 462,333 children with disabilities

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<sup>1</sup>On this work Miller and Sanders (1997) find that low rates of labor force participation among AFDC beneficiaries during the early years of an individual's career affect their level of human capital, and thus future wage, on the long run.

between the ages of 13 to 17 with an average monthly payment of \$633.23, totaling an annual federal spending of approximately \$2.9 billion. Out of these young participants it is estimated that 60%<sup>2</sup> will continue receiving SSI benefits as adults (Hemmeter, Kauff, and Wittenburg, 2009), with an average participation length of 26.7 years prior to their 65th birthday (Rupp and Scott, 1995). According to Burkhauser and Daly (2011), the persistence of health conditions among the U.S. population has remained constant over the past 30 years. During this same period, the labor supply of this population has decreased, while the number of SSI (and SSDI) recipients has increased. The large number of beneficiaries, along with the long-term dependence on the program, represents a substantial fiscal burden to the government. But the unintended long-term consequences of the SSIs design on the health and human capital of people with disabilities are more worrisome. Low investments in health during early ages translate into poor health and labor outcomes during adulthood. Further, low levels of human capital such as education or job training have negative consequences on wages and welfare dependence. As a result, it is important to assess the magnitude of the consequences (if any) that the SSI program might have on the choices of young people with disabilities and their families.

Most of the literature regarding the effects that welfare programs have on the lives of people with disabilities tend to study the negative effects of these on the labor supply of adult recipients. These works also show that unskilled laborers are disproportionately affected by these consequences, compared to their more educated counterparts<sup>3</sup>. These studies mainly focus on the impact these programs have on the labor decisions of mature participants.

Regarding the early work choices of welfare participants, Miller and Sanders (1997) find that AFDC payments reduce the early labor participation of young females, and that this work reduction has long-term negative effects in future wages and labor supply.<sup>4</sup>

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<sup>2</sup>From 1998 and until 2005 the share of child beneficiaries that continue receiving benefits during adulthood has varied from a low point of 55.37% in 1999 to a peak of 59.51% in 2004

<sup>3</sup>For example (Autor and Duggan (2003); Autor, Duggan, and Lyle (2011) show that increasing the attractiveness of disability programs, such as the SSDI and VA, induce workers with health conditions to leave the labor force and join the program, while preventing program participants from increasing labor supply (Autor and Duggan, 2007).

<sup>4</sup>Using data from the NLSY79, the authors exploit state differences in AFDC payments as to examine if the generosity of welfare payments affects the accumulation of human capital. The authors find that AFDC reception affects early labor force participation, which later translates in low human capital levels

To the best of my knowledge few works have explored the relationship between disability assistance programs and the health of the individuals. Singleton (2009) look at the health investments of potential beneficiaries of Veteran Affairs' disability program. By exploiting a policy that increased the amount of the disability benefits of Vietnam veterans diagnosed with diabetes, the author finds that the rated of obesity among this population do not change considerably.<sup>5</sup> This result is interpreted as an absence of moral hazard in which people might lower health investments resulting from the prospect of higher disability benefits.

Previous works about transition-age SSI participants have studied the existing negative correlation between job-related activities and education attainment during youth and SSI participation during early adulthood.<sup>6</sup> The present research will contribute to this literature by exploring whether the prospect of SSI participation negatively affects the choices of youth with disabilities and their families. A most recent work from Deshpande (2014) shows that children who are removed from the program after the age-18th redetermination process tend to have higher earnings than their counterparts who remained in the program. However, this difference in earnings does not make up for the payments lost after the termination of SSI benefits.<sup>7</sup>

The results of this work would inform future policy design for programs aimed to benefit children with disabilities and their families. Children with disabilities whose families receive benefits from the SSI program require additional help, perhaps more than non-SSI with disabilities, to ensure that their school performance, job-related activities, and health are maintained at high levels. In exploring the effects that the SSI program might have on the health of children with disabilities, it is important to understand both the long-term effects that health investments during childhood have on children development and their

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with negative consequences on wages and labor supply.

<sup>5</sup>On the other hand, an increase in disability payments results in a higher detection of diabetes among this population of veterans.

<sup>6</sup>Hemmeter and Gilby (2009) showed that children who received SSI payments with job earnings above \$250 at age 17 are more likely to have their benefits terminated when turning 18. Other works have also suggested a negative correlation between employment and vocational training activities before age 18th and Adult-SSI participation. (Hemmeter and Gilby (2009); Loprest and Wittenburg (2007)).

<sup>7</sup>Deshpande (2014) uses data from the SSA to study the effect that removing child beneficiaries from the SSI program after the adult redetermination has on later earnings of the individuals. Taking advantage of the 1996 welfare reform, the author implements a regression discontinuity strategy for child beneficiaries.

disability progression, and the relationship between the existing policies intended to assist this population and their health consequences.

### **Analysis Plan**

In order to explore the possible unintended consequences that the SSI program might have on the schooling and health investment decisions of children and their families. I developed a three period model of health and human capital investments. In this model, families have the opportunity to invest in the health and human capital of their children so as to maximize present and future utility in the presence of the SSI program. In what follows, I briefly outline the theoretical model.

During the first period, a child that lives with a family is born with a disability. The family of the child chooses consumption, labor supply, and whether or not to participate in the SSI program at the moment. A family needs to be eligible in order to participate in the program. SSI eligibility depends on two eligibility requirements: one for health, and one for income. Health eligibility depends on the health of the child, and how it compares to a health threshold defined by the authority. Income eligibility depends on the familys income; a large income would deem a child and his family not eligible.

The family is required to satisfy both eligibility requirements in order to receive benefits. However, eligibility does not necessarily mean that a family would choose to get a payment from the authority. Following Moffitt (1983) I will assume that there is a cost to the family from participating in SSI arising from welfare stigma, disability signaling, or other transactions costs derived from participation.

Along with these decisions the family also chooses to invest in the health of the child. Investing in the child's health has the positive effect of potentially improving the health of the child during later periods and the potential wage rate of the child in adulthood. A child and her family might lose eligibility if the child's health improves derived from health investments. This requirement generates a trade-off between health and access to SSI. On the one hand, investments have the potential benefit of improving the disability of the child (and thus increasing future wages). But on the other hand investments affect the chances of receiving SSI benefits in the future.

The family of the child faces a similar problem during the second period, except that now, in addition to health services, the family can invest in the human capital (schooling and job-related activities) of the child. Human capital investments increase the child's wage rate during adulthood, but have no effect on her health status. Since adult SSI health eligibility will depend on whether or not the youth's health condition prevents him from performing a substantial gainful activity. I assume that this adult eligibility depends on the youth's potential wage (which depends on the youth's health level and human capital) and how it compares to a threshold defined by the authority.

Once an adult, the youth observes potential wages and she satisfies the SSI health eligibility requirement. During this last period, the youth (now an adult) faces the labor market and obtains a level of utility that depends positively on the wage rate and on whether or not he is still eligible for SSI.

Some of the implications of the model are that some families might reduce their health investments during childhood and reduce their labor supply in order to participate in the program. Similarly, some families will reduce their human capital investments depending on the prospective of SSI eligibility during adulthood.

In order to test some of the implications of the model, I plan to jointly estimate a series of equations regarding the labor supply of the families of children with disabilities, their schooling choices, health investments and work experiences along with SSI program participation. For this purpose I will use the National Longitudinal Transition Study 2.

The NLTS-2 is a study that includes information about a national representative sample of children who were between the ages of 13 and 16, in at least 7th grade, and who were receiving some form of special education at the time. The information was collected every two years during five collection waves beginning in September of 2001. The NLTS-2 followed the students until early adulthood, even if they stopped receiving special education services or attending school altogether. Some of the information collected by the NLTS-2 explores the socio-demographic characteristics, health, work history, and family environment of their participants. In addition to this information, at each wave, the study also asks if the students are currently receiving SSI payments or if they had received at any point during the past

two years.

Special Education Services in the U.S. are a group of programs and services designed to meet the learning needs of children with health conditions that affect their academic performance. In using the NLTS-2, data this research will not focus on the entire population of children with disabilities. Rather, it will study the behavior of a subset of children (and their families) who received special education services during childhood. However it is important to emphasize that 13% of the respondents reported SSI participation during the first wave, while the proportion of SSI participants increased to 16% during the last wave. Another advantage of this data set is that I am able to observe the health status and working/schooling decisions of children who eventually decided to participate in the SSI program. Similarly, I am able to observe the outcomes of those individuals who participated during childhood and who left the program after the age-18th evaluation. Similarly using the NLTS-2 data will allow me to compare the health and schooling outcomes of this population with those of children who have similar health conditions, and who are at risk of SSI participation during adulthood.

The NLTS-2 data observes students from adolescence and into early adulthood, as a result I plan to use the NLTS-2 data to estimate the following set of equations:

$$HI_{i2} = \alpha_1 + \alpha_2 d_{it-1} + \alpha_3 KDT_{it+1} + \alpha_4 NDT_{it+1} + \alpha_5 \hat{w}_{i3} + \alpha_6 \hat{d}_{i3} + \alpha_7 O_{it} + \alpha_8 X_{it} + \epsilon_{it}^{HI} \quad (1.1)$$

$$HK_{i2} = \kappa_1 + \kappa_2 KDT_{it+1} + \kappa_3 NDT_{it+1} + \kappa_4 \hat{w}_{it+1} + \kappa_5 X_{it} + \epsilon_{it}^{HK} \quad (1.2)$$

$$h_{it} = \beta_1 + \beta_2 w_{it}(1 - 0.5P_{it}) + \beta_3(N_{it} + G_{it}P_{it}) + \beta_4 Child_{it} + \beta_5 Parent_{it} + \epsilon_{it}^h \quad (1.3)$$

$$P_{it} = V[w_{it}(1 - 0.5P_{it}), N_{it} + G_{it}P_{it}] - V[w_{it}, N_{it}] \quad (1.4)$$

where

$$\hat{d}_{it+1} = \sum_j^J Pr(d_{ijt+1}|d_{it}, HI_{it})(d_{ijt+1}) \quad (1.5)$$

$$\hat{w}_{it+1} = \sum_k^K \sum_j^J Pr(d_{ij}|d_{it}, HI_{it}) w_{it+1}(d_{ijt+1}, HK_{it}) \quad (1.6)$$

$$\log(w_{it+1}) = \omega_1 + \omega_2 d_{it+1} + \omega_3 HK_{it} + \omega_4 Urb_{it+1} + \omega_5 X_{it+1} + \epsilon_{it+1}^W \quad (1.7)$$

Equation 1.1 represents the demand for health investments  $HI_{it}$  of family  $i$  during at time  $t$ . By health investments I mean if during a given period the child received services directed to improve her health status<sup>8</sup>. This demand for health investments depends on the youth's last period health status  $d_{it-1}$ , age of disability onset  $O_{it}$  and other socio-demographic variables such as gender, ethnic group, and household composition, and a random error  $\epsilon_{it}^{HI}$ . Then I construct a 4-category health status variable  $d_{it-1}$  by considering a set of markers referring to the children's physical, mental, and social abilities and how they perform in such areas. Some of these markers include gross and dexterous movements, speech, conversational, and interpersonal abilities, hearing and visual capabilities, and self-care.

Exploiting the different rates at which benefits are granted or terminated depending on type of disability, I assume that health investments depends on the probability of keeping benefits after the age-18th revision,  $KDT_{it+1}$ , if the student is already a SSI participant, and the probability of being granted benefits as a new applicant,  $NDT_{it+1}$ , in case the student is not currently getting benefits, both of these depending on the type of disability of the youth.

Finally I will assume that the health investments depend on the students' potential future health,  $\hat{d}_{it+1}$ , and wage rate,  $\hat{w}_{it+1}$ . These two variables are constructed according to Equations 1.5 and 1.6 where  $Pr(d_{ijt+1}|d_{it}, HI_{i2})$  is the observed probability of transitioning to health category  $j$  given this period's health status and health investments. The wage rate is estimated according to equation 1.7 which depend on health status  $d_{ijt+1}$ , human capital, a dummy if the youth lives in an urban area  $Urb_{it+1}$ , a set of socio demographic controls  $X_{it+1}$ , and a random error  $\epsilon_{it+1}^W$ .

Equation 1.2 describes the demand for human capital, which I assume depends on the probability of future eligibility  $KDT_{it+1}$ ,  $NDT_{it+1}$ , potential future wage rate,  $\hat{d}_{it+1}$ , and a

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<sup>8</sup>Some of these services include speech/language, physical or mental therapy, diagnosis services, nursing care, or other services for the special needs of the student

random error  $\epsilon_{i2}^{HK}$ .

Equation 1.3 refers to the labor supply of the family  $i$  at time  $t$ , where  $w_{it}$  is the wage rate faced by the family,  $N_{it}$  is the non labor income, and  $G_{it}$  is the guarantee income provided by the program. The variable  $Child_{it}$  is a dummy variable if the family has any children living in the household,  $Parent_{it}$  is a variable that takes the value of one if there is two parents living in the household, zero otherwise, and finally  $\epsilon_{it}^h$  is an unobserved random error. Notice that depending on the family's SSI participation  $P_{it}$  the proposed labor supply function can take two different forms.

Notice that  $P_{it}$  is defined by Equation 1.4, where  $V[\cdot]$  is the indirect utility function of the family, at the moment I am still deciding on the functional form on the this indirect utility function. It is important to notice that the participation decision is endogenous and it also depends on the labor supply of the family, as a result I need an instrument variable for family's participation decision. Inspired by the results of Dahl, Kostol, and Mogstad (2013) I propose to use the existence of another disabled individual of the family as an instrument for SSI participation. In their paper the authors argue that having a parent receiving disability benefits increase the likelihood of their children to also receive disability benefits, but not that of other welfare programs. This is interpreted as the their children learning about the disability benefits process.

## Research Schedule and Timeline

### Divesting for the Future

Start Week		May 1, 2016										
Month	1	2	3	4	5	6	7	8	9	10	10	Notes
Starting	2016								2017			
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
												Literature Review
												Model Definition and Simulations
												Data Gathering and Cleaning
												Implementation of Empirical Strategy
												Paper Writing
												Estimation of Conterfactuals and Policy Implications
												Presentation of results

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**Dissertation title:**

Work, Need, and the Modern Welfare State:  
A Comparative Analysis of Country Responses to the Disability Crisis

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### **Project Abstract**

In many advanced economies, the proportion of the working-age population receiving disability benefits has grown considerably in recent decades (OECD, 2010), including in the United States where the share has more than doubled since the late 1970's (Liebman, 2015). Thus, substantial policy attention is now focused on identifying the reasons for this growth and developing strategies that help people with disabilities stay in and return to employment. The proposed project explores the individual and country-level determinants of disability benefit receipt for older working-age adults across 17 advanced economic countries. So far, cross-national research on disability benefit receipt has primarily examined how disability benefit programs incentivize older workers to exit the labor market early (Bound and Burkhauser, 1999; Börsch-Supan, 2010; Wise, 2015). This project expands upon this prior research by exploring the relevance of government integration policies that aim to help people with disabilities stay in and return to work.

The project will use harmonized nationally representative data from the Health and Retirement Study (HRS) in the United States (n=5,586), the English Longitudinal Study of Aging (ELSA) in the United Kingdom (n=3,189), and the Survey of Health Aging and Retirement in Europe (SHARE), a comparable sample of 15 European countries (n=21,801). The statistical analysis will consist of multi-level logistic regressions and a two-step estimation procedure (see, Angel and Heitzman, 2015), which is considered best practice when the number of second-level units (country-level policies) is relatively small (Bryan and Jenkins, 2015). The policy variables to be examined consist of country scores on integration policies, including the availability of employment programs, the use of work-incentives, and the degree of employer responsibilities for workers with disabilities (OECD, 2010). The analysis will consider the relationship between integration policies and the likelihood that an individual receives disability benefits. The findings can inform policy makers of the potential effectiveness of integration policies at reducing the disability benefit participation rate of older adults.

## Project Description

### **A. Statement of the Problem**

A core purpose of the modern welfare state is to provide economic protection to those who are unable to work (Esping-Andersen, 1990). Historically, disability is one of the primary “categories of need” (Stone, 1984) that countries have politically constructed to determine who is unable to work and is thus deserving of need-based aid. Though governments have developed elaborate determination processes to restrict entry into the disability category, in many advanced economic countries the proportion of the working-age population receiving disability benefits has grown over time (OECD, 2010; Burkhauser et al., 2014), including in the United States where the percentage has more than doubled since the late 1970s (Liebman, 2015). Ultimately governments face a difficult tradeoff in administering disability benefit programs. On the one hand, they must provide needed protection to vulnerable populations that often rely on disability benefits as an “option of last resort” (OECD, 2010). On the other hand, policy makers are under increasing pressure to improve labor market participation and reduce social expenditures in a time of population aging that is intensifying the fiscal pressures on the public purse (Pierson, 1998). Reducing early labor market exit onto public disability benefits and promoting the employment of people with disabilities is a major policy objective for all advanced economies. This dissertation project will, therefore, examine the relationship between integration policies that aim to help people with disabilities remain in or return to the labor force and the likelihood of an individual receiving disability benefits. It is hypothesized that individuals living in countries with strong integration policies will be less likely to receive disability benefits.

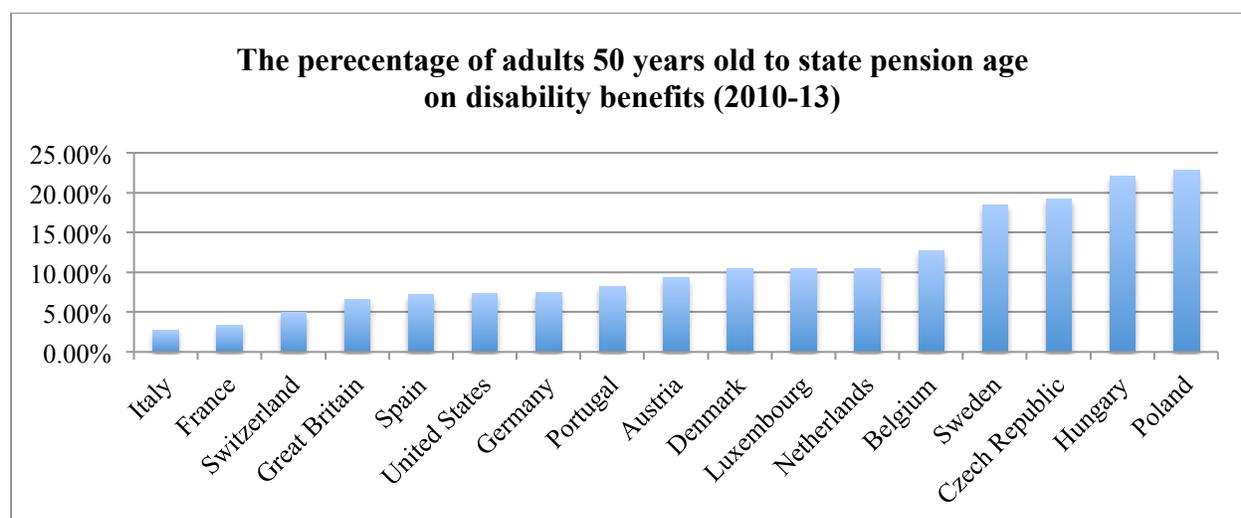
### **B. Background and Significance**

In order to develop effective disability policies, governments require an understanding of the factors driving disability benefit receipt. Though a great assortment of reasons can affect an individual’s likelihood of going on disability benefits (see, Rupp and Stapleton, 1998), one can distinguish between micro and macro factors. Micro factors consist of those attributes that are specific to individuals within a population. These include how an individual’s health, age, gender, and/or level of education may affect one’s likelihood of receiving disability benefits. Macro factors, however, consist of those properties that are shared by all people within a rule bound geographic boundary, such as living within a national or supranational jurisdiction. These

include, for example, the strictness of the disability determination process, the health of the labor market, the generosity of a disability benefit program, and the availability of rehabilitation or integration programs, each of which may affect the odds that a person in a given country will receive disability benefits.

Age and health are generally viewed as the most significant micro factors of disability benefit receipt (Börsch-Supan, 2010). As individuals age, they become more likely to develop work-limiting conditions that lead them to claim disability benefits (Liebman, 2015). Individuals who are in poor health, irrespective of their age, will also be more likely to receive disability benefits. It is conceivable that these two micro factors – age and health – could be the major underlying determinants of disability benefit receipt cross-nationally. In Figure 1, the percentage of 50-65 year olds receiving disability benefits across 17 OECD countries is provided. The figure indicates the striking differences that exist in disability benefit participation – from under 3% of the older working-age population receiving disability benefits in Italy to more than 20% in Poland. If age and health are the major determinants of disability benefit receipt, international differences in these demographic factors should be expected to explain this cross-national variation. However, when examining changes in health (e.g. mortality) and disability benefit participation over time and across multiple countries, Milligan and Wise (2012) found little evidence of such a relationship. Examining health, demographic, and policy factors, Börsch-Supan (2010) further estimated that more than 60% of the cross-national variation in the rate of disability benefit receipt across 11 countries in 2004 was attributable not to age or health but to the minimum level of disability required to receive disability benefits. This finding accords with research highlighting how the relative strictness of the disability determination process can create incentive structures that increase or decrease the number of disability benefit recipients (Autor and Duggan, 2003; Burkhauser et al., 2014).

Figure 1



*Note:* Based on 38,414 individuals age 50 to state pension age in the SHARE waves 4 (Hungary, Poland, Portugal) and 5 (all other continental European countries); ELSA wave 6; HRS wave 11. Interview years range from 2010-2013. Data on state pension age for men and women comes from OECD (2011). Disability benefit programs include the main and secondary disability benefit programs in each country. All data is weighted using cross-sectional individual weights taken from the respective surveys.

Other macro factors may also influence the rate of disability benefit receipt. During periods of economic recession, when the labor market is repressed, disability benefit programs may be used as an alternative to an unemployment benefit for workers with health issues (Rupp and Stapleton, 1998; Beatty and Fothergill, 2004; Black, Daniel, & Sanders, 2002). Looking across countries and over-time, Benitez-Silva, Disney, and Martin (2010) found, for example, a robust statistical relationship between unemployment rates and disability claims. Furthermore, in countries with stagnant wages for low-skilled workers (Autor and Duggan, 2003) or unemployment benefit programs with low replacement rates (Bound and Burkhauser, 1999), generous disability benefit programs may become more economically attractive and thus create incentives for people with health issues to claim benefits.

An additional macro factor, though less explored in the comparative disability policy literature, concerns the supply of policies that aim to integrate people with disabilities into the labor market. The OECD (2010) reports a surge in countries adopting these policies in the 2000s. For example, governments have increased access to rehabilitation and employment programs for people with disabilities, adopted policies that mandate employers to accommodate their workers with disabilities, and changed work-incentives so disability benefit recipients can test their abilities on the labor market without the risk of losing their benefits. Theoretically, these policies

should reduce the likelihood of receiving disability benefits. While evaluations of single country efforts at integration have shown some positive effects (Adam, Bozio, and Emmerson, 2010; von Sonsbeck and Gradus, 2012), the relationship between integration policies and declining disability benefit rates has yet to be explored in depth in a cross-national context. In the OECD (2010) report, *Sickness, Disability, and Work: Breaking the Barriers*, a multivariate analysis of aggregate country-level data indicated that certain integration policies were associated with low rates of disability benefit participation. However, these associations have not been tested using individual-level data and multi-level regression models that can better control for the effects of micro factors. This proposed research aims to fill this gap by investigating the relationship between integration policies and disability benefit receipt for older adults of working age across 17 advanced economies. The results of this analysis may prove useful for policy makers who must weigh the costs and benefits of expanding integration policies, particularly those that are directed at older adults approaching the state pension age.

### **C. Analysis Plan**

To explore the micro and macro determinants of disability benefit receipt cross-nationally, and to examine the relevance of integration policies specifically, I will draw on three data sources: the Health and Retirement Study (HRS) in the US (using the RAND HRS data file), the English Longitudinal Study of Aging (ELSA) for Great Britain, and the Survey of Health Aging and Retirement in Europe (SHARE) which in total provides a comparable ex-ante harmonized sample of older adults (50+) for 17 countries. Cross-national coordination in the development of these surveys allows them to be appended into a single dataset of older adults across 17 countries. I have obtained access to each of these surveys, which are made available to researchers upon formal registration. The analysis will consist of a cross-sectional analysis drawing on the latest survey data collected from 2010-2013. Using data on the official pension age in each country for men and women (OECD, 2011), I will restrict the analysis to individuals that are between 50 years old and the official age of entitlement in their respective country. This ensures that all individuals in the dataset are considered of “working-age” in his or her country.

The dependent variable used in the analysis consists of whether an individual currently receives income from a publicly financed disability insurance or sickness benefit program.<sup>1</sup>

The country-level variables that will be tested in this analysis all come from OECD (2010) and concern policies from the year 2007 (see Table 1). I will test five country-level variables that measure in each country: the minimum level of work-incapacity needed to receive full disability benefits; the degree of employer responsibility for workers with disabilities; the availability of supported employment programs; the use of work-incentives for disability benefit recipients, and the coverage consistency of employment programs (see, OECD 2010: 85 for a description of these variables). Of these macro factors, the level of work-incapacity needed to receive full benefits is the only factor that does not relate to integration policy. I include this variable because it was found to be highly predictive of disability benefit receipt in a study using the same dataset but in an earlier period (Börsch-Supan, 2007). A high score on the level of work-incapacity indicates looser eligibility criteria, while a lower score indicates more restrictive criteria. In accordance with Börsch-Supan (2010), I anticipate that individuals in countries with higher scores and thus less restrictive eligibility criteria will be associated with higher odds of receiving disability benefits when controlling for other micro factors.

A higher score on the four integration variables indicates increased efforts at improving employment opportunities for people with disabilities. I hypothesize that individuals residing in countries with higher levels of integration efforts will be associated with lower odds of receiving disability benefits when controlling for micro factors. However, I anticipate that the integration variables will display a weaker association than the eligibility criteria variable and some may show no association at all. I selected the specific integration variables because they represent major areas of integration policy but also different approaches to reducing inflow into or increasing outflow out of disability benefit programs. Adding to employer responsibilities for workers with disabilities and providing supported employment programs can be understood as early intervention policies. These strategies aim to reduce the inflow into disability benefit programs by helping people with disabilities remain in the labor market and off the benefit rolls. Expanding the coverage of employment programs and adjusting the work-incentives for benefit

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<sup>1</sup> This includes both contribution-based disability insurance programs (such as the SSDI program in the United States) and means-tested disability benefit programs (such as the SSI program in the United States). While it would be useful to examine these two kinds of programs separately, the SHARE data does not provide a means of distinguishing between them.

recipients primarily aim to assist disability benefit recipients in their return to employment, and thus seek to increase the outflow of individuals from disability benefit programs back into employment. Because benefit recipients may face systematic disincentives for returning to work (Stapleton et al., 2006), I predict that the early intervention strategies will be more likely to be associated with a reduction in the odds of an individual receiving disability benefits than the outflow oriented strategies.

**Table 1.** Descriptive summary of country-level independent variables

	<i>Dependent variable</i>	<i>Independent variables (country-level policies)</i>				
	<b>% of adults 50 years old to state entitlement age on disability benefits</b>	<b>Work-capacity level for full benefits (1-5)</b>	<b>Degree of employer responsibility (1-5)</b>	<b>Strength of supported employment programs (1-5)</b>	<b>Work incentive rules (1-5)</b>	<b>Coverage consistency of employment programs (1-5)</b>
<b>Italy</b>	2.75%	0	4	1	2	4
<b>France</b>	3.31%	1	3	3	3	3
<b>Switzerland</b>	5.00%	3	2	1	3	4
<b>Great Britain</b>	6.65%	2	4	3	5	4
<b>Spain</b>	7.20%	1	3	1	2	4
<b>United States</b>	7.36%	1	3	4	4	0
<b>Germany</b>	7.45%	3	4	5	2	4
<b>Portugal</b>	8.24%	3	2	1	1	3
<b>Austria</b>	9.29%	4	3	4	3	2
<b>Denmark</b>	10.47%	1	2	3	3	4
<b>Luxembourg</b>	10.48%	2	3	2	1	2
<b>Netherlands</b>	10.52%	2	4	2	5	4
<b>Belgium</b>	12.70%	3	3	1	0	3
<b>Sweden</b>	18.43%	1	5	2	0	3
<b>Czech Republic</b>	19.25%	3	4	1	3	3
<b>Hungary</b>	22.10%	2	4	3	2	2
<b>Poland</b>	22.77%	4	2	0	3	4

*Note:* Country scores come from OECD (2010:101-102) and reflect policies in 2007. The disability benefit rates come from HRS, ELSA, and SHARE and are weighted. The state entitlement ages are for 2010 and come from OECD (2011).

## *Methods*

My methodology will consist of conducting multi-level logistic regressions and a two-step estimation procedure. The two-step procedure is considered best practice when the number of countries analyzed is relatively small (Bryan and Jenkins, 2015). Since this study includes only 17 countries, the two-step procedure is needed to produce reliable estimates of the effects of the country-level policies. Because of the small number of countries, I will also be unable to conduct a joint assessment of more than one country-level policy at the same time. The analysis will begin by exploring the individual-level data and conducting multi-level logistic regressions that control for country differences on the basis of random intercepts and country fixed-effects. The random intercept model will allow for the identification of country level differences using the intra-class correlation coefficient, while the fixed effect model will allow for the observation of whether the individual-level variables change when controlling for unobservable country characteristics (Rabe-Hesketh and Skrondal, 2012). I predict that these regressions will indicate that the variation in disability benefit receipt cross-nationally is influenced by country-level differences, such as differing disability policies.

Following these multi-level logistic regressions, I will proceed with the two-step estimation procedure. In the first step, I will run a logistic regression predicting an individual's log odds of receiving disability benefits given his or her individual level variables, including age, health and gender.<sup>2</sup> After identifying an appropriate model of the individual-level variables, I will run the logistic regression for each country separately and save the y-intercepts. In the second step, the intercepts from the individual level regression will become the dependent variable that is then regressed on the macro-level policy variables. I will complement this analysis with a graphical analysis of the country-level factors and the y-intercepts on a scatterplot (see, Angel and Heitzman, 2015; Di Stasio et al., 2015 for examples of the two-step procedure). The overall aim of this methodological approach is to rigorously explore the relationships between the individual and country-level factors and the odds of an individual receiving disability benefits.

## **D. Research Schedule and Time line**

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<sup>2</sup> The health variables in the appended dataset include, among others, the individual's self-perceived health, their activities of daily living index, and their CESD-R depression score.

*Period 1: Conduct data cleaning and explore individual level data (May – August 2016)*

Before testing the analytical models, I will finish some data cleaning issues with the harmonized surveys and begin exploring the individual level data. I will use descriptive data techniques, including regression and graphical analysis. The work completed may be used in the descriptive section of the final research product. The goal of this exploratory portion of my research will be to gain familiarity with the individual level data and identify the appropriate variables to be included in the statistical models.

*Period 2: Complete multilevel statistical analysis (September – December, 2016)*

Upon cleaning and gaining familiarity with the dataset, I will proceed with the analysis plan described above. Different statistical analyses will be performed, while also conducting sensitivity analyses. I will explore reporting regression results separately for different groups, such as by gender and age. To deepen my understanding of the methodological approach, I will also enroll in an advanced hierarchical modeling course taught by Professor Rebe-Hasketh at UC-Berkeley in the fall of 2016.

*Period 3. Write up draft and complete research project (January-March, 2017)*

Upon completing the statistical analysis, I will conclude the research project by drafting the formal written analysis as a chapter of my dissertation. The draft will receive comments from my dissertation committee members. Upon completion of the edits, the research project will be completed by March of 2017.

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