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INSTITUTE OF RETAIL ECONOMICS

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# CAREER TRAJECTORIES IN RETAIL AND WHOLESALE - A SEQUENTIAL APPROACH

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MIKAELA BACKMAN, HELENA NILSSON & ÖZGE ÖNER

# Career trajectories in retail and wholesale - A sequential approach

Mikaela Backman<sup>a\*</sup>, Helena Nilsson<sup>a,b</sup> & Özge Öner<sup>a,c</sup>

## Abstract

High labor turnover imposes costs on a firm and hinders the accumulation of human capital. In an increasingly competitive market, retaining competent employees is a necessity. To avoid excessive labor turnover, it is necessary to identify which characteristics influence career pathways for employees. Becoming employed and/or staying employed within a certain firm or sector is normally not binary, but rather should be studied as employment-related events within a career trajectory. The combination of the timing and the order of distinct events that form a unique career pathway for an individual can be studied by using sequential analysis. In this paper, we systematically identify the common career paths of individuals who work in retail or wholesale.

**Keywords:** career trajectories, retail, wholesale, sequential analysis, employee turnover.

**JEL-codes:** C35, J24, L81.

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# 1 Introduction

Retail and wholesale are two vital sectors that employ a substantial percentage of the population. Beyond their significance to the employment base in absolute terms, these sectors are also important steppingstones into the labor market for outsiders such as younger workers (Daunfeldt & Hortlund, 2014), thanks to lower barriers to entry in terms of minimum required education and previous experience. While these lower entry requirements enable younger workers to easily enter the labor market, these same conditions also result in high labor turnover in these sectors (e.g Carré, Tilly, Van Klaveren, & Voss-Dahm, 2010; Hurst & Good, 2009; Mekraz & Gundala, 2016; Min, 2007).

Excessive employee turnover leads to continuous recruiting and training for the new staff, resulting in higher costs to firms (Darmon, 1990; Hall, 1981). High rates of employee turnover can also have severe and long-lasting impacts on a firm, including productivity loss (O'Connell & Kung, 2007), lower customer satisfaction (Hurley & Estelami, 2007), reduced workplace morale and negative PR stemming from employees who quit, and lower satisfaction among those that stay (Hall, 1981; Mobley, 1982).<sup>1</sup> The cost of high labor turnover is also not limited to the firm itself. If employees who leave a place of employment also leave the industry, the sector loses human capital, and there are sunk costs for both the individual and society in terms of potential returns from occupational investments in education (Blau, 2000; Zimmerman, Swider, & Arthur, 2020). A high labor turnover rate also has

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<sup>1</sup> There are also positive aspects from labor turnover such as displacement of employees with lower performance, increased flexibility, inflow of new knowledge, and an opportunity to save costs (Mobley, 1982).

negative consequences for employees, as it can potentially create unpleasant work environments. Firms' ability to retain their employees strengthens their human capital associated with experience, level of efficiency, and resilience, all which are essential in building a competitive advantage (Brush & Chaganti, 1999). In retail and wholesale where profit margins are slim, competition is fierce, and the whole landscape is changing (Grewal, Roggeveen, & Nordfält, 2017) preventing or reducing excessive turnover could make a critical difference in a firm's position. Without knowledgeable employees it is impossible to make informed decisions, forming strategies, and to create a customer experience above the usual, which enables a firm a competitive edge (Grewal, Levy, & Kumar, 2009; Kumar, Anand, & Song, 2017; Verhoef et al., 2009). In a landscape where consumers have access to nearly unlimited information regarding product and service alternatives, it is of vital importance that retailers engage and connect with their customers often done through meeting knowledge employees creating a superior customer experience. This we claim is done through having experienced employees working in firms with a low level of labor turnover.

One important aspect of labor turnover on which previous studies are relatively silent is the fact that individual career paths contain a chain of employment events. Existing empirical evidence predominantly focuses on single events in the form of binary employment outcomes, where the observed outcome is if an individual is employed within these sectors or not (Daunfeldt & Fergin-Wennberg, 2016; O'Leary & Deegan, 2005; Salleh, Nair, & Harun, 2012). While these illuminate propensities of employment for retail and wholesale, they fail to capture the full picture on career trajectories and how these trajectories are linked to high employee turnover. To understand how the timing and the order of single events build on each other, we propose the use of sequential analysis. Sequential

analysis has been used in the biology literature, particularly in the analysis of DNA strings. The use of sequential analysis was later expanded to social sciences (see e.g. Brzinsky-Fay (2007); Rowe, Corcoran, and Bell (2017); and Backman, Lopez, and Rowe (2020)). We build our empirical design on a sequential approach that systematically maps common career trajectories for individuals working in retail and wholesale. We further examine individual characteristics, both ascribed and achieved, and how location impacts different career paths.

We follow all individuals in Sweden who worked at least one year in the retail or wholesale sectors between 1990 and 2018. We explore 14 different statuses of employment<sup>2</sup> on a yearly basis for each individual and identify the most common sequences of these statuses by way of clustering probabilities. We identify four common career paths in retail and five in wholesale, where there are similarities of the career paths across sectors. We find a bimodal pattern in both sectors where employees tend to have either (i) a long career in the industries (retail and/or wholesale) where their labor market status is employment in either retail or wholesale for the entirety or majority of the period, or (ii) employment in retail or wholesale as a steppingstone to employment in another sector or leaving the market to obtain further education. The latter pattern confirms previous studies' predictions that employment in these sectors has the potential to serve as a steppingstone into the labor market.

The second part of our analysis investigates the influence of individual and geographic characteristics on different career paths. For retail, we find that individuals who are male, older, without children, and with lower levels of

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<sup>2</sup> Study (other); Study (wholesale); Study (retail); Study (retailing upper secondary school); Employed, other; Employed, wholesale; Employed, retail; Self-employed; Unemployed; Inactive; Parental leave; Retired; Died; Other.

education, are less prone to a switch between industries. For wholesale, we observe a similar pattern, but without significant gender differences. To reduce the tendency of individuals to change jobs and to invest in employees who pursue a long-term career in retail or wholesale, these respective sectors should try to become more attractive for (i) the young, (ii) females (retail, specifically), (iii) individuals with children, and (iv) individuals with higher levels of education. Given that the labor market regulations in Sweden are at the more rigid end of the distribution, in favor of the employee, we argue that the results in our study are highly applicable for economies with more relaxed labor market regulations. If anything, they constitute a lower bound. This study thus contributes with policy relevant findings on how to retain competence on organization- and sector level.

The paper is organized as follows: Section 2 presents an overview of the retail and wholesale sectors in Sweden, followed by the theoretical framework in Section 3. Section 4 presents our empirical design and the results, section 5 discusses and section 6 concludes.

## **2 Theoretical framework: Choice Models for Employment**

Individual choice, where each observed aggregate outcome originates from individual decisions, lies at the heart of economics (Ben-Akiva & Lerman, 1985). These choices, in turn, are the products of (in some cases) long processes. All individual choices and transitions between different labor markets, for example, normally come with many challenges. For instance, the transition into higher education or obtaining a first job are events that are often life-altering and therefore require time, motivation, energy, and resources. Thus, a choice is the outcome of a process with many steps that involves defining the choice problem,

generating alternatives, evaluating alternatives, making a decision, and implementing that decision (Ben-Akiva & Boccara, 1995). Although the decision-making process may be long, it is mostly observed only with a binary outcome. An individual's available alternatives are frequently dictated by that person's ascribed- (e.g., demographics, family status) and achieved- characteristics (e.g., formal education, experience).

The model used in our analysis builds on the work by Manski (1977), McFadden (1984), and Ben-Akiva and Boccara (1995). It captures the outcome (i.e., choice) for the economic agent who maximizes his/her utilities with respect to available alternatives, (i.e., different labor market choices), where such choices can be specified conditional on a perfect information assumption. The outcomes for the economic agent, i.e., the individual, are then modelled through a discrete choice analysis. The feasible and known alternatives make up an individual's complete choice set. The different alternatives are subject to several constraints including but not limited to physical availability (i.e., a job offer) and information frictions (i.e., information on available jobs), and these constraints differ across individuals.

When an individual is faced with at least two alternatives, she applies a decision rule to arrive at a choice. In this paper, we use a utility maximization framework where individuals are assumed to be rational in the sense that they maximize utility given their own objectives.<sup>3</sup> The utilities are random indicating that the individuals lack full information in relation to the different alternatives and the specific attributes of these alternatives. The individual decision maker  $i$ ,

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<sup>3</sup> Where we assume bounded rationality, acknowledging individuals' lack of ability to process and handle information which limit their problem solving.



chooses only one alternative,  $\alpha$ , from his/her choice set  $C_i$  ( $\alpha \in C$ ) that generates the highest utility  $U$  ( $U_{\alpha i} \geq U_{\acute{\alpha} i}$ , all  $\acute{\alpha} \in C$ , where  $\acute{\alpha}$  denotes all other alternatives).<sup>4</sup> Each alternative possesses a number of attributes,  $x$ , and each individual has a number of characteristics,  $s$ . The utility can then be formalized as:

$$U_{\alpha} = w(x_{\alpha}, s_i) \quad (1)$$

Where  $w$  is a function of the vectors  $x_{\alpha}$  and  $s_i$ . The function of  $w$  can further be presented in an additive form:

$$w(x_{\alpha}, s_i) \equiv V(x_O, s_O) + \varepsilon(x_U, s_U) \quad (2)$$

Where observable (indicated by  $O$ ) and unobservable (indicated by  $U$ ) factors are separated into  $V$ , and  $\varepsilon$ , respectively. The unobservable factors – the error term or the randomness – can arise from several sources including unobserved attributes such as taste, measurement errors, and the use of proxy variables that fail to capture the underlying true phenomenon.

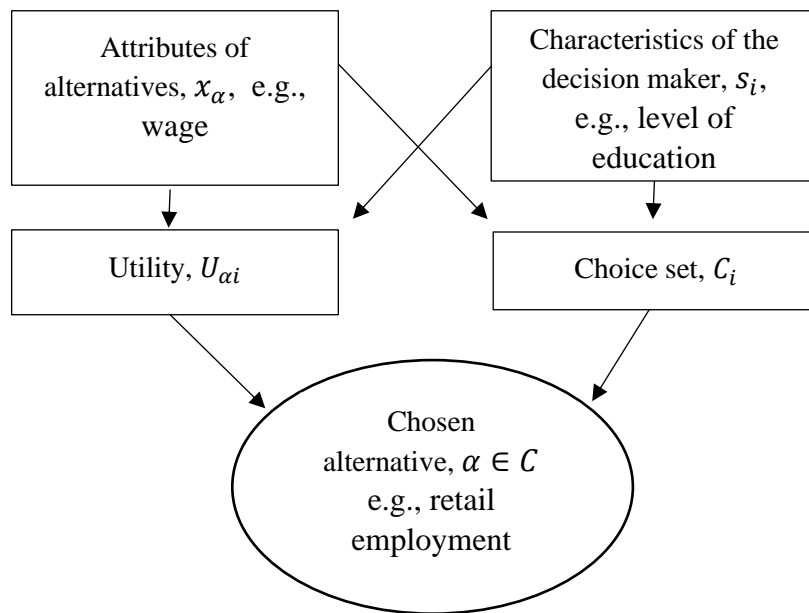
The choice set,  $C_i$ , faced by an individual holds different alternatives on which the individual may decide. The choice set can consist of *active* decisions – for instance, which type of education the individual will pursue, or the act of staying at a job, – and *passive* decisions, which are made for the individual (for instance, being laid off or fired). The decision to go forward with an alternative will depend on a) the available information, and b) the individual's ability to identify the utility (the  $w$  function) that corresponds to the alternative options.

The decision process is normally conducted in two steps. First, an individual is exposed to exogenous factors that dictate his/her to make a choice. Second, the

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<sup>4</sup> There exists a universal choice set  $C$  that includes all possible alternatives for a given population. Out of this universal choice set, each individual has a subset of  $C$  that constitutes his/her actual choice set  $C_i$ .

individual delineates the available alternatives, and chooses the one that yields the highest utility. Each decision can then be linked with a subsequent choice, forming a sequence of choices. Thus, by combining multiple choice sets, it is possible to construct a model that describes the complete career trajectory of an individual over the studied period. In each subsequent choice set, the individual faces the same maximization problem but with different attributes of the alternatives,  $x_\alpha$ , and different (regarding time varying variables) characteristics of the decision maker,  $s_i$ . The choice process can be displayed in the following figure where the arrows between the different boxes represent relationships and their direction.



**Figure 1.** Choice process of an individual through which an iterative process constitutes the individual's career path.

Individual characteristics such as age, income, and education influence what the individual may perceive to be possible choice sets (Ben-Akiva & Boccara, 1995). As such, an individual may choose a job with undesirable features such as low pay, short-term, and part-time, due to lack of other options or due to that the job can

be combined with other non-paid careers, such as art (Adler, 2020). The individual's characteristics may also have long-term implications for career trajectory; hence, they both create and enforce observable inequalities across individuals (Hodkinson, 1995). Perceived possible choices are also influenced by the individual's environment, a combination of socio-economic background as well as attitudes and perceptions (Ben-Akiva & Boccara, 1995).

## **2.1 Career trajectories in Retail and Wholesale**

An important determinant in developing a willingness to start or advance a career in a specific sector is the impression that the individual has of that sector. This impression may stem from either previous work experience (Broadbridge, 2003a, 2003b; Hodkinson, 1995) or through academic courses (Swinyard, 1981; Swinyard, Langrehr, & Smith, 1991). In a study by Hurst and Good (2009) on the perception and expectations of retail careers by college students in Generation Y (born in the 80s and 90s), the authors find that pre-entry expectations, sense of entitlement, and experiences are the drivers of career decisions after entry into the workforce. Retail experience can also be derived from being a customer, where it is hard to assess what a career would entail and with perhaps a more negative perception of a career in that sector. As many people also seek advice on career choices from within their private networks (e.g., friends, relatives, neighbors) (Hodkinson, 1995), the same mechanism applies to their accumulated experience. If a sector is regarded as being either male or female dominated it may further discourage an individual of the underrepresented gender to engage with or seek a career within the sector (Torre, 2018). Generally, studies that examine careers in retail and wholesale find that these sectors are perceived as less attractive compared to other industries (Broadbridge, 2003a, 2003b; Swinyard, 1981;

Swinyard et al., 1991). The underlying reasons involve (i) perceptions of work in these sectors as boring and less satisfying due to monotonous tasks, (ii) structural aspects of the sector including inconvenient and/or long working hours (or the perception of these), lower (initial) wage level, and fewer opportunities for promotions, (iii) negative images and coverage in popular media, and (iv) lower job prestige and status. The studies further point to a development over time whereby more college students (students in management and business administration have been the most often studied groups) in the later cohorts tend to have an increasingly negative attitude and perception of retail careers. This attitude dominates despite the sector's radical transformation in terms of increased globalization and technological developments, allowing for more qualified work tasks and hence a more stimulating career.

For retail and wholesale sectors, the perceived image is particularly relevant, as many young people have part-time or seasonal jobs within these sectors and combine this work with their studies and/or other activities. If their experience is positive and rewarding, it becomes natural for the individual to want to include that career in his or her choice set. Retail (often younger) employees find the work rewarding as it is regarded as a fashionable occupation, and this works as a compensating factor for the lower wage and poor working hours (Misra & Walters, 2016; C. L. Williams & Connell, 2010). In addition, there are large differences between sub-sectors. For instance, within retail, a career in design-boutiques and in department stores is valued higher than one in grocery stores (Broadbridge, 2003a; Swinyard, 1981). Thus, an individual can be attracted to or repelled from a career in an organization or sector based on the value and perception of a brand, making these attributes critical.

While there are many studies which have focused on career choices in retail, there are few empirical studies that have focused on the different career paths and choices in wholesale, despite it being used as a comparison to several industries (Garger, 1999; Melamed, 1996).

### **3 Retail and Wholesale Sectors in Sweden**

Retail and wholesale are two important sectors for the Swedish economy. In 2017, retail employed approximately six percent of the Swedish labor force, while wholesale employed approximately four percent. Value added in retail and wholesale as a part of GDP constituted 11 percent in 2017. Retail and to some extent wholesale also employ a disproportionately large share of young individuals (HUI Research, 2018; Svensk Handel, 2019).

Retail in Sweden has followed a similar trajectory as in other industrialized countries in Europe. The retail sector experienced a large increase in demand after the Second World War. Surging demand, combined with new practices of retail management, led to an increase in average firm size and in the number of supermarkets, but at the expense of small independent and specialized stores (Jacobsson, 1999; Widerstedt, Bergström, Arnberg, Blank, & Cronholm, 2006). The geographic distribution has also changed over time, as more suburban and rural areas have challenged locations in city centers (Forsberg, 1998; Kärrholm, 2016). Another obvious geographical pattern is the concentration in space. In 1993, 75 percent of retail sales took place in 88 of the 290 municipalities in Sweden. In 2016, the same share of sales took place in just 65 of the municipalities, many of which were primarily urban municipalities in larger cities (Nilsson, 2020).

The retail sector has grown in trade volume, employment, and productivity since the early 1950s. From 1994 to 2018, retail trade volume increased by an approximately 125% (though with large differences between sub-industries). Employment growth during the same period was only approximately 45% percentage (from 180,000 to 260,000 employees in absolute numbers). The growth pattern clearly signals an increase in productivity (170%), as employment growth is much lower than retail trade volume (HUI\_Research, 2018).

The wholesale sector is smaller than retail in Sweden in terms of number of employees and number of firms, but wholesale is larger in terms of turnover where a part of the turnover originates from products that are being exported. The wholesale sector has lagged behind the growth in number of employees in the retail sector and the overall increase in population during the last decade. Wholesale growth grew three percent while the population grew approximately nine percent. The number of wholesale firms have, however remained stable relative to the number of retail firms (Svensk\_Handel, 2019).

Wholesale is also unevenly spread across Sweden, with clear differences across municipalities as well as within them. Within municipalities, wholesale firms are often found at the outskirts of cities and in clusters. The location of wholesale firms is often driven by the accessibility to logistical facilities and transportation, such as motorways (Svensk\_Handel, 2019). Both the retail and wholesale sectors have low margins. The operating margin in retail is just below three percent and in wholesale just above four percent, compared to an average margin of approximately six percent for firms across all sectors (Svensk\_Handel, 2019).

## **4 Empirical design**

The data employed in our empirical analysis comes from Statistics Sweden (SCB) and covers all legally residing inhabitants of Sweden above the age of 15. Immigrants are registered once they have received a residence permit, which allows them to work. We can follow individuals on an annual basis from 1990 to 2018 (i.e., 29 years). We are able to make use of detailed information on ascribed characteristics (age, gender, foreign background), achieved characteristics (occupation, education, wage), as well as civil status and the specific work location. For the purposes of this paper, we define the different sequential steps that together form an individual's career trajectory based on the labor market status of the individual. Our analysis is then conducted through multiple steps: (i) define the different labor market status for every year, (ii) identify common career paths among employees in retail and wholesale by measuring similarities across the different steps, and (iii) find factors associated with the common career paths.

### **4.1 Sequential Analysis**

We work with a population, rather than a sample, that consists of all Swedes who worked at least one year in retail or wholesale between 1990 and 2018, and for whom it is possible to follow for at least five periods (i.e., years). The five-year threshold is used to capture the career path of an individual; a path cannot be found without such a minimum.

We differentiate across 14 different labor market states, defined in Table 1. The variables are recorded annually and are mutually exclusive. Thus, if an individual is self-employed and has a wage employment in the same year, that individual is recorded into the category through which she received his/her main income.

**Table 1.** Labor market status\*

Variable	Description
Study (other) <sup>a</sup>	Equal to 1 if an individual is engaged in education (all levels included) not related to retail or wholesale, 0 otherwise
Study (wholesale) <sup>a</sup>	Equal to 1 if an individual is engaged in education related to working in wholesale, 0 otherwise
Study (retail) <sup>a</sup>	Equal to 1 if an individual is engaged in education related to working in retail, 0 otherwise
Study (retailing upper secondary school) <sup>a</sup>	Equal to 1 if an individual specializes in retailing in upper secondary school, 0 otherwise
Employed, other <sup>a</sup>	Equal to 1 if an individual is employed in a sector outside of retail and wholesale, 0 otherwise
Employed, wholesales <sup>a</sup>	Equal to 1 if an individual is employed within the wholesale sector, 0 otherwise
Employed, retail <sup>a</sup>	Equal to 1 if an individual is employed within retail, 0 otherwise
Self-employed <sup>a</sup>	Equal to 1 if an individual is self-employed, 0 otherwise
Unemployed	Equal to 1 if an individual is registered as unemployed, 0 otherwise
Inactive	Equal to 1 if an individual is not registered as unemployed nor studying but is of working age (16-74), 0 otherwise
Parental leave	Equal to 1 if an individual receives subsidies from the state for being on parental leave (conditional on not working, studying or being self-employed in the same year), 0 otherwise
Retired	Equal to 1 if an individual receives retirement benefits (conditional on not working, studying, or being self-employed in the same year; in Sweden, there is no fixed retirement age), 0 otherwise
Died	Equal to 1 if an individual is deceased, 0 otherwise
Other	Equal to 1 if an individual does not fit into any of the above categories, 0 otherwise

<sup>a</sup>The individual can be part-time on parental leave.

\* An individual is only registered within one labor market status for each year.

In Table 2, the first column shows the ten most frequent career paths common to all individuals who have worked at least one year within retail or wholesale during 1990 to 2018 and can be followed for at least five years. The number of years is presented within the parentheses. Thus, the first column shows the most common career path in terms of order and duration of different labor market status. The second column does not take duration into account but only assesses the order of



labor market status and finds the top ten most common sequences of labor market status. Table 3 shows descriptive statistics for the sequences.

**Table 2.** The 10 most common career paths\*

	Most common career paths: Labor market status (number of years)	Most common order of labor market status
1	Employed, retail (29)	Study (other); Employed retail
2	Study (other) (4); Employed retail (1)	Employed, other; Employed wholesale; Employed, other
3	Employed, wholesale (29)	Study (other); Employed retail; Employed, other
4	Study (other) (4); Employed retail (2)	Study (other); Employed retail; Study (other); Employed, other
5	Study (other) (4); Employed retail (3)	Study (other); Employed, other; Employed retail
6	Study (other) (4); Employed retail (1); Study (other) (1)	Study (other); Employed retail; Study (other)
7	Study (other) (4); Employed retail (1); Employed other (1)	Employed retail; Employed, other; Retired
8	Study (other) (4); Employed other (1); Employed retail (1)	Employed wholesale; Employed, other
9	Study (other) (4); Employed wholesale (1)	Employed retail; Employed, other
10	Employed wholesale (1); Employed, other (28)	Employed retail

\*First column, where the order and the duration are considered and includes the most common order of labor market status; and second column, where only the order is considered. Includes all individuals who have worked at least one year in retail or wholesale between 1990-2018 and whose career paths can be traced over five years (N=1,752,297).

**Table 3.** Descriptive statistics for the sequences\*

Variable	Mean	St. Deviation	Min	Max
Overall length of sequence (years)	23.575	7.410	5	29
Overall length of sequence (Employed, retail) (years)	3.386	5.620	0	29
Overall length of sequence (Employed, wholesale) (years)	2.936	5.306	0	29
Number of different labor market statuses (elements) in sequence	4.189	1.422	1	11

\* All individuals who have worked in either retail or wholesale (N=1,752,297).

As presented in Tables 2 and 3, the maximum sequence length is 29 years (1990-2018). Most individuals in our population have long careers, with an average of 23 years (albeit with a large standard deviation of 7.5). The average length of a career in retail is 3.4 years, while the average for wholesale is a bit lower at an average of 2.9 years. It is, however, clear from Table 2 that many individuals do have long careers in either retail or wholesale; both career paths are in the top three most common paths. There are also other career paths that involve several different labor market statuses (a typical worker in either retail or wholesale has four different labor market statuses); many people start studying and then continue into employment within the retail sector, as presented in Table 2.

The same exercise can be done for retail and wholesale separately.<sup>5</sup> While observing the most common career paths (taking into account the order and duration of the different labor market statuses), we observe that the most common path is employment within wholesale for the entire time period. The most common order of labor market status for individuals working in wholesale involves shifting employment within other sectors to or from wholesale: from other sectors to wholesale; move from wholesale to other sectors, or move from employment in

<sup>5</sup> The numbers referred to are based on descriptive statistics that can be requested from the authors.

other sectors to wholesale, only to return to other sectors. For people working in retail, the most common career path is to have worked within the retail sector for the entire period. The top three most common orders of labor market status in retail (disregarding the duration) differ somewhat; individuals tend to pursue education before entering retail employment. The second and third most common orders of labor market status are to study, work in retail, and then switch to employment in other sectors, and to study, work in retail, study again, and then work in other sectors, respectively.

#### **4.2 Sequence Analysis: Finding the common career paths.**

To identify commonalities across individuals who work in retail and wholesale, i.e., to find career paths that are shared among many employees, we use sequence analysis. This method was originally developed for DNA analysis within molecular biology and was first employed in the social sciences by Abbott and Forrest (1986). It has been adopted more recently by, among others, Brzinsky-Fay (2007), Rowe et al. (2017), and Backman et al. (2020) to study the impact of education and foreign background on different career choices, or timing of retirement, as examples.

The advantage of sequence analysis is that the method allows for a more thorough analysis of career trajectories as it accounts not only for single events but a sequence of different steps. Sequence analysis treats the combination of different statuses/steps as one observation, considering the duration of different steps and their order. Thus, the steps that people take before employment in retail or wholesale might look very different for different groups of people, and are treated differently in a sequence analysis even if the outcome, i.e., employment within retail or wholesale, is the same.

To find common career paths, the sequential unit (where all labor market statuses create a unique sequence) of each individual is compared to the sequential units of all other individuals. The sequential unit is a unique combination created by different labor market statuses defined in Table 1. To find shared career paths, the dissimilarity between the different sequential units is used. The dissimilarity is measured using the Levenshtein distance, which captures the number of actions needed to create two equal sequence units (Levenshtein, 1966). Following Brzinsky-Fay (2007), Rowe et al. (2017), and Backman et al. (2020) we use an optimal matching algorithm (OMA)<sup>6</sup> to calculate the distance. By comparing sequential units, the OMA creates a value that measures how many adjustments are required to make two sequential units equal. Each adjustment equals a cost, and a larger cost indicates a greater dissimilarity between different sequence units. The cost of transforming sequential units is based on two factors: (i) the cost of inserting or deleting different statuses, so called indel-cost (Gabadinho, Ritschard, Mueller, & Studer, 2011), which is set equal to one in our study, and (ii) the cost of substituting a status set equal to two in our case.<sup>7</sup> There are many different options and combinations that create two similar sequences, and the one with the lowest cost/distance is chosen using the Needleman-Wunsch algorithm (Needleman & Wunsch, 1970). From this exercise, we construct a large matrix that shows the dissimilarities between all the different sequential units.

To form common career paths that are representative of those of the population that have been employed in retail or wholesale, we form a limited

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<sup>6</sup> Other methods that measure the dissimilarity between sequences are the longest common prefix (LCP) and the longest common subsequence (LCS).

<sup>7</sup> The analysis was conducted in Stata and explained in detail in Brzinsky-Fay, Kohler, and Luniak (2006).

number of career paths. The career paths are clustered based on commonalities across the group. Common clusters have a low cost of transforming one sequential unit into another and are based on the cost matrix previously discussed. To find the clusters, we used the Calinski-Harabasz index and the Duda-Hart index as indicative rules.<sup>8</sup> Since retail and wholesale are industries with different conditions and labor input requirements, the two industries are analyzed separately. Due to the size of our population, we construct a representative sample in each industry. This sample consists of a random selection of one percent of the individuals in each sector, resulting in approximately 10,000 individuals per group.<sup>9</sup> Cluster solutions using three to six medoids were assessed, and the cluster solution with four medoids was found to provide the maximum difference between clusters for retail; for wholesale, five medoids were chosen. The four representative career pathways in retail were thus identified, visualized, and labeled: (1) Employment dominant sequence, both in retail and other sectors (EMP-RET-OTHER), (2) Employment in retail to self-employment dominant sequence (EMP (RET)-SELF), (3) Employment to parental leave dominant sequence (EMP (RET)-PAR), and (4) Employment within retail to retirement dominant sequence (EMP(RET)-RETIRE). The clusters in wholesale were identified, visualized, and labeled as: (1) Employment dominant sequence, both in wholesale and other sectors (EMP-WHO-OTHER), (2) Employment in wholesale to self-employment dominant sequence (EMP (WHO)-SELF), (3) Employment in wholesale to parental leave dominant sequence (EMP (WHO)-PAR), (4) Employment within

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<sup>8</sup> There are many ways to define clusters but according to Milligan and Cooper (1985), these two rules have good properties.

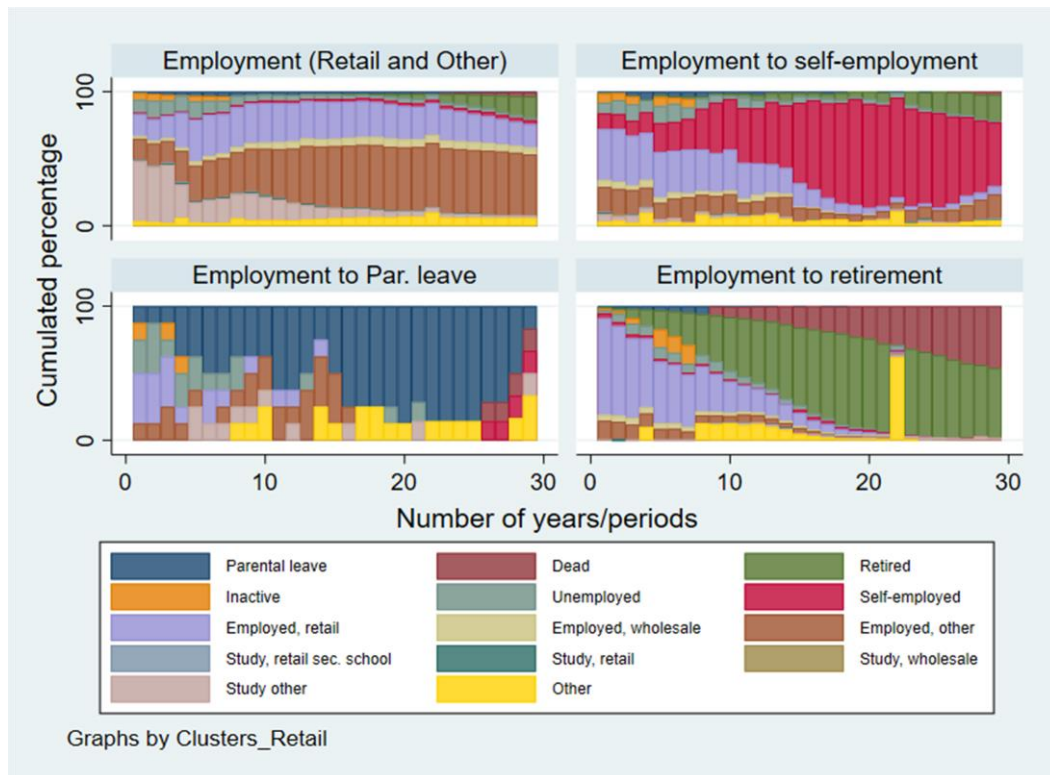
<sup>9</sup> We have re-done the sampling several times and find robust results.

wholesale to retirement dominant sequence (EMP (WHO)-RETIRE), and (5) End of employment (END-EMP).<sup>10</sup>

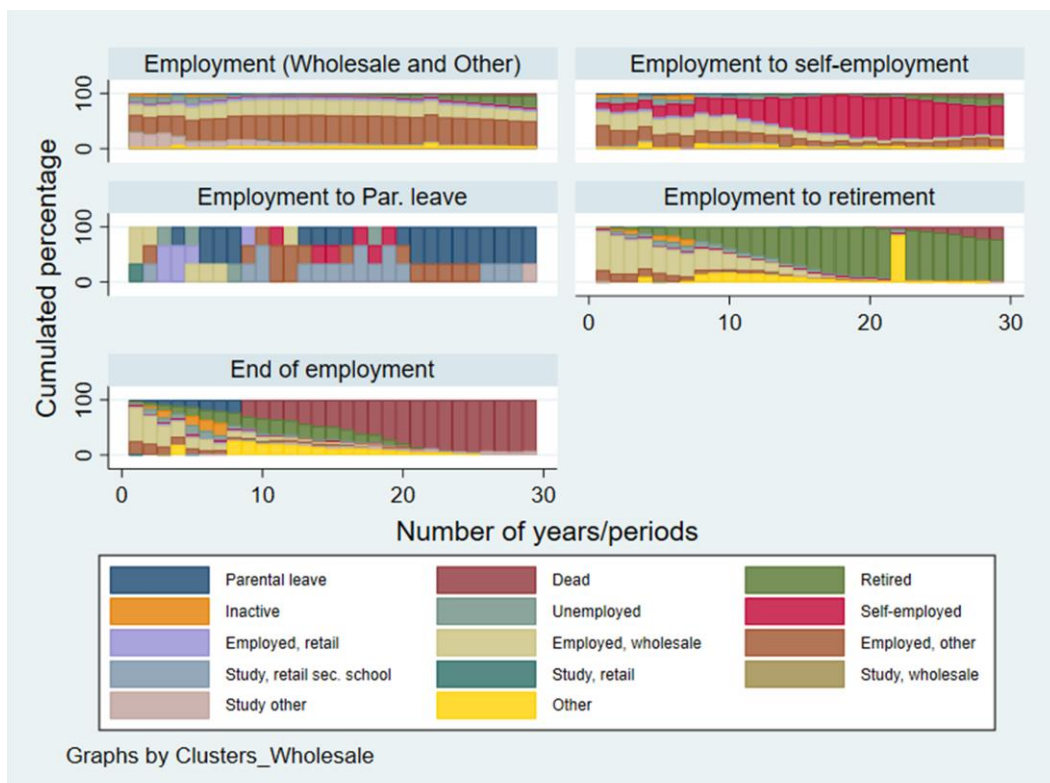
The following figures show the results from this cluster analysis; the different clusters that are identified for retail (Figure 2) and wholesale (Figure 3), respectively, are presented below. As visible from the figures, the optimal number of clusters differ across the two industries. Career paths in retail forms four clusters, while career paths in wholesale form five.

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<sup>10</sup> In this cluster many individuals are registered as dead.



**Figure 2.** The identified clusters for retail.



**Figure 3.** The identified clusters for wholesale.



### 4.3 What makes an individual more or less likely to have a given career path?

To get a better understanding of the clusters and which individuals enter into the different career paths, we perform a logit as described in R. Williams (2006), and a linear probability model (LPM) as a robustness, where we use the clusters as the outcome variables and contrast them to individual and locational factors. The estimated model is presented in Equation 3:

$$P(Y_{i1} = 1) = \frac{e^{\alpha + \beta' S'_{i0} + \varepsilon_{i0}}}{1 + e^{\alpha + \beta' S'_{i0} + \varepsilon_{i0}}} \quad (3)$$

Where  $Y_{it}$  is the dependent variable equal to 1 if individual  $i$  selects a specific career path in retail or wholesale in period 1, representing  $w$  in Equation 2.  $S'_{i0}$  is a vector of the ascribed (Age; Gender; Children; Foreign background) and achieved individual characteristics (Education), and a variable that captures the size of the municipality where the person lives (Municipality). These variables are fixed to the initial year of the career path,  $t=0$ . For example, if an individual is in the registry data for six years between 2001-2006, we use the values from 2001 to capture  $t=0$ . Hence, the initial values differ across individuals depending on the years in which they are in the data.  $\beta'$  is a vector of the parameters to be estimated.  $\alpha$  is an intercept, and  $\varepsilon_{i0}$  is the error term. Table 4 below shows the variables used in the estimations. Descriptive statistics of the independent variables can be found in Table A1 in the Appendix.

**Table 4.** Variable used in the empirical estimation.

Variable	Description
Dependent variable: Retail <sup>a</sup>	
EMP-RET-OTHER	Binary variable, 1= if belongs to the career trajectory “EMP-RET-OTHER”, 0=otherwise
EMP (RET)-SELF	Binary variable, 1= if belongs to the career trajectory “EMP-SELF”, 0=otherwise
EMP (RET)-PAR	Binary variable, 1= if belongs to the career trajectory “EMP-PAR”, 0=otherwise
EMP (RET)-RETIRE	Binary variable, 1= if belongs to the career trajectory “EMP-RET”, 0=otherwise
Dependent variable: Wholesale <sup>b</sup>	
EMP-WHO-OTHER	Binary variable, 1= if belongs to the career trajectory “EMP-WHO-OTHER”, 0=otherwise
EMP (WHO)-SELF	Binary variable, 1= if belongs to the career trajectory “EMP-SELF”, 0=otherwise
EMP (WHO)-PAR	Binary variable, 1= if belongs to the career trajectory “EMP-PAR”, 0=otherwise
EMP(WHO)-RETIRE	Binary variable, 1= if belongs to the career trajectory “EMP-RET”, 0=otherwise
END-EMP	Binary variable, 1= if belongs to the career trajectory “END-EMP”, 0=otherwise
Independent variables	
Age	Age of the individual
Gender	Binary variable, 1= male, 0=female
Foreign background	Binary variable, 1=individuals with a foreign background, 0=otherwise
Education	Level of education aggregated on seven levels: 1: Primary education shorter than 9 years 2: Primary education, 9 years 3: Secondary education, maximum 2 years 4: Secondary education, 3 years 5: Post-secondary education, shorter than 3 years 6: Post-secondary education, 3 years or more 7: Doctoral education
Children	Number of children under the age of 18 living in the same household
Population, municipality (ln)	Number of inhabitants in the municipality where the individual works

<sup>a</sup> Employment dominant sequence, both retail and other sectors (EMP-RET-OTHER), Employment in retail to self-employment dominant sequence (EMP (RET)-SELF), Employment to parental leave dominant sequence (EMP (RET)-PAR), and Employment within retail to retirement dominant sequence (EMP(RET)-RETIRE). <sup>b</sup> Employment dominant sequence, both wholesale and other sectors (EMP-WHO-OTHER), Employment in wholesale to self-employment dominant sequence (EMP (WHO)-SELF), Employment in wholesale to parental leave dominant sequence (EMP (WHO)-PAR), Employment within

wholesale to retirement dominant sequence (EMP (WHO)-RETIRE), and End of employment (END-EMP).

The following tables show the results from the logit estimation for retail (Table 5) and wholesale (Table 6). As a robustness test, we also run the models with a Linear Probability Model. The results show that people in career paths where they work in either retail or wholesale and continue to other sectors (Cluster 1) are overall younger, have more education, and have children. The individuals that continue into being self-employed (cluster 2) tend to be older, male, and in with retail with higher education. Size of municipality negatively affects the probability of becoming self-employed in wholesale. The third cluster represents individuals that shift between being on parental leave and working within either retail or wholesale; no consistent patterns can be observed. This could be driven by the lower number of observations of this career path. Career paths which lead to retirement (cluster 4) are associated with older individuals. This career path is also associated with individuals with a lower level of education and who have fewer children living in the same household. We find similar patterns within wholesale for individuals who work within wholesale and then later end their employment (cluster 5).

**Table 5.** Estimation results from running a logit estimation for those employed in retail; the outcome variables are the different clusters to which an individual can belong.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Variables	“EMP-RET-OTHER”	”EMP (RET)-SELF”	“EMP (RET)-PAR”	”EMP (RET)-RETIRE”
Gender	-0.240** (0.105)	0.499*** (0.152)	-a	0.104 (0.136)
Age	-0.167*** (0.00562)	0.0380*** (0.00528)	-0.0754*** (0.0192)	0.251*** (0.0127)
Foreign background	0.209 (0.162)	-0.227 (0.261)	1.177 (1.057)	0.00508 (0.222)
Education	0.211*** (0.0479)	0.160** (0.0626)	-1.296 (0.709)	-0.231*** (0.0646)
Children	0.594*** (0.103)	0.150 (0.191)	-1.294 (0.844)	-0.559*** (0.141)
Population, municipality (ln)	-0.0617 (0.0381)	0.0121 (0.0571)	-0.146 (0.109)	0.0893 (0.0501)
Constant	7.806*** (0.532)	-5.676*** (0.720)	0.452 (2.460)	-12.42*** (0.865)
Observations	7,514	7,514	4,678	7,514
Pseudo R2	0.550	0.0422	0.0692	0.695
Wald chi2	1186	114.3	95.74	565.5

\*\*\* p<0.01, \*\* p<0.05. Robust standard errors in parentheses.

<sup>a</sup> Missing due to lack of variation in our sample where only women are on parental leave.

**Table 6.** Estimation results from running a logit estimation for those employed in wholesale; the outcome variables are the different clusters to which an individual can belong.

Variables	Cluster 1 “EMP- WHO- OTHER”	Cluster 2 ”EMP (WHO)- SELF”	Cluster 3 “EMP (WHO)- PAR”	Cluster 4 ”EMP (WHO)- RETIRE”	Cluster 5 “END- EMP”
Gender	-0.0341 (0.0990)	0.383** (0.169)	-1.194 (1.154)	-0.594*** (0.140)	0.658*** (0.207)
Age	-0.143*** (0.00542)	0.0322*** (0.00511)	-0.00172 (0.0535)	0.193*** (0.00992)	0.119*** (0.00815)
Foreign background	-0.155 (0.152)	0.126 (0.234)	2.816** (1.215)	0.197 (0.219)	0.128 (0.277)
Education	0.168*** (0.0382)	0.0810 (0.0553)	-0.331 (0.504)	-0.142** (0.0591)	-0.180** (0.0731)
Children	0.497*** (0.100)	0.202 (0.162)	0.722 (1.486)	-0.359** (0.167)	-0.500** (0.223)
Population, municipality (ln)	0.0107 (0.0365)	-0.156** (0.0612)	0.799 (0.498)	0.0442 (0.0527)	0.0478 (0.0638)
Constant	6.661*** (0.500)	-3.493*** (0.713)	-17.13*** (6.053)	-10.50*** (0.816)	-8.795*** (0.889)
Observations	7,008	7,008	7,008	7,008	7,008
Pseudo R2	0.396	0.0282	0.193	0.503	0.301
Wald chi2	911	60.25	1308	560.9	332.5

\*\*\* p<0.01, \*\* p<0.05. Robust standard errors in parentheses.

## 5 Discussion

At a time when the retail and wholesale sectors face high competition and technological change, human capital (e.g., acquired through formal education, job training, or job tenure) is more important than ever to build and preserve knowledge and employee capabilities within a company. Individuals exiting a sector after building sector-specific experience is a challenge for sectors with high labor churn. To understand the probability of retaining experienced labor within a company and within a sector, one needs to analyze cumulative probabilities in career trajectories rather than treating individual outcomes independently.

In our study, we use a sequence analysis to systematically identify common career paths of individuals who have worked or are working in retail or wholesale.

Individuals who at some point have worked in retail typically follow four common career paths, in descending order of prevalence:

1. Shift between retail employment and employment in another sector.
2. Work within retail early in a career and later transition into self-employment.
3. Work in retail and later transition into parental leave.
4. Work in retail until retirement.

For wholesale, on the other hand, we identify five common paths. Four of these are analogous to those of retail careers, while the fifth most common career path is employment in wholesale followed by retirement and death. Next, we assess what initial characteristics influence individuals to sort into these career paths.

We also identify heterogeneous pathways based on individual characteristics. We find that being male decreases the propensity to change sectors of employment if a person has once worked in retail, while there is no such relationship in wholesale. For both retail and wholesale, family circumstances affect the propensity to change employment between industries. Individuals with children under the age of 18 are more prone to switch between sectors. For age, a close proxy for job experience, we find that older individuals have a lower propensity to change industries. As shown in the knowledge creation model by Berliant and Fujita (2008, 2009), it is, however, important to both have employees with firm-specific knowledge gained through extensive experience at that firm (i.e., firm tenure), as well as individuals who have experience and skills from outside that firm. We find that achieved characteristics in the form of education tend to increase the probability of changing sectors. In line with Becker (1964), individuals

with higher levels of education have a higher mobility in the labor market; this mobility may apply to sectoral change, a plausible explanation for our results.

The individuals who follow an entrepreneurial career path are more likely to be older and male, in line with previous studies that find a higher probability of self-employment for men than women (e.g. Koellinger, Minniti, & Schade, 2013). It is interesting to note that high levels of education are associated with the entrepreneur career path for those working in retail, but not for wholesale. Future research can potentially identify the sectors in which these individuals become self-employed.

For location, we find that an individual's working location is not associated with variation across potential career paths. Such a finding is unexpected, since the size of the local labor market (municipality size serving as a proxy) is expected to affect available options; hence the alternative career paths. We should note, however, that we use a density measure at the municipal level to capture the size of the local labor market. As it is not within the scope of this paper, we do not explore market reach extending beyond arbitrarily defined administrative borders, which may explain this puzzling result. Further investigation into the geographic determinants for different career paths will be a fruitful avenue for future research. Finally, we also perform linear probability estimations, which delivers consistent and robust results.

## **6 Conclusions**

The retail and wholesale sectors are of critical importance in many developed countries, as they provide many employment opportunities and often act as entry points into the labor market for young people (Daunfeldt & Hortlund, 2014). These realities illustrate the importance of these sectors for employees, but they also

reveal one of their biggest weaknesses: the high labor turnover rate (Näringsliv, 2015). Several studies focus on the decisions and characteristics of individuals in these sectors who leave employment (Daunfeldt & Fergin-Wennberg, 2016; O'Leary & Deegan, 2005; Salleh et al., 2012). However, these studies consider such decisions as one-time events. Our analysis complements the literature on career paths in retail and wholesale by mapping the entire sequence of events in an individual's career and assessing the determinants associated with the different paths. By using a sequential approach, we combine all the steps in an individual's career to draw inferences on the probable pathways. Thus, we differentiate careers both in terms of the elements that they contain and the order of these event. To the authors' knowledge, this is the first study that uses this method for the retail and wholesale sectors.

Although retail and wholesale are different in many aspects, our findings reveal similar career trajectories for their employees. Many individuals remain in the same sector for a long period of time. There is, however, a considerable share of people who have periods of employment in these sectors in between studying or working in other sectors. From our regression analysis, we find that age, gender, education, and family situation are associated with the choice of career path, while location seems to be of lesser importance. Individuals who follow a career path in which they change sectors tend to be of a lower age and with higher levels of education. This particular result highlights one of the challenges that firms in retail and wholesale currently face: holding on to young employees with a high level of human capital. To remain competitive in these increasingly fiercely competitive industries, firms need to attract and retain young and educated employees who will build careers in their industry, thus accumulating human capital both in terms of formal education and industry-specific competence. Retaining young talent



alongside more senior employees who tend to remain within the sector will create compounding effects for a firm that have the potential to be greater than the sum of their parts.

Even though the sequence analysis allows for new ways to analyze the career path of an individual, it also has flaws. This analysis is descriptive in its nature, so rather than eliminating sorting, it defines it. Another issue concerns the number of clusters; there is a trade-off between accuracy and efficiency. While the accuracy increases with the number of clusters across which we calculate differences, there is a point at which the calculations are too computationally demanding to be carried out. There are many aspects we were not able to cover in this paper that deserves further analysis. One could assume that career paths might differ depending on the initial conditions encountered at a firm by an employee, such as impression of the manager, collegiality, and scheduling. These attributes are not possible to capture using register data and therefore future research should attempt to uncover their impact using qualitative techniques. Another promising avenue for future research is to examine how different types of educational background affect the outcomes for the individuals. Of special interest are the outcomes of individuals who have chosen to specialize in retail or wholesale in upper secondary school and in higher education.

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## Appendix

**Table A1.** Descriptive statistics for the individuals in different clusters; mean and standard deviation in parenthesis

Retail (N=10,752)					
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	
Variable	“EMP-RET-OTHER”	”EMP (RET)-SELF”	“EMP (RET)-PAR”	”EMP (RET)-RETIRE”	(RET)-
Age	21.567 (8.758)	33.833 (12.718)	21.250 (4.200)	53.890 (8.428)	
Gender	0.388 (0.487)	0.509 (0.501)	0.000 (0.000)	0.319 (0.467)	
Foreign background	0.124 (0.329)	0.126 (0.333)	0.250 (0.463)	0.088 (0.283)	
Education	2.697 (1.002)	3.005 (1.124)	2.500 (0.756)	2.625 (1.005)	
Children	0.768 (0.422)	0.541 (0.499)	0.750 (0.463)	0.162 (0.368)	
Population, municipality	157 556 (223 950)	178 600 (241 007)	55 235 (21 648)	167 999 (225 722)	
Wholesale (N=8,738)					
Variable	Cluster 1 “EMP-WHO-OTHER”	Cluster 2 ”EMP (WHO)-SELF”	Cluster 3 “EMP (WHO)-PAR”	Cluster 4 ”EMP(WHO)-RETIRE”	Cluster 5 “END-EMP”
Age	25.473 (10.430)	34.165 (11.832)	28.667 (10.786)	54.267 (6.870)	51.793 (12.450)
Gender	0.656 (0.475)	0.739 (0.439)	0.333 (0.577)	0.609 (0.488)	0.762 (0.427)
Foreign background	0.119 (0.324)	0.142 (0.349)	0.667 (0.578)	0.111 (0.314)	0.138 (0.346)
Education	3.044 (1.216)	3.301 (1.245)	3.000 (1.000)	3.043 (1.183)	3.254 (1.560)
Children	0.646 (0.478)	0.548 (0.499)	0.667 (0.578)	0.171 (0.378)	0.188 (0.392)
Population, municipality	187 975 (238 301)	172 474 (236 540)	409 920 (276 817)	232 242 (254 392)	235 124 (259 650)

