

# Benefits of employment: decomposition and valuation

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## Abstract

The aim of this paper is to value different attributes of employment contract from the employee's perspective and to assess the extent of workers' heterogeneity in terms of their preferences for employment characteristics. This addresses one of the fundamental issues of labour market economics, i.e. modelling of the supply of labour and economic conditions of a contract between an employer and an employee. Despite a number of empirical studies, until now there is no comprehensive analysis of the utility function for employment (mainly for methodological reasons), that would take into account all relevant job attributes for the particular group of workers. Modelling of non-income benefits of employment is hardly possible with traditional methods. Discrete choice modeling (choice experiment method) was used to value employment attributes. Parameters of the employment-related utility function were estimated using multinomial logit model (MNL) and RPL (random parameter logit). The substitution rates between different attributes of employment contract were calculated and then degree of heterogeneity was assessed. Due to the opt-out alternative in choice experiment design the reservation wages analysis was conducted. In fact, calculated heterogeneous reservation wages relatively well explain observed wage differentials in employment offers for graduates.

Keywords: labor market supply, preferences, benefits of employment, reservation wage

## Introduction

Despite significant progress both in theoretical and empirical analysis, the subject of wage formation remains as one of the key problems in the labor market economics. Modeling the employees' preferences in terms of utility flowing from employment can be seen as a useful contribution, filling the gap in the understanding of the nature of substitution between the benefits of taking up employment.

According to the modern approach to labor supply modeling, by undertaking job, an employee decides to exchange not only their time for wage (as it was recognized by traditional neoclassical theory of labour supply), but rather to provide employer with their effort, skills, commitment, creativity, loyalty etc. in exchange for pecuniary and non-pecuniary benefits bringing them utility gains. They include salary (allowing for consumption of goods and services), extra benefits, sense of income security, social contacts, career perspectives, social prestige etc. Therefore in labour supply analysis we should take into account both wage and non-wage benefits gained by an employee. However in order to model interdependencies between different types of benefits, a problem of value attributed to different employment characteristics must be solved. Moreover, it can be expected that confirmed heterogeneity of workers (in terms of their characteristics) results in significant differences in substitution rates between different employment benefits.

The aim of this study is to assess the value of different characteristics of the employment contract with the employee's perspective, and to assess the degree of differentiation of employee's preferences related to employment benefits.

The research was focused on the particular group, i.e. students and graduates of social fields of study (up to 5 years after graduation). Although specifics of this group did not allow to generalize the results for the whole population, its other features seem to make it a very attractive object of study. In the case of this group, it is relatively easy to assure high response rate, relatively high level of homogeneity in terms of earlier labour market experience (persons entering labour market) and (to a large extent) similarity of types of jobs in terms of the level of qualifications required.

The paper starts with a theoretical background of used approach. This is followed by the basic information about the study design and the methodology. Later, the description of the Willing To Pay (WTP) for each levels of the attributes of employment is provided. The last part of the paper discusses the results and provides reservation wages analysis. The text ends with a comparison of the results of a direct declared valuations of employment attributes.

## Theoretical background on assessing employment benefits: selected topics

The issue of benefits gained by an individual undertaking employment has been undertaken in a number of theories explaining the equilibrium in the labour market, in particular those concerning the determinants of wages. Neoclassical theory of labour market has been the fundamental approach, in which a decision to work (and how much to work) has been modelled as a choice between consumption and leisure. An important extension of the neoclassical theory of labour supply has been the approach, which explains the wage differentials observed in the market. The most important of these extensions include the theory of equalizing differences,

human capital theory and the theory of efficiency wages. From the perspective of the research area, the first approach seems to be crucial. It assumes that wages should reflect different job characteristics and compensate for discomfort of job (related to effort, stress, insecurity etc.). In other words, salary should compensate for a disutility caused by inconvenience of particular job tasks.

The studies involving empirical analysis of the theory of equalizing differences, the main stress is placed on the usefulness of the work achieved with such attributes as the repeatability of tasks, physical stress, the need to control others (Lucas, 1977), psychological and physical pressure (Bluestone, 1974), work in environments associated with severe physical and mental stress (Quinn, 1975), work in noisy environments and in bad weather, dirt and with a high risk of injury (Hamermesh, 1977), the risk of death (Thaler & Rosen, 1975; Smith, 1973), working with heavy machinery, and the issue of allotted resting time (Duncan & Stafford, 1980). In all these studies, the results clearly confirm the validity of the theory of equalizing differences.

The research on employment utility determinants has especially developed since it was proved that job satisfaction influences employees' effort (Locke, 1969; Freeman, 1978; Borjas, 1979). Job satisfaction has traditionally been an index of utility derived from employment. Job satisfaction determinants concerning job characteristics and institutional environment have been addressed in a number of studies (Fischer and Sousa-Poza 2006; Blanchflower et al. 2001; Medgyesi and Robert 2003; Stier and Lewin-Epstein 2003; Bockerman 2004; Clark and Senik 2006; Green and Tsitsianis 2005; Kaiser 2007; Davoine and Erhel 2006; Warr 1999; Frey and Stutzer 2002). A general job satisfaction may be perceived as the weighted average of satisfaction obtained from characteristics of employment. This is an analogical view on consumer behaviour, which was initiated by Lancaster (1966, 1971). It also began the stream of research on the multidimensional understanding of the characteristics of goods and services, including employment (Skalli et al. 2008).

Despite numerous studies on job satisfaction determinants, so far, it has been impossible, mainly due to methodological reasons, to carry out complex research regarding the influence of employment utility function parameters on an employment decision, and to cover all the crucial attributes of employment, compare their significance and evaluate them in a reliable way. The only project worth mentioning is EPICUR (Societal and economic effects on quality of life and well-being: preference identification and priority setting in response to changes in labour market status<sup>1</sup>), which covered employment preference research by means of the conjoint analysis method. Apart from that, the previous research to verify empirically the theory of equalizing differences was based on comparing net wages in various types of jobs, or on employees' questionnaires which covered direct questions about the valuation of a given employment attribute. As the above methods are imperfect in comparison to choice experiment, it can be stated that there is a deficit of studies that allow on a precise valuation of employment utility function parameters from the employee perspective.

Most of the identified in the literature non-pecuniary gains from employment may be classified as the non-market goods (prestige, security, pleasure etc.). The key methodological problem faced by labour economists interested in elaboration of this problem is lack of open market for many components and the benefits of employment. In previous empirical studies two methods

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<sup>1</sup> <http://www.abdn.ac.uk/epicurus/>

were usually used. One was a statistical analysis of the survey results documenting employees' declaration on the importance they attribute to the different work characteristics. The other one was an econometric analysis of individual data on employment. Since the first method is based solely on declaration, not the actual choice, it is methodologically questionable. The other one is usually limited to a small group of attributes (such as cash compensation, working time, the form of the contract of employment), and does not examine the preferences, but the interdependence between labour supply and demand. That is why the modern micro-econometrical methodology proven to be extremely useful tool for assessing value of the non-market goods. As for empirical part of my study, I used discrete choice experiment methodology (DCE), which is a statistical method used for analysis of discrete choices. Originally it was used for modelling the trade-offs between the price and the attributes of goods or services, but more recently it started to be used in other, various domains of economics (environmental economics, public policy, labour market etc.). Core of this type of analysis is a specific survey methodology based on giving the respondent set of choices between a number of alternatives with different levels of attributes associated with each alternative. Using designed questionnaire applied in desktop application, a pilot study leading to the optimal choice design (*Bayesian efficient design*) was conducted. The interactive IT application was used, which provided appropriately rotated set of decision situations to each respondent.

### *Selection of the attributes and their levels*

The study is innovative primarily in two aspects. First, to date there has been no comprehensive study identifying the preferences for different aspects of employment (this applies to both: sample size and the number of attributes). The second unique aspect of the study is the use of discrete choice experiment (DCE) to analyze the behaviors of the labor market supply. So far, this method was successfully applied mainly to the valuation of non-market goods, particularly in research in the field of transport economics, health, environment and marketing. The specificity of transactions on the labor market, encourage the application of choice modelling to analyze the behavior related to accepting employment and employment conditions.

The first stage in designing the research using the DCE was to identify the attributes of the employment, and then determining the levels of each attribute. An in-depth analysis of the literature leads to the assumption that the attributes identified in this study generally cover the majority of factors considered during the assessment of job offers, and when making job choices by the target group.

The list of attributes identified as relevant to the target group (students and graduates of social sciences in Poland), includes the following items:

- net monthly wage,
- type of employment contract,
- number of working hours per week,
- attitude to work,
- job prestige,
- fringe benefits,
- commuting time,
- competition at work,
- atmosphere in a workplace,

- career development possibilities and
- remuneration method.

Each attribute must have a specific levels assigned. It is desirable for these to be the as clear and identifiable from the respondents' point of view as possible. The study includes three continuous attributes: salary, overtime spent at work, and travel time to work. For each of other attribute three levels were defined.

Net wage was the first and most crucial attribute taken into account in the study. This is not only because the income derived from work is a major source of benefits to the employee, but also due to the reasons of research methodology. The inclusion of this particular attribute allows for the subsequent estimation of the willingness to pay (WTP) for other attributes, and to calculate the reservation wage. In order to ensure maximum transparency of the respondents' choices, it was decided that the study will define wages as net monthly salary. Range of wages selected for the study ranged from 1500 to 4000 PLN (with a 500 PLN interval). The choice of available options was based on the analysis of the wage distribution among graduates and the Polish Central Statistical Office data on the average salary.

The second attribute taken into account in the study was the fridge benefits received by an employee from his employer. Benefits of this kind should be considered as a form of remuneration (they have a specific monetary value), yet they are transferred without the use of money and have a tangible form. In order to assign the levels of this attribute, a review of about 100 Internet job offers targeting graduates was conducted. This served as the basis for identifying the most common perks offered. These included: gym cards (usually in the form of sports/loyalty cards available to employees), and the access to private healthcare. The job offers presented to the respondents in the research were characterized by three sets (packages) of benefits. The first set assumed no benefits and no additional privileges. The second set included the possibility of using the Multisport card <sup>2</sup> (the most popular perk card). The card allows free access to a large number of sports facilities. The third and largest set of privileges assumed access to private healthcare provided by a medical center, providing the employee with the access to medical services in a comfortable environment without having to wait for an appointment. Since jobs offering additional health insurance typically include also the ability to use a sports card, the third attribute level contains both of these perks. It is obvious that job offers containing perks should be valued higher by the respondents. This means that the token parameters in the utility function at higher levels of the variable should be positive (in relation to the lack of benefits).

The third attribute is the type of the employment contract. Different levels of this attribute have been selected to best represent the institutional environment typical for people entering the labor market in big cities in Poland. The three levels match the most common forms of employment, and include: employment contract, contract for specific work/ contract of commission, and work without any written contract (illegal employment). Each level is described in detail in the survey form, with particular emphasis placed on the financial implications. A signed

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<sup>2</sup> The Multisport card is a product of Benefit Systems. It is the largest business loyalty program available in Poland. Currently, more than 5,000 companies provide their employees with the opportunity to benefit from a network of sport activities and recreation facilities. The number of Multisport cardholders is over 350 000 (source: <http://www.benefitsystems.pl/dzialalnosc.aspx>, accessed on 17/05/2013).

employment contract means that the employee is protected by the Labor Code (which brings with it holiday entitlement, sick pay, a sufficiently long period of notice, redundancy pay, as well as regulations on working hours, breaks, etc.), and is also covered by public health insurance and social security. The contract for specific work/contract of commission means that the respondent has the right to public healthcare, but without holiday entitlement and sick pay. Such person is also not protected by the Labor Code. Finally, working without a valid contract (illegally) means the lack of protection of by the Labor Code, lack of access to public healthcare, and the lack of protection of the social security system. In addition, illegal employment is associated with the risk related to obtaining wages, job security, etc. The inclusion of this attribute in the study is supported by the hypothesis that the increase of rights and privileges associated with work increases employees utility. Therefore, one can expect that the value of the parameter in the utility function at the highest level of this attribute (i.e. employment contract) should be higher than the value in the case of contract for specific work. The third option (illegal employment) should lead to a decline in utility due to the additional risks borne by the employee.

The fourth attribute of employment, is the number of hours devoted to work in a week. In order to ensure choice transparency, the respondents were provided with instructions indicating that these hours reflect actual practice adopted by a given employer, and are not necessarily consistent with the signed employment contract. The study assumes that in each case the job offer is for full-time employment. The first level denotes approximately 40 hours of work per week (e.g. 8 hours for 5 days, which is the standard amount for a full-time job, typical for example in the public sector). The work is usually carried out at fixed times (e.g. from Monday to Friday, and from 9.00 am to 5.00 pm, without the need to continue the work after returning home or hours). The second level of this attribute means working for approximately 50 hours per week (e.g. 10 hours for 5 days). This corresponds to a situation where there are fixed working hours, but quite often (min. three times a week), there is a need for the employee to stay longer or to continue the work at home (for min. 3 hours). The third level means working for about 60 hours a week. In this case, the employee is assigned a job that requires 60 hours of work each week, often for ten-odd hours per day. The requirement to work from home, even on weekends, happens relatively often. The choice of the number of hours corresponding to the three levels was based on the analysis of average work hours declared by the graduates surveyed in the period up to 5 years after graduation in Poland<sup>3</sup>. The hypothesis regarding the impact of the number of hours working on usability was based on the neoclassical theory. The increase in the number of hours worked reduces the utility obtained from employment.

Another attribute (and an indirect result of the previous), also associated with the value of time spent working is the commuting time, expressed in minutes, using three possible variants. The first option assumes a commuting time of 15 minutes or less in each direction (the study provides an example: a walking distance of less than 100 meters and two stops on the metro or tram). The second level means 30 minutes travel time in each direction (e.g. the workplace is located on the other side of the city, requiring a commute by bus, tram or metro plus walking, with a total travel time of more than 30 minutes). The longest journey time specified in the study was more than 1.5 hours (90 minutes) one way. This is a situation in which the workplace

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<sup>3</sup> Calculations based on data collected in the study of individual graduates - HEGESCO Project (Higher Education as a Generator of Strategic Competences). More information about the project and its results can be found at: <http://www.hegesco.org/>.

is located several kilometers outside the city (for example, suburban railway journey plus walking, taking more than one and a half hours in total). Since the commuting time can also be seen as time indirectly spent working in accordance with the neoclassical theory of labor supply, the rising length of travel reduces the utility of work. However, this leads to the question whether the hours of time spent in the workplace and the time consumed by the commute are valued by employees in an identical way. It seems that – although working time requires full personal commitment of the employee, the time spent traveling to and from work can be seen as less burdensome. The hypothesis behind the relationship of parameters when at work and while traveling shows that the time spent traveling should to a lesser extent reduce the usefulness of additional hours of work, as compared with the extra time spent in the workplace.

Another attribute included in the study is the respondent's attitude to activities performed at work, categorized using three possible states. Due to the qualitative nature of this attribute, the respondents were presented with statements characteristic for each level. The first level is characterized by the phrase "I like to perform the tasks that are my tasks", meaning that the tasks at work are pleasant and comfortable for the respondent. The second level corresponded to a neutral statement: "I am indifferent among the tasks I do at work", meaning that the tasks are not tiring, but also do not bring any special enjoyment. The last level was negatively characterized by the statement "I do not like to perform the tasks I do at work", meaning that the time spent on activities and tasks at work is unpleasant and tiring. The hypothesis describing this attribute indicates that the more positive the attitude towards the tasks is (the tasks are seen as more enjoyable), the higher should be the utility associated with accepting this type of employment.

Another attribute associated with attitudes towards workplace is the atmosphere in the team. This attribute describes the emotional connection with the people with whom the employee collaborates during the implementation of work assignments. In order to ensure easy understanding of this attribute by the respondent, also here the levels were categorized using qualitative statements about the team, referring to emotions towards colleagues. The first level corresponds to a statement that the co-workers form "a great team of people, which I really like." It means that the atmosphere is so positive that the employee would feel good about meeting with his or her colleagues also during leisure time. The second level denotes a neutral attitude towards co-workers, and is expressed by the statement: "The atmosphere at work is correct, people at work are fine". The third level expresses a negative attitude towards co-workers. It is expressed by the statement: "I do not like the people with whom I work, I do not enjoy meeting them". According to the hypothesis, the respondents should appreciate work more when the atmosphere in the team is better (the improvement in team atmosphere should lead to an increase in utility of work).

The attribute stemming from the sociological theory of motivation at work is prestige. This attribute is relatively difficult to operationalize. The most common method is to associate prestige with the job title itself. The largest survey of work related prestige conducted in Poland (Feliksiak, 2009) includes approximately 15 professional categories. It should be noted, however, that the profession or job title not only defines social prestige, but also responsibilities, accountability, and autonomy in decision making. The study offers three levels of prestige, characteristic for different professions (each with a different segment of the prestige ranking), selected to cover a wide spectrum of possible occupations. However, in order to clarify this

notion for the respondents, each job title was followed by a description of the tasks and responsibilities associated with it. The first level of this attribute is the position of manager. This level is further described as the head of a key team, involving the coordination of the team and setting tasks for others. This position involves a considerable amount of responsibility, but also the autonomy of tasks, as well as prestige. The second level is a specialist, described as a mid-level employee. This type of work requires a high level of competence: a specialist is valued, but always reports directly to the person standing higher in the hierarchy, who sets and enforces tasks performed by the specialist. The third level indicated a position with the lowest level of prestige: junior (basic) employee. This level also has been defined as characterized by the need for a precise execution of superior's commands, denoting a considerable lack of autonomy and few responsibilities. In extreme cases, this type of work may be the cause of shame with respect to people from respondent's environment (other graduates). The hypotheses associated with this attribute suggest that the higher the prestige of the profession, the higher should be the utility of the work.

Another attribute associated with attitudes towards employment is the level of competition and stress in the workplace. The variable "competition and stress" describes the level of stress associated with performing the employee's tasks, and the intensity of competition between employees (e.g. in seeking a promotion, a raise, etc.). The first level corresponds to a high pressure workplace, where the employee is subject to continuous evaluation by superiors, as well as results-focused competition with peers. In the second level the evaluation is carried out periodically. In order to provide the respondents with a clear picture of this type of employment, the description presented a staff performance control system, in which the management decides (twice a year) how to improve the efficiency of the employee. The third level corresponds to a relatively stress-free working environment with no competition among employees, and no stressful assessments carried out by the employer. The fulfilling of tasks by the employee is generally accepted. The hypothesis resulting from this attribute is unclear. This is due to the fact that the preferences are not obvious, e.g. in terms of the willingness to compete with colleagues, as there can be various personal preferences in this area. Ultimately, it was assumed that lower competition leads to higher utility. At the same time, however, it can be expected that the distribution of preferences for this attribute should be characterized by high standard deviation (above average).

From the perspective of young people, an important attribute is development opportunities at work. The attribute "development and prospects" describes the perception of opportunities to develop a career in the workplace (corresponding to a change in the probability of securing a better job in the future). It is defined using three qualitative levels. The first level assumes that work can be seen as providing high added value in developing a curriculum and thus allowing for personal development. This means that within the workplace the employee has the ability to quickly acquire new and valuable competences. This type of employment will pay off in the future, leading to growth of the employee's standings in the labor market. The second level denotes work in which the worker makes good use of his or her potential, but does not develop. Although tasks require high competence, they are repetitive and thus do not lead to developing new skills. The third level assumes minimum opportunities to develop and enhance the employee's value. Accepting this type of employment offer would practically mean a reduction of the human capital, because the tasks performed in this work are far below the employee's competences. The employee performs duties which anyone could accomplish. The tasks are



primitive and do not lead to any professional development. According to the economic theory, the more the work allows for personal growth and development, the higher the utility that comes from its accepting employment.

Another attribute concerns the uncertainty related to the wages obtained, seen as a system of employee remuneration. This attribute is a variable describing the structure of wages and linking their levels with work results. In each of the three levels an equal value of the anticipated salary is assumed. On the first level, the received remuneration is independent of performance. The second level denotes partial connection between efficiency and the employee's salary (50% of salary is fixed, and 50% depending on the results of work). The third level, which is associated with the highest risk, denotes a system of remuneration, in which all salary depends on performance. A hypothesis was formulated, assuming a significant heterogeneity of preferences with respect to this attribute. It can be expected that, for example, employees with children and who support their households will be characterized by a tendency to put higher value on the stability of wages than those subject to fewer responsibilities outside the workplace.

### *Empirical research*

The key element of the choice experiment process is to create an appropriate design, i.e., to select appropriate sets of categories (job offers in this case) which are characterized by defined levels of attributes. The selection of particular levels of attributes in subsequent choices should be done in a way that will make respondents reveal their preferences in the decision processes, which will allow on estimating their utility function parameters. The selection of effective attribute sets in the choices presented to respondents requires preliminary assumptions regarding utility function parameters. A pilot test was carried out to make parameter value assumptions and to check if respondents perceive the attributes in the right way. The pilot test included an efficient orthogonal design (Street & Burgess, 2007). This experiment design is close to an efficient one when all the parameters equal to zero. As an alternative, it is justified to use it when an analyst does not even have approximate information on a potential location of utility parameters.

The pilot test (which was based on the orthogonal design) was conducted with the use of printed copies on the sample of 67 people. Each of them received 16 choices (rankings) of four job offers which differed in the level of particular attributes. The outcomes allowed to claim that the directions of influence of particular variables (corresponding to the levels of particular attributes) on job utility were as expected. The utility function parameters obtained in this way were then used as an assumption to construct an efficient design for the real test. The Bayesian efficient design was generated by means of a numerical simulation in NGENE software. The generated Bayesian design was applied to the real test, which was carried out on the sample of 801 people from the target population of students of social specializations at University. The Internet access was the only prerequisite. Each participant was supposed to take part in 9 sessions of surveying. Each session involved 16 choice situations. Each choice covered 4 job offers, which a participant was supposed to rank from the most attractive to the least attractive one according. After finishing each session, a respondent's computer automatically connected to the server and sent the result file of the finished session.

Apart from the four job offers, which the respondents ranked, they also had a possibility to choose the option "none of the other [...]", thus indicating that they would not accept an

employment on the terms described by the attribute levels of the other job offers presented in the choice set. The selection of this option as the first one meant that a respondent would accept none of the offers. Even if a respondent did not choose any of the presented offers, they were asked to rank the them. Yet if at finishing their studies, a respondent would accept each of the presented offers, they were asked to rank the option “I accept none of the other offers” as the last one. Adding the option of rejecting the other offers allowed, in the further part of the study, to estimate reservation wages with the consideration of particular job characteristics. The students were encouraged to keep an appropriate level of concentration during the test by a system of incentives for doing it thoroughly. Finally, out of 801 people, who downloaded the application and started the test, 643 people completed all the sessions. For the other people, partial results were recorded in the base (the majority completed the first 3 sessions). In total, the data base on the choices covered 513760 observations, which corresponds to 102752 choice situations solved in 6422 complete sessions.

The process of collecting data lasted from 1 March 2014 to 31 May 2014. The total time spent by all the respondents on taking decisions and ranking the job offers amounted to over 2053 hours. Women accounted for 61% of the respondents. The age of the respondents was between 19 and 35, and the average age amounted to almost 23. 99.7% of the respondents are students of social specializations; out of them, 81.4% attend full-time studies. 25.2% of the respondents declared possessing work experience. Due to the fact that the respondents were students, at completing the questionnaire, 74.6% of them were supported by their parents or other people, 15.9% shared a household with someone, and only 9.5% supported themselves. Based on the above characteristic of the sample, it can be stated that the sample was relatively homogeneous and corresponded to the assumptions that were used to define the work attributes.

### *Statistical and econometrical processing of the data*

STATA software was used for the preliminary analysis of the data and for the basic computations. The software does not cover all the procedures necessary to estimate models used in the data analysis, but it was used to processing data base. In the course of analyses, it was decided to limit the analysed sample to three sessions for each respondent (3 times 16 choices). It is the minimum number of sessions for a respondent to make a choice as part of all the three attribute sets. The decision on limiting the analysed sample resulted from the lack of literature on the respondents' preference variability, with such a considerable number of the choices. The literature concerning product choice claims that in case of a significant amount of information and many products to choose from, consumers reduce the number of dimensions in which they consider the choice to several most important ones, which they are able to operationalize. It is justified to claim that a similar process occurs in case of the assessment of job offer attractiveness.

Streamlining the decision making process in subsequent sessions is reflected by the time needed to make a choice. Thanks to the fact that the study was conducted by means of a computer application, it was possible to register the time of making choices to the nearest millisecond. The duration of the first choices in the study is more than twice as long as the duration of the last choices in the ninth session. Making each choice at the two first choice sets in the first session took the respondents 15.49 seconds on average while making choices at the last two sets of the last session, they needed 6.09 seconds on average. The analysis of answer durations for the whole choice sets brings similar conclusions. The first two choice sets were completed

on average within 70.86 seconds each (with the standard deviation amounting to 52.05 seconds) while the choice sets at the end of the study (the 9th session, choice sets 15 and 16) were completed on average within 27.58 seconds (with the standard deviation amounting to 32.47 seconds).

The reduction of choice making duration and the respondents' gaining experience in participating in the study may lead to applying simplifications in choice process. While the most consumer's decisions concerning a purchase of goods are taken within short time, with a huge number of alternatives, and with simplifications necessary to maintain the effectiveness of continuously made choices, the decisions in the labour market are made with a small number of offers in a sequential manner. What is more, the majority of choices made in the labour market are only a comparison of a single offer with the status quo, with nearly an unlimited amount of time for an analysis and choice. Thus it was assumed that the preferences revealed as a result of the choices from the first session for each set of attributes would be the best to render the real preferences of people entering the labour market, and only this information was used for further analyses. The base, cut down in this way, included the solutions of 48 choices, which corresponds to 240 observations of each respondent (3 sessions with 16 choice sets with 5 alternatives). Despite such a limitation of the data set, it is the most extensive known set of information on preferences concerning making choices in the labour market by individual respondents.

In the subsequent step of the analysis of such data, models allowing to draw conclusions on job valuation were estimated. First, a multinomial logit model was estimated and WTP (willingness to pay) for each level of employment attributes was computed. The next step of the analysis was to estimate the random parameters logit (RPL; also called a mixed logit). The application of this model allows to relax a number of strict assumptions, which are usually not fulfilled in empirical data. The random parameters logit gives the possibility to take into account the heterogeneity of utility parameters in an examined sample.

The majority of the variables were coded as a set of binary variables. Three variables: net wage, commuting time, and working hours were left in the model as continuous linear variables. To conduct the analyses, the dummy coding was applied.

### *Results of the econometric analysis*

Estimations of utility function parameters for the examined levels of attributes are the main outcome of the research. Based on these parameter values, it was possible to estimate the marginal WTPs, which are respondents' marginal rates of substitution (MRS) of a given level of attribute. WTP is the most directly interpretable result of the empirical study on employment benefits.

The results for the examined sample are presented below. First, the estimations of utility function parameters were discussed in relation to the preliminary research hypotheses about the direction of dependencies between the levels of attributes and utility gained from a job offer. The following part presents WTP values for job characteristics. Due to a considerable number of the result options, the reservation wages analysis is limited to the selected cases which show how significant in this context is taking into account the value of non-pecuniary job characteristics.

### Utility function and its parameters

Two models were estimated: the multinomial logit (MNL) and the random parameters logit (MIXL). The result of likelihood ratio test (with twenty degrees of freedom) clearly indicates the joint significance of explanatory variables.

Almost all the variables (with the exception of the average level for the attribute concerning the remuneration system) appeared to be significant with the statistical significance at the level of 10%. In case of all variables, the direction of influence on work utility corresponded to the expectations. Table 1 presents the estimations of utility function parameters conducted with the use of MNL and RPL models. For RPL, the mean and the standard deviation of parameter distribution were given.

The lognormal distribution was assumed for the attribute “net wage”. The normal distribution was assumed for the other attributes for all the 19 non-pecuniary parameters. As for 5 parameters, the standard deviations were statistically insignificant at the level of 10%. In further analysis it was assumed that for those parameters, there was no random heterogeneity of preferences in the examined sample (the parameters are fixed). The assumption of normal distribution for all parameters except net wage allowed part of the preference distribution to be characterized by a different sign than the mean. For numerous attributes, it seems to be the right assumption due to the variety of preferences. For example, in the examined population, a high level of competition in a workplace results in lowering employment utility for most respondents, yet 11.29% of them revealed preferences which indicated that work in a strongly competitive environment suits them (it leads to an increase of utility). For the other attributes, the normal distribution assumption allows, to a certain extent, on the assessment of the reliability of results. The last column in table 1 shows what part of the preference distribution is on the opposite side of the coordinate system, as compared to the mean. For example, there are no rational reasons for the assumption that a considerable group of the examined people like longer commuting time or *ceteris paribus* longer working hours. In each case in which a particular sign for the straight majority of respondents was expected (e.g., commuting time, working hours, type of contract, fringe benefits, attitude to work, career development possibilities), the share of people with an opposite sign is lower than 5%. This indicates the high reliability of the results obtained.

**Tabel 1. Estimations of utility function parameters conducted with the use of MNL and RPL models**

Attribute	Level	MNL	RPL		
			mean	SD	% of distribution with opposite sign
Net wage (1 -log-normal distribution)		.00147***	.00058822***	.00050538***	-
Working hours (n - normal distribution)		-.017436***	.017850***	.0014738***	0.30%
Commuting time (n)		-.024578***	.023301***	.0011063***	1.11%
Fringe benefits (ref. level: lack)	Multisport packadge (n)	.26641***	.36628***	0.00413	0.00%

	Multisport & healthcare packadge (n)	.59586***	.80584***	.11978**	0.00%
attitude to work (ref. level: does not like tasks)	Neutral (n)	1.11550***	1.42993***	Stały parametr	-
	Like tasks (n)	1.79366***	2.27014***	.58196***	0.00%
Job prestige/position (ref. level: entry level employee)	Specialist (n)	.74683***	.87472***	.08968**	0.00%
	Manager (n)	.93235***	1.14908***	.23229***	0.00%
career development possibilities ( ref. level: lack )	Neutral (n)	.43513***	.75570***	Stały parametr	-
	Developing to high extent (n)	1.68087***	2.29117***	1.19096***	2.71%
Typo of contract (ref. level: illegal)	Contract work (n)	1.17288***	1.57178***	.81363***	2.67%
	Employment contract (n)	1.90283***	2.61835***	1.24646***	1.78%
Remuneration system (ref. level: salary depends on performace)	Flat salary (n)	.26658***	.32821***	.11647***	0.24%
	50% of salary depends on employee performace (n)	-0.02436	-0.02608	Stały parametr	-
Atmosphere in a workplace (ref. level: very bad)	Very good (n)	.78843***	1.09303***	.54982***	2.34%
	Neutral (n)	.78465***	1.05392***	Stały parametr	-
Competition at work workplace (ref. level: low)	High (n)	-1.05027***	-1.49325***	1.23258***	11.29%
	Neutral (n)	-.07849*	-.09708*	Stały parametr	-
Status Quo (n)		4.3751***	3.66864***	3.21399***	12.68%
LL		-27711.614	-23021.324		
Pseudo R2		0.5060	0.5906		
N		34944	34944		

Source: Own calculations.

Parameter signs for continuous variables (including the most important one – net wage) comply with the hypotheses and theory. The respondents' utility negatively depends on commuting time and the number of working hours. The following estimation results raise no interpretative doubts. The parameter for the job in which the respondents like doing their tasks (as compared to a job in which the tasks are particularly onerous) is one of the highest, both in MNL and MIXL. It is worth pointing out that the part of the distribution that is on the opposite side of the ordinate is almost equal to zero.

Job prestige, which is included by means of the position, related to an offer is also a significant predictor of work utility. A low-level position is the reference here. The parameter for the position of an expert is positive while the position of a manager is the most valued. The distributions of parameters have a relatively low standard deviation, which means low heterogeneity of preferences concerning this attribute.

Greater opportunities of personal and career development are especially important for the respondents (which seems to be natural in case of the discussed population). If a job is a valuable entry in a CV, it causes a considerable increase of utility (against the level meaning the lack of development). It is clear that the respondents expect the first job after studies to provide them with development and preparation for further career.

As it was expected, an employment contract is the most preferable employment relationship (it is at the same time the highest parameter obtained). A contract for specific work brings higher job utility, as compared to a job in the black economy. Almost 3% of distribution for the contract for specific work and almost 2% for the employment contract have the opposite sign.

An interesting result concerns the parameters for the attribute describing a remuneration system. This category is more related to risk seeking than to job preferences. The results indicate that the respondents statistically prefer a fixed net wage to a variable one (with the same expected value). The parameter for an average level (half of the wage is fixed, the other half is variable) does not statistically differ from zero. What is more, the standard deviation for this parameter was not statistically different from zero, which indicates that this parameter was not considered by the majority of the examined people while they were making choices. Apart from the abovementioned employment characteristics, the respondents valued a good (and neutral) atmosphere at work (against the base level: bad atmosphere) and no stressful assessment of their effects by their superiors (against the base level: no stress and assessment).

The following part presents WTPs for particular levels of attributes, computed based on the above estimations of the utility function parameters.

### *Valuation attributes levels*

The marginal WTPs are nothing else but marginal rates of substitution (MRS) at which respondents are willing to exchange particular levels of attributes for other characteristics of work. As the study covers net wage, it is possible to compute the pecuniary value of particular levels. The pecuniary value of a given employment benefit can be obtained by computing the rate at which the respondents are willing to exchange a given attribute level for a net wage expressed in money. In practice, WTP value is a quotient of the parameter for a given attribute and the parameter for a net wage. Standard errors of WTP (quotient) are estimated by the use of the delta method implemented in NLOGIT software by means of the WALD command. It is necessary to remember that all the computed values concern a monthly net wage. For the continuous variables (i.e., commuting time and additional working hours beyond the standard working time), the WTPs are the values per hour. For the quality attributes, the WTP estimations concern the base level, which was indicated for each attribute.

**Tabela 2. Willingness to Pay calculated on the basis of the results of estimation of utility function parameters conducted with MNL and RPL models**

Attribute	Level	MNL (WTP)	RPL (WTP)		
			mean	SD	median
Working hours		- 11.86	11.94	12.3218	12.04
Commuting time		-16.72	16.29	23.1795	17.18
Fringe benefits	Multisport package	181.12	233.73	278.4597	203.37

(ref. level: lack of)	Multisport healthcare packadge	405.09	514.70	571.0882	443.49
attitude to work (ref. level: does not like tasks)	Neutral	758.37	912.22	1088.31	794.83-
	Like tasks	1219.42	1445.47	1476.119	1234.29
Job prestige/position (ref. level: entry level employee)	Specialist	507.72	559.09	692.416	484.10
	Manager	633.85	735.64	1071.126	627.35
career development possibilities ( ref. level: lack)	Neutral	295.82	482.09	575.16	420.06
	Developing to high extent	1142.74	1465.08	2184.87	1193.67
Typo of contract (ref. level: illegal)	Contract work	797.38	989.63	826.7291	816.57
	Employment contract	1293.64	1665.57	1450.902	1360.32
Remuneration system (ref. level: salary depends on performace)	Flat salary	181.23	210.035	298.5153	175.21
	50% of salary depends on performace	-	-	-	-
Atmosphere in a workplace (ref. level: very bad)	Very good	536.01	700.812	1275.587	577.18
	Neutral	533.44	672.35	802.14	585.82
Competition at work workplace (ref. level: low)	High	-714.02	-951.93	1466.055	-754.67
	Neutral	-53.36	-61.93	73.89	-53.96
Status Quo		2976.26	3014.87	2679.131	2704.01

Źródło: Opracowanie własne.

It should be pointed out that for most attribute levels, the mean and the median do not differ significantly. This shows the good quality of the obtained data. The valuation of non-market goods often involves the necessity of assuming a fixed parameter for the cost to prevent unrealistic WTP values. If the cost parameter is close to zero (such an effect occurs if part of respondents ignore the cost), the parameter quotient that constitutes WTP is unrealistically high. Similarity of the mean and median values can indicate that in this study, cost (net wage) was perceived properly.

The starting point for the analysis of particular employment characteristics is the analysis of the most obvious exchange which comes out of the neoclassical theory of labour supply: the exchange of net wage for working hours. The study covers time (as a characteristic of work) in two ways: first – as working hours, second – as commuting time. The results indicate that statistically, for the respondents, one working hour more a week causes a drop in utility worth on average PLN 11.94. It should be pointed out that this is the average value of overtime, from the 41st to the 60th hour a week. The analysis of the utility loss caused by the duration of commuting time reveals a slightly different result. One hour spent on commuting to work is worth on average PLN 16.94 for the respondents. This is an unusual outcome considering a higher value of commuting time than working time. This can be related to the characteristic of the target group. People entering the labour market may perceive commuting to work as additional inconvenience (connected, e.g., with a physical discomfort in public transport). The high standard deviation indicates that preferences of this attribute are considerably varied.

The difference between the value of time depending on what it is spent on should be pointed out. The problem of difference in the value of time spent in different ways leads to a theoretical question if it is possible to separate the value of time in itself from the utility (positive or negative) of the form of spending it. In 2009 two studies were carried out to evaluate time (Gajderowicz, 2009). The first declarative study (by means of the Contingent Valuation Method: CVM), which consisted in presenting respondents with a hypothetical situation, enabled estimating the value of an hour of free time at the level of PLN 6.82. However, the experimental study, which covered the value of free time in itself, appeared to be considerably more interesting from the methodological point of view. Students who attended regular classes participated in the experiments. At the beginning of classes, each participant received 30 minutes of free time. At the beginning of classes, the participants traded in the free time with each other by means of a double oral auction (Smith V. L., 1976). Then the people who bought an appropriate amount of time from the others could leave (at the moment which depended on the amount of the purchased time). In the meantime the people who sold their free time had to stay in the room without a possibility to do any activities. The value of free time (for an analogical target group to the one in the presented study) which resulted in the equilibrium of the buyers and sellers amounted to PLN 12 per hour.

From the perspective of the neoclassical theory of labour supply, fringe benefits can be treated as wage, but they are paid in the form of goods or services. At the same time this attribute is relatively the simplest to change from an employer's point of view. From the economic point of view, it should be crucial to compare the costs of offering a given fringe benefit with its value for an employee. If the cost of a fringe benefit is higher than the employee marginal willingness to pay for it, such a fringe benefit is a non-optimal element of an employment contract. On the other hand, if the value that an employee attaches to a fringe benefit is higher than the cost of this bonus, introducing this fringe benefit by an employer (with lowering the net wage by the cost of the fringe benefit) is optimal in the Pareto sense.

The results of the study indicate that the value of a sport package (Multisport card) exceeds considerably its market value and the cost incurred by an employer. For the respondents, the Multisport card is worth PLN 233.73 on average. On the other hand, a health care package (together with a Mutlisport card) is, on average in the population, worth for an employee PLN 514.70 in comparison to no benefits. This amount is higher than an employer's cost of purchasing an additional insurance<sup>4</sup>. It should be remembered that the study was carried out on a group of students. It can be expected that with age, employees will value such a package more and more.

The type of contract is another characteristic of employment which determines work utility. An employment contract (with all its privileges) is worth PLN 1665.58 for an employee (as compared to work in the black economy) while a contract for specific work is worth 989.63 PLN as compared to work in the black economy.

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<sup>4</sup>Normally, the information on the prices of health insurance and sport programmes for employees of companies is not publicly available. According to the information obtained from three large service providers, the prices of health care packages are between PLN 90 and 200 depending on their scope, company size, and contract duration. A similar method was applied to gather the data on the price of a single Multisport card. Here, the prices are between PLN 60 and 125 per an employee.



The precise valuation of utility resulting from the attitude to work and the atmosphere in a workplace is an interesting result of the study. On average, the respondents are willing to accept a net wage lower by PLN 1445.47 if the tasks at work are pleasant (as opposed to onerous ones). For work in which the tasks are neutral (neither pleasant nor unpleasant), the respondents are willing to give away PLN 758.37 out of their monthly net wage, as compared to the situation in which the tasks would be onerous. The standard deviation for this level of attribute is not statistically significant.

If the atmosphere in a team turned out to be very good (as opposed to a weak one: “I don’t like people I work with”), the respondents would be willing to give away PLN 700.81 on average out of their monthly net wage. It is interesting that the standard deviation for this level of attribute indicates a strong differentiation of the respondents’ preferences as regards the atmosphere in a workplace. Another attribute related to emotions at work is the attribute “Competition at work, stress and control”. If work is subject to a continuous control, assessment and comparisons (the so called rat race), the respondents incur on average a loss of utility worth PLN 951.94, as compared to work which does not involve stress and control. In case of this attribute, the high standard deviation indicates a considerable heterogeneity of preferences.

The attribute concerning career prospects related to a job offer has the highest willingness to pay. If a job “looks good in a CV” and it provides training and development, the respondents are willing to give away on average PLN 1465.08 out of their monthly net wage, as compared to a job which does not involve development possibilities at all. An average level of career prospects related to a given job offer is worth PLN 295.82 for the respondents, as compared to a job which does not give an opportunity to develop. The standard deviation for this level of attribute is not statistically significant. Such a considerable value attached to career prospects is not surprising considering the characteristics of the target population. The influence on career prospects can be understood as a discounted value of the future wage (and other job characteristics) in the period of the whole career. For young people, the time of labour market activity ahead is so long that the discounted streams of utility from future work have relatively high values.

The position the respondents would work on was much less important for them than the career prospects. Work on a managerial position results in the rise of utility by on average PLN 735.64 (as compared to a job at a lower position) while a specialist position brings the increase by PLN 559.09 (this concerns also the lowest level of the attribute).

A remuneration system is less valued (probably, it is particularly in case of people entering the labour market). For the situation in which the wage does not depend on performance at all (as opposed to its complete dependence), but it is paid monthly in a fixed amount, the respondents were ready to pay only PLN 210.04 (standard deviation: PLN 298.51), as compared to a variable wage depending on performance at work. It is interesting that a remuneration system partially dependent on effectiveness is not a significant predictor of work utility.

The knowledge of the values of particular characteristics becomes complete when the values of threshold utility levels (for the characteristics of employment types) with which the respondents accept an offer are known. From the perspective of the abovementioned Herzberg’s motivation theory (1993), it is also essential to define the reservation utility for accepting a given job.

## *Estimations of reservation wages*

A reservation wage is defined as the lowest value of net wage with which an employee is willing to take a job. The traditional point of view considers only the financial value. In light of the above analyses, it is visible that employment utility is also affected by other characteristics than net wage, and the respondents are ready to exchange particular levels of employment attributes for other ones. This means that the reservation wage should be rather considered in reference to the threshold utility of a given type of job.

It is possible to calculate reservation wages if a study includes the fifth alternative “I would not accept any of other offers” in each choice. Respondents selected this option when the other offers involved an unacceptably low level of utility.

Computations of a threshold pay (for employment of a given bundle of characteristics) are done by adding the values of selected work characteristics (WTP) to the value of utility concerning taking a job in general.<sup>5</sup> In the study, this value amounted to on average PLN 3014.87 (with the standard deviation of PLN 2679.13 and the median of PLN 2704.01). This is the value of an average loss of utility due to taking a full-time job (40 hours per week, and the other attributes at the base levels). Thus if any of the attributes is not included in computations, the default level covered by the reservation wage will be (usually the lowest) base level. Two simulations of threshold wages are presented below: referring to job offers with the levels of attributes that are perceived negatively, and referring to an offer in which the levels of attributes are attractive. The examples below are to show how crucial it is to examine reservation wages also in reference to non-financial job characteristics.

The analysis starts with an example corresponding to a job with negative characteristics. In case of a job in the black economy (base level), which does not give any prospects and development possibilities (base level), done in the conditions of stress and control (WTP = PLN -951.94), where tasks are unpleasant and tiring (base level), and commuting time takes one hour each way (WTP = (PLN 16.94)\* 40 journeys a month = PLN 677.60), the reservation wage would amount to on average PLN 3014.87 + PLN 951.94 + PLN 677.60 = PLN 4644.41. An average respondent would not agree to work for a lower amount.

The required pay for an offer with positive characteristics can also be an interesting example of a properly calculated reservation wage. Let's assume that we analyse an offer of an employment contract (WTP = PLN 1665.58), looking good in a CV, and providing development possibilities (WTP = 1465.08), the respondent likes his tasks (WTP = PLN 1445.47) and the good atmosphere in a workplace (WTP = PLN 700.81), and he is employed as a manager (WTP = PLN 735.64). Let's assume that the other variables are at the base levels. In case of such a

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<sup>5</sup>As an alternative, the reservation wage could be computed with the use of the log-sum formula (Small and Rosen, 1981). This approach is necessary when respondents deal with numerous options and it is not known which of them will be realized (for example a change in well-being resulting from an improvement of water quality in lakes needs weighing with the probability of visiting these lakes after they become cleaner). The log-sum formula weighs the change in well-being with the probabilities related to the selection of given options. The context of this study is different although it presents 5 options (4 ones related to work and 1 SQ), there are, in fact, only two options: taking a job or not. While the study was carried out, most of respondents did not work and the presented offers concerned the first job (full-time) after finishing the studies. None of the 801 people chose systematically SQ in the 48 choices. This indicates that all the examined people were planning to enter the labor market. Considering this assumption, the log-sum formula is reduced to the applied approach.

“dream offer” the reservation wage is equal to: PLN 3014.87 - PLN 1665.58 - PLN 1465.08 - PLN 1445.47 - PLN 700.81 - PLN 732.64 = - PLN 2994.71. This means that the respondents would be willing to pay for an opportunity to do such a job. This fact explains why unpaid placements and traineeships in good companies where an employer provides development possibilities and good working conditions are such a popular and sought-after form of gaining experience among students and graduates. What is more, following this line of thinking, trainings and courses, for which the respondents are ready to pay a lot, can be treated as dream-job according to this study. However, at this work, the value of development, prestige, and the like, is considerably higher (at least by the price of a course) than the decrease of utility resulting from the loss of time.

Such computations of reservation wages for employment of particular characteristics can be multiplied by means of adding the values of WTP indicated in table 2 to the reservation wage for a job. It is possible to estimate a level of wage which brings reservation utility for any combination of employment attributes. The above examples show the imperfection of a traditional study on reservation wages, which is based only on their financial value in reference to a homogenous employment. While work attributes in themselves have already been partially evaluated in literature, this study is the only known attempt at such a complex estimation of reservation wages depending on employment characteristics.

### *Summary*

The text presented the results of an empirical study of employee’s preferences. The use of discrete choice modeling enabled the precise measurement of the perceived value of the levels of the identified employment attributes. The study provides an original attempt to apply microeconomic methods of measuring preferences into the area of labor supply. Although the study was conducted using a closely specialized population sample, and was thus limited, the promising nature of the results dictates the need for further research. In addition to its cognitive value, the results of the study may contribute to the development of tools used in the optimization of contract design and remuneration systems. Such research might lead to possible improvements in the efficiency of contract in the labor market by simultaneously reducing employment costs and increasing the utility of workers.

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