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ABSTRACT

The Impact of Wealth on Job Exit Rates of Elderly Workers*

In the literature theoretical models have appeared that predict a positive impact of the level of individual wealth on the job exit probability. Empirically this prediction is most likely to be relevant for elderly workers who have been able to accumulate wealth throughout their working life and whose residual working life is relatively short. In the Netherlands, as in other European countries, there is a tendency of introducing more individual choice options in pension schemes. It is likely that the individual level of wealth will become an increasingly important factor in the retirement decision. Therefore it is interesting to know whether individuals with a different financial situation make different job exit decisions, given other factors. Empirical analysis of job exit behaviour of elderly workers so far has concentrated on properties of the pension system and the health situation. For a sample of elderly male workers in the Netherlands in the period 1995 through 2001, we analyse the impact of wealth, savings, and debt position on job exit rates. We find evidence for a positive effect of wealth on the probability to retire (early).

JEL Classification: J26, D91

Keywords: retirement, life cycle models, saving

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1 Introduction

Labour market participation rates in the Netherlands typically tend to decrease once workers have passed the age of 50. Empirical analysis of the outflow of elderly workers out of the labor market has focused on the financial incentives created by social insurance and early retirement systems.[4] Structural empirical models of retirement behavior, like the model by Stock and Wise (1990), also concentrate on the properties of the retirement system on the job exit decision.

So far evidence on the impact of the private level of wealth on the decision to retire is scarce. It becomes increasingly interesting to gain insight in the empirical impact of the financial situation on the decision to exit the labour market as recent policy measures in the Netherlands aim at more individual flexibility in the choice options to retire from the labour market.

Theoretical models on savings and labor market transitions by Blundell, Magnac and Meghir (1997), and Danforth (1979) incorporate the role of wealth on the flows out of unemployment, while the first study also addresses the relation between wealth and the flow out of employment. It predicts that workers with a higher level of wealth will have a higher probability of job exit, given other factors. This result holds for any worker, and is not directed towards the retirement decision of elderly workers. The model also predicts a negative relation between the level of wealth and the transition probability from unemployment to employment, and the influence of wealth on the transitions in the different directions come from the same source: therefore evidence of a negative impact of wealth on the flow out of unemployment is indirect evidence of a positive impact of wealth on the flow out of employment, provided that the model structure holds. Woolley (2004) explicitly models the retirement decision, along with an intertemporal wealth accumulation relation, and the model also predicts that a higher level of wealth increases the probability of retirement.

Empirical evidence by Stancanelli (1999), Bloemen and Stancanelli (2001), and Bloemen (2002) shows that there is an impact of wealth on the flow from unemployment into

[4] See Kapteijn and De Vos (1998), and Lindeboom (1998) for studies for the Netherlands.

employment. However, there is little direct evidence on the impact of savings on the exit out of the labor market of elderly workers. Bloemen (2002) measures the impact of wealth on the transition from employment to nonemployment for male workers in the age range of 20 to 64 and finds a negative impact of wealth on the transition out of employment, which is opposite to the effect predicted by theory. The possible explanation for the opposite effect that is provided is that wealth may serve as a proxy for unobserved heterogeneity: someone with a high level of wealth may have favourable charactertistics that makes him more likely to stay on the job during working life. Bloemen (2002) spends much effort to incorporate unobserved heterogeneity, by allowing for random effects, initial conditions, and endogeneity of wealth, and although these efforts reduce the positive effect of wealth on the stay-on probability, it remains positive. However, studying the impact of wealth on the job exit probability is likely to be more relevant if we focus on the job exit behaviour of elderly workers. Someone aged, say, 30 still has many years to go until the age of 65, and there will be few workers of that age that have already accumulated a sufficient amount of wealth to finance the daily necessities for 35 years. Moreover, a job quit may induce the loss of pension rights. If workers with high wealth tend to have more favorable jobs with better pension arrangements, it will be unlikely that we will find a positive impact of wealth on the job exit rate.

In this paper we will estimate the empirical impact of wealth on the job exit behaviour of elderly workers. For this purpose we will use a subsample of the data from the Socio Economic Panel, collected by Statistics Netherlands. We use a sample of male workers in the age range of 48 to 64. We consider exit out of employment to various exit states. There are several factors that complicate the measurement of the impact of wealth on exit out of the labor market. Search theory emphasizes the impact of the income on the job, frictions on the labor market and the possibility of involuntary exit. Moreover, eligibility conditions for benefits in the state of inactivity may be a dominant factor in determining the job exit decision. The survey contains information on reasons for job exit and we will exploit this information in the empirical analysis. We use a multinomial choice framework in the individual may exit by different exit routes, or may stay employed. We use a reduced form regression model, as our purpose is to try and measure whether

wealth has an impact on job exit rates, without a priori imposing such a relationship. To isolate the impact of wealth from other factors, we include, among other, information on fixed term contracts, participation in employee or individual pension schemes, and the wage of the current job. We will use different measures for wealth, savings, and debt position.

In section 2 we present a simplified economic model that serves as a background to motivate our empirical specification. The model shows which factors are relevant in taking the job exit decision, and generates predictions on both the impact of wealth and the impact of the wage income on the job exit decision. In section 3 we present the data. Section 4 contains the empirical analysis. We present the empirical model, the estimation results, and elasticities of job exit probabilities with respect to wealth. Section 5 concludes.

2 Theoretical background

In this section we present a simple economic model that includes both the savings decision and the decision to retire. The purpose of this section is to make explicit which factors influence the decision to exit from employment, and serves as a guideline for the specification of our empirical model.

We consider an individual who makes choices in three subsequent periods. These three periods can be interpreted as three phases in life. In the first period the individual is employed, earns an income, accumulates pension wealth, spends income on consumption, and saves or borrows. In the second period, the individual can choose to stop or to continue working. If the individual continues working, he continues accumulating pension wealth, and continues receiving wage income. If the individual stops working he receives a benefit income, that may depend on past earnings (the wage income in period 1). Typically, the benefit income will be lower than the earnings. In the final period, there is mandatory retirement, and the individual does not work. Needless to say, the model can be further refined. For instance, in the middle period the individual may choose among different states of inactivity associated with different eligibility rules and different

benefit levels, but for the purpose of showing the mechanisms by which private wealth enters the decision we stick to the three period framework.

We assume that there exists an intratemporal utility function $U(C_\tau, d_\tau)$ defined over consumption C_τ and labour market state d_τ ($d_\tau = 1$ if employed, $d_\tau = 0$ if inactive) in periode τ. There is a constant rate of time preference ρ, and we label the three periods 0, 1, and 2. Given the above assumptions $d_0 = 1$ and $d_2 = 0$. Net wealth at the beginning of period τ is indicated by A_τ. The interest rate is constant and equal to r. Income in period τ is indicated by y_τ.

Thus, we have the following intratemporal budget constraint:

$$C_\tau = y_\tau + rA_\tau + A_\tau - A_{\tau+1}, \tau = 0, 1, 2, \text{ with } A_3 = 0 \tag{1}$$

The objective of the individual is the maximization of the intertemporal utility function

$$E \sum_{\tau=0}^{2} \left(\frac{1}{1+\rho} \right)^\tau U(C_\tau, d_\tau) \tag{2}$$

For income in period 1 we have that $y_1 = Y(d_1, y_0)$, which indicates that the income depends on the labour market state chosen and that the level of earnings in period 0 affects the level of income, for instance, because it determines the benefit level. Similary, we denote income in period 2 as $y_2 = b(y_1, d_1) = b(Y(d_1, y_0), d_1)$. Thus, the labour market state in the previous period determines the final pension benefit, as do the earnings levels in the previous periods. We make the following assumptions about the income processes:

$$\frac{\partial Y(d_1, y_0)}{\partial d_1} > 0, \frac{\partial Y(d_1, y_0)}{\partial y_0} > 0, \frac{\partial b(y_1, d_1)}{\partial y_1} > 0, \frac{\partial b(y_1, d_1)}{\partial d_1} > 0 \tag{3}$$

The first inequality in (3) says that the income of someone working in period 1 is higher than the income of someone retired in period 1, so there is a financial payoff to continue working. The second inequality says that someone with higher earnings in working life (period 0) will also have higher earnings in period 1, irrespective of the labour market state in period 1. The third and fourth inequality state that a higher income in period 1 and employment status in period 1 both imply a higher pension benefit in period 2. Together with inequality 1, this indicates that there is an additional incentive to continue working in period 1, as not only period 1 income will be higher, but also the eventual

pension benefit. Note that the loss of pension rights can be incorporated in the notation. Loss of pension rights or ineligibility to (early) retirement benefits can be denoted as $b(y_1, 0) \equiv 0$ or $Y(0, y_0) \equiv 0$.

The model outlined contains both the consumption/savings decision, and the decision to retire early. In the absence of liquidity contraints, the Euler equation for consumption holds and the model implies consumption smoothing:

$$\frac{\partial U(C_\tau, d_\tau)}{\partial C_\tau} = \frac{1+r}{1+\rho} E_\tau \frac{\partial U(C_{\tau+1}, d_{\tau+1})}{\partial C_{\tau+1}}, \tau = 0, 1, 2 \tag{4}$$

The assumptions (3) imply that income decreases on retirement so consumption can be smoothed by decumulating savings.[5]

In period 1 the decision to retire early is taken. Let $V_1(A_1, y_0; d_1)$ indicate the value function in period 1, conditional on choosing labour market state d_1, and let $C_\tau^{d_1}, \tau = 1, 2$ and $A_2^{d_1}$ denote optimal choices conditional on d_1: they satisfy the Euler equation (4). Then we write the value function as

$$V_1(A_1, y_0; d_1) = U(C_1^{d_1}, d_1) + \frac{1}{1+\rho} E_1 U(C_2^{d_1}, 0) \tag{5}$$

with

$$\begin{aligned} C_1^{d_1} &= Y(d_1, y_0) + (1+r)A_1 - A_2^{d_1} \\ C_2^{d_1} &= b(Y(d_1, y_0), d_1) + (1+r)A_2^{d_1} \end{aligned} \tag{6}$$

The decision to retire early can be characterized as

$$\begin{aligned} &\text{If } V_1(A_1, y_0; 0) - V_1(A_1, y_0; 1) > 0 : \text{ stop working} \\ &\text{If } V_1(A_1, y_0; 0) - V_1(A_1, y_0; 1) \leq 0 : \text{ continue working} \end{aligned} \tag{7}$$

To evaluate the impact of the level of wealth A_1 on the decision to retire early, we have to consider

$$\frac{\partial V_1(A_1, y_0; 0)}{\partial A_1} - \frac{\partial V_1(A_1, y_0; 1)}{\partial A_1} = \frac{\partial U(C_1^0, 0)}{\partial C_1} - \frac{\partial U(C_1^1, 1)}{\partial C_1} \tag{8}$$

Although the presentation of the model in this section is somewhat different, the result by Blundell, Magnac, and Meghir (1997) can be applied to (8): if the value function in

[5] In the empirical literature on consumption upon retirement evidence shows that upon retirement the retired do not always smooth consumption (see, for instance, Hamermesh (1984) and Alessie, Lusardi, and Kapteijn (1999)).

(5) is concave in A_1 and if[6]

$$\frac{\partial^2 U(C_\tau, d_\tau)}{\partial C_\tau \partial d_\tau} < 0 \tag{9}$$

then expression (8) is positive, indicating that the option to leave the job becomes more attractive relative to the option to stay on the job the higher is the level of wealth A_1. Thus, the probability to exit the job will be higher, the higher is the level of wealth. This result (i.e. the *qualitative* result that the impact of wealth on job exit is positive) does not depend on the shape of the income relations $Y(d_1, y_0)$ and $b(y_1, d_1)$, except for the fact that replacement rates are assumed to be smaller than 1: income is smaller in the state of inactivity. This is because the level of wealth does not influence the level of benefits in the state on inactivity. However, the *quantitative* impact of wealth on the job exit will be effected by the shape of $Y(d_1, y_0)$ and $b(y_1, d_1)$. For instance, the higher are replacement rates, the closer will be C_1^0 and C_1^1 in (8) and the impact of wealth on the job exit decision may become smaller.

Thus, under some regularity conditions, the model implies that the decision to exit the job will be positively influenced by the level of wealth, given everything else. Some comments are in order. The model formulated so far concentrates on job exit as a decision by the worker: wealth enters the job exit rate because it affects the choice of the worker. However, workers not always exit jobs by choice. Demand side factors may force them to leave the job. It is straightforward to extend the model with an exogenous layoff rate, in which case the job exit rate consists of the layoff rate and the choice probability to exit the job. This weakens the relation between the job exit rate and the level of wealth, but the theory does still predict a positive relationship. For an empirical analysis it is desirable to be able to observe the distinction between a forced job exit and a job exit by choice. On the other hand, in the discussion about job exit routes for elderly workers in the Netherlands, the unemployment benefit system and the disability insurance system are often mentioned as financially attractive exit routes for workers who are not (yet) eligible for a pension. Workers need to satisfy the eligibility rules of these systems, but a choice element by the worker may not be entirely absent.

[6] Note that (9) implies that the marginal utility of consumption at a given consumption level is higher if the individual has full leisure compared to the situation in which the individual is working.

Another factor that complicates the empirical measurement of the level of wealth on job exit are the eligibility rules and incentives of the early retirement system. Kapteijn and De Vos (1998) show that the early retirement system provides strong incentives to exit the labour force as soon as the early retirement age has been reached. If the rules of the early retirement system dominate the choice to retire early, the role of other factors may be limited.

Due to these considerations, we do not limit our analysis to one specific exit route. We will analyse the impact of wealth on the job exit rates of employed males in the entire age range of 48 through 64, and we allow for any reason of job exit (except death, in which case sample attrition occurs). The data allow us to make a rough distinction between various reasons of job exit and we will exploit this distinction in our empirical analysis.

The model outlined so far also enables us to analyse the effect of labour income y_0, that enters the value function (5), on the decision to exit from work. Without a life cycle model framework, it is tempting to say that a higher labour income y_0 makes it more attractive to stay on the job.[7] However, a higher labour income increases the entire life cycle budget, and, under an assumption like (9), a higher life cycle budget will make it more attractive to consume full leisure and to stop working. But the assumed impact (3) of the labour income and the labour market state on the early retirement benefits $Y(d_1, y_0)$ and the pension benefits $b(y_1, d_1)$ determine the negative incentives to stop working of a higher labour income during working life. To be more specific we evaluate the impact of labour income y_0 on the job exit decision, determined by $V_1(A_1, y_0; 0) - V_1(A_1, y_0; 1)$:

$$\frac{\partial V_1(A_1, y_0; 0)}{\partial y_0} - \frac{\partial V_1(A_1, y_0; 1)}{\partial y_0} = \frac{\partial U(C_1^0, 0)}{\partial C_1}\frac{\partial Y(0, y_0)}{\partial y_0} - \frac{\partial U(C_1^1, 1)}{\partial C_1}\frac{\partial Y(1, y_0)}{\partial y_0} +$$

$$+\frac{1}{1+\rho}E_1\left[\frac{\partial U(C_2^0, 0)}{\partial C_2}\frac{\partial b(Y(0, y_0), 0)}{\partial y_0} - \frac{\partial U(C_2^1, 0)}{\partial C_2}\frac{\partial b(Y(1, y_0), 1)}{\partial y_0}\right] \qquad (10)$$

[7] For instance, in job search models with on-the-job search, the reservation wage of the present job is determined by the current wage and consequently it is less likely that someone decides to exit from that job the higher is the wage.

Making use of the Euler equation (4), together with the assumption that the retirement benefit (system) is completely known in period 1, we can rewrite (10) as

$$\frac{\partial V_1(A_1, y_0; 0)}{\partial y_0} - \frac{\partial V_1(A_1, y_0; 1)}{\partial y_0} = \frac{\partial U(C_1^0, 0)}{\partial C_1} \left[\frac{\partial Y(0, y_0)}{\partial y_0} + \frac{1}{1+r} \frac{\partial b(Y(0, y_0), 0)}{\partial y_0} \right]$$

$$- \frac{\partial U(C_1^1, 1)}{\partial C_1} \left[\frac{\partial Y(1, y_0)}{\partial y_0} + \frac{1}{1+r} \frac{\partial b(Y(1, y_0), 1)}{\partial y_0} \right] \tag{11}$$

The impact (11) of the wage on the job exit decision has something in common with the impact (8) of wealth on the job exit decision: it contains the difference in the marginal utility of consumption in period 1 in the two labour market states. But the impact (11) of the wage adds some factors to this difference. We know that under the given assumptions (8) is positive. The questions is: (how) do the factors added in (11) change the sign? First, we know that if the replacement ratio of the early retirement system is smaller than 1, we have

$$\frac{\partial Y(0, y_0)}{\partial y_0} < \frac{\partial Y(1, y_0)}{\partial y_0} \tag{12}$$

and if early retirement decreases the pension benefit in period 2 due to, say smaller premium payments in period 1, we have

$$\frac{\partial b(Y(0, y_0), 0)}{\partial y_0} < \frac{\partial b(Y(1, y_0), 1)}{\partial y_0} \tag{13}$$

Thus, (12) and (13) imply that (11) is smaller than (8), and may even become negative if replacement rates are small enough. Summarizing, we can say that there are two opposing effects of the wage on the job exit decision. The first effect is the life cycle income effect. This effect is comparable to the effect of wealth on the job exit decision (8) and implies a positive influence of the wage income y_0 on the probability of job exit. There is a second, opposing, influence on the job exit probability that will make the total effect smaller or even negative, depending on the size of the replacement rates of early retirement and on the influence of the early retirement decision on final pension benefits: the smaller are the replacement rates, the smaller will become the impact of the wage income on the job exit rate. If the early retirement decision has no consequences on pension benefits in period 2 and/or if the replacement rate of the early retirement

system is large, which is typically the case in the Netherlands, the opposing negative effect will be small and a positive effect of the wage on the decision to retire early may prevail.

3 The data

We use data from the Dutch Socio-Economic Panel for the years 1995 through 2002. This panel survey was initiated in 1984, but through the years there have been minor and major changes in the setup. The first six years, 1984-1989, questionnaires were held among the respondents twice a year, in april and october, while income data was collected in the october wave. The year 1987 was the first year in which data on assets and debts were collected. In 1990 the setup was changed and data were collected each year in May. Also the collection of income data changed considerably. So far income had been collected in terms of net income earned in the month of the survey, but from 1990 on the survey in May collects income on the previous fiscal (calendar) year, and the information collected sticks more closely to the information that individuals need to fill out on the tax form each year, and information on earnings is expressed in gross earnings per year, with separate information on taxes paid. In the early nineties there were no major changes anymore, but the formulation of survey questions was not entirely stable from wave to wave. We chose to use data from the periods 1995 through 2002 as questions on participation in pension schemes and reasons for job exit were available and stable through these years. The year 2002 is the final year in which the survey was held. No more information is collected for subsequent years: the survey has stopped now.

To construct our data, we selected male individuals appearing in any of the survey waves in 1995 through 2001 in the age range of 48 through 64 who report to be employed. Then we use the subsequent wave to check the labour market state of the same individuals in the next year. An important condition is that information on the same individual is present in the next wave. Individuals that are subject to attrition of any kind are dropped from the data. This requires the assumption that unobserved factors in the attrition process are uncorrelated with unobservables in the determination of the labour

market state. Thus, we can determine whether an individual exits from the job from one year to another. We do not consider whether a job exit is definite. We add information on the individuals' background characteristics from the first wave of each pair of waves, except for income. For instance, if we select an employed individual in the age range 48-64 in the year 1995, we use the wave in 1996 to check whether a job exit took place, and use information on assets, debts, marital status, pension scheme participation, etc, from the May 1995 wave. However, since income refers to the previous fiscal year, we use income information collected from the May 1996 wave, which refers to the calendar year (January-December) 1995. Since the survey in May 1996 collects information on the wage income earned in 2005 and also on the number of months worked in that year, we can determine the monthly wage income of each individual in the year 1995, which is assigned to the monthly wage income earned in May 1995. This example is for the years 1995-1996 but the same holds for any other pairs 1996-1997 through 2001-2002. Self-employed individuals are not included: the survey does not apply all questions on assets and debts to the self-employed. In the waves of 1996 through 2001, information on income in the previous fiscal year is expressed in guilders. In the year 2002, the information on income has been collected in euro. We have converted this information in euro to guilders by multiplying the amount by 2.20371 which is the euro to guilder exchange rate.

Pooling the (pairs of) waves with information on job exits results in 3732 observations. Because of the panel nature of the survey, individuals who have not yet exited from the job and are still participating in the survey, may appear in more waves. Thus, the 3732 observations are on 1133 different individuals.

We will discuss the variables that we include in our sample by looking at tables 1 and 2 that contain sample descriptives on continuous and count variables, and indicators, respectively. In table 1 we see that the average age (measured in years) is 52.6. Since we selected individuals in the age range of 48 through 64, this indicates that there are relatively more 'younger-elderly' in our sample. This is related to higher job exit rates from a certain age on (see later).

The decision to retire may be influenced by the presence of children in the household.

We see that on average there is less than 1 child (0.88) in the household. In table 2 we see that in 47.0 per cent of the households no child is present (anymore).

There is some information on participation in pension schemes in the survey. The information on properties of the pension scheme, though, is very limited. Before we discuss this information, we want to stress that it is not the purpose of this paper to analyse the impact of the properties of the pension system on job exit: we want to measure the impact of wealth, assets, and debt position on job exit. But participation in a pension scheme could be a reason for postponing job exit, even if the individual has a high wealth level, and, moreover, people with a high wealth level also may have a favourable pension arrangement. So the reason to include this information on pension schemes is, in the first place, to isolate the impact of wealth on job exit.

In the survey, each individual is asked whether he participates in an employee pension scheme. Table 2 shows that this is the case for 89.7 per cent of the respondents, whereas 1.8 per cent does not know the answer to this question. Usually, the pension premium is withheld automatically from the salary, and the worker does not have to undertake any action to pay the pension premiums. However, 4.1 per cent of the individuals claims to pay a pension premium directly. For these individuals, information is collected on the premium they pay: on average, they pay 253 guilders. In 73.8 per cent of the cases the employer contributes to the payment of the premium, according to the survey respondents.

Some individuals participate in an individual pension scheme, initiated by themselves. The motives for participating in an individual pension scheme can be quite diverse and are not recorded in the survey. We can imagine that poor employee pension schemes or many job changes in the past may add to the participation in individual pension schemes, but an alternative motive may come from high income people who have more financial means to invest in individual pension schemes. In any case, someone participating in an individual pension scheme has a certain awareness of his financial situation after retirement, and including information on participation in individual pension schemes in the job exit rate may proxy this awareness as well as the 'true' impact of the pension scheme itself. We see that 15.6 per cent of the respondents participates in an individual

pension scheme. The sample average of the monthly contribution is 413 guilders.

We have included some other properties of the job. We see that 31.9 per cent of the respondents characterize themselves as a civil servant. Early retirement schemes of civil servants are known to be more generous and wide spread than for workers in the private sector. At this age, most workers (96.0 per cent) have a 'permanent' job.

The survey of the Socio-Economic Panel contains information about various asset and debt categories. Table 1 shows aggregates of these asset and debt categories. Total liquid wealth is obtained by aggregating the amount on the current accounts and savings accounts, bonds, stocks, money lent, value of jewelry, antiques, and cars. The mean value of total liquid assets is 69942. As the distribution of liquid wealth usually is quite skewed, table 1 also reports the median, which is 28095. The survey contains information on the following debt categories, which have been aggregated into total debt (excluding the value of mortgage debt outstanding): personal loans at banks and credit institutions, loans to finance purchases, and remaining (including money borrowed from family and friends). The mean value of debt outstanding is only 6907 guilders, and the median is zero, indicating that over 50 per cent of the respondents has no outstanding debts. Taking the difference of the aggregate measure for total liquid wealth and debt outstanding gives a measure of net total liquid wealth. Alternative measures of assets and debts can be obtained by incorporating the value of the house and the mortgage debt. The average value of the house of the sample respondents is 322700, and the average mortgage debt is 118070. In our empirical analysis we will examine the impact of the various measures of wealth on the job exit probability. Note that the basic theoretical framework of the previous section uses total net wealth as a variable. Nevertheless it is imaginable that, due to credit market imperfections, the impact of total assets on the job exit probability need not necessarily be exactly the opposite of the impact of total debts. Therefore, we will also allow for differences in the impacts of total assets and debts on job exit.

The avarage net monthly wage income is 4724 guilders and the other income is 242 guilders.

We also make use of indicators for the level of education ranging from primary education (level 1) to university (level 5). In addition, we use indicators for the sector

that respondents have been educated for, including technical, economic/administrative, general, and services.

We have 3732 pooled observations in our sample on 1133 different individuals that are selected on employment status (having a job) and age (48-64), and we track their labour market state the next year: 211 (5.7 per cent) is observed not to have a job the next year. Respondents that left their job can indicate the reason for their job exit from a list of possibilities. The most important are being fired, end of contract, shut down of firm, illness/disability, early retirement/living of one's investments,[8] pensioned, remaining (not specified any further). We have merged several of these categories. We made a category 'unemployed' for being fired, termination of contract, and shut down of a firm: 15.6 per cent of the job exiters indicate that unemployment is the reason for job exit. We also merged several categories of retirement. Note that the retirement categories are self-reported, and that we cannot distinguish whether someone goes on early retirement according to the narrow definition of the early retirement system, or whether someone decides to live on interest. Moreover, the category 'pensioned' is also recorded by some job exiters younger than 60, so it can indicate that the reported 'being pensioned' may also include early retirement in the narrow sense. Therefore, we made one category 'retirement': 65.9 per cent of the job exiters indicates that the job loss is due to retirement. Finally, there is a category 'remaining' which does not further specify the reason for job exit. The respondents could also indicate job exit reasons as 'marriage', 'taking care of the children', and 'taking care of a family member', but none of the respondents in our subsample indicated any of these categories as the reason for their job exit. The category 'remaining' does not include these type of reasons for job exit, and it seems likely that it refers to job quits.

Overall, the job exit rate is 5.7 per cent. The differences by age are however large as shown in table 4 and figure 1. First, note that the age indicated in the figure and the table is the age of selection in the sample, while employed, so the job exit takes place 1 year later at the indicated age + 1. The exit rates for the workers in the age range of 48 through 53 is around 1 to 2 percent, and peaking to 44.3 per cent at the age of 60. It

[8] In Dutch: 'rentenieren'.

should be mentioned that the number of observations decreases with age.

Unfortunately the survey does not contain information on eligibility to early retirement benefits. Age is an important determinant of eligibility to early retirement and in the empirical analysis we do a sensitivity analysis with a flexible specification in age, but different early retirement schemes can have a (somewhat) different age of eligibility. Job tenure is also a determinant of early retirement. Most early retirement schemes in the Netherlands contain the condition that someone must have worked for the employer the past 10 years to become eligible for early retirement at the age of eligibility. The survey contains information on the starting date of the present job, but job tenure itself is an endogenous variable: we model the probability of job exit, but the probability of observing a given job tenure consists of a sequence of probabilities of not experiencing a job exit during the length of the job. This requires the specification of job exit probabilities over the entire past, which will cover many years out of the sample period. Thus, we abstain from using information on job tenure. However, note that we include various additional covariates that are likely to correlate with eligibility to early retirement, like the education level, information on sectors, on being a civil servant, and participation in pension schemes. Finally, note that the retirement state as we define it is not restricted to early retirement in the sense of the early retirement system, but includes retirement, living on one's investements, as well as other reasons for job exit.

We do not include explicit information on expected pension benefits, but the theoretical model in section 2 highlighted the role of the current wage in determining the level of pension benefits. Pension schemes in the Netherlands are of the defined benefit type and benefits are based in the final wage.

4 Empirical analysis

4.1 The empirical model

We use a multinomial logit model to analyse the impact of wealth on job exit. We aggregate the four reasons to exit a job, listed in table 3, into two categories, to have a reasonable number of observations in each categorie. We have joined the categorie 'other'

with the categorie '(early) retirement/living of one's investments'. It is not specified what are the precise motives to exit for respondents who indicated to have an 'other' reason to exit, but we know that it is not (early) retirement, living of one's investments, layoff, termination of contract, shut down of firm, illness and disability, marriage, or taking care of children or other family members, so it most likely that it represents a voluntarily job exit, a quit. For this reason it may suit better in the retirement categorie. The other job exit categorie is unemployment and disability. Figure 2 shows the sample job exit rates into the combined category unemployment/disability by age. The figure does not show a clear relationship between age and exit rates into this destination. Figure 3 shows the exit rates into the extended category (early) retirement. The age pattern resembles the age pattern of the total exit rate in figure 1, although exit rates before age 54 are even smaller. In the figures 4 and 5 we have expressed the use of the different exit routes by job leavers, split up by age. They show the fraction of job leavers that use the exit route unemployment/disability (figure 4) and (early) retirement (figure 5). The figures vertically add up to one, and we see that the use of unemployment/disability is concentrated among the younger job leavers, whereas older job leavers use (early) retirement relatively more often. Notably in the age range of 52 through 58 each exit route is used by some substantial fraction of job leavers. Above the age of 58, the use of retirement as exit route dominates. A reason for this is the age of the eligibility in early retirement schemes, in combination with a high fraction of workers that are eligible for early retirement, the attractiveness of the early retirement scheme relative to other exit routes, and the eligibility conditions for the other exit routes. Below the age of 52 few job leavers exit by retirement.

Thus, for an individual i_t selected in the sample in period t and whose labour market state we keep track of in period $t+1$, we have three possible values for the outcome variable $d_{i_t t}$: staying employed (E), retirement (R), and unemployment/disability (U). We use the state of employment as our base category, and the probabilities we specify below are job exit probabilities. If $x_{i_t t}$ is a vector of explanatory variables, we specify

the probability of job exit to state J as

$$P(d_{i_t t} = J|x_{i_t t}) = \frac{\exp(x_{i_t t}\beta_J)}{1 + \exp(x_{i_t t}\beta_R) + \exp(x_{i_t t}\beta_U)}, J = R, U \tag{14}$$

with $\beta_J, J = R, U$ the parameter vectors measuring the impact of the explanatory variables $x_{i_t t}$ on the probability of job exit to state J. For the interpretation of the parameter estimates it is important to note that the parameter vector β_R measures the impact of the variables $x_{i_t t}$ on job exit into (early) retirement, keeping constant the impact of these variables on job exit into unemployment/disability. The latter effect is measured by the parameter β_U and affects the probability of job exit into (early) retirement by the denominator in (14). Thus, β_R does not measure the total effect of $x_{i_t t}$ on the probability of job exit into (early) retirement. This is because of the competing risks nature of the model. In the extreme case, the total effect of a variable $x_{k,i_t t}$ may be opposite to the sign of $\beta_{k,R}$: if the impact of a variable $x_{k,i_t t}$ on the probability of job exit into (early) retirement, measured by $\beta_{k,R}$ is positive, but there is also a very strong positive impact of this same variable on the probability of job exit into unemployment/disability $\beta_{k,U}$, the sign of the eventual effect of the job exit probability into (early) retirement may even reverse. This should be kept in mind when we present and discuss the tables with the parameter estimates: we will first discuss the estimates (the effects keeping constant job exit into alternative directions) and thereafter we present elasticities that measure the total effect of wealth on the job exit probabilities.

Note that we do not exploit the fact that some individuals may be observed for more periods by including random or fixed effects. But the inclusion of random or fixed effects in a process of transitions from one period to another, in which age is an important explanatory factor (see table 4), does not add much to the explanation of the process: at most we will loose efficiency of the parameter estimates. A more stringent assumption[9] we make is that the explanatory variables $x_{i_t t}$ are uncorrelated with the errors of the extreme value distribution underlying the multinomial choice model for $d_{i_t t}$, and in particular this assumption is made for the wealth variables included in $x_{i_t t}$. More specific, the model assumes that there is no correlation in unobservables between

[9] Not to be confused with the absence of fixed or random effects.

wealth A_{it} and the labour market state the next period: any possible correlation between the two runs via the observables that are included in the regression. Bloemen (2002) specifies a model of transitions that not only includes random effects in the labour market transitions, but also specifies a random effects equation for wealth, and allows for correlation in the errors between the wealth equation and the transition process. His analysis also shows that it is extremely hard to find suitable exclusion restrictions to allow for endogeneity of wealth on basis of the theoretical framework outlined in section 2. In the present analysis the approach is to include as many as possible observable covariates in the job exit probabilities to explain as much of the (spurious) correlation between wealth and job exit as possible. For this reason, we include the information on participation in pension schemes, working as a civil servant, working in a permanent job, as well as income. These are all variables that are likely to correlate with the level of wealth, but also are likely to influence the probability of job exit.

4.2 The parameter estimates

Table 5 shows the estimation results of the multinomial logit model including measures of liquid wealth. Table 5a shows the parameter estimates of the job exit rate into unemployment, illness, and disability, whereas table 5b shows the results for (early) retirement. The regression in the first two columns includes total net liquid wealth as defined in section 3. Although the coefficient estimate of net liquid wealth in the job exit rate to unemployment/disability is positive, it is not significant at conventional levels. The 5b shows that total net liquid wealth has a positive and significant effect on the exit rate into (early) retirement: this is in accordance with the theoretical prediction outlined in section 2.

Before we continue our presentation of the impact of wealth on the job exit rate, we look at the other variables included in the regression. The number of children itself did not affect the exit rates, but the absence of children in the household has a positive impact on the job exit rate into (early) retirement: care for children seems to be a motive to continue working. The results presented in table 5 exclude the number of children, but inclusion of this variable does not change the impact of wealth that is found. We have

merged singles, divorced, and widows into one category (the base) and only include a dummy variable for being married. There is weak evidence that married workers exit the job less often due to unemployment/disability (p-value of 0.101). Being a civil servant has no significant influence on either of the job exit rates. Participation in an employee pension scheme makes it less likely that workers exit the job by unemployment/disability. Recall that for those who are participating in an employee pension scheme, we know whether the worker pays the premiums directly, and if so, we know the premium amount. The amount of the premium was not significant and is excluded from the regression in the table (but inclusion does not alter the result on wealth that was found). However, workers who do pay the premium directly have a higher job exit rate by both routes. It could indicate that the fact that the worker pays the premium directly means that he has also more freedom to choose the retirement age, and eligibility rules may be less stringent. Participation in individual pension schemes does not seem to affect the job exit rate by any route. Workers with a 'permanent' job are less likely to exit a job by unemployment/disability and are more likely to exit a job by (early) retirement. The latter probably indicates eligibility to pension benefits of workers with a 'permanent' job. Individuals with the lower levels of education seem to have a higher probability of job exit into (early) retirement than individuals with the highest level of education. The monthly wage income does not have a significant influence on job exit, but the coefficient is positive for both exit routes. Recall that the model in section 2 implies that there are opposing effects of the wage income on the probability of job exit. There is a positive income effect that makes it more likely that workers exit the job the higher is their wage income, but there is a negative effect that is stronger the lower are the replacement rates of the state of inactivity. The positive coefficient found suggests that the positive income effect dominates, but it is not strong enough to find a significant effect of wage income on job exit rates. The impact of other income on the job exit rates was somewhat puzzling. A priori we may expect that a higher level on non-labour income makes it more attractive to leave the job, at least if leisure is a normal good. We first included other income linearly in the job exit rate and found a significant negative effect on the job exit rate into (early) retirement. However, we found that this negative effect was

driven by the observations with the highest values of non-labour income: we defined a dummy variable taking the value 1 for workers with more than the 95 per cent quantile of the sample distribution of other income (0 otherwise), and found that this variable entirely picked up the negative effect. In the regression in table 5, we have added other income squared. The level of the coefficient of total net liquid wealth does not change much depending on whether we include other income linearly, add it squared, or add the dummy variable described above.

We have done sensitivity analyses to find out whether the positive and significant effect of total net liquid wealth on the job exit rate into (early) retirement may be caused by some observations in the tails of the distribution of wealth. We defined two dummy variables: one dummy variable that takes the value 1 for observations with a wealth level that exceeds the 95 per cent quantile of the sample distribution (0 otherwise) and another dummy variable that takes the value 1 for observations with a wealth level smaller than the 5 percent quantile of the sample distribution of wealth. These dummy variables turned out not to be significant, whereas the positive significant effect of wealth on the job exit rate into (early) retirement itself remained. We have also run a regression with total net liquid wealth squared: both the coefficient of wealth and wealth squared in the job exit rate into (early) retirement were positive, but the separate coefficients were not significant, indicating that wealth squared does not add to the explanation of the job exit rate and there is no such thing like a backward or forward bending pattern in the relation between wealth and the job exit rate into (early) retirement.

The next move is to look at the impact of alternative measures of wealth. Total net liquid wealth is obtained by subtracting total debt outstanding (excluding mortgage debt) from total liquid assets. The theoretical framework in section 2 concentrates on the impact of net total wealth, but there may be a difference between the impact of assets and debts on job exit. For this reason, we have estimated the job exit probabilities with total liquid assets and debts separately. The results are in the final two columns of table 5. Again, we do not see any significant effect of these variables on the job exit probability into unemployment/disability. Total liquid assets has a positive and significant impact on the job exit rate into (early) retirement. Total debt shows a negative coefficient

estimate for the job exit probability into (early) retirement, but the coefficient estimate is not significant. Note that the coefficient of total liquid assets is almost the same as the coefficient estimate of total net liquid wealth in the first regression. Recall from the descriptives in section 3 that over 50 per cent of the sample respondents do not have any debts, and that the mean amount of debts is small compared to the amount of liquid assets.

There has been a discussion in the literature on the value of the house as a stock of assets that may be released to finance future consumption (see, for instance, Venti and Wise (1991)). After retirement, individuals may sell the house, and move into a smaller and cheaper appartment. Therefore we consider an alternative measure of assets and an alternative measure of debts. To the liquid assets considered so far, we add the value of the house to obtain this alternative measure. Moreover we add the value of the mortgage debt outstanding to the debts measure used so far. We estimated a multinomial logit model for the job exit rates including these alternative wealth measures, and the results can be found in the tables 6a and 6b. Table 6a contains the results for job exit into unemployment and disability. The first two columns show the impact of total net wealth. Although the coefficient estimate is positive, it is not significantly different from zero. The final two columns show the results of the separate inclusion of total assets and total debt. Again, the coefficients have the predicted sign (the asset coefficient is positive and the debt coefficient is negative) but they are not significantly different from zero. Table 6b shows the results on the job exit rate into (early) retirement. Here we see that total net wealth has a significantly positive effect on the job exit rate into (early) retirement. If assets and debts are included separately, we also find significant effects: a higher value of assets increases the job exit rate, and a higher value of debts decreases the job exit rate into (early) retirement.

This result shows that with different measures of wealth, with entirely different orders of magnitude (see table 1), we find a positive significant impact of wealth on the probability of job exit into (early) retirement. However, a significant effect of wealth on job exit into unemployment/disability cannot be detected. The model in section 2 implies that wealth enters the job exit rate as a choice factor. In the discussion of the model

in section 2 we concluded that the impact of wealth on job exit will be weakened if job exit is determined by exogenous lay-off rates or eligibility rules. Finding no significant effect of wealth on job exit into unemployment/disability suggests that job exit by these routes are less governed by individual choice and more by demand side and eligibility factors, in spite of the 'consensus between employers and workers' stories about job exit of elderly workers into unemployment and disability.[10]

Moreover, the results show that a higher mortgage debt may be a motive for workers to postpone retirement from the labour force.

So far we have distinguished two different exit routes, and the different results for the different exit routes suggest that it is important to make that distinction. However, the positive effect of wealth on job exit may hold for job exit in general, and moreover, we may obtain more precise estimates of the effect of wealth on job exit if we merge the job exit routes into one exit state. Note that the multinomial logit model also allows us to evaluate the impact of wealth on the total probability of job exit (or, equivalently, on the staying-on probability), and we will later on present results on elasticities of the staying-on probability with respect to wealth, but as a sensitivity check we have estimated a logit model to estimate the impact of wealth on job exit, aggregating the different exit routes. We do not report complete tables of estimation results, but we mention the key outcomes. We found a positive effect of total net liquid wealth on the job exit probability, but it was not significant at the 5 per cent level: its p-value is 0.11. Splitting up total net liquid wealth into liquid assets and debts (excluding mortgage) again showed a positive but insignificant effect of liquid assets, and a negative effect of outstanding debt, that is significant at the 10 per cent level. The results confirm the importance of making a distinction between different exit routes: merging exit routes does not lead to a higher precision of the effect of wealth on job exit, which indicates that the insignificant effect of wealth on job exit into unemployment and disability, found with the multinomial logit model, was not just driven by a low number of observations of job exits in this category.

[10] This result is not inconsistent with an analysis by Lindeboom (1998), who finds that the replacement rate of disability (unemployment) insurance benefits has no significant effect on job exit into disability (unemployment), which also indicates that the possibilities of workers to 'choose' for these exit routes may be limited.

If we add the value of the house to assets and the value of the mortgage to debt, we find a positive effect of total assets on the job exit probablity that is significant at the 10 per cent level, and a negative effect of debt that is not significant (with a p-level of 0.11).

4.3 Elasticities

So far we have discussed the coefficient estimates of the multinomial logit model. Before, we have warned that the coefficients indicate the impact of the variables on job exit in a given direction, keeping constant job exit in an other direction. We will now present the total effect of wealth on the job exit probabilities in different directions, as well as on the staying-on probability, by presenting the elasticities of these probabilities with respect to wealth. The elasticities we present are point elasticities, evaluated at certain values of the explanatory variables. Note that net wealth is a variable that can take both positive and negative values, but that need not deteriorate the function of the elasticity as a means to summarize the impact of wealth on job exit: we will evaluate the elasticity in the sample's mean and median values of wealth.

If we denote the job exit probability into direction $J, J = U, R$, evaluated in characteristics $x_{i_t t}$ by $P_J(x_{i_t t}), J = U, R$, the elasticity of the probability of job exit into (early) retirement with respect to variable $x_{k,i_t t}$ is

$$\epsilon_{R,k} = \beta_{k,R} x_{k,i_t t}(1 - P_R(x_{i_t t})) - \beta_{k,U} x_{k,i_t t} P_U(x_{i_t t}) \tag{15}$$

The form of the elasticity in (15) reveals several properties. First, we see that the effect $\beta_{k,U}$ of the variable $x_{k,i_t t}$ on the exit into the alternative exit state of unemployment/disability, has an opposing effect: if $x_{k,i_t t}$ raises the opportunity to exit by unemployment/disability, its impact on exiting by retirement will be smaller. The size of this opposing effect also depends on the size of the probability $P_U(x_{i_t t})$ of exiting to that alternative state. This is the competing risk property of the multinomial choice framework. Second, the size of the elasticity is affected by $1 - P_R(x_{i_t t})$. This reflects that the elasticity is a relative measure: if $P_R(x_{i_t t})$ is small, the relative change in the probability will be large. For the elasticity of the probability of job exit into unemploy-

ment/disability with respect to variable $x_{k,i_t t}$ we have a similar expression:

$$\epsilon_{U,k} = \beta_{k,U} x_{k,i_t t}(1 - P_U(x_{i_t t})) - \beta_{k,R} x_{k,i_t t} P_R(x_{i_t t}) \tag{16}$$

The elasticity in (16) is the mirror image of the elasticity in (15). Finally, the elasticity of the staying-on probability $P_E(x_{i_t t})$ with respect to variable $x_{k,i_t t}$ is

$$\epsilon_{E,k} = -\beta_{k,R} x_{k,i_t t} P_R(x_{i_t t}) - \beta_{k,U} x_{k,i_t t} P_U(x_{i_t t}) \tag{17}$$

Since staying employed is chosen as the base category in our multinomial logit model, the expression (17) for the elasticity of staying employed built up by the opposite effects of exiting by any exit route.

The base for evaluating the numerical values of the elasticities are the sample averages of all of the explanatory variables. Alternatively, we have also evaluated elasticities in the median values of wealth, keeping the remaining variables on their sample averages. Moreover, since the sample average of age is only 52.6 while job exit rates peak at the age of 60, we have also evaluated elasticities at the age of 60, keeping the other values at their sample average. Table 7 shows the resulting values of the elasticities. The upper panel shows the elasticities of the job exit probabilities and the staying-on probability with respect to net liquid wealth, and is obtained from the estimates in the first columns of table 5. It shows that the job exit rate into (early) retirement is the most sensitive with respect to changes in net liquid wealth: the elasticity evaluated in sample averages is 0.11 and is significantly different from zero. The elasticity of job exit rate into unemployment/disability is positive but fairly small and not significantly different from zero. The elasticity of the staying-on probability with respect to net liquid wealth is negative but close to zero and insignificant. Evaluated at median wealth (second column of table 7) the qualitative conclusions remain the same but the quantitative outcomes differ. The elasticities evaluated at age 60 show some interesting differences. The elasticity of the job exit probability into unemployment/disability with respect to net liquid wealth has become negative, but still insignificant, although the coefficient in table 5 shows a positive effect. This means that in the computation of the elasticity according to (16) the competing risk effect of transiting into (early) retirement dominates

at age 60. We also see that the staying-on probability is more sensitive with respect to net liquid wealth at the age of 60, although it remains insignificant. The second panel of table 7 shows the elasticities of the exit and staying-on probabilities with respect to net wealth, including the value of the house and the mortgage debt, corresponding to the estimates in the first columns of table 6. The job exit rate into (early) retirement shows a higher sensitivity with respect to this measure of wealth, compared to net liquid wealth. The elasticities for this exit route again are positive and significant. The third and the fourth panel of table 7 show the elasticities with respect to total assets (liquid + value of the house) and total debt (including mortgage debt), and correspond to the estimates in the final two columns of table 6. For total assets, the qualitative results remain the same as before. However, we see larger values of the elasticities for all the probabilities. For instance, the elasticity of the job exit probability into (early) retirement, evaluated in sample means, now has a value of 0.32, and is significantly positive. The elasticity of job exit into (early) retirement with respect to total debt is -0.31 and significantly smaller than zero.

In conclusion we can say that the job exit probability into (early) retirement is the only probability that reveals significant elasticities with respect to various measures of wealth, assets, and debt. They have the signs predicted by the theoretical framework. The probability of exit into unemployment/disability is fairly insensitive with respect to wealth, assets and, debt. The signs of the elasticities are usually in accordance with the theoretical predictions, but they are not significant. Even though the exit probability into (early) retirement shows a significant effect of wealth, we do not find significant impacts of wealth, assets, and debt on the staying-on probability, if we consider the staying-on probability as the residual of the exit rates into (early) retirement and unemployment/disability in the multinomial logit model, but recall that we found some significant effects if we merge the different exit routes. The effects of wealth, assets, and debt always have the sign predicted by theory.

4.4 The fit of the model

To give an indication of the fit of the models that we have estimated, we evaluate the fitted total job exit probability by age for the model variant that includes net liquid wealth (first columns of table 5). The sample job exit rates have been shown in figure 1, and display a clear peak at the age of 60. It is well known that peaks in empirical distributions are notoriously difficult to explain by structural economic factors, but the peak at age 60 would be very easy to reproduce by including a dummy variable for this age, which is not part of the model specification in table 5. The peak here is undoubtedly caused by the eligibility rules of the early retirement system. Figure 6 shows the mean fitted job exit probabilities by age. It shows a small peak at the age of 61, but the drop in sample job exit rates between the ages of 60 and 64 is not reproduced by the model specification. Now it should be noted that the purpose of our analysis is not to explain this peak in the job exit rate: we know where it comes from. Our purpose is to measure the impact of wealth on the job exit rates. But a legitimate question is whether the significant positive impact of wealth on the probability of job exit into (early) retirement will disappear if we allow for a more flexible specification in age. Therefore, we have done the following sensitivity analysis. We have specified two age dummies: one dummy that takes the value one for workers aged 60 (zero otherwise), and another dummy taking the value one for workers aged 61 through 63 (zero otherwise). We have added these age dummies to the multinomial logit specification with net liquid wealth, and we have re-estimated the model. The coefficient estimate of net liquid wealth for exit into (early) retirement is still positive and significant: it takes the value 0.0172 with a standard error of 0.0068. This is not much different from the numbers in table 5b. Figure 7 shows the fitted job exit rates by age for this extended model specification showing a better fit of the peak at the age of 60. In conclusion we may say that a more flexible model specification that leads to a better fit of the sample job exit rates does not change the significant impact of wealth on job exit into (early) retirement.

5 Conclusions

The level of private wealth, assets, and debt may become increasingly important for the decision of elderly workers to exit from the labour force if more choice options are introduced to determine the age of retirement. So far, there is little empirical evidence on the role of individual wealth in the job exit decision, as empirical studies have concentrated on the attractiveness provided by the exit routes themselves, like eligibility conditions and replacement rates. In this paper we study the impact of wealth on the job exit rates of elderly workers. We present a theoretical framework that, under some regularity conditions, predicts a positive effect of wealth on the decision to exit a job. The model also generates predictions for the impact of the earnings associated with the job. On the one hand, the wage income has a positive income effect on the decision to leave a job, provided that a higher wage income also generates higher benefits in the subsequent state of inactivity. But this positive impact of the wage income on job exit may turn negative if replacement rates of the benefits obtained in the inactive states are low enough and/or if the decision to stop working leads to lower pension benefits in future. There are several factors that may complicate the measurement of any effect of wealth on the job exit rate. First, the level of wealth may be positively correlated with favourable individual characteristics that may increase the probability to stay on the job. If individuals with a high level of wealth have better pension arrangements, they will be less likely to leave the job if that leads to a loss in eligibility to pension rights. For this reason, we include information on participation in employee pension schemes. Second, involuntary reasons for leaving a job will weaken the relation between job exit and wealth, which is a typical choice factor in the job exit rate. Third, eligibility rules to early retirement benefits may dominate the decision to retire.

For our empirical analysis we use data from the Socio-Economic Panel. We selected male workers in the age range of 48 through 64, who are present in the panel for two subsequent waves such that we can observe their labour market state one year later. Sample exit rates by age remain low until the age of 53, and they peak at the age of 60. The sample information allows us to distinguish different reasons for job exit.

From this information we construct two different exit routes. The first includes job exit to (involuntary) unemployment, disability, and illness. The second includes early retirement, living on one's investments, and pensioning. The second exit route may a priori be more likely to be taken by choice, while the first is more likely to be taken by demand side factors, health risks, and eligibility conditions. However, it has been argued that transitions into unemployment and disability insurance of elderly workers is often governed by consensus between workers and employers and therefore may contain a hidden choice element as well.

We use a multinomial logit framework with three states: (i) exit into (early) retirement; (ii) exit into unemployment/disability; and (iii) our base, staying employed. We perform analyses with different measures of wealth: liquid wealth, without inclusion of the value of the house and the mortgage debt, and total wealth that does include the value of the house and mortgage debt. Moreover, we allow for separate effects of assets on the one hand, and outstanding debt on the other hand. We find that the two different measures of net wealth both increase the probability of job exit into (early) retirement, which is in accordance with the prediction. We do not find a significant effect of any of the wealth measures on the probability of job exit into unemployment/disability, although the coefficient estimates are positive. Moreover, we find that splitting up wealth into assets and debt, shows a significant positive effect of assets (both of liquid assets and assets including the value of the house) and a significant negative impact of debt (including mortgage debt) on the probability to exit the job by (early) retirement. These variables show the same signs on the probability of exiting the job into unemployment/disability, but are not significantly different from zero. Estimates of elasticities show that also the quantitative impact of wealth, assets, and debt is largest for job exit into (early) retirement. The impacts of wealth, assets, and debt on total job exit rates, without distinguishing the state of destination, are less clear. We have analysed total job exit rates in two ways. First, we have merged the different exit routes and simply done a logit analysis to analyse the impact of wealth on job exit. We still found some impact of wealth, assets, and debt on the job exit rate, but p-levels were lower and sometimes slightly higher than 0.10. Second, the probability of staying-on follows from

the multinomial logit specification, with employment as the base category. We have computed the elasticities of the probability of staying-on with respect to wealth, assets, and debt. Although the elasticities always have the signs that may be expected from theoretical arguments, they are never significant. The analysis shows that it is important to distinguish different states of destination. An interpretation of not finding a significant effect of wealth on job exit into unemployment/disability is that this exit route is hardly governed by individual choice, as wealth enters the exit rate as a component of the choice process.

As an additional result of our analysis, we find a positive, but insignificant effect of the wage income on the probability of job exit by any of the exit routes. The positive effect, though, suggests that the income effect of the wage income on job exit rates dominates, which is consistent with the relatively high replacement rates in the Netherlands.

Summarizing we may say that for the years 1995 through 2001, in which eligibility conditions for (early) retirement schemes were strongly dependent on age and in which replacement rates of (early) retirement schemes were relatively high, private wealth affects the job exit rates of elderly workers into (early) retirement. The role of private wealth in the retirement decision will increase if individuals obtain more freedom to determine their age of retirement, but also if replacement rates of pension benefits are decreased or if the age at which workers become eligible for retirement benefits is increased. The exact interaction of the role of wealth with such policy measures may be simulated with a structural model that incorporates savings, retirement, and institutional details, like, for instance, the model by Woolley (2004). The quantitative effects found in the present study may serve as a guideline for the choice of model parameters in this type of analysis.

References

Alessie, R, A. Lusardi, and A. Kapteijn (1999), Saving after Retirement: Evidence from Three Different Surveys, Labour Economics, Vol. 6 (2), pp. 277-310.

Bloemen, H.G. (2002), The Relation between Wealth and Labour Market Transitions: An Empirical Study for the Netherlands, Journal of Applied Econometrics, Vol. 17, pp. 249-268.

Bloemen, H.G. and E.G.F. Stancanelli (2001), Individual wealth, reservation wages and transitions into employment, Journal of Labor Economics, Vol. 19, nr. 2. pp. 400-439.

Blundell R, T. Magnac and C. Meghir (1997), Savings and Labor Market Transitions, Journal of Business and Economic Statistics, Vol. 15, no. 2, pp. 153-164.

Danforth, J. P, (1979), On the Role of Consumption and Decreasing Absolute Risk aversion in the Theory of Job Search, in: Lippman, S. A.and McCall J.J (eds.), Studies in the Economics of search, North-Holland.

Hamermesh, D. (1984), Consumption During Retirement: The Missing Link in the Life Cycle, Review of Economics and Statistics, Vol. 66 (1), pp.1-7.

Kapteyn, A, and K. de Vos (1998), Social Security and Labor-Force Participation in the Netherlands, American Economic Review, Vol. 88, no. 2, pp. 164-167.

Lindeboom, M, (1998), Microeconomic analysis of the retirement decision: the Netherlands, OECD, Economics Department working papers, no. 207.

Stancanelli, E. G. F. (1999), Do the Richer Stay Unemployed Longer? An Empirical Study for the UK, Oxford Bulletin of Economics and Statistics, Vol. 61, pp. 295–314.

Stock, J.H. and D.A. Wise (1990), Pensions, the Option Value of Work, and Retirement, Econometrica, Vol. 58, no. 5, pp. 1151-1180.

Venti, S. and D. Wise (1991), Aging and the Income Value of Housing Wealth, Journal of Public Economics, Vol. 44 (3), pp. 371-397.

Woolley, M, (2004), Optimal Consumption and Investement with Labor Income Uncertainty and Endogenous Retirement, working paper, unc.

Table 1: Sample descriptives

Number of observations: $N = 3732$		
Variable	Mean	standard error
Age	52.6	3.5
# Children living in the household	0.88	1.0
Pension premium (monthly, guilders) only for workers participating in employee pension system and paying premium directly ($N =$)	253	398
Pension premium (monthly, guilders) only for workers participating in an individual pension scheme	413	651
Total liquid assets (guilders)	69942	145187
(Median):	(28095)	
Total debt outstanding (excl. mortgage)	6907	33610
(Median):	(0)	
Net total liquid wealth (guilders)	63035	143880
(Median):	(24878)	
Value of house	322700	363639
(Median)	(280000)	
Value of mortgage debt outstanding	118070	380134
(Median)	(8000)	
Total assets (including value house)	392642	443613
(Median):	(324950)	
Total debt (including mortgage)	110775	122682
(Median):	(84750)	
Net total wealth (liquid + illiquid)	281867	395804
(Median):	(199209)	
Net monthly wage income (guilders)	4724	3054
(Median):	(4250)	
Other income (monthly)	242	(1996)
(Median):	(0)	

Table 2: Sample descriptives

Number of observations: $N = 3732$	
	Percentage
Education Level:	
1 (lowest)	6.0
2	14.2
3	47.4
4	21.7
5	9.5
Education type:	
Technical	32.1
Economic/administrative	24.8
General	17.5
Services	25.0
No children in the household	47.0
'Permanent' job	96.0
Civil servant	31.9
Participating in employee pension scheme	89.7
Unknown whether part. in pens. scheme	1.8
Pays contribution directly	4.1
The employer contributes to premium	73.8
Participates in individial pension scheme	15.6
Married	88.0
Divorced	6.5
Widowed	1.2
Single	4.3
Still employed next year	94.3
Wave 1995	12.8
Wave 1996	13.5
Wave 1997	13.7
Wave 1998	14.4
Wave 1999	14.7
Wave 2000	15.9
Wave 2001	15.1

Table 3: Job leavers: self-reported reasons to exit

Number of Job Leavers	211
Reason for exit	Percentage of job leavers
Became unemployed	15.6
Illness Disability	11.9
(Early) retirement/living of one's investments	65.9
Other	6.6

Table 4: Job exit rates by age

Number of Job Leavers	211
Number of Stayers	3521
	Exit rate (%)
Total	5.7
Age:	
48	1.3
49	1.2
50	2.0
51	1.1
52	0.8
53	1.8
54	8.0
55	6.1
56	7.3
57	8.2
58	13.5
59	29.6
60	44.3
61	34.3
62	19.1
63	14.3
64	50.0

Table 5a: Results of multinomial logit model
with liquid assets and debt outstanding (excl. mortgage)
The Job Exit Rate with Destination Unemployment, Illness, and disability

	Net Liquid Wealth		Liquid assets and Debts Separately	
Variable	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Log-likelihood	-682.44		-679.79	
Ln Age	365.5	237.7	379.9	239.3
Ln Age Squared	-45.6	29.9	-47.4	30.1
Education level 1 (lowest)	0.78	0.82	0.75	0.82
Education level 2	-0.65	0.69	-0.69	0.69
Education level 3	0.18	0.53	0.15	0.53
Education level 4	-0.11	0.57	-0.16	0.57
Technical	0.51	0.39	0.49	0.39
Economic/administrative	0.14	0.42	0.19	0.42
General	-0.11	0.58	-0.07	0.58
No Children in household	-0.12	0.30	-0.14	0.30
Married	-0.62*	0.38	-0.63*	0.38
Civil Servant	-0.30	0.36	-0.28	0.36
Part. in employee pension scheme	-1.22**	0.61	-1.21**	0.61
Worker pays premium directly	1.26**	0.50	1.33**	0.50
Employer attributes to premium	0.89*	0.54	0.91*	0.54
Permanent job	-2.16**	0.39	-2.15**	0.40
Part. in individual pension scheme	-0.02	0.38	0.02	0.38
1995	0.25	0.46	0.26	0.46
1996	0.01	0.47	0.00	0.47
1997	-0.23	0.49	-0.19	0.49
1998	-0.31	0.48	-0.29	0.48
1999	-0.45	0.50	-0.44	0.50
2000	-0.55	0.52	-0.56	0.52
Monthly earnings	0.022	0.038	0.024	0.037
Other income/1000	0.46	0.30	0.55*	0.31
Other income/1000 squared	-0.043	0.033	-0.047	0.032
Total net liquid wealth/10000	0.00013	0.00932		
Total liquid assets/10000			-0.0035	0.0100
Debt/10000			-0.26	0.19
Intercept	-733.9	472.9	-762.5	476.0

Table 5b: Results of multinomial logit model
with liquid assets and debt outstanding (excl. mortgage)
The Job Exit Rate with Destination (Early) Retirement

	Net Liquid Wealth		Liquid assets and Debts Separately	
Variable	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Ln Age	223.0	234.7	230.2	235.3
Ln Age Squared	-24.0	29.1	-24.9	29.1
Education level 1 (lowest)	0.91	0.58	0.87	0.58
Education level 2	1.12**	0.48	1.10**	0.47
Education level 3	1.08**	0.44	1.03**	0.44
Education level 4	0.43	0.45	0.37	0.45
Technical	-0.10	0.26	-0.11	0.27
Economic/administrative	0.12	0.29	0.16	0.29
General	0.17	0.34	0.17	0.34
No Children in household	0.51**	0.23	0.51**	0.23
Married	0.20	0.29	0.21	0.29
Civil Servant	0.24	0.22	0.25	0.22
Part. in employee pension scheme	-0.37	0.36	-0.36	0.36
Worker pays premium directly	0.87**	0.40	0.87**	0.40
Employer attributes to premium	-0.22	0.27	-0.22	0.27
Permanent job	1.16**	0.56	1.17**	0.56
Part. in individual pension scheme	-0.49	0.34	-0.44	0.35
1995	1.10**	0.37	1.10**	0.37
1996	0.44	0.39	0.44	0.39
1997	0.99**	0.35	1.00	0.35
1998	0.53	0.36	0.54	0.36
1999	0.15	0.38	0.15	0.38
2000	0.27	0.36	0.25	0.36
Monthly earnings	0.023	0.026	0.025	0.025
Other income/1000	-1.01	1.07	-1.05	1.06
Other income/1000 squared	-0.61	0.95	-0.58	0.94
Total net liquid wealth/10000	0.0176**	0.0068		
Total liquid assets/10000			0.0171**	0.0068
Debt/10000			-0.095	0.066
Intercept	-514.4	473.9	-529.0	475.1

**: significant at 5 per cent level
*: significant at 10 per cent level

Table 6a: Results of multinomial logit model
with assets (including house) and debt (including mortgage)
The Job Exit Rate with Destination Unemployment, Illness, and disability

	Net Wealth		Assets and Debts Separately	
Variable	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Log-likelihood	-683.89		-682.01	
Ln Age	366.4	237.7	368.1	237.9
Ln Age Squared	-45.7	29.9	-45.9	29.9
Education level 1 (lowest)	0.78	0.83	0.75	0.84
Education level 2	-0.65	0.69	-0.68	0.70
Education level 3	0.18	0.53	0.16	0.54
Education level 4	-0.11	0.57	-0.12	0.57
Technical	0.51	0.39	0.51	0.39
Economic/administrative	0.14	0.42	0.14	0.42
General	-0.11	0.58	-0.10	0.58
No Children in household	-0.12	0.30	-0.12	0.30
Married	-0.62	0.38	-0.61	0.38
Civil Servant	-0.30	0.36	-0.30	0.36
Part. in employee pension scheme	-1.22**	0.61	-1.22**	0.61
Worker pays premium directly	1.26**	0.50	1.26**	0.50
Employer attributes to premium	0.89*	0.54	0.90*	0.54
Permanent job	-2.16**	0.39	-2.15**	0.39
Part. in individual pension scheme	-0.02	0.38	-0.01	0.38
1995	0.25	0.47	0.24	0.47
1996	0.01	0.48	0.00	0.48
1997	-0.23	0.49	-0.24	0.49
1998	-0.31	0.49	-0.31	0.49
1999	-0.45	0.50	-0.46	0.50
2000	-0.55	0.52	-0.55	0.52
Monthly earnings	0.022	0.038	0.023	0.038
Other income/1000	0.46	0.31	0.47	0.31
Other income/1000 squared	-0.043	0.033	-0.043	0.033
Total net weatlh/10000	0.0000044	0.0038		
Total assets (incl. house)/10000			0.00010	0.0038
Debt (incl. mortgage)/10000			-0.0030	0.014
Intercept	-735.6	472.9	-738.9	473.3

Table 6b: Results of multinomial logit model
with assets (including house) and debt (including mortgage)
The Job Exit Rate with Destination (Early) Retirement

	Net Wealth		Assets and Debts Separately	
Variable	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Ln Age	269.2	237.4	283.9	238.1
Ln Age Squared	-29.7	29.4	-31.6	29.5
Education level 1 (lowest)	0.97	0.59	0.74	0.60
Education level 2	1.21**	0.49	1.01**	0.49
Education level 3	1.16**	0.45	0.98**	0.46
Education level 4	0.49	0.46	0.39	0.46
Technical	-0.10	0.26	-0.13	0.27
Economic/administrative	0.14	0.29	0.20	0.29
General	0.17	0.34	0.20	0.35
No Children in household	0.51**	0.23	0.53**	0.23
Married	0.13	0.29	0.22	0.29
Civil Servant	0.22	0.22	0.21	0.22
Part. in employee pension scheme	-0.37	0.36	-0.39	0.36
Worker pays premium directly	0.86**	0.40	0.84**	0.41
Employer attributes to premium	-0.24	0.27	-0.20	0.27
Permanent job	1.10**	0.55	1.14 **	0.55
Part. in individual pension scheme	-0.42	0.34	-0.41	0.34
1995	1.14**	0.38	1.10	0.38
1996	0.49	0.39	0.45	0.39
1997	1.03**	0.35	0.99**	0.35
1998	0.59	0.37	0.56	0.37
1999	0.19	0.38	0.16	0.38
2000	0.28	0.36	0.28	0.36
Monthly earnings	0.024	0.026	0.027	0.025
Other income/1000	-0.74	1.02	-0.90	1.00
Other income/1000 squared	-0.63	0.91	-0.57	0.88
Total net wealth/10000	0.00624**	0.00310		
Total assets (incl. house)/10000			0.00806**	0.0031
Debt (incl. mortgage)/10000			-0.0283**	0.012
Intercept	-607.6	479.3	-636.2	480.8

**: significant at 5 per cent level
*: significant at 10 per cent level

Table 7: Elasticities of exit and staying on probabilities
with respect to various measures of wealth, assets, and debt

Elasticity with respect to:	Sample average for all variables	Median for variable that elasticity is calculated for	Evaluated at age 60, sample average other variables
Net liquid wealth			
Exit to retirement	0.11**	0.049**	0.11**
	(0.04)	(0.019)	(0.04)
Exit to unemp./disab.	0.00077	0.00035	-0.0020
	(0.058)	(0.026)	(0.06)
Staying-on prob.	-0.000058	-0.00023	-0.0028
	(0.0006)	(0.00027)	(0.010)
Net wealth (liquid and ill.)			
Exit to retirement	0.18**	0.20**	0.17**
	(0.09)	(0.10)	(0.08)
Exit to unemp./disab.	0.000046	0.000050	-0.0042
	(0.11)	(0.12)	(0.11)
Staying-on prob.	-0.000077	-0.000091	-0.0043
	(0.0011)	(0.0012)	(0.015)
Total assets (liq. and ill.)			
Exit to retirement	0.32**		0.30**
	(0.12)		(0.12)
Exit to unemp./disab.	0.039		-0.0050
	(0.15)		(0.15)
Staying-on prob.	-0.0020		-0.0091
	(0.0015)		(0.030)
Total debt (incl. mortgage)			
Exit to retirement	-0.31**		-0.30**
	(0.14)		(0.13)
Exit to unemp./disab.	-0.033		-0.024
	(0.16)		(0.16)
Staying-on prob.	0.00048		0.0092
	(0.0016)		(0.030)

**: significant at 5 per cent level
*: significant at 10 per cent level

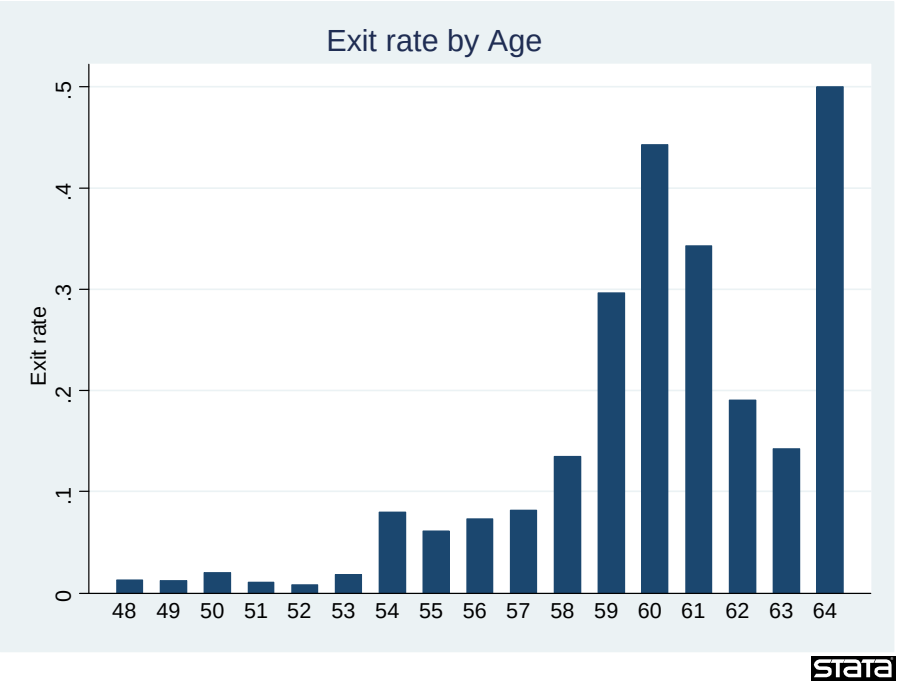

Figure 1: Exit rate by age

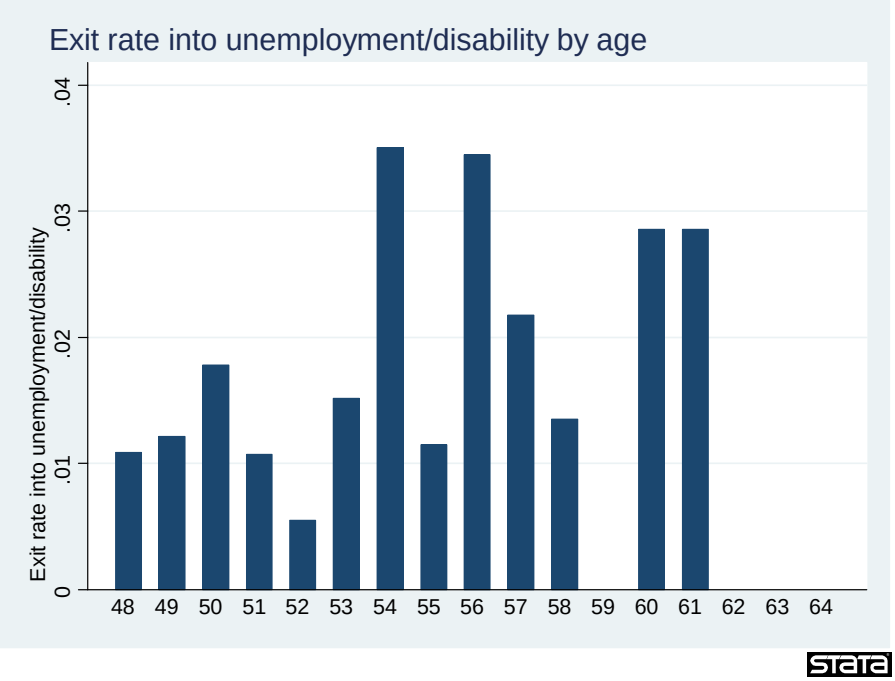

Figure 2: Exit rate into unemployment/disability by age

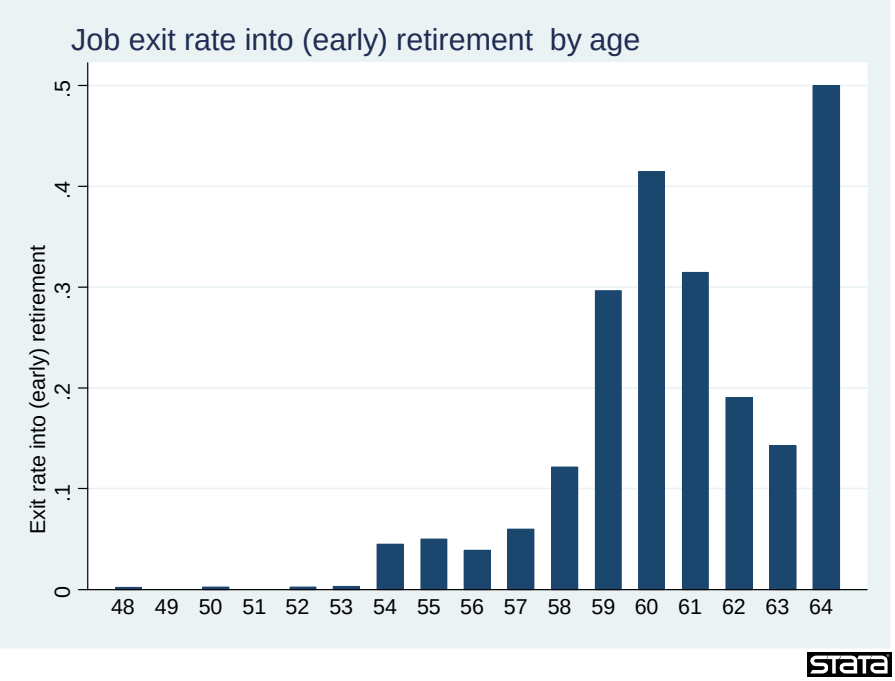

Figure 3: Exit rate into early retirement by age

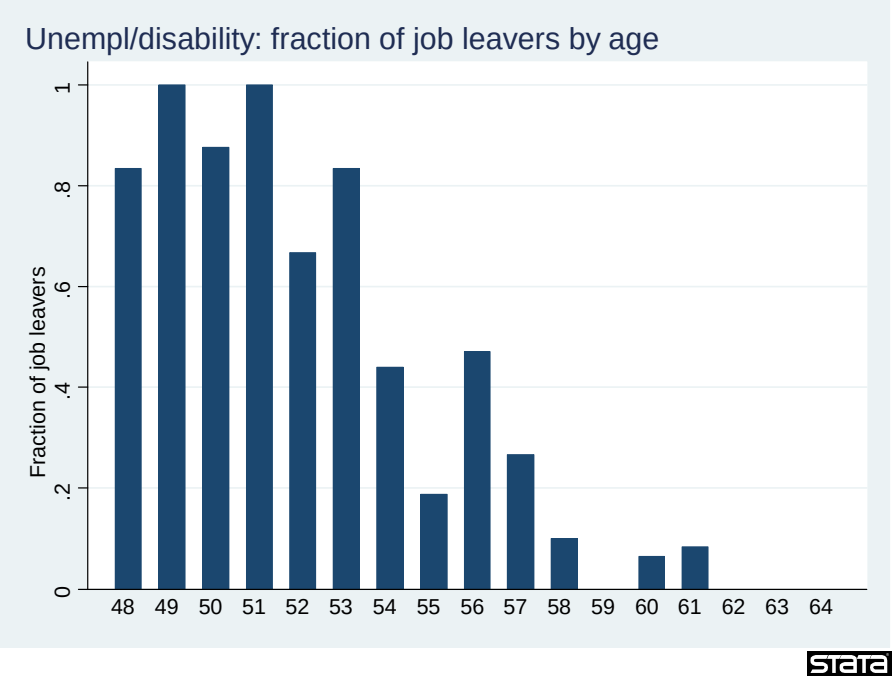

Figure 4: Fraction of job leavers exiting by unemp/disability by age

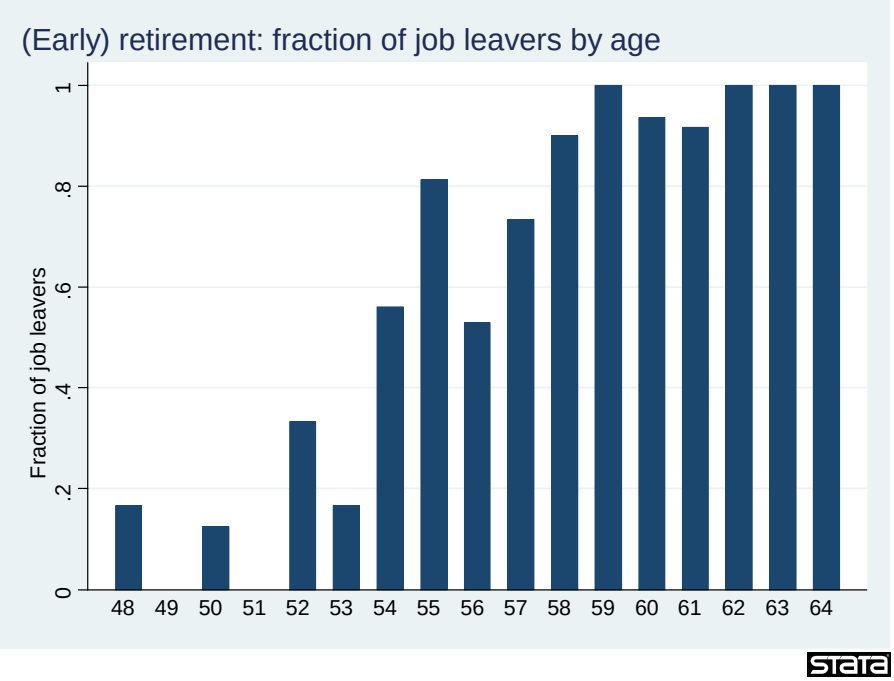

Figure 5: Fraction of job leavers exiting by (early) retirement by age

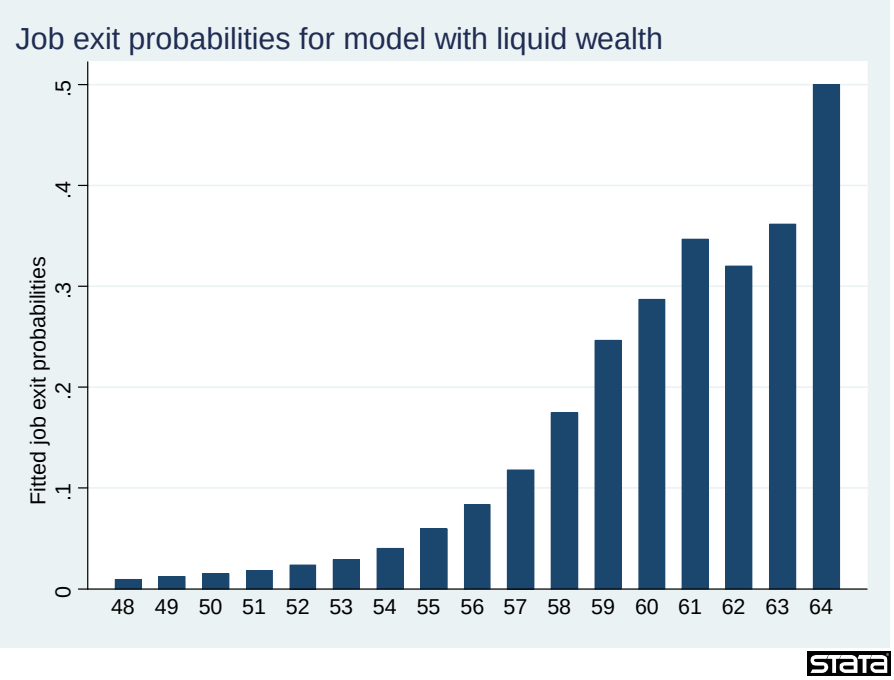

Figure 6: Mean of fitted job exit probabilities

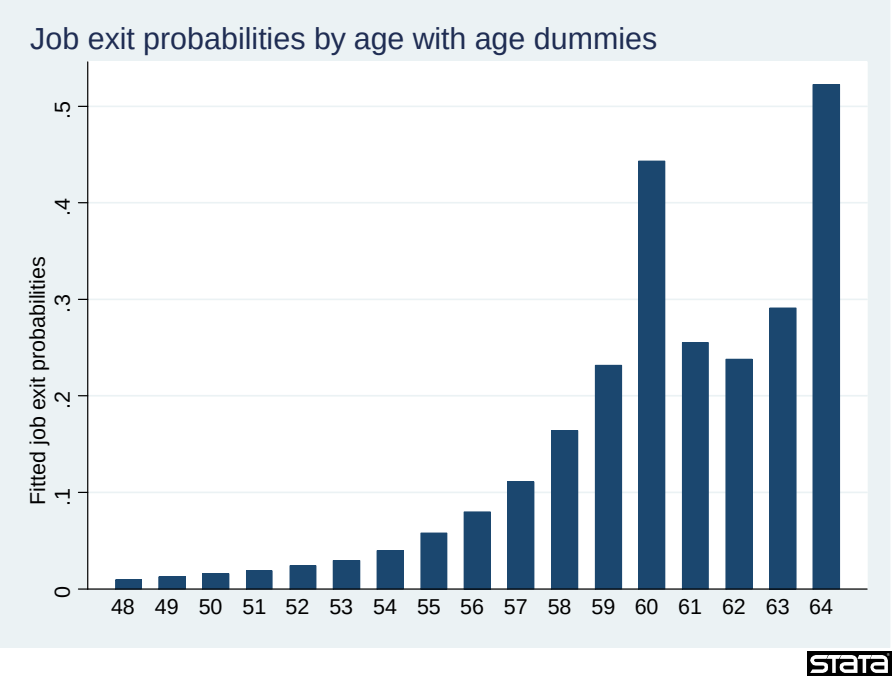

Figure 7: Fitted job exit probabilites: specification extended with age dummies