

# Self-employment towards retirement: necessity or opportunity? Revealed preference evidence from search requirements in unemployment insurance \*

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## Abstract

This paper analyzes whether self-employment at older ages is primarily chosen as a gradual retirement mechanism (opportunity) or because of lacking alternatives (necessity). This is done by analyzing labor market dynamics and the interaction with unemployment rates and treatment effects for persons aged 50-63 in the Netherlands during the period 1989-2009. More explicitly, the paper analyzes state dependence and mobility between self-employment, paid-employment, unemployment (UI), and other non-employment using a dynamic multinomial logit model with unobserved heterogeneity in a difference-in-differences framework. The treatment exploits an exogenous policy shock that introduced search requirements for older unemployed (57.5+) on January 1st 2004. This reform is used to identify the importance of (downward) flexibility in hours provided by self-employment. Based on the results, we reject this hypothesis that self-employment at older ages is chosen to reduce working hours. In stead, the paper provides evidence that self-employment at older ages is primarily chosen to end a spell of unemployment as well as providing an opportunity to avoid unemployment.

JEL codes: C23, J14, J26, J64, J68

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# 1 Introduction

In virtually all OECD countries, labor force participation rates of the 50+ population decreased in the period from the 1960s to the mid-1990s (OECD, 2011). Among others, Blondal and Scarpetta (1999) argue that this was partially due to generous early retirement possibilities, provided by social insurance schemes such as unemployment- and disability insurance. The Netherlands was not an exception to this phenomenon and social insurance reforms have been undertaken to increase the labor force participation of the 50+ population since the mid-1990s. As a result, participation rates of the 50+ population increased from 40% in 1996 to 60% in 2011, thereby increasing the number of 50+ persons being active in both paid-employment and self-employment.

In several countries, it has been found that social insurance reforms resulted in substitution effects between unemployment insurance, disability insurance, early retirement and paid-employment.<sup>1</sup> With regard to self-employment, substitution with unemployment insurance has been found by Carrasco (1999), Moore and Mueller (2002), Martinez-Granado (2002) and Parker and Robson (2004), indicating that less generous unemployment insurance, in terms of benefits, duration and eligibility, make self-employment a more attractive alternative.<sup>2</sup> These results suggest that the recent increase in self-employment among Dutch older persons (Van Es and Van Vuuren, 2010) may, at least partially, be explained by recent policy reforms that have made self-employment relatively more attractive compared to social insurance schemes. Self-employment may then be chosen as an alternative opportunity to reduce working hours and enhance gradual retirement (e.g. Quinn, 1980; Quinn and Kozy, 1996; Gustman and Steinmeier, 1984; Ruhm, 1990; Bruce et al., 2000; Kim and DeVaney, 2005; Ruhm, 2006; Parker and Rougier, 2007; Giandrea et al., 2008; Gu, 2009; Maestas and Zissimopoulos, 2010).<sup>3</sup> On the other hand, self-employment may be chosen out of necessity when people lack adequate alternatives.

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<sup>1</sup>E.g. Hassink et al. (1995); Kapteyn and De Vos (1997); Riphahn (1997); Autor and Duggan (2003); Karlstrom et al. (2008); Koning and Van Vuuren (2010); Bratsberg et al. (2010); De Jong et al. (2011); Staubli (2011); De Vos et al. (2012); Lammers et al. (2012).

<sup>2</sup>Carrasco (1999) and Moore and Mueller (2002) find that persons who are actually eligible for UI benefits have a smaller probability to enter self-employment than person who are unemployed but not eligible. Martinez-Granado (2002) indicates that persons with a longer duration of UI benefits have a smaller probability to enter self-employment. On a macro level, Parker and Robson (2004) shows that self-employment rates are significantly higher when benefit replacement rates are low.

<sup>3</sup>Older workers generally tend to reduce working hours substantially before complete withdrawal from the labor market (Gordon and Blinder, 1980; Gustman and Steinmeier, 1983, 1984; Quinn and Kozy, 1996; Ekerdt et al., 1996; Ghent and Clark, 2001; Ruhm, 1990; Morris and Millier, 2003; Cahill et al., 2006; Kantarci and Van Soest, 2008). The flexible working hours for self-employed may also result in later withdrawals from the labor market, as suggested by Fuchs (1982), Hochguertel (2010) and Zissimopoulos et al. (2007).

Self-employment out of necessity may be relevant for older workers, since they often face difficulties finding a job (Chan and Stevens, 1999, 2001; Maestas and Li, 2006; Walker and Webster, 2007). It has been found that flows from unemployment to self-employment are relatively high, such that self-employment is used as a way to escape unemployment (e.g. Tapia, 2008; Martinez-Granado, 2002; Carrasco, 1999; Falter, 2001; Taylor, 1999; Reize, 2000; Rissman, 2003; Glocker and Steiner, 2007).<sup>4</sup> Furthermore, Benedict (2008), for example, finds a positive relation between the aggregate unemployment rate and self-employment (known as the *recession push* hypothesis). However, the recession push hypothesis has not been confirmed by Moore and Mueller (2002) and Tapia (2008). On the contrary, Carrasco (1999) finds that self-employment becomes more attractive when the economic situation improves (the *recession pull* hypothesis).<sup>5</sup>

This paper focuses on an age-specific unemployment insurance (UI) reform for older unemployed in the Netherlands in order to identify the importance of (downward) flexibility in working hours in choosing self-employment at older ages (opportunity). On the first of January 2004, the reform introduced job search requirements for persons between the age of 57.5 and 63 which implied an exogenous shock in the attractiveness of unemployment as a pathway to retire before the statutory retirement age.<sup>6</sup> Persons who started their own business, however, were excluded from job search requirements. The paper builds on two recent papers by Lammers et al. (2012) and Hullegie and Van Ours (2012), who found that the 2004 UI reform has significantly increased exits from unemployment to paid-employment as well as exits from unemployment to disability insurance. The primary difference between their papers and this paper is that we focus on self-employment. Increases in flows from paid-employment to self-employment due to the hours shock in unemployment would provide evidence in favor of the hypothesis that self-employment primarily acts a gradual retirement mechanism (opportunity).

Our papers contribution to the empirical literature is threefold. First, we estimate the effect of job search requirements for unemployed individuals at the end of their working life on transitions to self-employment, using a Dutch UI reform in 2004. As far as we know, there are no other studies that investigated the effect of job search requirements on substitution between unemployment and self-employment as an exit route to retirement.<sup>7</sup> Second, whereas Lammers

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<sup>4</sup>A remark here, is that it has been found that flowing from unemployment to self-employment also reduces the probability of success of the business.

<sup>5</sup>For an overview of the discussion regarding the necessity and opportunity of self-employment before 1991, see Meager (1992).

<sup>6</sup>65 is the statutory retirement age and persons aged 64 are excluded from the reform.

<sup>7</sup>For an overview of the literature regarding the effects of search requirements in unemployment, see Fredriksson and Holmlund (2006). Section 4.3 of that paper focuses on the empirical studies analyzing the effects of search requirements and shows that the bulk of the literature is focused on the effects of exiting unemployment. Little attention has been paid to the effect of search requirements on the labor market state after the unemployment

et al. (2012) and Hulleger and Van Ours (2012) thoroughly investigated the effect of job search requirements for older workers on the outflow from unemployment, this paper shows whether and to what degree job search requirements have decreased the inflow to unemployment. A lower inflow would be reasonable since the introduction of search requirements for older people has made unemployment a less attractive exit route to retirement for people in paid employment. Finally, this study contributes to the literature on push and pull factors to self-employment by investigating the pathways through which people enter self-employment and by estimating the effects of the unemployment rate on these pathways. Previous research found ambiguous results. We focus on push and pull factors for people at the end of their working life, for whom the decision to become self-employed is incomparable to people at a younger age. That is because people at the end of their working life may prefer flexibility in working hours as a way to retire partially and for unemployed older people it is relatively difficult to find a paid job.

The methodology used in this paper is related to previous research by Cappellari et al. (2010), who model state dependence and mobility of employment among men and women of age 50-63 in the UK. Transition probabilities between mutually exclusive labor market states are modeled in a dynamic multinomial logit framework<sup>8</sup> correcting for unobserved heterogeneity. Estimating a dynamic multinomial logit model avoids a possible sample selection bias, which may occur when considering binomial estimates for a transition. Whereas Cappellari et al. consider higher-order transitions, we introduce self-employment as a separate state in the model, similar to Emmanoulidi and Kyriazidou (2012) and Zucchelli et al. (2012). However, unlike most other studies, which distinguish paid-employment, self-employment and unemployment (which generally includes all non-employed people), we separately distinguish paid-employment, self-employment, unemployment (indicated by receiving UI benefits) and other non-employment (hereafter called ‘inactivity’).<sup>9</sup> To estimate the effects of the 2004 UI reform we use a difference-in-differences approach. The results of the difference-in-differences estimation should indicate to what extent job search requirements for the unemployed have increased self-employment as a retirement route. Finally, the paper takes advantage of the long panel dimension of the Dutch Income Panel data (1989-2009), where repeated observations of the same individuals allow us to take into account unobserved heterogeneity.

Our main finding is that older persons who chose a period of self-employment before retire-

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spell.

<sup>8</sup>This approach is also used by, among others, Constant and Zimmerman (2004), Caliendo and Uhlendorff (2008) and Martinez-Granado (2002).

<sup>9</sup>E.g. people in social assistance, disability, early retirement or people without a personal income. Most of the people in ‘inactivity’ receive early retirement benefits or disability benefits.

ment tend to do this out of necessity, e.g. primarily to end a spell of unemployment or even to avoid a spell of unemployment. Even after correcting for observed and unobserved characteristics, most people enter self-employment from unemployment and unemployed individuals at the end of their working life have a higher probability to enter self-employment than paid employment. This effect is found to be increasing in age as well as in periods of high unemployment rates. Introducing job search requirements among unemployed individuals at the end of their working age increased exits to both paid employment and self-employment in a similar degree. This means that job search requirements for the unemployed of age 57.5-63 increased self-employment at the expense of unemployment, but self-employment did not increase more than paid employment. For older workers in paid employment the reform made unemployment a less attractive exit route to retirement and we indeed find that flows to unemployment declined. As an alternative, women more often move to inactivity (e.g. early retirement or disability), while men stay in paid employment, despite the flexible character of self-employment. This suggests that self-employment has not acted as an alternative opportunity to reduce working hours.

The structure of the paper is as follows. The next section describes the system of unemployment insurance in the Netherlands. Section 3 describes the model we use to analyze labor market dynamics of older workers as well as the identification of the reform. Section 4 addresses the data and presents summary statistics on labor market statuses and mobility of older workers, after which section 5 presents the estimation results. Finally, section 6 discusses the results and 7 concludes.

## 2 Unemployment insurance towards retirement

In the Netherlands individuals receive public pension benefits as from the statutory retirement age of 65.<sup>10</sup> Several exit routes can be taken to retirement, namely paid employment, self-employment, early retirement, disability, unemployment, and other non-employment. In the 1990s the use of UI benefits expanded since generous arrangements and easy eligibility rules made unemployment attractive to bridge employment and retirement for older workers (Kapteyn and De Vos, 1997; Huynen et al., 2004; De Vos et al., 2012; Lammers et al., 2012).<sup>11</sup> In light of the aging population, exits from the labor market through unemployment have been made

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<sup>10</sup>From 2013, the statutory retirement age increases gradually to 66 in 2018 and 67 in 2021.

<sup>11</sup>For an extensive description of the Dutch social security system before 1990, see Aarts and Jong (1990).

far less attractive since the late 1990's / early 2000's. For an excellent overview of all social security reforms to reduce early exits from the labor market in the Netherlands, see De Vos et al. (2012). For a more detailed overview of reforms in unemployment insurance, we refer to Lammers et al. (2012).

This paper focusses on a UI reform started on January 1st 2004, which implied that unemployed persons older than 57.5 years were no longer exempted from the requirement to search actively for a job. Before 2004, only persons younger than 57.5 years faced search requirements to be eligible for UI benefits. Such search requirements imply that persons in unemployment 1) have a mandatory intake meeting at the unemployment office (*UWV*) where individual criteria are made regarding the expected activities undertaken during unemployment that are *ex post* testable,<sup>12</sup> 2) have the obligation to accept suitable job-offers, where suitable job offers are defined by the educational level and the time spent in unemployment, 3) have to make a sufficient number of applications,<sup>13</sup> where sufficiency is individually determined and related to the labor market, the number of available vacancies and personal health, 4) have to participate in educational programs and job-search assistance when they are assumed to not to be able to find work within six months, and 5) have regular report meetings every 4-6 weeks in addition to the mandatory intake meeting and the follow-up to explain the further procedures.

The baseline from which individual arrangements are made is the requirement of applying for a job once a week on average. An automatic exception is made for individuals starting their own business. Exceptions are also made for persons participating in care or volunteering for at least 20 hours per week for a period of at most six months, individuals taking part in an educational program, people aged 64, or persons older than 62 years and 2 months who already received UI benefits for at least a year in 2004. The first two exceptions are made because they may increase the probability to find a job. The latter two exceptions are part of transitory arrangements.

The 2004 UI reform made unemployment far less attractive as an exit route to retirement and we can reasonably assume people to be complying with the search requirements due to the risk of substantial financial sanctions otherwise (Verveen et al., 2005). Not only did the reform imply mandatory search effort, it also introduced mandatory acceptance of a job if offered. This also implies that, after time, people have to accept all job offers irrespective of educational level.

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<sup>12</sup>The employability of an individual is determined by objective characteristics such as profession, education, age and experience as well as the subjective impression of the caseworker during the interview.

<sup>13</sup>The following options are considered to be an application: letter, e-mail, phone call or nuncupative contact with a company, registering at an agency, having a job interview and doing an assessment.

Fulfilling above mentioned obligations, together with the eligibility requirements that people do not quit voluntarily and have worked at least 26-out-of-36 weeks, gives persons the right to receive UI benefits. In October 2006, both benefits and the duration of benefits were moderated for all UI recipients. Since then, benefits amount to 75% of previously earned labor income<sup>14</sup> in the first two months<sup>15</sup> and 70% thereafter up to exhaustion. The duration of benefits depends on actual employment history with a maximum of 38 months. Before October 2006, maximum UI benefits duration was age-dependent and amounted to a maximum of 42, 48 and 60 months for persons aged 50-54, 55-59 and 60-64 respectively.

The policy prior to October 2006 implied that persons aged 60-64 could retire at the age of 60 using UI benefits up to the mandatory retirement age without having to search for a job. Until August 2003, even all persons aged 57.5+ had this possibility by being able to extend the benefit period with 3.5 years with an income replacement of 70% of minimum wage or 70% of previous wage whichever is lower.<sup>16</sup> Unemployment was, therefore, used frequently to bridge retirement in agreement between employers and employees.

Since the introduction of job search requirements for older persons in unemployment, extended benefits, in the form of *IOAW-insurance* for persons aged 50-64, are consistent with the job search requirements introduced in UI. The actual benefits of the IOAW are similar to the benefits of the previous extended UI benefits: household income is complemented up to subsistence level independently from wealth. For low-income people with a low wealth level this means that benefits from IOAW are as generous as the UI benefits prior to the extended benefits. The IOAW benefit is very similar to the means-tested social assistance benefits covering low-wealth households independent of age. Prior to IOAW legislation, social assistance was often an important way to retain benefits as an extension of UI benefits among low income and -wealth households.

Additionally, while self-employed persons in general do not have access to social insurances such as UI, older self-employed persons (55-64) can opt for a special type of UI for self-employed (*IOAZ-insurance*). Given the same requirements as in UI, IOAZ is available for older self-employed who terminate their business and have insufficient income. This arrangement complements household income up to subsistence level comparable to social assistance with the major difference that wealth threshold is substantially larger in IOAZ compared to

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<sup>14</sup>Up to a maximum of 187.77 euro (gross) a day in 2010.

<sup>15</sup>This was 70% for persons who had worked at least 26-out-of-39 weeks until October 2006.

<sup>16</sup>Persons younger than 57.5 only had the possibility to extend the benefit period with 2 years prior to August 2003.

social assistance.

As from 2006, unemployed are encouraged to start a business: irrespective of age, 26 weeks of unemployment benefits can be received in advance without any further job-search requirements if a person tries to start a business from unemployment. Evidence from Germany suggests that such programs tend to be an effective way of stimulating people to enter self-employment from unemployment (Baumgartner and Caliendo, 2008). However, there is no evidence on the long-term effectiveness, e.g. sustained (self-)employment or re-entry of unemployment, of these programs. Income from self-employment is deducted *ex post* from the unemployment benefits.

### 3 Model

#### 3.1 Exit routes to retirement

This section describes the model we use to investigate labor market transitions of individuals in the age group 50-63. The exit route to retirement can be seen as the outcome of a maximization process, in which individuals reevaluate their optimal labor market status each period, given their preferences and the constraints that coincide with each labor market state. They compare utility streams associated with different exit routes and choose the alternative with the highest utility stream. More specifically, we define the inter-temporal utility of individual  $i$  as follows:

$$U_\tau = \sum_{t=\tau}^T (1 + \rho)^{\tau-t} u_t(c_{it}, l_{it}, j_{it}; s_{it}, v_{it}) \quad (1)$$

where  $c_{it}$  and  $l_{it}$  denote consumption and leisure time of individual  $i$  in time period  $t$ , respectively.  $\rho$  is the discount factor and  $T$  the time horizon of the individual (life expectancy). In our model we distinguish between four mutually exclusive labor market states: paid-employment ( $j = 1$ ), self-employment ( $j = 2$ ), unemployment insurance ( $j = 3$ ), and inactivity ( $j = 4$ ). After the age of 65, unemployment ( $j = 3$ ) disappears from the set of labor market statuses. Furthermore, transitions from self-employment or inactivity to unemployment are not possible because only persons in paid-employment are eligible for UI benefits. Each labor market status is associated with its own consumption and leisure possibilities, but labor market status itself may also influence the utility function directly. E.g. conditional on leisure and consumption, some people receive a higher utility from self-employment than from paid employment, due to characteristics of self-employment such as the independence and flexibility that self-employment provides. These preferences for labor market statuses, but also for consumption and leisure may differ between demographic groups.

Social security rules  $s_{it}$  that hold for individual  $i$  in period  $t$  also influence the exit route to retirement. The search requirements of the 2004 Dutch UI reform, for example, decrease the amount of leisure associated with the exit route through unemployment. Finally, observed and unobserved characteristics  $v_{it}$  influence the utility function indirectly through preferences. For example, the number of children in the household (observed) and education (unobserved) may influence the utility perceived from consumption and leisure.

Equation 1 provides a guideline for the empirical specification of the model. It shows that individuals choose the exit route that maximizes their utility over consumption, leisure, and labor market status. Furthermore, individual characteristics and social security rules affect current and future labor market statuses. For the empirical implementation of the problem, like Blau (1998) and Mastrogiacomo et al. (2004), we approximate the value function  $U_\tau$  for individual  $i$  who chooses labor market status  $j$  at time  $\tau$  with a linear function:

$$V_{ij}(\tau) = X_{i\tau}\beta_j + Z_{i\tau-1}\gamma_j + UR_\tau Z_{i\tau-1}\theta_j + D_{ij\tau} + \mu_{ij} + \epsilon_{ij\tau}, \quad (2)$$

where  $X_{i\tau}$  is a vector of observed personal and household characteristics that influence preferences as shown in (1).  $Z_{i\tau-1}$  is a vector of dummy variables indicating the lagged labor market status and  $UR_\tau$  is the unemployment rate in period  $\tau$ , which we interact with  $Z_{i\tau-1}$  to take into account that the unemployment rate may affect individuals with various previous employment states differently. The treatment variables function  $D$  contains variables and interactions that we use to identify the effect of the 2004 UI reform. We will explain  $D$  in more detail in the next section. Finally, the terms  $\mu_{ij}$  describe individual specific unobserved heterogeneity and  $\epsilon_{ij\tau}$  are i.i.d. error terms, which we assume to be independent of the explanatory variables and to follow a Type I extreme value distribution. Hence, the probability for individual  $i$  to have labor market status  $j$  at time  $\tau > 0$  can be written as

$$P(j|X_{i\tau}, Z_{i\tau-1}, UR_\tau, D_{ij\tau}, \mu_{i1}, \dots, \mu_{iJ}) = \frac{\exp(X_{i\tau}\beta_j + Z_{i\tau-1}\gamma_j + UR_\tau Z_{i\tau-1}\theta_j + D_{ij\tau} + \mu_{ij})}{\sum_{k=1}^J \exp(X_{i\tau}\beta_k + Z_{i\tau-1}\gamma_k + UR_\tau Z_{i\tau-1}\theta_k + D_{ik\tau} + \mu_{ik})}, \quad (3)$$

where  $J$  denotes the number of mutually exclusive labor market states distinguished in the model. To identify the model,  $\beta_1, \gamma_1, \theta_1$  and  $\mu_{i1}$  are normalized to zero (paid employment is the reference category). The unobserved heterogeneity or random effects  $\mu_i = (\mu_{i2}, \mu_{i3}, \mu_{i4})'$  are assumed to follow a multivariate normal distribution with mean zero and variance  $\Sigma_\mu$ . In other words,

$$\begin{pmatrix} \mu_{i2} \\ \mu_{i3} \\ \mu_{i4} \end{pmatrix} = L \begin{pmatrix} \eta_{i2} \\ \eta_{i3} \\ \eta_{i4} \end{pmatrix} \quad \text{with} \quad \begin{pmatrix} \eta_{i2} \\ \eta_{i3} \\ \eta_{i4} \end{pmatrix} \sim N \left( \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \right), \quad (4)$$

where  $L$  is the Choleski matrix of  $\Sigma_\mu$  which has to be estimated (the unique lower triangular matrix such that  $LL' = \Sigma_\mu$ ). This dynamic multinomial logit model with unobserved heterogeneity (random effects) has the advantage that the irrelevance of independent alternatives (IIA) property of the multinomial logit model is avoided. Furthermore, allowing for unobserved heterogeneity between choice possibilities will give true, instead of spurious, state dependence in the model.

The initial labor market status  $Z_{i0}$  is not fixed or exogenous and, as in most papers, we do not have the entire history of the process generating individual's employment dynamics available. Therefore, the initial conditions problem arises, which is discussed in Heckman (1981). To deal with this problem Heckman (1981) proposes to estimate a static multinomial logit model for the initial state with different slope parameters and without lagged labor market status, simultaneously with the dynamic model. Several studies investigating transitions between multiple states have used this method, e.g. Gong et al. (2000), Uhlenborff (2006) and Cappellari et al. (2010). However, the number of parameters increases a lot with this method and with a lot of observations this becomes computationally unattractive. To take into account the initial conditions problem, Wooldridge (2005) proposed an alternative approach, which has been used in several studies, such as Devicienti and Poggi (2011), Michaud and Tatsiramos (2011), Haan and Wrohlich (2011), Buddelmeyer et al. (2010) and Christelis and Sanz-de Galdeano (2011). In the method of Wooldridge (2005), individual specific heterogeneity terms are modeled conditional on the initial condition and the individual mean of time-varying covariates

$$\mu_{ij} = \alpha_{0j} + Z_{i0}\alpha_{1j} + X_i\alpha_{2j} + a_{ij} \quad (5)$$

where  $Z_{i0}$  is the vector of initial conditions and  $X_i$  the vector of the individual mean of time-varying covariates. The remaining stochastic element,  $a_{ij}$ , follows a multivariate normal distribution with mean zero and variance  $\Sigma_\alpha$ . This implies that applying the Wooldridge correction for initial conditions automatically results in a Mundlak random effects estimation (Mundlak, 1978). Applying the Mundlak random effects regression has the advantage of allowing for correlation between the observed- and unobserved heterogeneity similar to a fixed effects model, even in an unbalanced panel (Wooldridge, 2010).

Akay (2011) studied the performance of the Wooldridge method, compared to for example the Heckman method. He found that for moderately long panels (5-8 periods) the Wooldridge method works well and that all methods perform equally well for panels of long duration (longer than 15-20 periods). Since we have a long panel available and our large sample makes the

Heckman method computationally unattractive, we use the method of Wooldridge (2005).

### 3.2 Identification of job search requirements

The 2004 reform in UI, where persons aged 57.5+ are no longer exempted from job-search requirements except for the special cases described in section 2, provides an exogenous source of variability in the data. To exploit the exogeneity of the reform and infer a causal relationship between job search requirements among older unemployed and labor market mobility, we apply a *differences-in-differences* framework. In this framework we compare labor market transitions before and after the reform for the 57.5+ population (for whom job search requirements were no longer exempted), relative to those younger than 57.5 (for whom nothing changed). We assume that in absence of the reform there should not be a discontinuous change in labor market transitions for 57.5+ individuals relative to those younger than 57.5 after the reform.

Formally, the difference-in-difference framework is implemented in (2) using the treatment variable function  $D$  which is given by

$$D_{ijt} = [PE_{it-1} \quad UI_{it-1}] \otimes [G_{it} \quad P_{it} \quad G_{it} \cdot P_{it}] \delta_j \quad (6)$$

where  $G_{it}$  is a dummy variable indicating the treatment group, which is equal to one if a person is aged 58-63 and zero otherwise.<sup>17</sup> Only, due to a transitional regime, persons older than 62 years and 2 months who were already unemployed for a minimum of one year at the time the reform was implemented were not affected by the reform and belong to the control group.  $P_{it}$  indicates the treatment period (2004-2009) and  $G_{it} \cdot P_{it}$  refers to the interaction term that captures the treatment effect of the policy reform. Finally, by interacting the treatment variables with paid employment (PE) and unemployment (UI) in the previous period, we explicitly model the effects of the reform on the inflow to unemployment and outflow from unemployment to other labor market states.

Anticipation effects may disturb our analysis. If before 2004 unemployed individuals who were close to 57.5 were already reducing their search capacity in anticipation of the removal of the search requirement after the age of 57.5, the labor market transitions of those younger than 57.5 are also affected by the reform. Hulleger and Van Ours (2012), however, find no strong evidence that UI recipients who were getting close to the age of 57.5 reduced their search intensity. Lammers et al. (2012) notice that anticipation of the policy change can result in

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<sup>17</sup>Since we have yearly data we cannot distinguish people as from the age of 57.5. Instead, our treatment group includes all individuals as from the age of 58, such that we are sure that they are being treated as from the introduction of the reform (1st of January 2004).

selective inflow into unemployment around the time the policy was initiated, but found no evidence of this. Probably, since none of the individuals flowing into UI in 2003 were exempted from the new rules, speeding up the firing procedure could not prevent them from the new search requirements after the age of 57.5.

### 3.3 Estimation

We estimate the model parameters using maximum likelihood. The likelihood contribution of individual  $i$  with observed labor market states  $j_1, \dots, j_M$  is

$$L_i(j_1, \dots, j_M | X, Z, UR, D, a_i; \alpha, \beta, \gamma, \theta, \delta) = \prod_{t=1}^M \frac{\exp(X_{it}\beta_{j(t)} + Z_{it-1}\gamma_{j(t)} + UR_t Z_{it-1}\theta_{j(t)} + D_{ijt} + Z_{i0}\alpha_{1j(t)} + X_i\alpha_{2j(t)} + a_{ij})}{\sum_{k=1}^J \exp(X_{it}\beta_{k(t)} + Z_{it-1}\gamma_{k(t)} + UR_t Z_{it-1}\theta_{k(t)} + D_{ikt} + Z_{i0}\alpha_{1k(t)} + X_i\alpha_{2k(t)} + a_{ik})} \quad (7)$$

where  $M$  is the last year for which we observe labor market status  $j$  for individual  $i$ . We do not observe the individual specific effects  $a_i$ . This term has to be integrated out, such that the likelihood contribution becomes

$$L_i(j_1, \dots, j_M | X, Z, UR, D, a_i; \alpha, \beta, \gamma, \theta, \delta) = \int_{-\infty}^{\infty} L_i(j_1, \dots, j_M | X, Z, UR, D, a_i; \alpha, \beta, \gamma, \theta, \delta) da_i \quad (8)$$

We evaluate the integral using Maximum Simulated Likelihood (for details, see Gourieroux and Monfort (1993) and Hajivassiliou and Ruud (1994)) applying Halton Sequences.<sup>18</sup>

## 4 Data

### 4.1 Data and definitions

Data are taken from the Dutch Income Panel Study 1989-2009 of Statistics Netherlands (IPO, Inkomens Panel Onderzoek, CBS (2009)) using the years 1989-2009. IPO is a representative sample of the population in the Netherlands and consists of administrative data, most particularly from the tax office. About 95,000 individuals are selected and followed over time. This selection takes place on persons' national security number. A major advantage of having administrative data is the number of observations and the high level of representativeness. It is a well-known fact that the rich and the poor are often underrepresented in surveys, but also that self-employed individuals are often underrepresented.

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<sup>18</sup>Results of models applying Halton draws instead of random draws are found to give more precise estimation results (Train, 2000; Bhat, 2001). We use 50 Halton draws in our analysis. Results are, however, robust for 100 and 200 Halton draws.

Another advantage of IPO is that we have a long time span available (21 years) and that we have no endogenous panel attrition, since panel attrition only occurs as a result of emigration or death. IPO contains detailed information on income, wealth, gender, age, marital status, children, ethnicity, homeownership and labor market status.

In this paper we analyze men and women of age 50-63.<sup>19</sup> Men and women are analyzed separately, because their retirement routes may be quite different (as suggested by Huynen et al., 2004).

To indicate whether someone is paid-employed, self-employed, unemployed or inactive we use an individual's *main source of income* during a year of observation. We make one exception for self-employment, namely, we also indicate someone to be self-employed when he has a negative profit (i.e. a loss) while income from wealth is larger than any other component that year. This, for example, allows us to take into account start-ups. Income from self-employment denotes income from profit, freelancing or from being a director/major shareholder. Income from paid employment includes all wages earned in the private or public sector and *Unemployment* income includes all regular unemployment insurance benefits. The remaining category *inactivity* includes all other people, who are for example in disability, early retirement, social assistance or out of the labor force.

Additional published data of Statistics Netherlands about the macroeconomic unemployment rate and the consumer price index (CPI) are used in the analysis. Using the CPI we express all financial variables in 2010 euro's.

## 4.2 Descriptive analysis

Table ?? describes individual- and household characteristics of persons aged 50-57 in the periods 1989-2003 (control group) and 2004-2009 (control group) and persons aged 58-63 in the periods 1989-2003 (control group) and 2004-2009 (treatment group). No large differences in characteristics are observed within age groups over time such that the age groups are well comparable over time in terms of observed heterogeneity.

The treatment and unemployment rates are important variables in the analysis. From the table, it becomes clear that all persons belong to the control group in the period 1989-2003, the persons aged 50-57 also belong to the control group in the period 2004-2009 and that 5% of the men and x% of the women aged 58-63 are in the transitory arrangement and therefore belong to the control group as well in the period 2004-2009. Furthermore, it can be observed that the

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<sup>19</sup>We exclude persons of age 64, since they are excluded from the UI reform that we investigate.

unemployment rate is virtually constant across age groups and somewhat lower in the period 2004-2009 than in 1989-2003.

Given our definitions of paid-employment, self-employment, unemployment and inactivity from previous section, Table ?? indicates the percentage of persons present in each labor market state. The table shows that the percentage of persons in paid-employment is generally higher among the group of persons aged 50-57 compared to the group of 58-63 year old. The percentage of persons in paid employment increased in the period 2004-2009 compared to the period 1989-2003 for both age groups. Nevertheless, the 58-63 group shows a more substantial increase in the period 2004-2009. This is true for both men and women although the absolute percentage of persons in paid employment is lower among women. This may be explained by cohort effects, as has been found by Euwals et al. (2011). Among women, inactivity percentages are more substantial than among men although the percentage of persons in inactivity decreases substantially over time among both men and women.

The percentage of persons in unemployment is fairly constant over age groups and periods although we do observe a more pronounced decrease in unemployment among 58-63 year old men in the period 2004-2009. For the same group, we observe a small increase in self-employment in the period 2004-2009. A larger increase is observed among 58-63 year old women. Self-employment remained constant for the persons aged 50-57. These results suggest that the period in which the UI reform was introduced is associated with increasing activity at the labor market at the cost of unemployment and inactivity. To get a better picture of the transitions associated with these changes over time, we present transition matrices below.

A final remark regarding Table ?? has to be made. The table shows the prevalence of individuals combining self-employment or unemployment with a (part-time) paid job. The incidence of these combinations is small (only 2 to 5% of the self-employed receive labor income for at least half of their profits from business and only 10 to 15% of the unemployed received labor income for at least half of their unemployment benefits), which reassures us that we do not have to worry about the main income source approach in the model.

[Insert Table ?? here, TO DO]

Transition matrices in tables 1 to 4 present labor market transitions for both men and women during the period 1989-2003 and 2004-2009 (the control and treatment period). We distinguish

between the age groups 50-57 and 58-63 (the control and treatment group). The diagonals of tables 1 and 2 for men show that year to year transitions out of paid employment, self-employment and inactivity diminished between 1989-2003 and 2004-2009 for both age groups. Only, yearly transitions out of unemployment increased between the 1989-2003 and 2004-2009 period. Whereas in 1989-2003 64.62% of the unemployed men aged 50-57 were still unemployed in the next period, this declined to 53.82% during the 2004-2009 period. In the age group 58-63, people stay in unemployment more often, but also the number of people that continued to be unemployed from one year to the other declined approximately 7.5%-points, from 80.61% in 1989-2003 to 73.14% in 2004-2009. More transitions out of unemployment led to more transitions into paid employment and self-employment. For individuals of age 50-57 transitions from unemployment to paid employment increased from 16.27% to 26.61% and transitions to self-employment increased from 1.80% to 3.91%. For individuals aged 58-63 transition rates from unemployment to employment are much lower, probably because it is more difficult for them to find a job. However, when we compare the period 1989-2003 with 2004-2009 transitions rates out of unemployment increased from 1.81% to 4.74% and from 0.55% to 1.26% for paid employment and self-employment, respectively. Regarding self-employment we find that among the employed individuals the prevalence of self-employment is higher in the age group 58-63 than in the age group 50-57. This may be due to necessity reasons (it is generally more difficult for them to find a job), but also preferences may play a role (gradual retirement through self-employment). Furthermore, in the older age group the share of self-employment in total employment decreased between 1989-2003 and 2004-2009. Among other things, this may be due to early retirement plans that have become less generous, which stimulates paid employed individuals to also work longer. Transitions from paid-employment to self-employment do not change that much but we do observe a decline in the share of employed people moving to unemployment, especially in the age group 58-63 who were confronted with the 2004 UI reform discussed before, which made unemployment less attractive as an exit route to retirement because of search requirements. For men of age 58-63 we find that the share of individuals moving from paid employment to unemployment declined from 2.51% to 1.42%, compared to a decline only from 1.30% to 1.21% for the younger age group that was not confronted with the reform.

Similar patterns emerge for women. The major difference compared to men is that relatively more women are inactive. Transitions in tables 1 to 4 are not conditional on observed and unobserved characteristics. Therefore, information on state dependence may be spurious and may contain information of both observed and unobserved heterogeneity. These problems are

solved in the following section.

[Insert Table 1 here]

[Insert Table 2 here]

[Insert Table 3 here]

[Insert Table 4 here]

## 5 Estimation results

Tables 5 and 6 present parameter estimates of our baseline model for men and women, respectively.<sup>20</sup> As we pointed out earlier in the paper, we try to explain the nature (necessity or opportunity) of self-employment among older persons. Our empirical specification allows us to analyze the importance of avoiding unemployment or inactivity with self-employment and, from a macroeconomic perspective, how the unemployment rate affects inflow into self-employment (necessity). More importantly, the treatment effect allows us to analyze the opportunity hypothesis of self-employment as gradual retirement mechanism. Essentially, the 2004 UI reform changed the number of active hours to be spend (obligatory and monitored job search) in unemployment while keeping generosity fixed, in terms of benefit and duration. This implies that the reform did not increase the necessity of starting self-employment out of unemployment thereby disentangling necessity and opportunity effects.

Controlling for individual- and household characteristics as well as unobserved hetero-

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<sup>20</sup>*Random sample* indicates the percentage of persons that is drawn from the original number of persons in the data set if the number of observations-variables combinations exceed the maximum size of the matrix that is used in the procedure to calculate individual- and state-specific heterogeneity. Results of the multinomial logit model excluding this heterogeneity indicate that results are robust to different percentages of persons drawn.

generosity, the estimation results in tables 5 and 6 reject the opportunity hypothesis of self-employment as gradual retirement mechanism. Search requirements in UI did not increase transitions from paid employment to self-employment relative to paid employment ( $PE_{t-1} \cdot Treatment_{0409}$ ). In other words, self-employment has not been evaluated to be more attractive compared to paid-employment despite the (downward) flexibility in working hours associated with self-employment that unemployment may have provided prior to the reform (opportunity hypothesis). Neither did this reform increase transitions from unemployment to self-employment relative to paid employment ( $UI_{t-1} \cdot Treatment_{0409}$ ) which shows that the reform did not induce necessity of self-employment to avoid unemployment. In stead, the increased search efforts have mostly likely increased the probability of finding a job in stead of having decreased the probability.

Regarding paid employment, the estimation results indicate that the increased search efforts for older unemployed have induced paid employment at the cost of unemployment. Both men and women of age 58+ are less likely to stay in unemployment relative to flowing from unemployment to paid employment ( $UI_{t-1} \cdot Treatment_{0409}$ ) after the introduction of search requirements. This result is in line with Lammers et al. (2012) and Hulleger and Van Ours (2012). Extending the analysis of Lammers et al. (2012) and Hulleger and Van Ours (2012), we find that men are even less likely to flow from paid employment to unemployment relative to staying in paid employment ( $PE_{t-1} \cdot Treatment_{0409}$ ) due to the UI reform.

Although we find that the reform has induced active states on the labor market, we do find substitution effects between unemployment and inactivity due to the reform. Among men, we do not observe significant differences in inactivity compared to paid employment. Knowing that the number of people in paid employment have increased, however, indicates that the number of people in inactivity has increased as well although not significantly different from the increase in paid employment. For women, a different pattern emerges: the results suggest that flows from paid employment to inactivity relative to paid employment ( $PE_{t-1} \cdot Treatment_{0409}$ ) increased because of the reform. Finding such substitution effects is in line with Lammers et al. (2012). Nevertheless, we also find a decrease in transitions from unemployment to inactivity relative to paid-employment ( $UI_{t-1} \cdot Treatment_{0409}$ ) suggesting that fewer women may exhaust their UI benefits and flow into inactivity (social assistance) afterwards.

Not only do the results suggest to reject the flexibility in hours hypothesis of self-employment at older ages, it also suggests that self-employment is primarily chosen to end a spell of unemployment at older ages. Firstly, we do not find significant increases in flows from paid employ-

ment to self-employment with age ( $PE_{t-1} \cdot Age$ ) although the hypothesis of self-employment as bridge to retirement would suggest so. Secondly, we do find such effects in flows from unemployment to self-employment ( $UI_{t-1} \cdot Age$ ).

Among men, we find a significant positive difference between flowing from unemployment to self-employment compared to flowing from unemployment to paid employment ( $UI_{t-1}$ ) and we find that this difference increases with age ( $UI_{t-1} \cdot Age$ ). A high unemployment rate (UR) is shown to decrease this difference in the table ( $UI_{t-1} \cdot UR$ ) although the effect of the unemployment rate is not found to be statistically significantly different from the effect of the unemployment rate on persons flowing from unemployment in a *t-test*.<sup>21</sup> In periods of high unemployment rates probabilities to flow from paid-employment to self-employment (Unemployment rate (UR)) increase which is consistent with the recession push hypothesis. Among women, we find an age-specific difference between flowing from unemployment to self-employment compared to flowing from unemployment to paid employment only ( $UI_{t-1} \cdot Age$ ). The general effect of the unemployment rate (Unemployment rate (UR)) is significantly negative for the probability of self-employment. The combination of the dynamics and the unemployment rates suggest that self-employment is primarily used to end a spell of unemployment at older ages although this function of self-employment is decreased in periods of high unemployment rates.

Numerous other effects are suggested by the estimation results that are not of great importance to identify the nature of self-employment at older ages but that may be interesting in understanding exit routes to retirement in general. Unless otherwise reported, these effects apply to both men and women. We find state dependence in unemployment that increases in age. State dependence is highest in inactivity and increased over time.<sup>22</sup> Entry in inactivity increased over time irrespective of previous labor market state. Nevertheless, inactivity is mostly used by older persons flowing from paid employment (most likely early retirees) and persons flowing from unemployment (most likely persons who exhausted the UI benefits). Younger cohorts are less likely to be in inactivity although they are more likely to be in unemployment. Unemployment entry generally decreased over the years. The probability of exiting unemployment is lower in periods of high unemployment rates.

The last part of tables 5 and 6 shows the variances and covariances of the random effects. The estimates show that the random effect for self-employment plays a significant role and is more important than the idiosyncratic error term (which has a variance of  $\pi^2/6$ , by normalization).

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<sup>21</sup>*p* - value = 0.1053

<sup>22</sup>The inactive state contains retirement and disability, which are often irreversible states.

This means that, compared to paid employment, time invariant unobserved characteristics play a substantial role in the choice for self-employment. The random effects for unemployment and inactivity are significant, but are less important than the idiosyncratic error terms, indicating that time invariant unobserved characteristics do not play a large role for unemployment and inactivity. Compared to the multinomial logit model where unobserved heterogeneity is not taken into account (Tables 7 and 8 ), including unobserved heterogeneity increases the likelihood and, as expected, reduces the coefficients that reflect the probability of people remaining in the same state as in the previous period.

[Insert Table 5 here]

[Insert Table 6 here]

Since coefficients in a multinomial logit model are relative to the base outcome (paid employment in our case), it is hard to directly interpret results next to the sign and significance of a variable. Therefore, we estimated *average partial effects* conditioned on the distribution of unobserved heterogeneity following Wooldridge (2005). The average partial effects of the dynamics, the treatment effect and the unemployment rate can be observed in table ?? and ?? for men and women respectively.

TO DO

## 6 Summary and Discussion

The estimation results did not show support for the hypothesis that self-employment is chosen as an opportunity to decrease active hours before full retirement. In stead, the results suggested that self-employment is primarily chosen as a way to end a spell of unemployment at older ages.

Among others, Hamilton (2000) finds that non-pecuniary considerations, such as flexibility in working hours, are generally most important for persons to become self-employed. In general, no robust empirical support for the effect of financial incentives on becoming self-employed is found (Berkhout et al., 2011).<sup>23</sup> This seems to be the case for older persons especially since it is

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<sup>23</sup>These results would also imply that the effect of substantial tax advantages of the self-employed over the

found that self-employment acts as a gradual retirement mechanism (a.o. Bruce et al. (2000)). Therefore, this paper assumed that the opportunity of self-employment is completely defined by a (downward) flexibility in working hours, such that the treatment effects are a revealed preferences indication of the opportunity of self-employment at later ages. Other considerations of opportunity self-employment may, however, consist but remain unattended in this paper.

Regarding the necessity of self-employment, the paper assumed that necessity of self-employment is driven by a lack of adequate alternatives to self-employment. Therefore, the paper defined necessity self-employment as self-employment to avoid unemployment (UI). Although self-employment may also be chosen as a way to avoid inactivity (IA), inactivity is often a consequence of bad health (disability) or the choice to retire (early retirement) and, therefore, often unavoidable or choosing the opportunity to retire. Given these assumptions, the results suggested that necessity self-employment is present among older workers ( $UI_{it-1}$  and  $UR$ ) while the treatment effect did not find evidence for causality between an increase in active hours in one of the alternatives and self-employment entry that should indicate opportunity self-employment.

A possible explanation for not finding evidence for the hours effect in choosing self-employment may be the availability of part-time paid employment that allows for gradual reductions in working hours. Unfortunately, our data set does not contain information on the number of hours worked. Results of Emmanoulidi and Kyriazidou (2012), however, suggest that including part-time employment would not alter the conclusion that self-employment is primarily chosen out of necessity. Emmanoulidi and Kyriazidou (2012) find that part-time paid employment is more often used as an exit route from paid employment while self-employment is more regularly chosen as an exit from inactivity.

The data set, however, does have information on the types of income received within a year. Adding a variable that equals one if a person received both labor income (LI) and unemployment insurance benefits (UIB) in the previous period and zero otherwise to the baseline regression corrects for the possibility that a person flowing from UI to PE to SE within a year is observed as a transition from UI to SE. The latter is a clear indication of self-employment out of necessity while the first is not. Including this variable does not affect the main conclusions, as can be seen in Tables 11 and 12, indicating that necessity self-employment is not overestimated by the baseline model.

[Insert Table 11 here]

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paid-employed may be small.

[Insert Table 12 here]

An other explanation of why we primarily find necessity self-employment may be due to an other drawback of the data set at hand. The data set does not contain information on the accumulation of occupational pension rights. Such pension rights, however, may be a consideration of entering self-employment because occupational pension rights are not accumulated in self-employment. On the other hand, pension accumulation considerations are far less important for transitions from unemployment to self-employment since occupational pensions are generally not accumulated (or accumulated with a large discount in some pension funds) during unemployment. This explanation is supported by the results of Moore and Mueller (2002) and Zissimopoulos and Karoly (2007).

Although the data set lacks pension wealth, it does provide information on income received from non-pension wealth and other indicators of the financial position of an individual. Due to possible endogeneity problems, we model the wealth variables on the basis of the initial period a person is observed ( $t = 0$ ). Tables 9 and 10 show that liquid wealth increases the probability of self-employment among men. Among women, we find that fixed wealth decreases the probability of choosing self-employment. Nevertheless, we do not find effects of homeownership and mortgage debt. Finally, we find that having a partner with labor income is associated with a lower probability of self-employment. One should, however, remain cautious interpreting this variable since participation at the household level may be endogenous. An *F-test* shows that the financial variables are jointly significant for both men and women.<sup>24</sup> Most importantly, correcting for heterogeneity in wealth does not alter the earlier results and the conclusion that self-employment at older ages seems to be primarily chosen to avoid unemployment.

[Insert Table 9 here]

[Insert Table 10 here]

Apart from information on previously mentioned part-time work and pension accumulation,

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<sup>24</sup>*p - valuem*en : XX, *p - value*women : XX

the data set also lacks information regarding two other determinants that may be relevant for self-employment: education and health. The random effects term can correct for the unobserved levels of education. The random effects are, however, unable to correct for health shocks. Adding a variable to the baseline regression that should take into account heterogeneous health statuses does not alter the main conclusion regarding the nature of self-employment among older persons, however. This can be observed in Tables 13 and 14. In line with our results, Zucchelli et al. (2012) show that ill-health and health shocks do not increase the probability of using self-employment as retirement mechanism. Instead, they conclude that health seems to be an important determinant for early retirement.

[Insert Table 13 here]

[Insert Table 14 here]

From a policy perspective, we conclude that persons aged 50-63 are responsive to incentives in social insurances. Both men and women have adjusted their labor market state to the 2004 reform in UI such that active labor market participation has increased. Furthermore, we find that self-employment is primarily used to end or avoid a spell of unemployment meaning that there is a lot of hidden unemployment in self-employment among older persons. This may justify social insurance instruments for the older self-employed with insufficient income.<sup>25</sup>

## 7 Conclusion

This paper examines whether individuals at the end of their working lives choose self-employment as a gradual retirement mechanism that is chosen because of the (downward) flexibility in hours (opportunity) or whether self-employment is chosen because of a lack of alternatives (necessity). For this purpose we use a dynamic multinomial logit model correcting for unobserved heterogeneity applied to administrative data for people aged 50-63 in the Netherlands. This model allows us to analyze the pathways to self-employment before retirement by modeling

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<sup>25</sup>Currently, 55+ persons who have worked for at least 1,225 hours a year in self-employment for a minimum of three years can apply for *IOAZ*-benefits (see section 2). Based on our conclusions, it may be relevant to loosen eligibility criteria.

state dependence and mobility between labor market states.

The importance of (downward) flexibility in hours that self-employment provides is tested by analyzing the effects of the introduction of search requirements for older unemployed on the pathways to self-employment. The introduction of search requirements in unemployment for persons aged 57.5+ on January 1st 2004 was an exogenous policy shock that decreased the attractiveness of unemployment as a retirement route in terms of active hours to be spent in unemployment. While search effort in unemployment increased for older unemployed, both the level of benefits and the duration of benefits remained constant. A difference-in-differences framework allows us to analyze whether entry in self-employment increased due to increased hours in one of the alternative retirement routes. If the reform would increase self-employment more than paid employment, this would be an indication of the importance of self-employment as gradual retirement mechanism.

However, the results show that the introduced search requirements in UI did not increase transitions from paid employment to self-employment relative to paid employment. This rejects the flexibility in hours hypothesis of self-employment at older ages: self-employment has not been evaluated to be more attractive compared to paid-employment despite the (downward) flexibility in working hours associated with self-employment that unemployment may have provided prior to the reform. Neither did we find significant age-dependent increases in flows from paid employment to self-employment although the hypothesis of self-employment as bridge to retirement would suggest so.

The results do suggest that self-employment is primarily chosen to end a spell of unemployment at older ages. We find a significant positive difference between flowing from unemployment to self-employment compared to flowing from unemployment to paid employment and we find that this difference increases with age. Self-employment entry, however, depends on the unemployment rate as well as our results suggest. Although self-employment is primarily used to end a spell of unemployment at older ages, this effect declines in periods of high unemployment rates. On the other hand, the probability to flow from paid employment to self-employment increases in periods with high unemployment rates which is consistent with the push hypothesis in the literature and indicating that self-employment also provides an alternative to avoid unemployment.

Finally, we conclude that there exist substitution effects between the introduced search requirements that are both positive (increased paid employment and self-employment, although self-employment did not increase more than paid employment, as well as decreases in the inac-

tivity state) and negative (increased entry in inactivity).

For future research it would be interesting to investigate to what extent self-employment provides an alternative to unemployment by comparing income for those who move from unemployment to self-employment versus those who move from employment to self-employment. Furthermore, it would be interesting to see whether the transition to self-employment actually increases the financial well-being of persons in old age both prior to retirement and after retirement.

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## 8 Tables and Figures

Table 1: Average year-to-year transitions 1989-2003 (men)

| Year $t$     |       |       |       |        |       |           |       |       |        |  |
|--------------|-------|-------|-------|--------|-------|-----------|-------|-------|--------|--|
| Year $t - 1$ |       |       |       |        |       |           |       |       |        |  |
| Age 50-57    |       |       |       |        |       | Age 58-63 |       |       |        |  |
| PE           | SE    | UI    | IA    | Total  | PE    | SE        | UI    | IA    | Total  |  |
| 94.70        | 1.12  | 1.30  | 2.88  | 100.00 | 73.57 | 0.99      | 2.51  | 22.93 | 100.00 |  |
| 5.98         | 87.31 | 0.13  | 6.59  | 100.00 | 3.70  | 82.54     | 0.04  | 13.72 | 100.00 |  |
| 16.27        | 1.80  | 64.62 | 17.31 | 100.00 | 1.81  | 0.55      | 80.61 | 17.03 | 100.00 |  |
| 4.15         | 3.15  | 0.81  | 91.90 | 100.00 | 1.70  | 1.12      | 0.35  | 96.82 | 100.00 |  |
| 64.97        | 12.31 | 2.28  | 20.45 | 100.00 | 24.64 | 8.59      | 5.88  | 60.89 | 100.00 |  |

Table 2: Average year-to-year transitions 2004-2009 (men)

| Year $t$     |       |       |       |        |       |           |       |       |        |  |
|--------------|-------|-------|-------|--------|-------|-----------|-------|-------|--------|--|
| Year $t - 1$ |       |       |       |        |       |           |       |       |        |  |
| Age 50-57    |       |       |       |        |       | Age 58-63 |       |       |        |  |
| PE           | SE    | UI    | IA    | Total  | PE    | SE        | UI    | IA    | Total  |  |
| 96.13        | 0.95  | 1.21  | 1.71  | 100.00 | 81.21 | 0.92      | 1.42  | 16.45 | 100.00 |  |
| 3.45         | 92.48 | 0.04  | 4.03  | 100.00 | 3.12  | 85.76     | 0.29  | 10.83 | 100.00 |  |
| 26.61        | 3.91  | 53.82 | 15.66 | 100.00 | 4.74  | 1.26      | 73.14 | 20.85 | 100.00 |  |
| 3.48         | 2.70  | 1.12  | 92.70 | 100.00 | 1.23  | 1.49      | 0.58  | 96.71 | 100.00 |  |
| 70.15        | 12.84 | 2.29  | 14.72 | 100.00 | 38.32 | 10.30     | 3.85  | 47.53 | 100.00 |  |

Table 3: Average year-to-year transitions 1989-2003 (women)

| Year $t$     |       |       |       |        |       |           |       |       |        |  |
|--------------|-------|-------|-------|--------|-------|-----------|-------|-------|--------|--|
| Year $t - 1$ |       |       |       |        |       |           |       |       |        |  |
| Age 50-57    |       |       |       |        |       | Age 58-63 |       |       |        |  |
| PE           | SE    | UI    | IA    | Total  | PE    | SE        | UI    | IA    | Total  |  |
| 92.94        | 1.65  | 1.45  | 3.96  | 100.00 | 75.43 | 2.17      | 2.22  | 20.18 | 100.00 |  |
| 7.40         | 88.18 | 0.16  | 4.25  | 100.00 | 5.69  | 80.37     | 0.10  | 13.84 | 100.00 |  |
| 16.82        | 2.00  | 69.41 | 11.76 | 100.00 | 2.51  | 0.97      | 82.98 | 13.54 | 100.00 |  |
| 2.80         | 0.93  | 0.46  | 95.82 | 100.00 | 1.07  | 0.59      | 0.13  | 98.21 | 100.00 |  |
| 51.13        | 10.96 | 2.69  | 35.23 | 100.00 | 18.05 | 5.89      | 3.20  | 72.86 | 100.00 |  |

Table 4: Average year-to-year transitions 2004-2009 (women)

| Year $t$     |       |       |       |        |       |           |       |       |        |  |
|--------------|-------|-------|-------|--------|-------|-----------|-------|-------|--------|--|
| Year $t - 1$ |       |       |       |        |       |           |       |       |        |  |
| Age 50-57    |       |       |       |        |       | Age 58-63 |       |       |        |  |
| PE           | SE    | UI    | IA    | Total  | PE    | SE        | UI    | IA    | Total  |  |
| 95.67        | 1.21  | 1.07  | 2.05  | 100.00 | 82.80 | 1.50      | 1.10  | 14.60 | 100.00 |  |
| 5.46         | 91.84 | 0.10  | 2.60  | 100.00 | 3.55  | 89.73     | 0.09  | 6.63  | 100.00 |  |
| 21.59        | 4.26  | 57.39 | 16.76 | 100.00 | 6.61  | 1.50      | 75.08 | 16.82 | 100.00 |  |
| 3.13         | 1.27  | 1.09  | 94.52 | 100.00 | 0.95  | 0.82      | 0.29  | 97.94 | 100.00 |  |
| 63.93        | 11.36 | 2.11  | 22.60 | 100.00 | 30.78 | 10.26     | 2.96  | 56.00 | 100.00 |  |

Table 5: Estimation results baseline model (men)

| Effects relative to paid-employment          | Self-employment |       | Unemployment |       | Inactivity |       |
|--|-----------------|-------|--------------|-------|------------|-------|
|  | Coeff.          | S.E.  | Coeff.       | S.E.  | Coeff.     | S.E.  |
| <i>Personal characteristics</i>              |                 |       |              |       |            |       |
| Birth year (/10)                             | 0.08            | 0.15  | 0.26**       | 0.13  | -2.13***   | 0.09  |
| Immigrant                                    | -0.45***        | 0.17  | 0.30***      | 0.10  | -0.05      | 0.06  |
| <i>Household characteristics</i>             |                 |       |              |       |            |       |
| Partner                                      | -0.07           | 0.11  | 0.25**       | 0.11  | 0.21***    | 0.07  |
| Number of children                           | 0.06            | 0.07  | -0.01        | 0.07  | 0.11**     | 0.05  |
| Age youngest child                           | 0.00            | 0.01  | -0.03***     | 0.01  | -0.02***   | 0.01  |
| <i>Mobility</i>                              |                 |       |              |       |            |       |
| SE <sub>t-1</sub>                            | 3.61***         | 0.49  |              |       | 2.93***    | 0.45  |
| UI <sub>t-1</sub>                            | 2.68***         | 1.34  | 1.52***      | 0.54  | 2.65***    | 0.58  |
| IA <sub>t-1</sub>                            | 2.56***         | 0.57  |              |       | 5.26***    | 0.29  |
| <i>Age groups</i>                            |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Age 54-57                 | -0.16           | 0.12  | 0.01         | 0.10  | -0.31***   | 0.07  |
| SE <sub>t-1</sub> ·Age 54-57                 | -0.08           | 0.13  |              |       | -0.20      | 0.15  |
| UI <sub>t-1</sub> ·Age 54-57                 | 0.86*           | 0.47  | 1.64         | 0.18  | 0.28       | 0.21  |
| IA <sub>t-1</sub> ·Age 54-57                 | 0.46**          | 0.18  |              |       | -0.06      | 0.18  |
| PE <sub>t-1</sub> ·Age 58-63                 | -0.16           | 0.19  | 0.80***      | 0.14  | 0.64***    | 0.09  |
| SE <sub>t-1</sub> ·Age 58-63                 | -0.15           | 0.19  |              |       | -0.24      | 0.16  |
| UI <sub>t-1</sub> ·Age 58-63                 | 1.79***         | 0.54  | 3.96***      | 0.26  | 1.10***    | 0.27  |
| IA <sub>t-1</sub> ·Age 58-63                 | 0.14            | 0.21  |              |       | 0.06       | 0.11  |
| <i>Time periods</i>                          |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Year 94-98                | -0.45***        | 0.16  | -0.57***     | 0.11  | 0.54***    | 0.08  |
| SE <sub>t-1</sub> ·Year 94-98                | 0.81***         | 0.17  |              |       | 1.61***    | 0.18  |
| UI <sub>t-1</sub> ·Year 94-98                | 0.41            | 0.75  | -0.31        | 0.28  | 0.98***    | 0.30  |
| IA <sub>t-1</sub> ·Year 94-98                | 0.20            | 0.21  |              |       | 1.23***    | 0.11  |
| PE <sub>t-1</sub> ·Year 99-03                | -0.48**         | 0.24  | -1.03***     | 0.15  | 1.28***    | 0.10  |
| SE <sub>t-1</sub> ·Year 99-03                | 0.49**          | 0.24  |              |       | 1.99***    | 0.26  |
| UI <sub>t-1</sub> ·Year 99-03                | -1.23           | 1.01  | 0.29         | 0.37  | 1.79***    | 0.40  |
| IA <sub>t-1</sub> ·Year 99-03                | 0.27            | 0.31  |              |       | 1.67***    | 0.17  |
| PE <sub>t-1</sub> ·Year 04-09                | -0.36           | 0.26  | -0.98***     | 0.19  | 2.14***    | 0.14  |
| SE <sub>t-1</sub> ·Year 04-09                | 1.07***         | 0.28  |              |       | 3.32***    | 0.27  |
| UI <sub>t-1</sub> ·Year 04-09                | 0.02            | 0.90  | -0.44        | 0.36  | 2.43***    | 0.38  |
| IA <sub>t-1</sub> ·Year 04-09                | 0.79**          | 0.32  |              |       | 3.15***    | 0.19  |
| <i>Treatment</i>                             |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.35           | 0.24  | -0.44***     | 0.15  | 0.14       | 0.09  |
| UI <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.64           | 0.67  | -0.75**      | 0.31  | -0.35      | 0.33  |
| <i>Unemployment</i>                          |                 |       |              |       |            |       |
| Unemployment rate (UR)                       | 0.11**          | 0.05  | 0.08**       | 0.04  | -0.08***   | 0.02  |
| SE <sub>t-1</sub> ·UR                        | -0.10           | 0.08  |              |       | -0.05      | 0.07  |
| UI <sub>t-1</sub> ·UR                        | -0.34*          | 0.19  | 0.32***      | 0.08  | 0.01       | 0.09  |
| IA <sub>t-1</sub> ·UR                        | -0.09           | 0.09  |              |       | -0.11**    | 0.05  |
| Constant                                     | -21.89          | 28.94 | -54.96**     | 25.63 | 409.99***  | 16.87 |
| <i>Random effects</i>                        |                 |       |              |       |            |       |
| $\sigma_{se}^2$                              | 4.09***         | 0.31  |              |       |            |       |
| $\sigma_{se,ui}$                             | 0.17            | 0.18  |              |       |            |       |
| $\sigma_{se,ia}$                             | -0.83***        | 0.08  |              |       |            |       |
| $\sigma_{ui}^2$                              | 0.71***         | 0.16  |              |       |            |       |
| $\sigma_{ui,ia}$                             | -0.07           | 0.06  |              |       |            |       |
| $\sigma_{ia}^2$                              | 0.17***         | 0.03  |              |       |            |       |
| Initial conditions correction                | Yes             |       |              |       |            |       |
| Random sample                                | 65%             |       |              |       |            |       |
| Halton draws                                 | 50              |       |              |       |            |       |
| Observations                                 | 99,171          |       |              |       |            |       |
| Persons                                      | 12,447          |       |              |       |            |       |
| Log likelihood                               | -31,096.60      |       |              |       |            |       |
| Adj. R <sup>2</sup>                          | 0.51            |       |              |       |            |       |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level

Table 6: Estimation results baseline model (women)

| Effects relative to paid-employment          | Self-employment |      | Unemployment |       | Inactivity |       |
|--|-----------------|------|--------------|-------|------------|-------|
|  | Coeff.          | S.E. | Coeff.       | S.E.  | Coeff.     | S.E.  |
| <i>Personal characteristics</i>              |                 |      |              |       |            |       |
| Birth year                                   | -0.05***        | 0.02 | 0.04***      | 0.01  | -0.22***   | 0.01  |
| Immigrant                                    | -0.16           | 0.14 | 0.32***      | 0.11  | 0.09       | 0.08  |
| <i>Household characteristics</i>             |                 |      |              |       |            |       |
| Partner                                      | -0.12           | 0.13 | 0.35**       | 0.16  | 0.59***    | 0.11  |
| Number of children                           | 0.15            | 0.11 | 0.00         | 0.16  | 0.19**     | 0.08  |
| Age youngest child                           | -0.01           | 0.01 | -0.04**      | 0.02  | -0.01      | 0.01  |
| <i>Mobility</i>                              |                 |      |              |       |            |       |
| SE <sub>t-1</sub>                            | 3.56***         | 0.48 |              |       | 2.93***    | 0.56  |
| UI <sub>t-1</sub>                            | 1.01            | 1.32 | 0.42         | 0.55  | 1.15*      | 0.66  |
| IA <sub>t-1</sub>                            | 1.84***         | 0.61 |              |       | 4.49***    | 0.32  |
| <i>Age groups</i>                            |                 |      |              |       |            |       |
| PE <sub>t-1</sub> ·Age 54-57                 | -0.22*          | 0.12 | 0.10         | 0.11  | -0.39***   | 0.08  |
| SE <sub>t-1</sub> ·Age 54-57                 | -0.16           | 0.14 |              |       | -0.12      | 0.19  |
| UI <sub>t-1</sub> ·Age 54-57                 | 1.11**          | 0.45 | 1.30***      | 0.19  | 0.00       | 0.23  |
| IA <sub>t-1</sub> ·Age 54-57                 | 0.20            | 0.21 |              |       | -0.16      | 0.10  |
| PE <sub>t-1</sub> ·Age 58-63                 | -0.04           | 0.20 | 0.67***      | 0.17  | 0.38***    | 0.11  |
| SE <sub>t-1</sub> ·Age 58-63                 | 0.00            | 0.19 |              |       | 0.20       | 0.21  |
| UI <sub>t-1</sub> ·Age 58-63                 | 1.59***         | 0.61 | 3.62***      | 0.30  | 1.06***    | 0.32  |
| IA <sub>t-1</sub> ·Age 58-63                 | 0.40*           | 0.24 |              |       | 0.17       | 0.13  |
| <i>Time periods</i>                          |                 |      |              |       |            |       |
| PE <sub>t-1</sub> ·Year 94-98                | 0.54***         | 0.17 | -0.74***     | 0.12  | 0.85***    | 0.10  |
| SE <sub>t-1</sub> ·Year 94-98                | 1.19***         | 0.21 |              |       | 1.06***    | 0.27  |
| UI <sub>t-1</sub> ·Year 94-98                | 0.52            | 0.75 | -0.11        | 0.27  | 1.84***    | 0.36  |
| IA <sub>t-1</sub> ·Year 94-98                | 0.55**          | 0.26 |              |       | 1.42***    | 0.13  |
| PE <sub>t-1</sub> ·Year 99-03                | -0.28           | 0.23 | -1.57***     | 0.15  | 1.35***    | 0.13  |
| SE <sub>t-1</sub> ·Year 99-03                | 0.48*           | 0.27 |              |       | 1.27***    | 0.35  |
| UI <sub>t-1</sub> ·Year 99-03                | 0.25            | 0.94 | 0.44         | 0.37  | 2.28***    | 0.46  |
| IA <sub>t-1</sub> ·Year 99-03                | -0.04           | 0.36 |              |       | 1.76***    | 0.19  |
| PE <sub>t-1</sub> ·Year 04-09                | -0.03           | 0.28 | -1.68***     | 0.19  | 2.08***    | 0.17  |
| SE <sub>t-1</sub> ·Year 04-09                | 1.32***         | 0.31 |              |       | 2.53***    | 0.35  |
| UI <sub>t-1</sub> ·Year 04-09                | 1.01            | 0.90 | 0.26         | 0.38  | 3.89***    | 0.45  |
| IA <sub>t-1</sub> ·Year 04-09                | 0.63*           | 0.37 |              |       | 3.00***    | 0.21  |
| <i>Treatment</i>                             |                 |      |              |       |            |       |
| PE <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.02           | 0.21 | -0.22        | 0.19  | 0.24**     | 0.10  |
| UI <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.88           | 0.74 | -0.90***     | 0.35  | -0.90**    | 0.40  |
| <i>Unemployment</i>                          |                 |      |              |       |            |       |
| Unemployment rate (UR)                       | -0.09*          | 0.05 | 0.04         | 0.04  | -0.15***   | 0.03  |
| SE <sub>t-1</sub> ·UR                        | -0.06           | 0.07 |              |       | -0.20**    | 0.09  |
| UI <sub>t-1</sub> ·UR                        | -0.07           | 0.20 | 0.47***      | 0.09  | 0.11       | 0.10  |
| IA <sub>t-1</sub> ·UR                        | 0.00            | 0.09 |              |       | 0.01       | 0.05  |
| Constant                                     | 100.48***       | 0.32 | -80.80***    | 27.06 | 417.90***  | 21.06 |
| <i>Random effects</i>                        |                 |      |              |       |            |       |
| $\sigma_{se}^2$                              | 2.95***         | 0.25 |              |       |            |       |
| $\sigma_{se,ui}$                             | 0.35*           | 0.20 |              |       |            |       |
| $\sigma_{se,ia}$                             | -0.01           | 0.19 |              |       |            |       |
| $\sigma_{ui}^2$                              | 0.98***         | 0.19 |              |       |            |       |
| $\sigma_{ui,ia}$                             | -0.11           | 0.14 |              |       |            |       |
| $\sigma_{ia}^2$                              | 1.20***         | 0.12 |              |       |            |       |
| Initial conditions correction                | Yes             |      |              |       |            |       |
| Random sample                                | 100%            |      |              |       |            |       |
| Halton draws                                 | 50              |      |              |       |            |       |
| Observations                                 | 97,395          |      |              |       |            |       |
| Persons                                      | 13,906          |      |              |       |            |       |
| Log likelihood                               | -26,157.23      |      |              |       |            |       |
| Adj. R <sup>2</sup>                          | 0.52            |      |              |       |            |       |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level

Table 7: Estimation results baseline model without random effects (men)

| Effects relative to paid-employment          | Self-employment |       | Unemployment |       | Inactivity |       |
|--|-----------------|-------|--------------|-------|------------|-------|
|  | Coeff.          | S.E.  | Coeff.       | S.E.  | Coeff.     | S.E.  |
| <i>Personal characteristics</i>              |                 |       |              |       |            |       |
| Birth year                                   | -0.03***        | 0.01  | 0.02*        | 0.01  | -0.19***   | 0.01  |
| Immigrant                                    | -0.42***        | 0.10  | 0.25***      | 0.09  | -0.05      | 0.06  |
| <i>Household characteristics</i>             |                 |       |              |       |            |       |
| Partner                                      | 0.01            | 0.08  | 0.26*        | 0.10  | 0.20***    | 0.06  |
| Number of children                           | 0.09            | 0.06  | -0.01        | 0.07  | 0.11**     | 0.04  |
| Age youngest child                           | 0.00            | 0.01  | -0.02***     | 0.01  | -0.02***   | 0.01  |
| <i>Mobility</i>                              |                 |       |              |       |            |       |
| SE <sub>t-1</sub>                            | 4.37***         | 0.46  |              |       | 2.75***    | 0.44  |
| UI <sub>t-1</sub>                            | 2.32**          | 1.15  | 1.77***      | 0.52  | 2.59***    | 0.57  |
| IA <sub>t-1</sub>                            | 2.88***         | 0.51  |              |       | 5.29***    | 0.29  |
| <i>Age groups</i>                            |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Age 54-57                 | -0.42***        | 0.11  | -0.03        | 0.09  | -0.26***   | 0.07  |
| SE <sub>t-1</sub> ·Age 54-57                 | 0.32***         | 0.12  |              |       | -0.29**    | 0.15  |
| UI <sub>t-1</sub> ·Age 54-57                 | 0.28            | 0.40  | 1.70***      | 0.17  | 0.35*      | 0.20  |
| IA <sub>t-1</sub> ·Age 54-57                 | 0.26            | 0.16  |              |       | 0.01       | 0.10  |
| PE <sub>t-1</sub> ·Age 58-63                 | -0.40**         | 0.17  | 0.70***      | 0.14  | 0.72***    | 0.09  |
| SE <sub>t-1</sub> ·Age 58-63                 | 0.42***         | 0.16  |              |       | -0.40**    | 0.16  |
| UI <sub>t-1</sub> ·Age 58-63                 | 1.07**          | 0.49  | 3.91***      | 0.26  | 1.18***    | 0.26  |
| IA <sub>t-1</sub> ·Age 58-63                 | 0.19            | 0.19  |              |       | 0.15       | 0.12  |
| <i>Time periods</i>                          |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Year 94-98                | -0.38***        | 0.14  | -0.58***     | 0.10  | 0.43***    | 0.07  |
| SE <sub>t-1</sub> ·Year 94-98                | 1.18***         | 0.16  |              |       | 1.35***    | 0.18  |
| UI <sub>t-1</sub> ·Year 94-98                | 0.73            | 0.68  | -0.10        | 0.26  | 0.83***    | 0.29  |
| IA <sub>t-1</sub> ·Year 94-98                | 0.28            | 0.18  |              |       | 1.15***    | 0.11  |
| PE <sub>t-1</sub> ·Year 99-03                | -0.06           | 0.21  | -1.02***     | 0.14  | 1.14***    | 0.10  |
| SE <sub>t-1</sub> ·Year 99-03                | 1.05***         | 0.22  |              |       | 1.70***    | 0.26  |
| UI <sub>t-1</sub> ·Year 99-03                | -0.45           | 0.91  | 0.51         | 0.35  | 1.60***    | 0.39  |
| IA <sub>t-1</sub> ·Year 99-03                | 0.44            | 0.27  |              |       | 1.53***    | 0.17  |
| PE <sub>t-1</sub> ·Year 04-09                | 0.19            | 0.24  | -0.93***     | 0.18  | 1.89***    | 0.14  |
| SE <sub>t-1</sub> ·Year 04-09                | 1.85***         | 0.26  |              |       | 2.94***    | 0.26  |
| UI <sub>t-1</sub> ·Year 04-09                | 0.75            | 0.80  | -0.10        | 0.34  | 2.04***    | 0.36  |
| IA <sub>t-1</sub> ·Year 04-09                | 1.01***         | 0.29  |              |       | 2.92***    | 0.18  |
| <i>Treatment</i>                             |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.31           | 0.21  | -0.44***     | 0.15  | 0.14*      | 0.09  |
| UI <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.46           | 0.61  | -0.77***     | 0.30  | -0.35      | 0.33  |
| <i>Unemployment</i>                          |                 |       |              |       |            |       |
| Unemployment rate (UR)                       | 0.12**          | 0.05  | 0.07*        | 0.04  | -0.07***   | 0.02  |
| SE <sub>t-1</sub> ·UR                        | -0.11           | 0.07  |              |       | -0.03      | 0.07  |
| UI <sub>t-1</sub> ·UR                        | -0.24           | 0.16  | 0.28***      | 0.08  | 0.02       | 0.08  |
| IA <sub>t-1</sub> ·UR                        | -0.14*          | 0.08  |              |       | -0.11**    | 0.05  |
| Constant                                     | 62.79**         | 25.45 | -46.67*      | 24.67 | 373.40***  | 16.00 |
| Initial conditions correction                | Yes             |       |              |       |            |       |
| Random sample                                | 65%             |       |              |       |            |       |
| Halton draws                                 | n.a.            |       |              |       |            |       |
| Observations                                 | 99,171          |       |              |       |            |       |
| Persons                                      | 12,447          |       |              |       |            |       |
| Log likelihood                               | -31,646.44      |       |              |       |            |       |
| Adj. R <sup>2</sup>                          | 0.71            |       |              |       |            |       |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level

Table 8: Estimation results baseline model without random effects (women)

| Effects relative to paid-employment          | Self-employment |       | Unemployment |       | Inactivity |       |
|--|-----------------|-------|--------------|-------|------------|-------|
|  | Coeff.          | S.E.  | Coeff.       | S.E.  | Coeff.     | S.E.  |
| <i>Personal characteristics</i>              |                 |       |              |       |            |       |
| Birth year                                   | -0.05***        | 0.01  | 0.03***      | 0.01  | -0.16***   | 0.01  |
| Immigrant                                    | -0.24**         | 0.10  | 0.26***      | 0.10  | 0.04       | 0.06  |
| <i>Household characteristics</i>             |                 |       |              |       |            |       |
| Partner                                      | -0.07           | 0.10  | 0.35**       | 0.14  | 0.49***    | 0.09  |
| Number of children                           | 0.13            | 0.09  | 0.02         | 0.14  | 0.17**     | 0.07  |
| Age youngest child                           | -0.02*          | 0.01  | -0.04**      | 0.02  | -0.02**    | 0.01  |
| <i>Mobility</i>                              |                 |       |              |       |            |       |
| SE <sub>t-1</sub>                            | 4.05***         | 0.43  |              |       | 2.77***    | 0.51  |
| UI <sub>t-1</sub>                            | 1.04            | 1.22  | 0.81         | 0.51  | 1.46**     | 0.60  |
| IA <sub>t-1</sub>                            | 1.79***         | 0.56  |              |       | 4.55***    | 0.30  |
| <i>Age groups</i>                            |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Age 54-57                 | -0.39***        | 0.11  | 0.03         | 0.10  | -0.41***   | 0.07  |
| SE <sub>t-1</sub> ·Age 54-57                 | 0.33***         | 0.12  |              |       | -0.08      | 0.17  |
| UI <sub>t-1</sub> ·Age 54-57                 | 0.94**          | 0.39  | 1.50***      | 0.17  | -0.21      | 0.20  |
| IA <sub>t-1</sub> ·Age 54-57                 | 0.14            | 0.19  |              |       | 0.10       | 0.09  |
| PE <sub>t-1</sub> ·Age 58-63                 | -0.24           | 0.17  | 0.51***      | 0.16  | 0.28***    | 0.10  |
| SE <sub>t-1</sub> ·Age 58-63                 | 0.62***         | 0.17  |              |       | 0.17       | 0.18  |
| UI <sub>t-1</sub> ·Age 58-63                 | 1.31**          | 0.56  | 3.59***      | 0.28  | 0.70**     | 0.30  |
| IA <sub>t-1</sub> ·Age 58-63                 | 0.39*           | 0.21  |              |       | 0.34***    | 0.12  |
| <i>Time periods</i>                          |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Year 94-98                | 0.31**          | 0.15  | -0.75***     | 0.12  | 0.47***    | 0.09  |
| SE <sub>t-1</sub> ·Year 94-98                | 1.17***         | 0.18  |              |       | 0.68***    | 0.24  |
| UI <sub>t-1</sub> ·Year 94-98                | 0.52            | 0.70  | 0.01         | 0.24  | 1.14***    | 0.31  |
| IA <sub>t-1</sub> ·Year 94-98                | 0.46*           | 0.24  |              |       | 1.14***    | 0.12  |
| PE <sub>t-1</sub> ·Year 99-03                | -0.25           | 0.21  | -1.53***     | 0.15  | 0.87***    | 0.12  |
| SE <sub>t-1</sub> ·Year 99-03                | 0.66***         | 0.23  |              |       | 0.82***    | 0.32  |
| UI <sub>t-1</sub> ·Year 99-03                | 0.18            | 0.88  | 0.60*        | 0.33  | 1.54***    | 0.42  |
| IA <sub>t-1</sub> ·Year 99-03                | 0.18            | 0.33  |              |       | 1.41***    | 0.17  |
| PE <sub>t-1</sub> ·Year 04-09                | -0.01           | 0.24  | -1.62***     | 0.18  | 1.33***    | 0.15  |
| SE <sub>t-1</sub> ·Year 04-09                | 1.49***         | 0.27  |              |       | 1.80***    | 0.32  |
| UI <sub>t-1</sub> ·Year 04-09                | 1.05            | 0.83  | 0.45         | 0.34  | 2.72***    | 0.40  |
| IA <sub>t-1</sub> ·Year 04-09                | 0.72**          | 0.34  |              |       | 2.39***    | 0.19  |
| <i>Treatment</i>                             |                 |       |              |       |            |       |
| PE <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.07           | 0.18  | -0.19        | 0.18  | 0.21**     | 0.09  |
| UI <sub>t-1</sub> ·Treatment <sub>0409</sub> | -0.98           | 0.69  | -0.83***     | 0.32  | -0.70*     | 0.37  |
| <i>Unemployment</i>                          |                 |       |              |       |            |       |
| Unemployment rate (UR)                       | -0.04           | 0.04  | 0.03         | 0.04  | -0.10***   | 0.03  |
| SE <sub>t-1</sub> ·UR                        | -0.06           | 0.07  |              |       | -0.19**    | 0.08  |
| UI <sub>t-1</sub> ·UR                        | -0.07           | 0.18  | 0.41***      | 0.08  | 0.11       | 0.09  |
| IA <sub>t-1</sub> ·UR                        | 0.00            | 0.09  |              |       | 0.01       | 0.05  |
| Constant                                     | 83.88***        | 27.80 | -70.01***    | 25.68 | 316.42***  | 18.22 |
| Initial conditions correction                | Yes             |       |              |       |            |       |
| Random sample                                | 100%            |       |              |       |            |       |
| Halton draws                                 | n.a.            |       |              |       |            |       |
| Observations                                 | 97,395          |       |              |       |            |       |
| Persons                                      | 13,906          |       |              |       |            |       |
| Log likelihood                               | -26,600.85      |       |              |       |            |       |
| Adj. R <sup>2</sup>                          | 0.76            |       |              |       |            |       |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level

Table 9: Estimation results with financial variables (men)

| Effects relative to paid-employment           | Self-employment |      | Unemployment |      | Inactivity |      |
|---|-----------------|------|--------------|------|------------|------|
|   | Coeff.          | S.E. | Coeff.       | S.E. | Coeff.     | S.E. |
| <i>Treatment</i>                              |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.14           | 0.26 | -0.44***     | 0.17 | 0.11       | 0.10 |
| UI <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.36           | 0.71 | -0.42        | 0.35 | -0.02      | 0.38 |
| <i>Financialvariables</i>                     |                 |      |              |      |            |      |
| Partner with labor income                     | -0.52***        | 0.08 | -0.31***     | 0.07 | -0.21***   | 0.04 |
| Homeowner <sub>t=0</sub>                      | -0.05           | 0.10 | -0.37***     | 0.08 | -0.09**    | 0.04 |
| Mortgage <sub>t=0</sub> /10 <sup>6</sup>      | 0.99**          | 0.46 | -0.37        | 0.46 | -0.37      | 0.25 |
| Liquid wealth <sub>t=0</sub> /10 <sup>4</sup> | 0.11***         | 0.03 | -0.04        | 0.06 | 0.01       | 0.02 |
| Fixed wealth <sub>t=0</sub> /10 <sup>4</sup>  | 0.21**          | 0.09 | 0.00         | 0.11 | 0.02       | 0.05 |
| Risky assets <sub>t=0</sub> /10 <sup>3</sup>  | 0.48            | 0.42 | 0.09         | 0.48 | -0.39*     | 0.23 |
| Including variables baseline                  | Yes             |      |              |      |            |      |
| Random effects                                | Yes             |      |              |      |            |      |
| Initial conditions correction                 | Yes             |      |              |      |            |      |
| Random sample                                 | 55%             |      |              |      |            |      |
| Halton draws                                  | 50              |      |              |      |            |      |
| Observations                                  | 83,803          |      |              |      |            |      |
| Persons                                       | 10,522          |      |              |      |            |      |
| Log likelihood                                | -26,205.52      |      |              |      |            |      |
| Adj. R <sup>2</sup>                           | 0.51            |      |              |      |            |      |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level  
*Liquidwealth*<sub>t=0</sub> is the income the household of a person received from interest, dividend, stocks, bonds minus interest payments from other debt than mortgages in the initial period observed. *Fixedwealth*<sub>t=0</sub> is the income the household a person received from housing and other property minus the interest payments from mortgages in the initial period observed. *Riskyassets*<sub>t=0</sub> is defined as the percentage of household income from risky assets in the income received from the total of wealth of the household in the initial period.

Table 10: Estimation results with financial variables (women)

| Effects relative to paid-employment           | Self-employment |      | Unemployment |      | Inactivity |      |
|---|-----------------|------|--------------|------|------------|------|
|   | Coeff.          | S.E. | Coeff.       | S.E. | Coeff.     | S.E. |
| <i>Treatment</i>                              |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.06           | 0.22 | -0.35*       | 0.20 | 0.22**     | 0.11 |
| UI <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.69           | 0.78 | -0.89**      | 0.36 | -0.87**    | 0.42 |
| <i>Financialvariables</i>                     |                 |      |              |      |            |      |
| Partner with labor income                     | -0.32***        | 0.07 | -0.33***     | 0.08 | -0.67***   | 0.05 |
| Homeowner <sub>t=0</sub>                      | 0.07            | 0.15 | -0.16        | 0.16 | -0.02      | 0.07 |
| Mortgage <sub>t=0</sub> /10 <sup>5</sup>      | -0.09           | 0.08 | -0.17        | 0.10 | -2.11      | 7.43 |
| Liquid wealth <sub>t=0</sub> /10 <sup>5</sup> | 0.64*           | 0.36 | -0.51        | 1.06 | -0.39      | 0.26 |
| Fixed wealth <sub>t=0</sub> /10 <sup>4</sup>  | -0.41*          | 0.24 | -0.41        | 0.25 | 0.02       | 0.12 |
| Risky assets <sub>t=0</sub> /10 <sup>2</sup>  | 0.01            | 0.11 | 0.19         | 0.21 | -0.02      | 0.04 |
| Including variables baseline                  | Yes             |      |              |      |            |      |
| Random effects                                | Yes             |      |              |      |            |      |
| Initial conditions correction                 | Yes             |      |              |      |            |      |
| Random sample                                 | 90%             |      |              |      |            |      |
| Halton draws                                  | 50              |      |              |      |            |      |
| Observations                                  | 87,625          |      |              |      |            |      |
| Persons                                       | 12,512          |      |              |      |            |      |
| Log likelihood                                | -23,542.41      |      |              |      |            |      |
| Adj. R <sup>2</sup>                           | 0.53            |      |              |      |            |      |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level  
*Liquidwealth*<sub>t=0</sub> is the income the household of a person received from interest, dividend, stocks, bonds minus interest payments from other debt than mortgages in the initial period observed. *Fixedwealth*<sub>t=0</sub> is the income the household a person received from housing and other property minus the interest payments from mortgages in the initial period observed. *Riskyassets*<sub>t=0</sub> is defined as the percentage of household income from risky assets in the income received from the total of wealth of the household in the initial period.

Table 11: Estimation results with extra mobility variable (men)

| Effects relative to paid-employment           | Self-employment |      | Unemployment |      | Inactivity |      |
|---|-----------------|------|--------------|------|------------|------|
|   | Coeff.          | S.E. | Coeff.       | S.E. | Coeff.     | S.E. |
| <i>Treatment</i>                              |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.34           | 0.24 | -0.28*       | 0.16 | 0.18**     | 0.09 |
| UI <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.57           | 0.66 | -0.58*       | 0.31 | -0.25      | 0.33 |
| <i>Mobility</i>                               |                 |      |              |      |            |      |
| SE <sub>t-1</sub>                             | 3.62***         | 0.49 |              |      | 2.96***    | 0.45 |
| UI <sub>t-1</sub>                             | 2.39*           | 1.33 | -0.44        | 0.55 | 2.12***    | 0.58 |
| IA <sub>t-1</sub>                             | 2.56***         | 0.57 |              |      | 5.28***    | 0.30 |
| LI & UIB <sub>t-1</sub>                       | 0.29*           | 0.15 | 3.07***      | 0.07 | 0.69***    | 0.06 |
| <i>Age groups</i>                             |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Age 54-57                 | -0.18           | 0.12 | 0.03         | 0.10 | -0.34***   | 0.07 |
| SE <sub>t-1</sub> · Age 54-57                 | -0.09           | 0.13 |              |      | -0.22      | 0.15 |
| UI <sub>t-1</sub> · Age 54-57                 | 0.84*           | 0.48 | 1.51***      | 0.19 | 0.24       | 0.21 |
| IA <sub>t-1</sub> · Age 54-57                 | 0.43**          | 0.18 |              |      | -0.11      | 0.10 |
| PE <sub>t-1</sub> · Age 58-63                 | -0.20           | 0.19 | 0.75***      | 0.15 | 0.59***    | 0.09 |
| SE <sub>t-1</sub> · Age 58-63                 | -0.17           | 0.17 |              |      | -0.29*     | 0.16 |
| UI <sub>t-1</sub> · Age 58-63                 | 1.71***         | 0.55 | 4.04***      | 0.27 | 1.11***    | 0.27 |
| IA <sub>t-1</sub> · Age 58-63                 | 0.09            | 0.22 |              |      | -0.01      | 0.12 |
| <i>Time periods</i>                           |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Year 94-98                | -0.44***        | 0.16 | -0.85***     | 0.11 | 0.57***    | 0.08 |
| SE <sub>t-1</sub> · Year 94-98                | 0.84***         | 0.17 |              |      | 1.66***    | 0.18 |
| UI <sub>t-1</sub> · Year 94-98                | 0.44            | 0.75 | -0.39        | 0.28 | 1.05***    | 0.30 |
| IA <sub>t-1</sub> · Year 94-98                | 0.21            | 0.21 |              |      | 1.25***    | 0.11 |
| PE <sub>t-1</sub> · Year 99-03                | -0.47**         | 0.24 | -1.34***     | 0.15 | 1.31***    | 0.10 |
| SE <sub>t-1</sub> · Year 99-03                | 0.52**          | 0.24 |              |      | 2.04***    | 0.27 |
| UI <sub>t-1</sub> · Year 99-03                | -1.06           | 1.02 | 1.46***      | 0.38 | 2.31***    | 0.41 |
| IA <sub>t-1</sub> · Year 99-03                | 0.29            | 0.31 |              |      | 1.70***    | 0.17 |
| PE <sub>t-1</sub> · Year 04-09                | -0.34           | 0.26 | -1.43***     | 0.19 | 2.18***    | 0.15 |
| SE <sub>t-1</sub> · Year 04-09                | 1.12***         | 0.28 |              |      | 3.42***    | 0.27 |
| UI <sub>t-1</sub> · Year 04-09                | 0.26            | 0.91 | 1.40***      | 0.37 | 2.83***    | 0.38 |
| IA <sub>t-1</sub> · Year 04-09                | 0.82**          | 0.33 |              |      | 3.22***    | 0.19 |
| <i>Unemployment</i>                           |                 |      |              |      |            |      |
| Unemployment rate (UR)                        | 0.11**          | 0.05 | 0.12***      | 0.04 | -0.09***   | 0.02 |
| SE <sub>t-1</sub> · UR                        | -0.10           | 0.08 |              |      | -0.05      | 0.07 |
| UI <sub>t-1</sub> · UR                        | -0.34*          | 0.19 | 0.24***      | 0.08 | -0.01      | 0.09 |
| IA <sub>t-1</sub> · UR                        | -0.09           | 0.09 |              |      | -0.11**    | 0.05 |
| Including variables baseline                  | Yes             |      |              |      |            |      |
| Random effects                                | Yes             |      |              |      |            |      |
| Initial conditions correction                 | Yes             |      |              |      |            |      |
| Random sample                                 | 100%            |      |              |      |            |      |
| Halton draws                                  | 50              |      |              |      |            |      |
| Observations                                  | 99,171          |      |              |      |            |      |
| Persons                                       | 12,447          |      |              |      |            |      |
| Log likelihood                                | -30,184.62      |      |              |      |            |      |
| Adj. R <sup>2</sup>                           | 0.52            |      |              |      |            |      |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level LI & UIB<sub>t-1</sub> equals 1 if a person received both labor income (LI) and unemployment insurance benefits (UIB) in the previous period. This corrects for the possibility that a person flowing from UI to PE to SE within a year is observed as a transition from UI to SE. The latter is a clear indication of self-employment out of necessity while the first is not.

Table 12: Estimation results with extra mobility variable (women)

| Effects relative to paid-employment           | Self-employment |      | Unemployment |      | Inactivity |      |
|---|-----------------|------|--------------|------|------------|------|
|   | Coeff.          | S.E. | Coeff.       | S.E. | Coeff.     | S.E. |
| <i>Treatment</i>                              |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.01           | 0.21 | -0.13        | 0.19 | 0.27***    | 0.10 |
| UI <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.85           | 0.74 | -1.04***     | 0.35 | -0.95**    | 0.40 |
| <i>Mobility</i>                               |                 |      |              |      |            |      |
| SE <sub>t-1</sub>                             | 3.55***         | 0.48 |              |      | 2.93***    | 0.56 |
| UI <sub>t-1</sub>                             | 1.10            | 1.32 | -1.56***     | 0.55 | 0.51       | 0.66 |
| IA <sub>t-1</sub>                             | 1.84***         | 0.61 |              |      | 4.50***    | 0.32 |
| LI & UIB <sub>t-1</sub>                       | 0.12            | 0.16 | 2.60***      | 0.08 | 0.71***    | 0.08 |
| <i>Age groups</i>                             |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Age 54-57                 | -0.24**         | 0.12 | 0.08         | 0.11 | -0.40***   | 0.08 |
| SE <sub>t-1</sub> · Age 54-57                 | -0.15           | 0.14 |              |      | -0.13      | 0.19 |
| UI <sub>t-1</sub> · Age 54-57                 | 1.07**          | 0.46 | 1.20***      | 0.19 | -0.03      | 0.23 |
| IA <sub>t-1</sub> · Age 54-57                 | 0.18            | 0.21 |              |      | -0.19*     | 0.10 |
| PE <sub>t-1</sub> · Age 58-63                 | -0.07           | 0.20 | 0.66***      | 0.17 | 0.35***    | 0.11 |
| SE <sub>t-1</sub> · Age 58-63                 | 0.00            | 0.19 |              |      | 0.19       | 0.21 |
| UI <sub>t-1</sub> · Age 58-63                 | 1.60***         | 0.62 | 3.85***      | 0.30 | 1.20***    | 0.33 |
| IA <sub>t-1</sub> · Age 58-63                 | 0.37            | 0.24 |              |      | 0.13       | 0.13 |
| <i>Time periods</i>                           |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Year 94-98                | 0.54***         | 0.17 | -0.93***     | 0.12 | 0.86***    | 0.10 |
| SE <sub>t-1</sub> · Year 94-98                | 1.19***         | 0.20 |              |      | 1.08***    | 0.27 |
| UI <sub>t-1</sub> · Year 94-98                | 0.55            | 0.75 | -0.15        | 0.27 | 1.85***    | 0.36 |
| IA <sub>t-1</sub> · Year 94-98                | 0.56**          | 0.26 |              |      | 1.44***    | 0.13 |
| PE <sub>t-1</sub> · Year 99-03                | -0.27           | 0.23 | -1.73***     | 0.15 | 1.37***    | 0.13 |
| SE <sub>t-1</sub> · Year 99-03                | 0.50*           | 0.27 |              |      | 1.31***    | 0.35 |
| UI <sub>t-1</sub> · Year 99-03                | 0.16            | 0.96 | 1.44***      | 0.37 | 2.72***    | 0.47 |
| IA <sub>t-1</sub> · Year 99-03                | -0.02           | 0.36 |              |      | 1.79***    | 0.19 |
| PE <sub>t-1</sub> · Year 04-09                | -0.02           | 0.28 | -1.88***     | 0.19 | 2.10***    | 0.17 |
| SE <sub>t-1</sub> · Year 04-09                | 1.34***         | 0.31 |              |      | 2.59***    | 0.35 |
| UI <sub>t-1</sub> · Year 04-09                | 0.98            | 0.91 | 1.94***      | 0.38 | 4.42***    | 0.46 |
| IA <sub>t-1</sub> · Year 04-09                | 0.64*           | 0.37 |              |      | 3.04***    | 0.21 |
| <i>Unemployment</i>                           |                 |      |              |      |            |      |
| Unemployment rate (UR)                        | -0.09*          | 0.05 | 0.04         | 0.04 | -0.15***   | 0.03 |
| SE <sub>t-1</sub> · UR                        | -0.06           | 0.07 |              |      | -0.20**    | 0.09 |
| UI <sub>t-1</sub> · UR                        | -0.09           | 0.19 | 0.47***      | 0.09 | 0.13       | 0.10 |
| IA <sub>t-1</sub> · UR                        | 0.00            | 0.09 |              |      | 0.01       | 0.05 |
| Including variables baseline                  | Yes             |      |              |      |            |      |
| Random effects                                | Yes             |      |              |      |            |      |
| Initial conditions correction                 | Yes             |      |              |      |            |      |
| Random sample                                 | 100%            |      |              |      |            |      |
| Halton draws                                  | 50              |      |              |      |            |      |
| Observations                                  | 97,395          |      |              |      |            |      |
| Persons                                       | 13,906          |      |              |      |            |      |
| Log likelihood                                | -25,652.57      |      |              |      |            |      |
| Adj. R <sup>2</sup>                           | 0.53            |      |              |      |            |      |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level LI & UIB<sub>t-1</sub> equals 1 if a person received both labor income (LI) and unemployment insurance benefits (UIB) in the previous period. This corrects for the possibility that a person flowing from UI to PE to SE within a year is observed as a transition from UI to SE. The latter is a clear indication of self-employment out of necessity while the first is not.

Table 13: Estimation results with health status correction (men)

| Effects relative to paid-employment           | Self-employment |      | Unemployment |      | Inactivity |      |
|---|-----------------|------|--------------|------|------------|------|
|   | Coeff.          | S.E. | Coeff.       | S.E. | Coeff.     | S.E. |
| <i>Treatment</i>                              |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.35           | 0.23 | -0.37**      | 0.16 | 0.18**     | 0.09 |
| UI <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.64           | 0.66 | -0.56*       | 0.31 | -0.17      | 0.34 |
| <i>Health status</i>                          |                 |      |              |      |            |      |
| Health <sub>t=0</sub>                         | -0.46***        | 0.13 | 0.95***      | 0.10 | 0.79***    | 0.06 |
| <i>Including variables baseline</i>           |                 |      |              |      |            |      |
| Random effects                                | Yes             |      |              |      |            |      |
| Initial conditions correction                 | Yes             |      |              |      |            |      |
| Random sample                                 | 100%            |      |              |      |            |      |
| Halton draws                                  | 50              |      |              |      |            |      |
| Observations                                  | 99,171          |      |              |      |            |      |
| Persons                                       | 12,447          |      |              |      |            |      |
| Log likelihood                                | -30,943.81      |      |              |      |            |      |
| Adj. R <sup>2</sup>                           | 0.51            |      |              |      |            |      |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level Health<sub>t=0</sub> equals 1 if a person received disability benefits in the initial period observed and 0 otherwise.

Table 14: Estimation results with health status correction (women)

| Effects relative to paid-employment           | Self-employment |      | Unemployment |      | Inactivity |      |
|---|-----------------|------|--------------|------|------------|------|
|   | Coeff.          | S.E. | Coeff.       | S.E. | Coeff.     | S.E. |
| <i>Treatment</i>                              |                 |      |              |      |            |      |
| PE <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.02           | 0.21 | -0.19        | 0.19 | 0.26***    | 0.10 |
| UI <sub>t-1</sub> · Treatment <sub>0409</sub> | -0.82           | 0.74 | -0.70**      | 0.35 | -0.70*     | 0.40 |
| <i>Health status</i>                          |                 |      |              |      |            |      |
| Health <sub>t=0</sub>                         | -0.34**         | 0.15 | 1.05***      | 0.11 | 0.96***    | 0.07 |
| Including variables baseline                  | Yes             |      |              |      |            |      |
| Random effects                                | Yes             |      |              |      |            |      |
| Initial conditions correction                 | Yes             |      |              |      |            |      |
| Random sample                                 | 100%            |      |              |      |            |      |
| Halton draws                                  | 50              |      |              |      |            |      |
| Observations                                  | 97,395          |      |              |      |            |      |
| Persons                                       | 13,906          |      |              |      |            |      |
| Log likelihood                                | -26,024.49      |      |              |      |            |      |
| Adj. R <sup>2</sup>                           | 0.53            |      |              |      |            |      |

\* Significant at the 0.10 level; \*\* at the 0.05 level; \*\*\* at the 0.01 level Health<sub>t=0</sub> equals 1 if a person received disability benefits in the initial period observed and 0 otherwise.