


# Predictors of transitions from single to multiple job holding: Results of a longitudinal study among employees aged 45-64 in the Netherlands

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**Objectives:** To construct prediction models for transitions to combination multiple job holding (MJH) (multiple jobs as an employee) and hybrid MJH (being an employee and self-employed), among employees aged 45-64.

**Methods:** A total of 5187 employees in the Netherlands completed online questionnaires annually between 2010 and 2013. We applied logistic regression analyses with a backward elimination strategy to construct prediction models.

**Results:** Transitions to combination MJH and hybrid MJH were best predicted by a combination of factors including: demographics, health and mastery, work characteristics, work history, skills and knowledge, social factors, and financial factors. Not having a permanent contract and a poor household financial situation predicted both transitions. Some predictors only predicted combination MJH, e.g., working part-time, or hybrid MJH, e.g., work-home interference.

**Conclusions:** A wide variety of factors predict combination MJH and/or hybrid MJH. The prediction model approach allowed for the identification of predictors that have not been previously studied.

## KEYWORDS

ageing employee, dual job holding, employability, moonlighting, multi-jobbing, predictors

## 1 | INTRODUCTION

In many industrialized countries, a substantial proportion of workers hold multiple paid jobs, for instance, approximately 10% in Norway and the Netherlands,<sup>1</sup> and 5% in the US.<sup>2</sup> We define multiple job holding (MJH) as having more than one paid job. We distinguish two types of MJH: (i) having more than one job as an employee (combination MJH); or (ii) having one or more jobs as an employee while also being

self-employed (hybrid MJH). MJH has been associated with increased flexibility in labor markets, higher job mobility, and lower job security.<sup>3,4</sup> The few studies on the consequences of MJH have generally focused on health effects and have all been conducted in the US. These studies suggest that MJH is associated with an increased risk of injuries and less sleep.<sup>5,6</sup>

Although common in many labor markets, little is known about the reasons for MJH.<sup>7</sup> In general, the few studies on determinants of MJH have focused on the hours-constraint hypothesis. According to this hypothesis, MJH is more likely to occur if a worker cannot work their preferred number of hours in their first job.<sup>8-10</sup> Individuals may desire to work more hours if they cannot meet regular expenses or want to

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earn extra money.<sup>2,11</sup> Some studies have found that employees who work part-time or want to work additional hours are more likely to have multiple jobs.<sup>9,12</sup> However, other studies have shown that the hours-constraint hypothesis does not apply to all multiple job holders.<sup>10,12</sup>

A second hypothesis on reasons for MJH states that having multiple heterogeneous jobs can have non-pecuniary benefits, such as increased job satisfaction and the acquisition of new skills (heterogeneous-jobs hypothesis).<sup>13</sup> Few studies have examined this hypothesis. Some of these studies, however, have found some preliminary support.<sup>10,14</sup> In addition, some studies examined “hedging,” that is, holding two or more jobs to prevent unemployment, and found little support for it.<sup>3,11,14</sup>

Previous research has shown that reasons for MJH may differ between older and younger workers. For example, financial reasons are less common among older workers.<sup>2,7</sup> Qualitative studies have suggested that MJH might be a way for (older) workers to combine jobs with heterogeneous demands and resources, thereby improving their (sustainable) employability.<sup>15,16</sup> This may enable older workers to stay in paid employment, which is increasingly important in countries where workers are expected to participate in paid employment until later in life.

Although previous research on determinants of MJH provides valuable insights, these studies have focused on a limited set of determinants, generally related to the hours-constraint and heterogeneous-jobs hypotheses. The findings of these studies suggest that these two hypotheses do not apply to many multiple jobholders. Therefore, it is important to generate new hypotheses regarding who has multiple jobs and for which reason. Since little is known about the determinants of MJH among older employees and because these determinants likely differ from younger workers' determinants, the first aim of this study is to construct a prediction model for transitions from single job holding to MJH among employees aged 45-64. The results of these models may contribute to the development of new hypotheses. To construct prediction models, statistical methods are used to identify a combination of predictors, from a broad set of candidate predictors, that best predicts an outcome. We use the term predictor as it relates to elements of our prediction models only, and not to causal inference. We include candidate predictors that have been studied in previous studies, such as working hours, contract type, and household composition. Further, we include candidate predictors that have rarely been studied, but may be related to MJH, for instance because they have been found to be related to job-job mobility, such as health-related variables, physical work demands, psychosocial work factors, and work motivation.<sup>17</sup>

The second aim of this study is to explore whether the combination of predictors differs between combination MJH and hybrid MJH to account for heterogeneity among multiple job holders.<sup>16</sup> We expect predictors of transitions to MJH to differ between combination and hybrid MJH, for example, because people choose self-employment partly because of their desire for independence<sup>18</sup> and since setting up a business requires resources such as capital.<sup>19</sup>

## 2 | MATERIALS AND METHODS

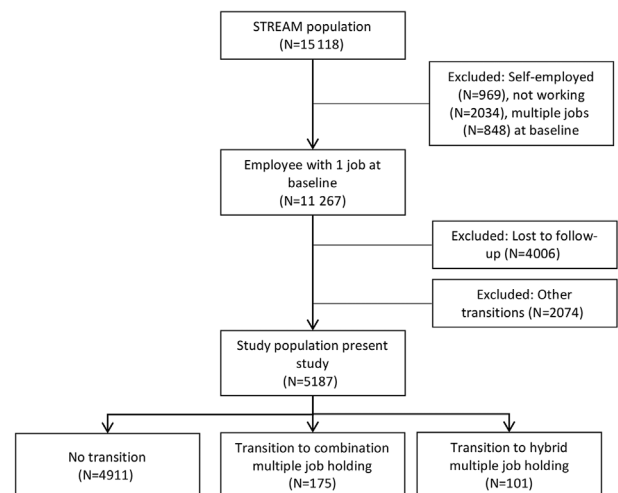
### 2.1 | Study population

The study population consisted of participants of the Study on Transitions in Employment, Ability, and Motivation (STREAM). STREAM is a Dutch longitudinal study of 15 118 persons aged 45-64 years at baseline (12 055 employees, 1029 self-employed persons, and 2034 not-working persons). The baseline age limit was set at 64 years (2010), because at the time the statutory retirement age in the Netherlands was 65 years. Follow-up continued after participants turned 65. The study population is extensively described elsewhere.<sup>20</sup> In short, STREAM participants are members of an internet panel of GfK Intomart, a company specializing in market research. The study population was stratified by employment status and age at baseline. The population was selected to be representative of the Dutch population with respect to gender and educational level within age groups 45-49, 50-54, 55-59, and 60-64 years. Participants completed online questionnaires in October/November 2010 (T1), 2011 (T2), 2012 (T3), and 2013 (T4). For every completed questionnaire, the participant's savings balance was increased by about €3.00.

In this study, we included STREAM participants who had one paid job as an employee at baseline ( $N = 11\,267$ ) and who had participated in all four questionnaires ( $N = 4006$  employees lost to follow-up) (Fig. 1). Employees who did not complete all four questionnaires were not included, because we required yearly information on work status to determine whether or not a respondent had made a transition to combination MJH or hybrid MJH. We excluded employees if they had experienced a transition other than a transition to MJH (eg, to unemployment or a new employer) to create a more homogenous reference group ( $N = 2074$  excluded).

### 2.2 | Outcome

Transitions from being an employee with a single job to MJH were identified using a question on the respondents' work status.



**FIGURE 1** Study population

Participants indicated whether they were: (i) an employee with one job; (ii) an employee in more than one job; (iii) self-employed; (iv) unemployed; (v) work disabled; (vi) retired early; (vii) retired; (viii) studying; and/or (ix) housewife/househusband. Employees who reported having more than one job as an employee during follow-up (T2, T3, or T4) were classified as having made a transition to combination MJH. Those who reported having one or more jobs as an employee and being self-employed during follow-up were classified as having made a transition to hybrid MJH. If both transitions were made during follow-up, persons were classified according to their first transition. If a respondent transitioned back to a single job, then they were still categorized as having made a transition to combination MJH or hybrid MJH.

### 2.3 | Predictors

All candidate predictors were assessed at baseline. Table 1 provides an overview of the candidate predictors, which were grouped in eight domains: demographic factors, health and mastery, work characteristics, work history, skills and knowledge, social factors, financial factors, and work motivation.

### 2.4 | Statistical analyses

To achieve the study's first aim, we used logistic regression analyses to create prediction models. We created separate prediction models for combination MJH and hybrid MJH. We used a backward elimination strategy to select predictors for the final models<sup>21</sup> because of the high number of candidate predictors and the relatively low number of events. The backward elimination process consisted of four steps, which were performed separately for combination MJH and hybrid MJH. First, we established univariable associations between the predictors and the outcome measures. To decrease the likelihood of eliminating relevant candidate predictors in the early steps of the elimination process, we used a high *P*-value (0.20; corresponding with 80% confidence intervals) as a threshold for elimination. Second, we performed multivariable analyses per domain, that is, demographics, health and mastery, work characteristics, work history, skills and knowledge, social factors, financial factors, and work motivation, using backward elimination. All predictor variables with *P* < 0.20 were selected for the next step. Third, we conducted multivariable analyses using backward elimination to construct prediction model 1A (for combination MJH) and prediction model 1B (for hybrid MJH). Predictors with *P* < 0.05 were retained in this step. No candidate predictors were included in the final prediction models by default. Finally, we examined whether or not models 1A and 1B were improved by adding interaction terms between predictors included in these models and educational level. The analyses described above were performed using SPSS. Bootstrapping was conducted to internally validate the model performance (1000 bootstraps using *R*).<sup>22</sup>

To achieve the study's second aim, that is, to explore the differences between combination MJH and hybrid MJH, we constructed a model including all predictors in models 1A and 1B. This

model was applied to combination MJH (model 2A) and hybrid MJH (model 2B). Three dimensions of the performance of models 1A, 1B, 2A, and 2B were assessed: explained variance (Nagelkerke *R*<sup>2</sup>), discriminatory power (C-statistic), and goodness-of-fit (Hosmer and Lemeshow test). The Hosmer and Lemeshow test was not internally validated, since there is no method to correct this test using bootstrapping.

### 2.5 | Ethics

The medical ethics committee of VUmc declared that the collection of the data used in this study was not subject to the Medical Research Involving Human Subjects Act. At the start of the online questionnaire, respondents received information stating that their privacy was guaranteed, all answers were confidential, and all data were stored in secured computer systems.

## 3 | RESULTS

In total, 5187 employees were included in this study. Just over a quarter of the participants (25.8%) were 45-49 years at baseline, 29.4% were 50-54 years, 32.2% were 55-59 years, and 12.6% were 60-64 years. A total of 43.6% of the study population was female and education level was high for 34%, intermediate for 39%, and low for 27%. Characteristics of the study population are further described in Table 2.

Respondents who were lost to follow-up had worked for a shorter period at their current employer (15.7 vs 17.2 years), less often attended training or education (72% vs 77%), and more frequently reported having a good household financial situation (54% vs 48%).

In total, 175 employees had made a transition to combination MJH and 101 to hybrid MJH. Transitions to combination MJH were most prevalent among employees working in hospitality, agriculture or health care. Transitions to hybrid MJH were most prevalent among employees working in construction, or financial services (data not shown). Table 2 presents the results of the univariable analyses (only predictors included in model 1A or 1B are shown). Having a part-time contract only predicted combination MJH. A high educational level, higher mastery and work-home interference only predicted hybrid MJH. In the univariable analyses per domain, no predictors in the work motivation domain were retained for transitions to combination MJH.

In multivariable analysis, type of contract and household financial situation predicted transitions to combination MJH (model 1A) and hybrid MJH (model 1B) (Table 3). Other factors only contributed to the prediction of one of these transitions. Transitions to combination MJH were predicted by health and mastery (being overweight), work characteristics (not having a permanent contract, having a part-time contract, not working in a medium-sized organization, a poor social climate at work), work history (demotion in the past 12 months, a physically demanding job for more than 20 years), skills and knowledge (higher self-perceived ability to find a new employer in the coming 12 months), social factors (children living at home, participating in

**TABLE 1** Overview of candidate predictors

Candidate predictors at baseline	Description and source	Scale/categories	
		Original	Used in analyses
<b>Demographics</b>			
Age	-	Continuous 45-64	Categorized: 1. 45-49 2. 50-54 3. 55-59 4. 60-64
Gender	-	Dichotomous: 0. Female 1. Male	Identical
Education	-	Categorical: 1. Low 2. Medium 3. High	Identical
<b>Health and mastery</b>			
Self-perceived physical health	SF-12	Continuous (0-100)	Identical
Self-perceived mental health	SF-12	Continuous (0-100)	Identical
Vitality	SF-36	Continuous (0-100)	Identical
Depressive symptoms	CES-D 10-item scale	Continuous (0-100)	Dichotomized; cut-off point: 0.8
Mastery	Control over factors that influence life situations. Pearlin Mastery Scale. <sup>39</sup>	Continuous 0-4	Identical
BMI	Calculated by dividing body weight in centimeters by body height in meters, squared.	Continuous (16.6-62.7)	Categorized: 0. Under-/normal weight (0-25) 1. Overweight (25-30) 2. Obese (>30)
Chronic health problems	We presented respondents with a list of chronic health problems <sup>a</sup> and asked them to select the ones they had.	-	Dichotomized: 0. No 1. Yes
Physical activity norm	How many days per week are you usually physically active for at least 30 min per day?	Categorical: 1. 0 days 2. 1 day 3. 2 days 4. 3 days 5. 4 days 6. 5 days 7. 6 days 8. 7 days	Dichotomized: 0. 6 days or less 1. 7 days

(Continues)

TABLE 1 (Continued)

Candidate predictors at baseline	Description and source	Scale/categories	
		Original	Used in analyses
Work characteristics			
Number of hours according to contract	How many hours per week do you work according to your contract?	Continuous (0-84)	Dichotomized:
			0. Part-time (36 h or less)
			1. Full-time (more than 36 h)
Contract type	What type of contract do you have?	Categorical:	Dichotomized:
			0. No permanent contract
			1. Permanent
			1. Permanent contract
			2. Temporary with potential for permanent
			3. Temporary for a defined period of time
			4. Temporary employ, stand-by employee/ substitute
			5. Sheltered employment
Number of employees working in organization	About how many persons work at your company or institution? (Only count the number of persons at your office/location. If you do not know the number of persons exactly, please give an estimate).	Categorical:	Reduced categories:
			0. $\leq$ 49 persons
			1. 1-4 persons
			1. 50 to 249 persons
			2. $\geq$ 250 persons
			3. 10-49 persons
			4. 50-99 persons
			5. 100-249 persons
			6. More than 249 persons
Restructuring	Did the company you work for carry out a restructuring or reorganization in the past 12 months?	Categorical:	Dichotomized:
			0. No
			1. No
			1. Yes
			2. Without compulsory redundancies
			3. With compulsory redundancies
Supervisor	Do you manage other workers in your present job? (please include personnel that you manage through others)	Categorical:	Dichotomized
			0. No
			1. No
			1. Yes
			2. Yes, to 1-4 employees
			3. Yes, to 5-9 employees
			4. Yes, to 10-49 employees

(Continues)

TABLE 1 (Continued)

Candidate predictors at baseline	Description and source	Scale/categories	
		Original	Used in analyses
		5. Yes, to 50-99 employees	
		6. Yes, to more than 99 employees	
Physical demands	5-item scale on the regular use of force, vibrating tools, awkward postures, and prolonged standing or squatting. Dutch Musculoskeletal Questionnaire. <sup>40</sup>	Continuous 0-4	Identical
Job demands	4-item scale, Job Content Questionnaire (JCQ). <sup>41</sup>	Continuous 0-4	Identical
Mental demands	3-item scale, NOVA-WEBA. <sup>42</sup>	Continuous 0-4	Identical
Emotional demands	3-item scale, Copenhagen Psychosocial Questionnaire (COPSOQ) <sup>43</sup>	Continuous 0-4	Identical
Bullying	Respondents were asked the question: have you experienced any bullying, intimidation, physical violence or unwanted sexual attention at work in the last 12 months by customers?		Aggregated <sup>b</sup>
			0. No
			1. Yes
Social support	4-item scale, Copenhagen Psychosocial Questionnaire (COPSOQ) <sup>43</sup>	Continuous 0-4	Identical
Autonomy	5-item scale, Job Content Questionnaire (JCQ) <sup>41</sup>	Continuous 0-4	Identical
Age discrimination	4-item scale, based on Nordic Age Discrimination Scale <sup>44</sup>	Continuous 0-4	Identical
Presence of 10 work characteristics	Appreciation, interesting work, opportunities for learning and development, autonomy, good social climate, good supervisor, good salary, opportunities to work part-time, opportunity to determine one's own working hours, high job security	Categorical:	Dichotomized:
		0. Not present at all	0. Not present (0 and 1)
		1. Somewhat present	1. Present (2 and 3)
		2. Rather present	
		3. Highly present	
Work history			
Number of years:			
In a paid job		Continuous	Identical
At current employer	-	Continuous	Categorized:
In current function	-		0. ≤2 years
			2. 3-5 years
			3. 6-10 years
			4. ≥11 years
In a physically demanding job	-	Continuous	Categorized:
In an emotionally demanding job	-		0. 0 years
In a mentally demanding job	-		1. 1-20 years
			2. >20 years
Increase in working hours	-	Dichotomous:	Identical
		0. No	
		1. Yes	

(Continues)

TABLE 1 (Continued)

Candidate predictors at baseline	Description and source	Scale/categories	
		Original	Used in analyses
Decrease in working hours	-	Dichotomous:	Identical
		0. No	
		1. Yes	
Demotion	-	Dichotomous:	Identical
		0. No	
		1. Yes	
Skills and knowledge			
Developmental pro-activity	The extent to which employees actively search for opportunities to enhance their skills and knowledge. <sup>45</sup>	Continuous (0-4)	Identical
Training/education	Respondents were asked whether they attended a training, course, congress, trade fair, or meeting of suppliers or branch association in the past 12 months.	-	Aggregated <sup>b</sup>
			0. No
			1. Yes
Match skills/knowledge and work	How do your knowledge and skills fit with your job?	Categorical:	Dichotomized:
		0. Badly	0. Badly (0 and 1)
		1. Moderately	1. Well (2 and 3)
		2. Reasonably	
		3. Well	
Ability to re-educate to new profession	In the coming 12 months, will you be able to re-educate to a new profession?	Categorical:	Dichotomized:
Ability to find a new employer	In the coming 12 months, will you be able to find a new employer?	0. Totally disagree	0. No (0, 1, and 2)
		1. Disagree	1. Yes (3 and 4)
		2. Neutral	
		3. Agree	
		4. Totally agree	
Social factors			
Partner	The candidate predictors on having a partner and having children living at home were created using the following two variables:	-	Categorical:
	How would you describe your household?		0. Working partner
	1. Married or living together without children living at home		1. Partner who does not work
	2. Married or living together with children living at home		2. No partner
	3. Single-parent family		
	4. Single		
	5. Other		
Children living at home	And:	-	Dichotomous:
	Is your partner currently... :		0. No

(Continues)

TABLE 1 (Continued)

Candidate predictors at baseline	Description and source	Scale/categories	
		Original	Used in analyses
	- Having one paid job as an employee (salaried employment)		1. Yes
	- Self-employed or entrepreneur		
	- Unemployed		
	- Work disabled		
	- Housewife/househusband		
	- Retired (early)		
	- Studying		
	- Doing volunteer work or volunteer aid		
Participation in:	Have you spent part of your time on one of the following activities in the past 12 months?	Dichotomous:	Identical
Volunteer work	- Volunteer work or charity work (for example unpaid work for a club, committee, health care institution, charitable institution, religious community, etc.)	No	
Informal care	- Volunteer aid (for example taking care of an invalid person in your close environment without being paid. Does not include looking after healthy children)	Yes	
Household activities	- Household work (household work, taking care of children living at home)		
Work-home interference	Missing or neglecting work because of family responsibilities	Categorical:	Dichotomized:
Home-work interference	Missing or neglecting family activities because of work	1. No, never	0. No (1)
		2. Yes, sometimes	1. Yes (2, 3, 4)
		3. Yes, often	
		4. Yes, very often	
Financial factors			
Financial position of household	What is the financial situation of your household now?	Categorical:	Categorized:
		1. Very short on money	0. Short of money
		2. Somewhat short on money	1. Just adequate
		3. Just adequate	2. Money left
		4. Some money left	
		5. A lot of money left	
Breadwinner	Do you contribute most to the household income?	Categorical:	Dichotomized:
		1. Yes, most	0. No (2 and 3)
		2. Equal	1. Yes (1)
		3. No, less	
Work motivation			
Work engagement	We used six items on two dimensions of the Utrecht Work Engagement Scale, ie, vigor and dedication. <sup>46</sup>	Continuous: 0-6	Identical
I work because:			
Of structure	"I work because it provides structure and regularity to my life"	Categorical:	Continuous (Continues)



**TABLE 1** (Continued)

Candidate predictors at baseline	Description and source	Scale/categories	
		Original	Used in analyses
Nice social contacts	"I work because it provides nice social contacts"	1. Totally disagree	
I enjoy working	"I work because I enjoy working"	2. Disagree	
		3. Neither agree nor disagree	
		4. Agree	
		5. Totally agree	

<sup>a</sup>Complaints of the hands or arms (also arthritis, repetitive strain injury [RSI]), complaints of the legs and feet (also arthritis), complaints of the back or neck (also arthritis, RSI), migraine or severe headache, cardiovascular diseases, asthma, bronchitis, emphysema, gastrointestinal disorders, diabetes, severe skin disease, psychological complaints/disorders, hearing problems, epilepsy, life-threatening diseases (eg, cancer, acquired immune deficiency syndrome [AIDS]), and/or problems with vision.

<sup>b</sup>Aggregated using multiple dichotomous (yes/no) variables. If a respondent indicated "yes" for at least one variable, they were scored "yes" for the aggregated variable.

volunteer work), and financial factors (a poor household financial situation).

Transitions to hybrid MJH were predicted by demographics (high educational level), health and mastery (higher mastery), work characteristics (not having a permanent contract, higher emotional work demands, lower social support, absence of inappropriate behavior by customers), work history (short work history at current employer, no history of mental job demands or a history of more than 20 years in a mentally demanding job), social factors (work-home interference), and financial factors (a poor household financial situation).

Age and gender were not retained in either model 1A or 1B. This indicates that neither age nor gender contributed to the prediction of either combination MJH or hybrid MJH, independent from the predictors that were retained in the two models.

Factors that significantly predicted combination MJH did not significantly predict hybrid MJH in model 2B and vice versa, except for the number of years worked at current employer, contract type and household financial situation (Table 3). Several predictors were similarly associated, although not significantly, with both transitions (eg, organization size, social support at work, demotion, and years in a physically demanding job). Some predictors were distinctly associated with transitions to combination and hybrid MJH (eg, body mass index (BMI), part-time work, work-home interference, and inappropriate behavior by customers).

Table 4 shows that both model 1A and 1B fit the data well. The C-statistic for model 1A decreased from 0.72 to 0.70 after internal validation indicating moderate discriminatory power. The C-statistic for model 1B decreased from 0.77 to 0.74 after internal validation. The explained variance (Nagelkerke  $R^2$ ) decreased from 12% to 9% after internal validation for model 1A and from 13% to 10% for model 1B. The shrinkage factor was similar for both models (model 1A: 0.91, and model 1B: 0.89).

## 4 | DISCUSSION

The first aim of this study was to identify the combination of predictors that best predicted transitions to combination MJH and hybrid MJH

among older workers. We found that these transitions were best predicted by a combination of a wide variety of factors, including demographics, health and mastery, work characteristics, work history, skills and knowledge, social factors, and financial factors. The second aim was to explore whether or not the combination of predictors differ between combination MJH and hybrid MJH. We found that some factors predicted transitions to both combination MJH and hybrid MJH, that is, not having a permanent contract and a poor household financial situation. Other factors only contributed to the prediction of one of these transitions. For instance, working part-time only predicted transitions to combination MJH and work-home interference only predicted hybrid MJH.

Although the present study only included employees over the age of 45, some of our findings are in line with studies including all age groups. For instance, in agreement with previous studies,<sup>9,23,24</sup> we found that not having a permanent contract predicted combination MJH and hybrid MJH. This indicates that hedging and increasing income stability may be a reason for MJH among older employees. Previous research found that financial reasons are less important among older multiple job holders.<sup>2,7</sup> However, we found that, among older employees, a poor household financial situation did predict combination MJH and hybrid MJH. This suggests that financial reasons for MJH are important among older workers as well. Cross-sectional research in the Netherlands has shown that employees who have multiple jobs out of financial necessity score higher on a burnout scale than employees who have multiple jobs for other reasons.<sup>25</sup> Therefore, it is important to further examine the association between reasons for MJH and its effects on health, since the results of such research could help prevent the negative health effects of MJH.

Previous research has shown that working part-time is a determinant of MJH.<sup>9,23,26</sup> Because this is the first study that analyzed combination MJH and hybrid MJH separately, we were able to determine that working part-time only contributed to predicting combination MJH. Combined with the finding that work-home interference only predicted hybrid MJH, it appears that older employees are less likely to make transitions to hybrid MJH to increase work hours,

**TABLE 2** Univariable associations between predictors and transitions to combination multiple job holding (MJH) and hybrid MJH

	Frequency	Mean	Inter quartile range	Univariable results combination MJH		Univariable results hybrid MJH	
				OR	80% CI	OR	80% CI
<b>Demographics</b>							
<b>Educational level</b>							
Low	27%	-		Ref	-	Ref	-
Medium	39%	-		1.14	0.89-1.47	1.45	0.98-2.14
High	34%	-		1.10	0.85-1.42	2.51	1.73-3.63
<b>Health and mastery</b>							
Mastery (0-4)	-	2.8	2.4-3.1	0.87	0.74-1.02	1.34	1.08-1.67
<b>Body mass index</b>							
Underweight/normal weight	36%	-		Ref	-	Ref	-
Overweight	46%	-		1.43	1.14-1.79	0.96	0.71-1.29
Obese	18%	-		0.85	0.62-1.18	1.21	0.85-1.73
<b>Work characteristics</b>							
Permanent contract (yes)	93%	-		0.19	0.15-0.25	0.23	0.16-0.32
Part time contract (yes)	53%	-		2.73	2.21-3.36	0.96	0.74-1.25
<b>Organization size</b>							
1-49 persons	28%	-		Ref	-	Ref	-
50-249 persons	26%	-		0.50	0.38-0.66	0.73	0.54-1.07
>249 persons	46%	-		0.56	0.45-0.71	0.67	0.49-0.90
Emotional demands (0-4)	-	1.5	1.0-2.0	1.11	0.99-1.25	1.31	1.15-1.53
Social support at work (0-4)	-	2.6	2.3-3.0	0.83	0.73-0.94	0.65	0.55-0.76
Poor social climate	18%			1.51	1.20-1.91	1.11	0.80-1.54
Inappropriate behavior by customers (yes)	16%			1.44	1.13-1.83	0.64	0.42-0.96
<b>Work history</b>							
Demotion in past 12 months (yes)	5%			3.03	2.21-4.13	3.14	2.09-4.71
<b>Years at current employer</b>							
1 to 2	11%	-		Ref	-	Ref	-
3 to 5	20%	-		0.43	0.30-0.62	0.59	0.39-0.90
6 to 10	18%	-		0.45	0.33-0.62	0.31	0.20-0.48
>10	62%	-		0.28	0.21-0.37	0.24	0.17-0.34
<b>Physically demanding job</b>							

(Continues)

TABLE 2 (Continued)

	Frequency	Mean	Inter quartile range	Univariable results combination MJH		Univariable results hybrid MJH	
				OR	80% CI	OR	80% CI
Never	45%	-		Ref	-	Ref	-
1 to 20 years	38%	-		1.29	1.03-1.62	1.35	1.02-1.79
>20 years	17%	-		1.72	1.32-2.24	1.03	0.70-1.53
Mentally demanding job							
Never	25%	-		Ref	-	Ref	-
1 to 20 years	45%	-		0.95	0.75-1.21	0.86	0.61-1.22
>20 years	30%	-		0.82	0.62-1.07	1.41	1.01-1.99
Knowledge and skills							
Ability to find a new employer in the coming 12 months	-	1.7	1.0-3.0	1.15	1.06-1.25	1.09	0.97-1.21
Social factors							
Children living at home (yes)	46%	-		1.58	1.30-1.93	1.45	1.12-1.88
Work-home interference (yes)	34%	-		1.02	0.83-1.26	2.49	1.92-3.24
Volunteer work (yes)	39%	-		1.68	1.38-2.05	1.28	0.99-1.65
Financial factors							
Financial situation							
Short of money	17%	-		1.85	1.45-2.35	2.05	1.50-2.81
Just adequate	25%	-		1.21	0.95-1.54	1.45	1.07-1.98
Money left	58%	-		Ref	-	Ref	-

**TABLE 3** Multivariable associations between predictors and transitions to combination multiple job holding (MJH) and hybrid MJH

	Model 1A		Model 1B		Model 2A		Model 2B		
	Combination MJH		Hybrid MJH		Combination MJH		Hybrid MJH		
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	
<b>Demographics</b>									
<b>Educational level</b>									
Low	-	-	Ref	-	Ref	-	Ref	-	
Medium	-	-	1.69	0.87-3.27	1.32	0.86-2.03	1.45	0.71-2.95	
High	-	-	2.52	1.30-4.87	1.33	0.81-2.18	3.12	1.51-6.48	
<b>Health and mastery</b>									
Mastery	-	-	1.62	1.14-2.30	0.95	0.72-1.26	1.55	1.05-2.28	
<b>Body mass index</b>									
Underweight/normal weight	1.29	0.75-2.22	-	-	1.28	0.74-2.22	0.65	0.35-1.19	
Overweight	1.81	1.09-3.01	-	-	1.84	1.10-3.06	0.63	0.35-1.11	
Obese	Ref	-	-	-	Ref	-	Ref	-	
<b>Work characteristics</b>									
Permanent contract (yes)	0.33	0.22-0.51	0.31	0.16-0.60	0.42	0.25-0.72	0.38	0.18-0.82	
Part time contract (yes)	2.50	1.75-3.57	-	-	2.35	1.63-3.38	0.91	0.56-1.47	
<b>Organization size</b>									
1-49 persons	Ref	-	-	-	Ref	-	Ref	-	
50-249 persons	0.53	0.33-0.84	-	-	0.52	0.33-0.83	0.66	0.36-1.20	
>249 persons	0.71	0.49-1.03	-	-	0.74	0.51-1.07	0.73	0.43-1.23	
Emotional demands	-	-	1.42	1.07-1.89	1.03	0.82-1.29	1.24	0.91-1.68	
Social support at work	-	-	0.66	0.51-0.85	0.90	0.71-1.12	0.63	0.47-0.85	
Poor social climate	1.67	1.14-2.45	-	-	1.52	0.99-2.32	0.91	0.49-1.70	
Inappropriate behavior by customers (yes)	-	-	0.49	0.25-0.95	1.34	0.88-2.03	0.47	0.23-0.97	
<b>Work history</b>									
Demotion in past 12 months (yes)	2.42	1.42-4.13	-	-	2.26	1.30-3.93	1.89	0.90-3.95	
<b>Years at current employer</b>									
1 to 2	-	-	Ref	-	Ref	-	Ref	-	
3 to 5	-	-	0.82	0.40-1.67	0.69	0.36-1.32	0.84	0.38-1.86	
6 to 10	-	-	0.48	0.23-1.02	0.78	0.43-1.43	0.40	0.17-0.95	
>10	-	-	0.34	0.18-0.67	0.56	0.32-0.99	0.32	0.15-0.68	
<b>Physically demanding job</b>									
Never	Ref	-	-	-	Ref	-	Ref	-	
1 to 20 years	1.28	0.88-1.87	-	-	1.26	0.85-1.88	1.48	0.88-2.50	
>20 years	1.83	1.18-2.84	-	-	1.93	1.20-3.12	1.87	0.93-3.74	
<b>Mentally demanding job</b>									
Never	-	-	Ref	-	Ref	-	Ref	-	
1 to 20 years	-	-	0.56	0.32-0.98	0.97	0.63-1.51	0.63	0.34-1.20	
>20 years	-	-	0.97	0.55-1.73	0.88	0.53-1.46	0.99	0.51-1.91	
<b>Knowledge and skills</b>									
Ability to find a new employer in the coming 12 months	1.16	1.01-1.34	-	-	1.13	0.97-1.32	0.90	0.74-1.11	
<b>Social factors</b>									
Children living at home (yes)	1.48	1.05-2.09	-	-	1.44	1.02-2.05	1.24	0.77-1.97	
Work-home interference (yes)	-	-	2.46	1.60-3.77	0.98	0.68-1.40	2.51	1.57-4.02	

(Continues)

**TABLE 3** (Continued)

	Model 1A		Model 1B		Model 2A		Model 2B	
	Combination MJH		Hybrid MJH		Combination MJH		Hybrid MJH	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Volunteer work (yes)	1.58	1.13-2.20	-	-	1.58	1.13-2.21	1.10	0.70-1.74
Financial factors								
Financial situation								
Short of money	1.68	1.12-2.52	2.16	1.28-3.65	1.59	1.05-2.42	1.76	0.98-3.15
Just adequate	1.07	0.71-1.62	1.68	1.02-2.78	1.06	0.70-1.61	1.71	1.00-2.92
Money left	Ref	-	Ref	-	Ref	-	Ref	-

Model 1A: Prediction model combination multiple job holding (MJH).

Model 1B: Prediction model hybrid MJH.

Model 2A: Predictors in model 1A and 1B applied to combination MJH.

Model 2B: Predictors in model 1A and 1B applied to hybrid MJH.

Original: model before internal validation. Corrected: model after internal validation.

but more likely to do so to improve work-life balance. This finding indicates that the hours-constraint hypothesis may be more applicable to combination MJH than hybrid MJH among older workers. Work-life imbalance has been associated with (job) exhaustion,<sup>27,28</sup> marital dissatisfaction,<sup>28-30</sup> and depression.<sup>28</sup> Older employees might be using hybrid MJH to reduce the negative effects of a work-life imbalance. Further research regarding the association between work-life imbalance, hybrid MJH and mental health is desirable.

Some candidate predictors that had not been studied earlier predicted transitions to combination MJH, hybrid MJH, or both. For instance, we found that both transitions were predicted by (distinct) job demands and job resource variables. A long history of high physical job demands and a poor social climate predicted transitions to combination MJH and higher emotional job demands and lower social support at work predicted transitions to hybrid MJH. MJH might enable older employees to combine jobs with heterogeneous demands and resources while retaining established privileges and rights in their primary job, which would be in line with the heterogeneous jobs hypothesis. Combining jobs with heterogeneous demands and resources could positively affect health and work engagement,<sup>31,32</sup> which may enhance

(sustainable) employability. Future research should study whether and how MJH can improve imbalances between job demands and job resources, and thereby contribute to sustainable employability.

To our knowledge, this is the first study to include health-related variables and mastery as potential predictors of MJH. This study showed that only BMI (combination MJH) and mastery (hybrid MJH) contributed to predicting transitions to MJH. Mastery has been associated with cognitive self-efficacy<sup>33</sup> and in turn with entrepreneurial intentions and activities.<sup>34</sup> We found that higher self-efficacy, assessed as the self-perceived ability to find a new employer in the next 12 months, also predicted combination MJH.

The finding that other health-related variables did not contribute to the prediction of either combination MJH or hybrid MJH may be attributable to the healthy worker effect.<sup>35</sup> Employees who have been able to continue working over the age of 45 are probably relatively healthy or able to adapt their work to their health situation. In both cases, health may not be a factor in the decision to hold multiple jobs. Alternatively, health may influence MJH via various mechanisms. On the one hand, employees with good health may be more likely to have multiple jobs as they have energy to cope with having more than one job.

**TABLE 4** Performance and internal validation of model 1A, 1B, 2A, and 2B

	Model 1A		Model 1B		Model 2A	Model 2B
	Original	Corrected	Original	Corrected	Original	Original
Hosmer and Lemeshow test ( <i>P</i> -value)	0.105	-	0.549	-	0.118	0.072
C-statistic	0.723*	0.701	0.772*	0.744	0.737*	0.782*
Nagelkerke <i>R</i> <sup>2</sup>	0.118	0.093	0.128	0.096	0.118	0.146
Shrinkage factor coefficients	-	0.91	-	0.89	-	-

Model 1A: Prediction model combination multiple job holding (MJH).

Model 1B: Prediction model hybrid MJH.

Model 2A: Predictors in model 1A and 1B applied to combination MJH.

Model 2B: Predictors in model 1A and 1B applied to hybrid MJH.

Original: model before internal validation. Corrected: model after internal validation.

\**P* < 0.05.

On the other hand, employees with poor health may also be more likely to have multiple jobs, as MJH may provide them with the flexibility needed to combine their health situation with (full-time) work while retaining established rights and privileges in their primary job.

One strength of this study is that we constructed prediction models, which enabled us to study a broad set of predictors. Our final models contained both predictors known to be related to MJH and predictors that had not been studied previously in relation to MJH. An additional strength is that we studied transitions to combination MJH and transitions to hybrid MJH separately, which to our knowledge has not been done before. This study also has limitations. First, the cohort may suffer from selection bias. STREAM participants are members of an internet panel. This may have caused an underrepresentation of groups with limited access to internet and in turn biased estimates.<sup>36</sup> Response analyses of the baseline questionnaire showed that persons aged 60–64 years and those with a low level of education participated slightly less often in STREAM. In addition, members of an internet panel may differ in other respects from the general population that were not measured. If these differences are related to predictors or outcomes, this may have affected our results. Second, because we excluded respondents who did not respond in all years, selective loss-to-follow-up may have resulted in bias. However, comparison of the respondents and non-respondents revealed few relevant differences. Third, employees who reported having two jobs at T2, T3, or T4 were identified as having made a transition to MJH. Therefore, the time period between the assessment of predictors and the outcomes varied from one to three years. However, we chose this design since little is known about the time between the occurrence of the various determinants and transitions to MJH. Fourth, the events per variable (EPV) ratio in multivariable backward selection was relatively low (4.9 for combination MJH and 3.2 for hybrid MJH) in light of the commonly used threshold of five to ten.<sup>37,38</sup> A low EPV can lead to biased regression coefficients. Internal validation was performed to estimate this bias, and resulted in shrinkage factors of approximately 0.9, thus indicating that bias was limited.

In conclusion, a wide variety of factors predicted transitions to combination MJH and hybrid MJH among older workers. Some factors predicted both combination MJH and hybrid MJH, for example, not having a permanent contract and a poor household financial situation. Other factors only predicted combination MJH, for example, working part-time, or hybrid MJH, for example, work-home interference. This suggests that distinct mechanisms may underlie transitions to combination MJH and hybrid MJH. Further, the present study added to our knowledge that some factors that had not been previously studied predicted MJH, for example, self-efficacy and job demands and resources. These insights can be used to formulate new hypotheses regarding determinants of and reasons for MJH.

The results of this study show which factors form the best combination of predictors of combination MJH and hybrid MJH among older workers but do not imply that there is a causal relation between individual predictors and combination MJH and/or hybrid MJH. Future etiologic studies should examine which of the predictors we found are also individually and causally related to MJH and by which mechanisms.

## AUTHORS' CONTRIBUTIONS

SB participated in the design of the research question and the methods and analyzed the data. He drafted the manuscript and approved the final version for publication. GAG, CRLB, and AJB also participated in the design of the research question and the methods used, provided critical feedback on the manuscript and approved the final version for publication. PMB provided critical feedback on the manuscript and approved the final version for publication.

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## ETHICS APPROVAL AND INFORMED CONSENT

The work was performed at the Department of Public and Occupational Health, the Amsterdam Public Health research institute, VU University Medical Center, Amsterdam, The Netherlands, and Netherlands Organisation for Applied Scientific Research TNO, Leiden, The Netherlands. The medical ethics committee of the VU university medical center declared that the collection of the data used in this study was not subjected to the Medical Research Involving Human Subjects.

## DISCLOSURE (AUTHORS)

The authors declare no conflicts of interest.

## DISCLOSURE BY AJIM EDITOR OF RECORD

Paul Landsbergis declares that he has no conflict of interest in the review and publication decision regarding this article.

## DISCLAIMER

None.

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