Applying Aspects of Disability Determination Methods From the Netherlands in the U.S.

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1. Introduction

In recent years, there has been a policy debate about whether the disability determination process for Social Security Disability Insurance (DI) benefits in the U.S. should be revised to reflect changes in the functional requirements of work. In particular, some policy makers have expressed interest in incorporating insights about how disability determination in other countries relies on information about occupational requirements to make disability determinations. The disability determination system in the Netherlands is one potential model.[1]

The Netherlands uses a unique, direct method of measuring an applicant's residual work capacity. Disability assessment focuses on first identifying specific residual functional abilities. These standardized functional abilities are then directly linked to standardized requirements of existing jobs in the Netherlands, allowing direct computation of the set of feasible jobs and residual earnings capacity of an applicant, conditional on educational attainment. Moreover, it is possible to calculate an estimated degree of disability-related loss in earnings capability, defined as the ratio of estimated residual earnings capacity to prior earnings. This degree of disability is used to determine eligibility for DI benefits, which can be received as full benefits or as partial benefits combined with part-time work.

In contrast, the system in the U.S. relies heavily on delineation of medical conditions, and does not utilize a standardized, explicit link between an applicant's functional abilities and the functional requirements of potential jobs in the national economy. Instead, applicants are deemed to have no work capacity if they have one or more specific medical conditions or if they fall into certain categories under the medical-vocational guidelines, based on age, education, prior work experience and an aggregated measure of residual functional capacity.

[1] The Dutch reforms that caused employers to recognize the cost of disability claims have been suggested as a model for other countries to influence the trajectory of disability claims (Autor and Duggan 2010, Burkhauser and Daly 2011, Fulz 2015, Koning and Lindeboom 2015).

The guidelines were originally intended to identify as disabled only those applicants with little remaining capacity for physically demanding work and who had limited job prospects because of their low education, narrow skills, and/or age, but the guidelines have not been updated since 1978 and only ever comprised a coarse mapping between health and alternative job prospects (Maestas 2019).

The goal of this paper is to explain how work capacity is measured in the Netherlands and then apply aspects of that method to a representative sample of Americans. The insights from this project could motivate improvements in the current disability determination process. Moreover, understanding the explicit link between functional abilities, and the requirements of occupations could provide useful inputs for SSA's work incentive programs by explicitly listing jobs that a beneficiary is capable of performing.

2. Disability Determination in the Netherlands

DI applications for individuals with recent work history in the Netherlands are processed by the UWV, the Dutch Social Security Administration, after two years have passed since the onset of disability.[2] DI eligibility depends on the applicant's *estimated loss in earnings capacity*, defined as the ratio of the applicant's estimated *residual earnings capacity* (calculated using the procedure outlined below) to his or her actual earnings prior to disability onset, multiplied by 100. An estimated earnings loss of less than 35 percent means that the applicant does not qualify for disability benefits. An estimated earnings loss of 35-79 percent means the applicant qualifies for (partial) DI benefits, and an estimated earnings loss that is greater than 80 percent entitles the applicant to full DI benefits.

The applicant's residual earnings capacity is determined through selection of the highest-earning feasible occupations from an actively maintained database of approximately

[2] During these two years, mandatory sick pay is paid by the employer for the duration of the employment contract, and by a public short-term DI scheme thereafter.

5,500 *job profiles* ("functieprofielen"), which describe the tasks, functional ability and educational requirements, and earnings of actual jobs in the Netherlands. Job profiles are unique in their duties and characteristics and can be aggregated into nearly 300 occupations (approximately equivalent to the four-digit level of Standard Occupation Classification in the U.S.) defined by up to three *generalized tasks* ("werktypes") and industry. Each job profile can have multiple positions: workers who do the same job with the exact same characteristics in accordance with the job profile. Job profiles are only included in the database if they relate to an occupation that exists in all five regions of the country.

Figure 1 provides an illustration of these concepts based on seven employees at two employers. Employer 1 employs six employees, each of whom hold a single position, and three of whom are in Occupation 1 and three of whom are in Occupation 2. The three employees in Occupation 1 share the same generalized tasks and industry, but the two employees in Job Profile A differ from the employee in Job Profile B in some key characteristic such as weekly work hours. In this stylized example, three employees in Occupation 2 work for Employer 1 and a employee in Occupation 2 works for Employer 2. Even if these three employees share the exact same tasks and work characteristics, their positions are described by two different job profiles (C and D) corresponding to their different employers.

The content and requirements of each job profile in the database are collected by an *occupational analyst* during a multi-hour in-person workplace visit. During this visit, the occupational analyst interviews the worker(s), their supervisor, and a human resources employee. In addition, the occupational analyst observes the worker during his/her activities and asks questions for clarification. The UWV job profile database is maintained by 25 occupational analysts employed by the UWV. They are only allowed to include profiles of jobs with high employment security, or "open-ended employment agreements." Temp jobs

and alternative work arrangements, totaling 36% of all working individuals,[3] cannot be included. Additionally, certain occupations which require specific beliefs, such as military occupations, religious occupations or sex work, are excluded. Each job profile is updated with current information from the employer approximately every 18 months. If an update has not occurred for at least 24 months, the job profile is no longer active and is not used in the disability determination procedure.

Each job profile has a single minimum required educational level, out of seven educational levels. Historically, the first digit of the SBC code also relates to an educational level. Consequently, occupation codes can be ranked by educational level requirement. UWV occupational analysts have told us in interviews that employers tend to adjust educational level requirements over the business cycle: in a tight labor market they may relax the requirements. Occupational analysts are instructed to push employers to report only the absolute minimum requirement. In practice, no occupation has associated job profiles with more than two different (but always adjacent) educational levels.

Two types of UWV specialists review applications following the process, summarized in Figure 2. First, an *examining physician* ("verzekeringsarts") records the applicant's medical conditions and the examining physician, who has a six-year medical school degree as well as a four-year medical specialization degree, can record up to 3 diagnoses in the medical file, starting with the diagnoses most responsible for the limitation of productive capacities.

Next, the examining physician determines whether the DI applicant has "durable capabilities for work". There are five possible formal reasons why this is not the case: 1) if the applicant is severely limited in his ability to function at a personal and/or social level because of a mental disorder; 2) if the applicant resides in a long-term care facility; 3) if the applicant is bed-ridden for most of the day and this is expected to remain the case in the long run; 4) if

[3] https://www.flexbarometer.nl/verhouding-vast-flex-zelfstandig

the applicant is highly dependent in activities of daily living (ADL) and needs the assistance of another person to fulfil the basic functions of normal life; 5) if the applicant has strongly fluctuating capabilities, is expected to lose ADL independence within three months, or is expected to die within a year. While the fifth category actually comprises three different situations, it is viewed as a single reason in the UWV documents. If it is determined that no durable capabilities for work remain, the DI applicant will be determined fully eligible for DI benefits through the "IVA" scheme.

The examining physician can determine that the DI applicant has durable capabilities for work for one of four reasons: 1) if both the DI applicant and the examining physician agree that the applicant can fulfill his/her prior job; 2) if the DI applicant has no limitations to his/her functional abilities relative to the well-defined "normal" levels of functional ability;[4] 3) if the applicant is limited on at least one functional ability, which means that functioning is below the defined "normal" value; 4) there is a miscellaneous category.

If the examining physician determines that the DI applicant has durable capabilities for work, she will complete a 108-item standardized *Functional Abilities Questionnaire* (Dutch acronym: FML) based on a review of the applicant's medical records and a one-hour interview to confirm the conclusions with the applicant. The functional abilities of applicants and the functional requirements of jobs measure the same underlying construct. Functional abilities are measured on binary, ordinal, or check-all-that-apply scales. Sometimes the actual capacity of an applicant is between two levels of an ordinal scale. In that case, the examining physician is expected to score the mildest of these two and clarify the actual level in a remark.

For privacy reasons, only the main conclusion and the information on functional abilities and limitations, but not the information on medical conditions, are accessible by the second UWV specialist: the non-medically trained *disability assessor* ("arbeidsdeskundige"),

[4] This does not automatically imply that the applicant can fulfill his prior job if that job required functional abilities above the level that is considered "normal" by UWV standards.

who will use this information to determine work capacity by identifying the highest-earning feasible job profiles and the associated residual earnings capacity of the applicant. Disability assessors usually work with the same examining physicians.

The disability assessor uses the information on functional abilities to assess whether the applicant can work in his current job for the same number of hours per week. If this is the case, the applicant is not eligible for disability benefits because there is no loss in earnings capacity. The disability assessor has information on the prior job of the applicant, including job title, average number of hours worked in the year prior to sickness, and earnings prior to sickness. These earnings are automatically adjusted for inflation by the software used by the UWV. If the disability assessor is not familiar with the previous job of the applicant, she needs to investigate, in some cases visiting the (former) workplace of the applicant in person.

If the applicant is not capable of working in his prior job, the disability assessor selects the attained educational degrees from a given (very large) set of degrees in CBBS. The system then translates the educational degree into a 7-level classification. The disability assessor can also select an educational "field" from a list of seven options: administration, agriculture, art and culture, commercial, health care, services, technical. If no field is chosen, it is assumed that the direction is "general." The disability assessor notes language skills, possession of a driver's license, typing skills, computer skills, and any experience with text processing, and records the full employment history (employers and periods).

Next, the disability assessor runs an *automated pre-selection* procedure which accepts, flags, or rejects job profiles in the database, by comparing the ability and educational requirements to the residual functional abilities and educational credentials of the applicant. Figure 3 illustrates how ability levels and requirements are combined to determine whether the applicant has the ability to perform a particular requirement of a given job for the case of collaboration with others, with is measured on a three-value ordinal scale for both ability level

and requirement. For applicants who are very limited in their ability to collaborate with others, all job profiles that require workers to jointly contribute in interaction with others are *rejected*. If a job profile is rejected, then it is removed from the set of job profiles which will be reviewed by the disability assessor. Figure 3 shows that job profiles which require workers to jointly contribute in interaction with others are *flagged* if the applicant is limited in his ability to work with others; similarly, job profiles which require collaboration but in which workers have a defined sub-task are flagged if the applicant is very limited in his ability to collaborate with others. UWV manuals define in great detail how abilities and requirements are measured. See Appendix Figure 1 for a complete correspondence between functional requirements and abilities.

The automated preselection procedure produces a list of job profiles for which all functional and educational requirements are met by the applicant (i.e., excluding all job profiles with at least one rejected requirement) within each occupation, ranked by their associated earnings. Starting from the top of the list, the disability assessor verifies the feasibility of each job profile, considering the applicant's abilities. In case of doubt, the disability assessor can consult with the occupational analyst who prepared the job profile and the examining physician who interviewed the applicant. The disability assessor is expected to provide a written motivation for inclusion of job profiles with flagged requirements in the set of feasible job profiles, explaining how the requirements still fall within the applicant's abilities. Furthermore, a job profile can only be accepted if the client possesses all educational degrees to start working in the job. For some jobs, the employer may require that the employee obtains an additional educational degree within a certain time after starting in the job. The job profile will only be considered acceptable if the labor expert can argue that the client is capable of obtaining the degree within the required period, based on prior training and skills.

Finally, the residual earnings capacity of an applicant is determined by ranking occupations by the earnings of the median feasible job profile within each occupation, where occupations with fewer than 3 positions across all feasible job profiles are dropped. The earnings of the second-highest earning occupation represent the potential earnings of the applicant and determine his residual earnings capacity by comparing potential earnings to past earnings. Applicants with an estimated earnings loss that is less than 35% are not eligible for benefits.[5] Applicants with an estimated earnings loss of 35-80% receive partial disability benefits, and those with an estimated loss of more than 80% receive full disability benefits. The UWV "quality control" department checks profiles to make sure the disability assessors are not too lenient. Applicants and their employers can also appeal an unfavorable determination.

3. Data

We make use of two data sources: a dataset containing all active job profiles as of May 1, 2018, as well as harmonized survey data on individuals' functional abilities corresponding to the job requirements in the Dutch functional assessment instrument. We describe each of these databases in turn below.

3.1. Job Profile Data

We obtained comprehensive data on the training and functional requirements of 5,479 active job profiles at 1,553 employers from the UWV. Each job profile contains the following information: generalized characteristics and education/training and other requirements, up to 36 categorical requirements and up to 20 continuous requirements, such as distance, duration, angle, and frequency.

[5] The examination report can be used by rejected applicants by helping their (future) employer to obtain subsidies for accommodation.

As explained above, all job profiles in the same occupation are characterized by the same generalized tasks and industry (which is denoted by the first four digits of the 12-digit job profile identifier). The database of active jobs includes job profiles which correspond to an occupation with active job profiles in each of the five regions of the Netherlands, and within each employer there can be multiple job profiles, each with at least one position.

Each job profile contains a free-text overall description of supervision; work content; location; inputs; information processing; output type, quantity, quality, and recipient; quality norms; safety regulations; collaboration; tools. We do not have access to this overall free-text description of each job profile, while the disability assessor does have access to this information. The job profile data contains 114 generalized tasks and 284 occupations according to the six-digit classification. Figure 4 provides a graphical illustration of the job profile data for a fictional job profile for a ”breakfast staff” member, classified in the occupational category of a waiter.

Dropping the sixth digit of the occupation code results in 239 codes in the original five-digit SBC-92 classification. Each occupation code is associated with up to 3 generalized tasks. For example, in Figure 4, the fictional job profile in the waiter occupation has two generalized tasks: handling customer payments and serving drinks and meals. The top-3 primary generalized tasks with the most associated job profiles are: cleaning/tidying (488 job profiles and 11 occupations); handling customer payments (311 job profiles and 9 occupations); carrying our sales activities (279 job profiles and 12 occupations).

Table 1 shows that within each occupation-employer combination, the mean number of job profiles is 2.73 (s.d. 2.90). While the majority of job profiles have only one or two positions, the 95^{th} percentile of the distribution of positions is 20. The mean total number of positions across all job profiles by occupation is 106.86 (s.d. 179.04).

The mean daily work hours is 7.46 (s.d. 1.43), with 3,911 job profiles (71.4%) requiring 8-hour work days. While 1,766 job profiles (32.2%) have a full-time work week of between 36 and 40 hours, the mean and median are approximately 28 hours (s.d. 9.82), reflecting the variation across job profiles in work hours within the same occupation-employment pair. Hours worked therefore account for much of the variation in the earnings of each job profile.

The mean hourly earnings, converted to 2018 U.S. dollars, is $14.57 (s.d. $3.29). For context, the minimum hourly earnings found in the job profile data is $8.77. The mean monthly earnings, calculated as the product of hourly wage and monthly work hours, are $1761.11 (s.d. $809.63).

The job profile data contains seven educational levels which we aggregate into four levels: less than high school (required by 55% of job profiles), high school or some college (30%), Bachelor's degree (12%) and greater than Bachelor's degree (3%). See Appendix Table 2 for the mapping of Dutch to American educational levels. Job profiles may require a single specific field of training, out of a total of seven fields: administration (286 job profiles), agriculture (78), art and culture (1), commercial (62), health care (772), services (219), technical (674). Most job profiles (3,387 or 62 percent) in the data do not require a specific educational field. Additional educational requirements are recorded in a free text field, typically describing the educational field in greater detail. Job profiles requiring specific educational fields are uncommon for lower educational levels, however, at higher educational levels, field specialization plays a sizeable role in determining the number of feasible job profiles.[6]

[6] A degree in health care gives access to the most job profiles: an Associate's degree in health care gives access to 3552 job profiles, while a general Associate's degree is sufficient for 3011 job profiles. For a Bachelor's degree this is 4058 (health care) versus 3294 job profiles, while the highest theoretical maximum number of 4159 job profiles is obtained by individuals with a degree above the Bachelor's level in health care. Those without specialization with a degree greater than a Bachelor's degree can have at most 3387 feasible job profiles.

Required work experience is described as free text. The prior experience free text field is not filled out for approximately 240 job profiles. We use text matching on variations of "Not Required" and the absence of free text to create a binary indicator for prior required work experience. Approximately 75% of the job profiles do not require prior work experience. Job profiles cannot require prior work experience at the same employer.

There is not much variation in the minimum and maximum age of job profiles. The mean minimum age is 16.76 (1.12) and the mean maximum age is 66.97 (s.d. 0.29), reflecting the statutory retirement age of 67 in the Netherlands in 2018.

The job profile data contain for each job profile all requirements which should be taken into account in the job matching procedure. Each relevant job requirement for each job profile is described on a separate row of the job profile data. If a certain requirement is not needed for a certain job profile, which means that no above-normal functional ability is required, it is not shown in the data. The mean number of requirements is 28.06 (s.d. 5.64), out of a total of 56 job requirements.

33 requirements can have categorical values, typically these are binary variables indicating whether a certain requirement is required for a specific job profile. The job profile data on categorical job requirements contains 5512 job profile identifiers.

32 of these categorical job requirements take on a single value. Only one of the categorical job requirements is a check-all-that apply variable: "dust, smoke, gases, and vapors" can take up to four different values for a single job profile, shown in separate rows in the data, depending on whether working in all four conditions is required. We therefore create four new variables and remove the "dust, smoke, gases, and vapors" variable from our data, which results in a total of 36 categorical job requirements. We also remove 370 rows in our data which are duplicates in all variables except the free text explanation field. The mean number of categorical job requirements is 15.34 (s.d. 2.07).

The 18 remaining job requirements are measured on a continuous scale. Each row describes a single combination of characteristics, with potentially multiple rows per requirement and job profile, and the mean number of continuous requirements is 15.34 (s.d. 2.07).

3.2 Health and Functional Capacities Survey

We adapted the Dutch Functional Abilities Questionnaire for self-administration over the internet, in English. We then fielded the adapted FML plus questions on educational attainment and the presence of medical conditions to the nationally representative RAND American Life Panel (ALP) in May 2019 (N=2,657 respondents, 78% completion rate). We utilize weights that match our sample to the 2018 Current Population Survey (CPS) distribution of age, gender, race/ethnicity, educational level, household income and the number of household members.

Respondents were asked screener questions, which correspond to the reasons why DI applicants in the Netherlands are determined by the examining physician to have no durable abilities for work, show in Figure 2. These include serious mental illness that limits daily activities, living in an institutional setting, inability to perform activities of daily living (ADL) without assistance, and the expectation of terminal, and terminal illness. Table 2 shows the characteristics of our sample of 2,461 respondents who passed the screener questions and were subsequently presented with the adapted FML.

The mean age in the HFCS sample is 49.42 (s.d. 15.82), and 51% is female. Educational attainment was initially measured by twelve levels and then collapsed into four levels, as shown in Appendix Table 2. The mean age for those with both less than high school and high school or some college is 50, while those with a BA are on average 47 years old. Those with a degree greater than BA are on average 51 years old.

66% was working at the time of the survey and 5% had applied for and/or received disability benefits. On average respondents reported 2.40 health conditions (s.d. 2.68) and 9.00 (8.77) limitations in the functional abilities listed in the questionnaire. The average number of functional limitations varies by educational attainment: those with less than high school report on average 14.8 limitations, those with high school or some college report 10.01 limitations, those with a BA report 5.5 limitations, and those with a degree greater than BA report 6.4 limitations.

4. Measuring Work Capacity in an American Sample

Next, we estimate work capacity in an American sample by applying the automated pre-selection procedure described above to harmonized data on functional abilities in the ALP. Recall that the automated preselection procedure selects only those job profiles for which a respondent's abilities meet all job requirements. Because our research process does not include disability assessors, we err on the side of excluding all job profiles with flags. In an actual disability determination procedure, disability assessors might have resolved some of the flagged items to include additional job profiles in the feasible set, which could have the effect of increasing the estimated work capacity of our respondents.

Our current procedure to determine work capacity includes only categorical functional abilities, plus daily and weekly work hours. In subsequent analyses we will extend the set of functional abilities to also include those measured continuously (e.g., in terms of duration, weight, and frequency). In addition to matching job profile requirements to these categorical functional abilities, we also matched on educational attainment and field of study. Other limitations of our approach include the self-administered nature of the Functional Abilities Questionnaire in the RAND ALP and a potential lack of similarity between the requirements of Dutch and American jobs. Nonetheless, the Dutch instrument is a comprehensive

assessment of work ability (regardless of ultimate DI qualification) and our approach is a useful illustration of how work capacity evaluation works in the Netherlands.

Figure 1 shows distribution of the estimated number of feasible job profiles in the HFCS sample. 104 respondents were estimated to have zero feasible job profile options. The variation is driven by three important factors. First, educational level and field determine the theoretical maximum number of feasible job profiles, even if no functional limitations are present. Second, weekly work hours drive much of the variation in the number of feasible job profiles, while daily working hours are rarely a binding requirement. Third and finally, the categorical work hours lead to more variation. Figure 2 shows the distribution for the number of occupations with at least three positions across the feasible job profiles. 111 respondents were estimated to have zero feasible occupation options. More detail on the estimated number of feasible job profiles and occupations is given in Table 3.

Figure 3 shows the estimated earnings for the HFCS respondents by educational level. The highest-earning occupations require a Bachelor's degree, leading to the same maximum earnings for both the BA and the greater than BA group. As we have seen, respondents with a BA report fewer functional limitations than respondents with a higher educational degree, potentially reflecting their younger age. This results in a higher average estimated earnings capacity among BA respondents compared with respondents with a degree greater than BA.

Comparing the estimated earnings capacity to the Substantial Gainful Activity threshold in Table 3 shows that 17 percent of the HFCS sample is estimated to have an earnings capacity below the threshold. 11 percent have zero estimated earnings capacity.

5. Conclusion

We applied aspects of the Dutch disability determination process to a sample of U.S. adults to estimate work capacity. The methods we use to measure work capacity reflect a

simplification of the Dutch procedure, which involves the personalized approach of UWV professionals, while we measure the abilities of respondents through a self-administered survey. Our results serve to illustrate the possible advantages and shortcomings of a method of disability determination that centers around functional abilities to identify occupations which are feasible to individuals who are limited in some of those functional abilities.

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Figure 1. Job Profile Structure Diagram

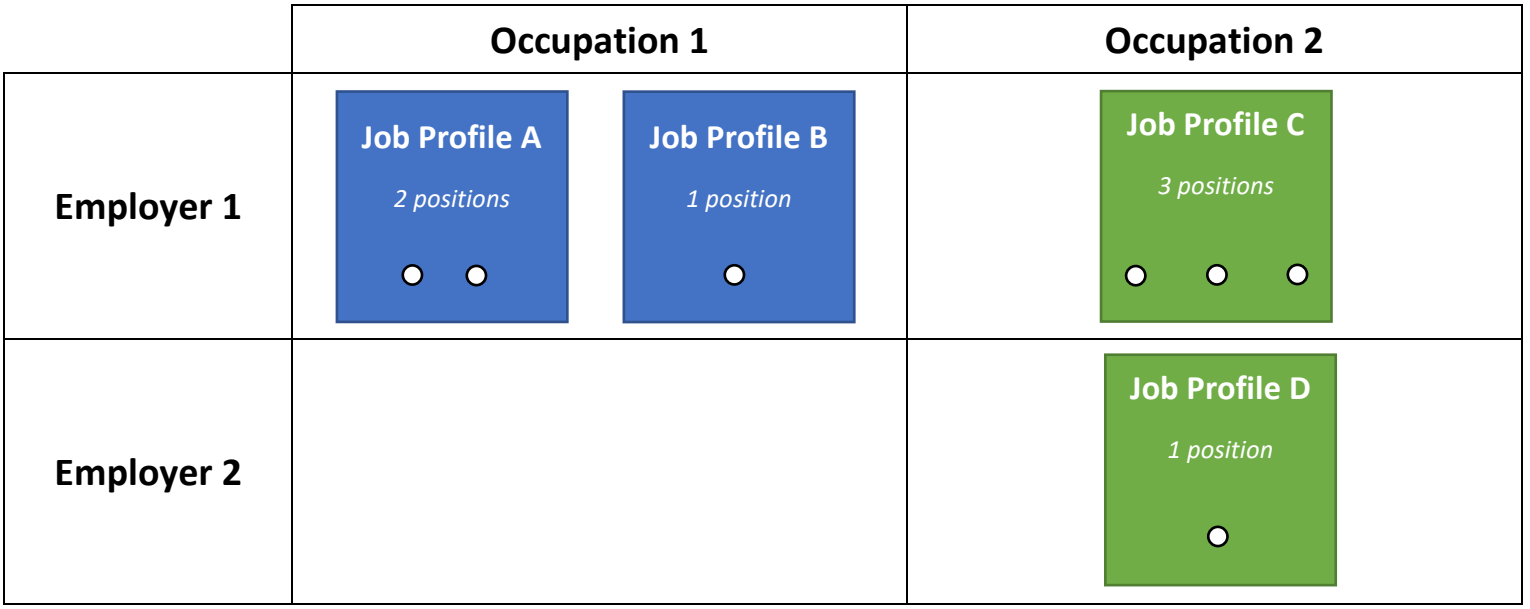


Figure 2. Dutch Disability Determination Process

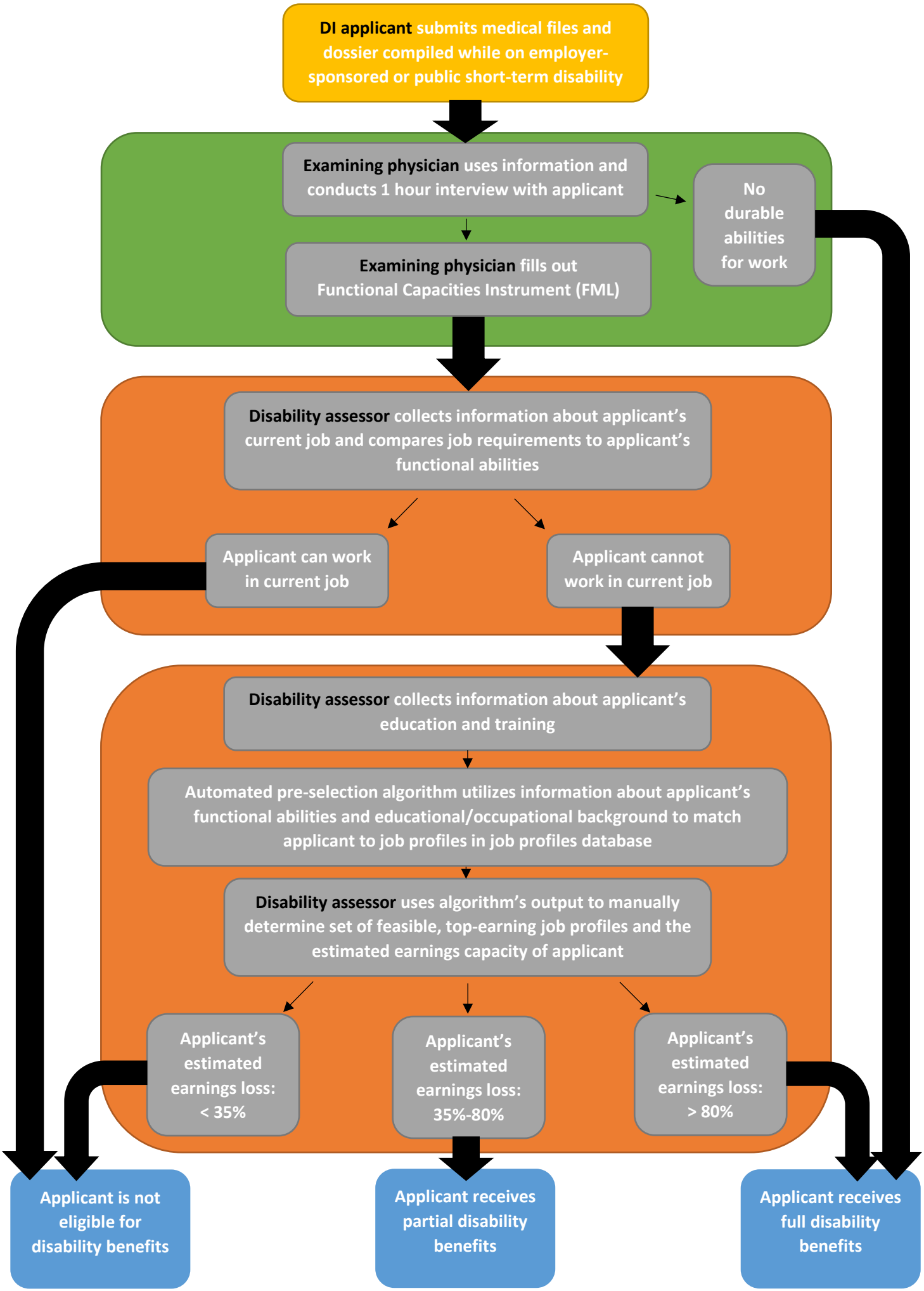


Figure 3. Job Requirement – Functional Ability Correspondence Matrix Example

		Job Requirement 53: Collaboration		
		Not required	Required, but with own defined sub-task	Joint contribution in interaction with others
Functional Ability 2.9: Collaboration	Normal, no difficulties working in teams	Accept	Accept	Accept
	Limited, can work in teams only if tasks are clearly mine	Accept	Accept	Flag
	Very Limited, unable to work in teams	Accept	Flag	Reject

Figure 4. Waiter Job Profile

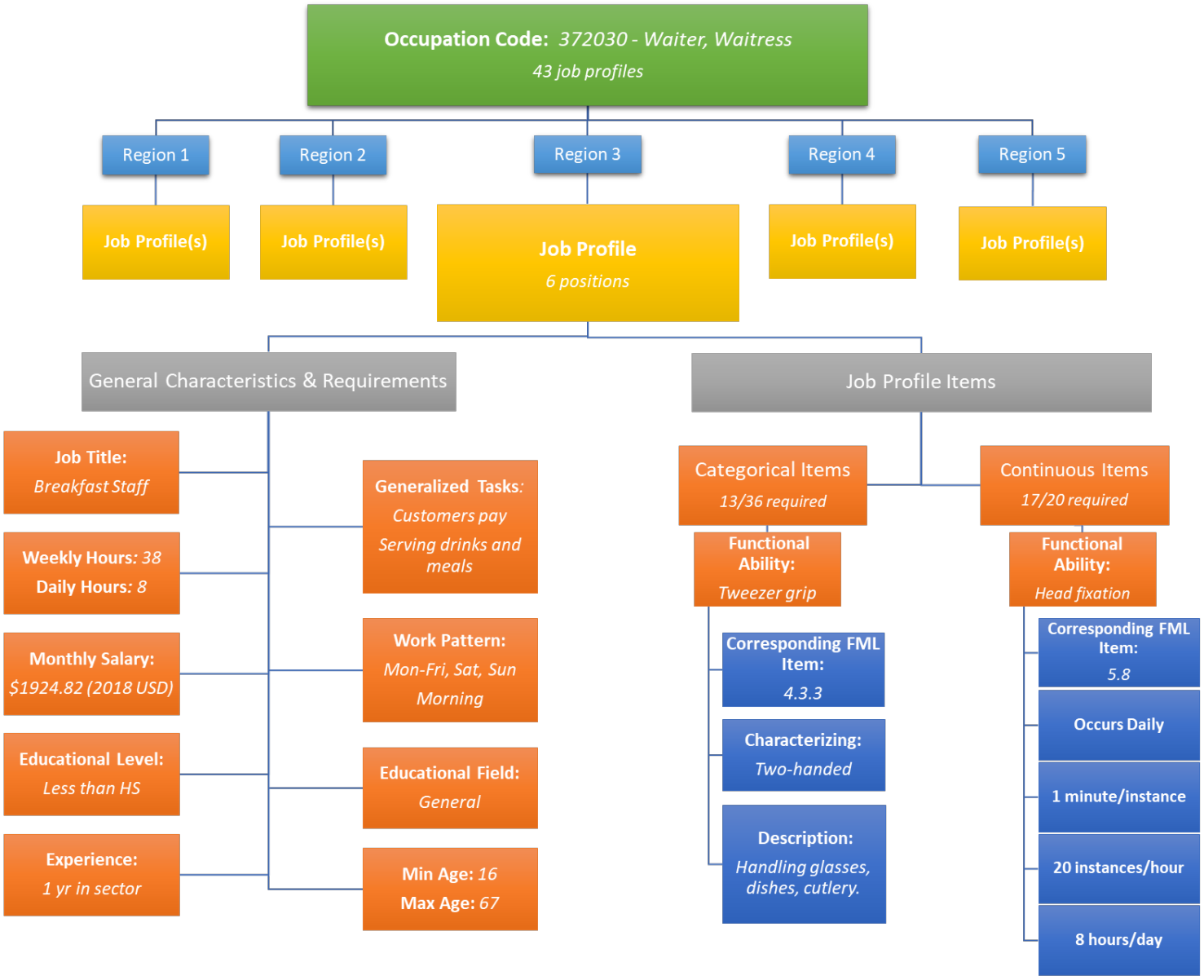


Table 1. Job Profile Descriptive Statistics					
	Mean	***SD***	***5th Percentile***	***50th Percentile***	***95th Percentile***
Job Profile Structure					
Job profiles by employer-occupation	2.73	2.90	1	2	8
Positions by job profile	5.54	16.12	1	2	20
Positions by occupation	106.86	179.04	6	53	342
Work Hours					
Regular hours worked per day	7.46	1.43	4	8	9
Hours worked per week	27.34	9.82	9	28.1	40
Earnings					
Hourly earnings (2018 USD)	14.57	3.29	11.27	13.55	20.89
Monthly earnings (2018 USD)	1761.11	809.63	514.48	1767.17	3068.42
Educational Level					
Less than HS	0.55				
HS / Some college	0.30				
BA	0.12				
Greater than BA	0.03				
Educational Field					
Administration	0.05				
Agriculture	0.01				
Art and culture	0.00				
Commerical	0.01				
Health care	0.14				
Services	0.04				
Technical	0.12				
General	0.62				
General Qualifications					
No prior experience needed	0.75				
Minimum age	16.76	1.12	16	16	18
Maximum age	66.97	0.29	67	67	67
Job Requirements					
Total requirements (Max: 56)	28.06	5.64	19	28	38
Categorical requirements (Max: 36)	12.72	4.24	6	12	20
Continuous requirements (Max: 20)	15.34	2.07	12	16	18

Table 2. HFCS Respondent Descriptive Statistics	
	Wtd. Mean (SD)
Age	49.42 *(15.82)*
Female	0.51
Race & Ethnicity	
White/Caucasian	0.74
Black/African American	0.13
Asian or Pacific Islander	0.03
Hispanic or Latino	0.24
Educational Level	
Less than HS	0.06
HS/Some college	0.59
BA	0.19
Gretaer than BA	0.16
Educational Field	
Administration	0.09
Agriculture	0.01
Art and culture	0.02
Commerical	0.07
Health care	0.28
Services	0.19
Technical	0.19
Currently working	0.66
Applied for/receiving disability benefits	0.05
Number of health conditions	2.40 *(2.68)*
Number of functional limitations	9.00 *(8.77)*

Table 3. Job Profile-HFCS Respondent Matching Descriptive Statistics					
	Wtd. Mean	***SD***	***5th Percentile***	***50th Percentile***	***95th Percentile***
Number of feasible job profiles by respondent	1679.14	1211.42	0	1969	3276
Less than HS	661.19	911.59	0	165	2326
HS/Some college	1422.46	1130.72	0	1355	2810
BA	2305.64	1036.10	195	2740	3332
Gretaer than BA	2275.30	1194.59	88	2831	3886
Number of feasible occupations by respondent	125.83	79.45	0	155	221
Less than HS	42.92	51.12	0	19	128
HS/Some college	108.60	74.64	0	129	191
BA	171.16	64.72	24	200	238
Gretaer than BA	167.45	71.67	15	207	245
Estimated earnings capacity (2018 USD)	3050.09	1621.46	0.00	2969.85	5235.60
Less than HS	1535.42	1138.75	0.00	1964.40	2874.56
HS/Some college	2351.01	1139.79	0.00	2969.85	3145.20
BA	4591.47	1294.47	1110.62	5235.60	5235.60
Gretaer than BA	4398.96	1378.31	1080.00	5235.60	5235.60
Estimated earnings capacity less than SGA threshold ($1180 2018 USD)	0.17				
Less than HS	0.39				
HS/Some college	0.22				
BA	0.05				
Gretaer than BA	0.08				
Estimated earnings capacity of $0	0.11				
Less than HS	0.28				
HS/Some college	0.14				
BA	0.01				
Gretaer than BA	0.03				

Figure 5. Distribution of the Number of Feasible Job Profiles in HFCS Sample

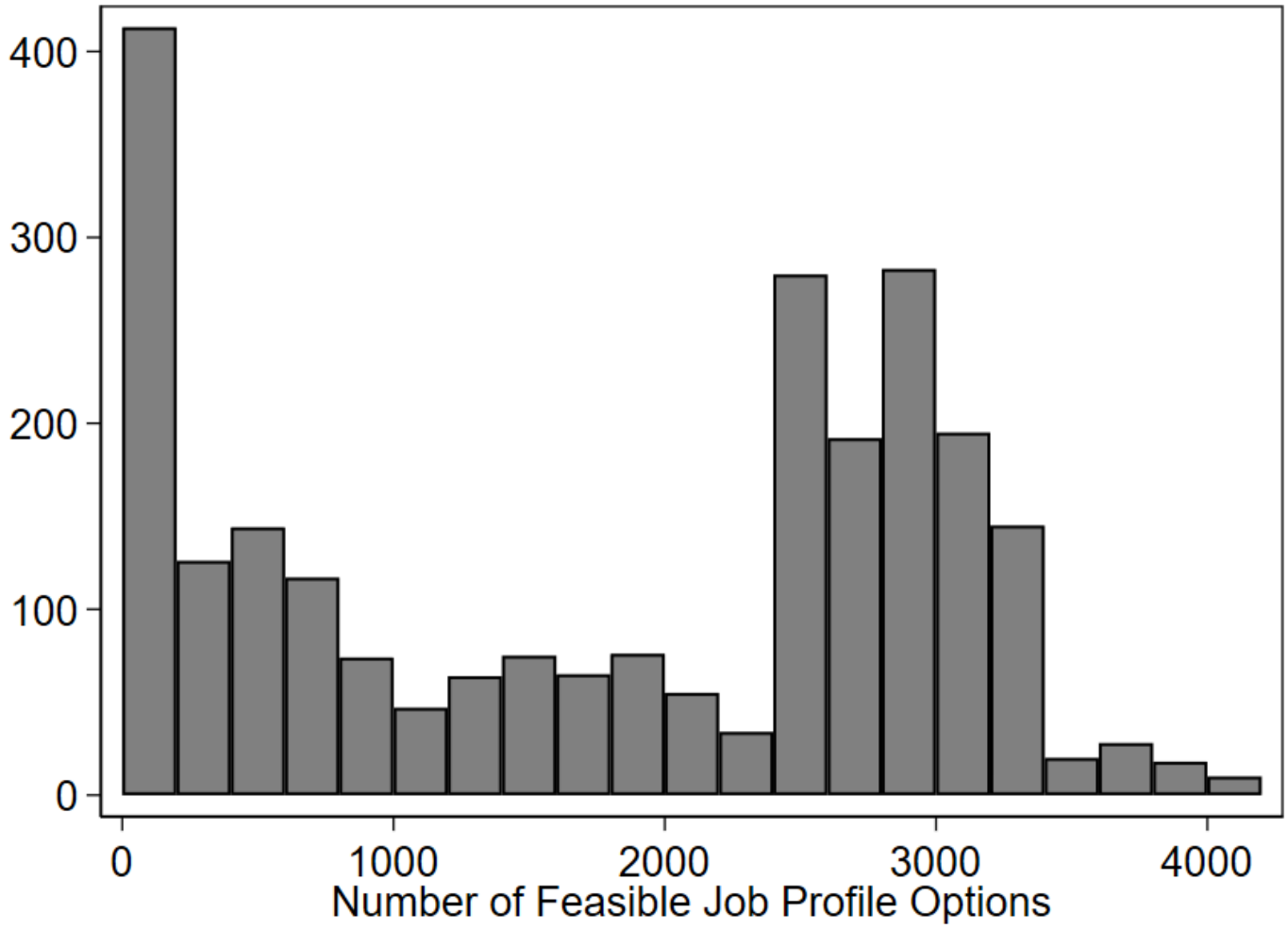


Figure 6. Distribution of the Number of Feasible Occupations in HFCS Sample

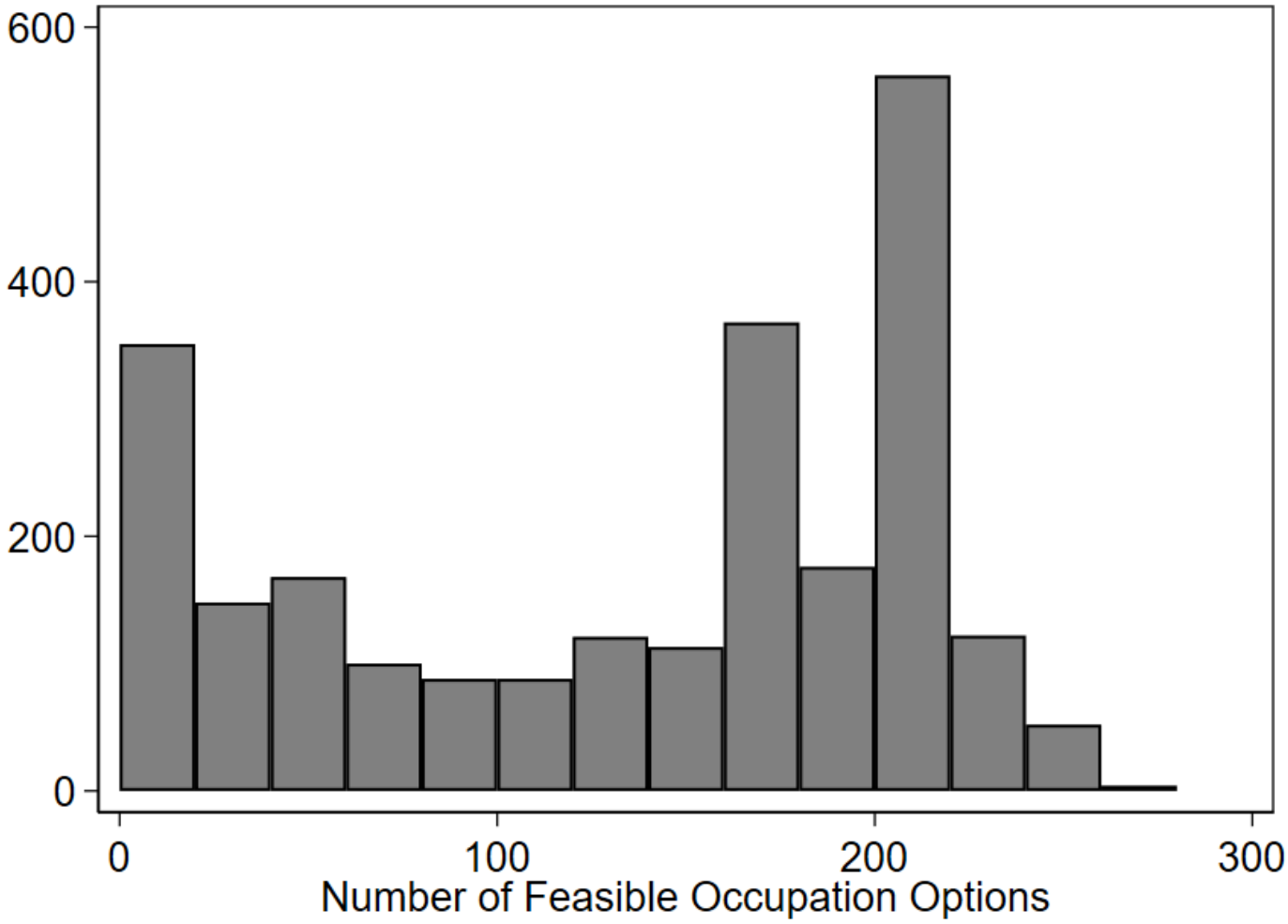
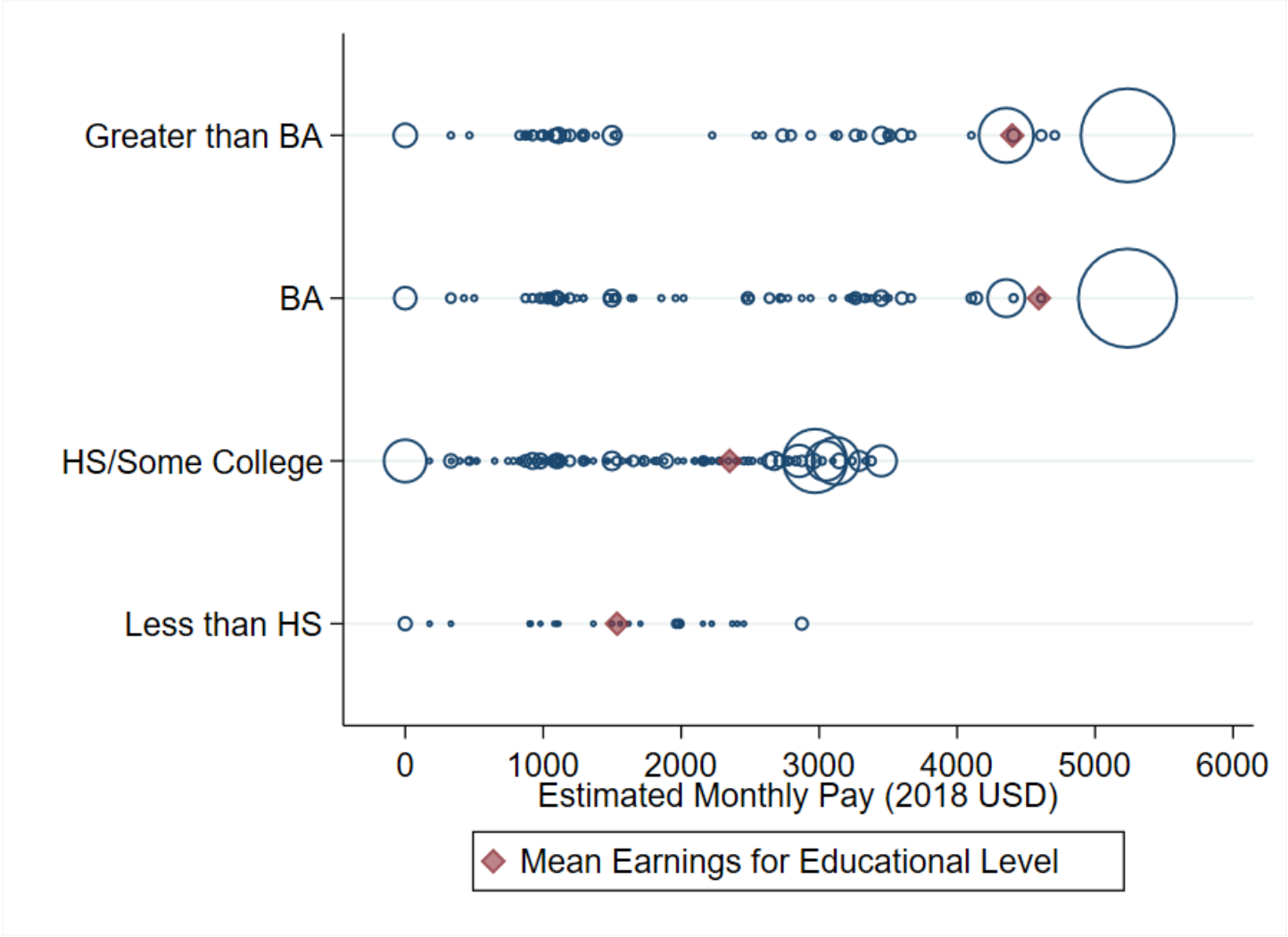


Figure 7. Estimated Earnings Capacity in HFCS Sample by Educational Level



Appendix Table 1: Listing of Available Job Requirements					
Job Requirement			Functional Ability		Utilized in Matching Results
	Education Level	General			X
	Education Field	General			X
	Minimum Age	General			
	Maximum Age	General			
	Work Pattern (Days of Week, Time of Day)	General			
	Experience	General			
3	Sitting	Continuous	5.1	Time spent sitting uninterrupted	
			5.2	Time spent sitting throughout work day	
4	Standing	Continuous	5.3	Time spent standing uninterrupted	
			5.4	Time spent standing throughout work day	
5	Walking	Continuous	4.18	Time spent walking uninterrupted	
			4.19	Time spent walking throughout work day	
6	Climbing stairs	Continuous	4.20	Ability to ascend/descend stairs	
7	Climbing	Continuous	4.21	Ability to ascend/descend steps	
8	Kneeling/ squatting	Continuous	4.22	Ability to reach the ground by kneeling/squatting	
			5.5	Ability to be active while kneeling/squatting	
9	Crawling	Continuous	7.2	Ability to crawl	
11	Active while bending	Continuous	5.6	Ability to be active while bending	
12	Active while twisting	Continuous	7.3	Ability to be active while twisting	
13	Short-cycle twisting	Continuous	4.12	Ability to twist torso	
14	Short-cycle bending	Continuous	4.10	Ability to bend	
			4.11	Frequency of bending throughout work day	
15	Head movements	Continuous	4.17	Ability to move head	
16	Head fixation	Continuous	5.8	Ability to keep head in specific position throughout work day	
17	Reaching	Continuous	4.8	Ability to stretch arm	
			4.9	Frequency of stretching arm throughout work day	
18	Being active above shoulder	Continuous	5.7	Ability to be active with arm above shoulder	
19	Sphere grip	Categorical	4.3	Ability to grasp round object	X
20	Pen grip	Categorical	4.3	Ability to handle objects between the tips of 2 fingers and thumb	X
21	Tweezer grip	Categorical	4.3	Ability to handle objects between top of index finger and thumb	X
22	Key grip	Categorical	4.3	Ability to grip objects with fingers and thumb	X
23	Cylinder grip	Categorical	4.3	Ability to handle rod-shaped objects	X
24	Squeezing & gripping	Categorical	4.3	Ability to grip with hand	X
25	Fine motor skills	Categorical	4.3	Ability to make fine, accurate movements with fingers and hands	X
26	Repetitive acts	Categorical	4.3	Ability to make repetitive movements with fingers and hands	X
27	Lifting	Continuous	4.15	Frequency of lifting and using light weight objects	
			4.16	Ability to frequently lift heavy loads	
27/28	Lifting/Carrying	Continuous	4.14	Weight that one can lift/carry	
29	Pushing & pulling	Categorical	4.13	Weight that one can push/pull	X
30	Air draft	Categorical	3.3	Exposure to draft or sudden air movements	X
31	Air quality: Dust	Categorical	3.6	Exposure to dust	X
	Air quality: Smoke	Categorical	3.6	Exposure to smoke	
	Air quality: Gas	Categorical	3.6	Exposure to gas	
	Air quality: Vapors	Categorical	3.6	Exposure to vapors	
32	Cold	Categorical	3.2	Exposure to cold	X
33	Heat	Categorical	3.1	Exposure to heat	X
34	Skin contact	Categorical	3.4	Exposure to substances that might make skin wet, dirty, or irritated	X
35	Vibrations	Categorical	3.8	Exposure to vibrations or jolts	X
36	Seeing	Categorical	2.1	Ability to see with or without the use of wearing glasses or contact lenses	X
37	Hearing	Categorical	2.2	Ability to hear with or without the use hearing aids	X
38	Speaking	Categorical	2.3	Ability to speak	X
39	Reading	Categorical	2.5	Ability to read	X
40	Writing	Categorical	2.4	Ability to write	X
41	Noise	Categorical	3.7	Exposure to noise levels high enough to require protective equipment	X
42	Protective equipment	Categorical	3.5	Ability to wear protective equipment	X
43	Personal risk	Categorical	1.9	Ability to recognize and protect oneself from physical risks	X
44	Touch sense	Categorical	4.4	Sense of touch	X
45	Screw movment with arm-hand	Categorical	4.7	Ability to make twist arm-hand	X
46	Using mouse/keyboard	Continuous	4.6	Time spent using mouse/keyboard throughout work day	
47	Rate of action	Categorical	1.9	Ability to do work with a fast pace	X
48	Adjusting to production peaks	Categorical	1.9	Ability to work harder than usual or to meet deadlines	X
49	Frequent contact with customers	Categorical	2.12	Ability to have contact with customers or clients	X
51	Managing others	Categorical	2.12	Ability to do work that involves managing other people	X
52	Dealing with conflicts	Categorical	2.8	Ability to cope with conflicts with difficult people	X
53	Collaborate	Categorical	2.9	Ability to work in teams	X
			2.12	Ability to have contact with colleagues	
54	Dealing with patients	Categorical	2.12	Ability to do work that requires care of others (patients)	X
55	Not being able to fall back on colleagues	Categorical	2.12	Ability to do solitary work	
98	Hours per week	Continuous	6.3	Time that one can work per week	X
99	Hours per day	Continuous	6.2	Time that one can work per day	X

Appendix Table 2: Dutch-US Educational Level Crosswalk		
Dutch Educational Level	**US Educational Level**	**Aggregated US Educational Level**
1	Kindergarten	Less than HS
2	1st, 2nd, 3rd, 4th, 5th, or 6th grade	Less than HS
2	7th, 8th, or 9th grade	Less than HS
3	10th, 11th, or 12th grade - but no diploma received	Less than HS
5	High school diploma or equivalent (GED)	HS/ Some College
5	Some college, but no degree	HS/ Some College
5	Associate degree in college - Occupation/vocational program	HS/ Some College
5	Associate degree in college - Academic program	HS/ Some College
6	Bachelor's Degree (BA, BS, AB)	BA
7	Master's Degree (MA, MS, MEng, Med MSW, MBA)	Greater than BA
7	Doctoral Degree (PhD, ScD, EdD)	Greater than BA
7	Professional School Degree (MD, DDS, DVM, LLB, JD)	Greater than BA