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USING WEB DATA TO MEASURE THE DEMAND FOR SKILLS

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ABSTRACT

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In the post-Fordist economy, a skilled workforce is crucial for maintaining competitiveness in the global economy. Nevertheless, how to measure the demand for skills remains a puzzle. The main issue discussed in this paper is how can online based surveys serve researchers and policy makers as a tool for determining the demand for skills on the labour market. The paper begins by an overview of the literature to make a case for the importance of measuring skills for the public policy. Following the introductory part, different approaches to measuring demand for skills are evaluated. Special attention is paid to the role of the Internet as a source of the relevant data. Measurement of frequency in which various tasks are being performed is proposed as an indicator for measuring skills associated with the specific occupation. The paper closes by a demonstration of the practical implementation of the questions measuring frequency of performance of different tasks in more than 400 occupations in the environment of the global WageIndicator survey.

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Introduction: The Public Policy Case for Measuring Skills

Economists and social scientists in general have been interested in the topic of skills and knowledge for a very long time. Already Adam Smith has written in the than *Wealth of Nations* that "wages of labour vary with the easiness and cheapness, or the difficulty and expense of learning the business." [1] Smithian understanding of economic value of competencies was incorporated into modern neoclassical microeconomics by Milton Friedman, for whom investment in skills was in principle the same as investment in machinery, buildings or other things that increase the productivity of a worker [2] and further developed by the *'Chicago boys'* Theodore Schultz [3] and Gary Becker [4] under the term *human capital*. Subsequently, human capital has been also introduced in macroeconomics as an important factor determining economic growth by scholars subscribing to the *New Growth* Theory, in particular Robert Lucas. [5]

More recently, it has been argued - among others by Abrahamovitz and David [6] that *human capital* is just an important in the context of the *Post-Fordist* economy as the physical capital once was for the industrial economies. The same case has been made in the empirical works as well. The importance of skills for modern economy was demonstrated by Kurekova, Beblavy and Hainta [7] on the example of the Central and Eastern Europe (CEE) region. The authors cite a wide range of literature all agreeing that the influx of Foreign Direct Investments (FDI) into CEE to a large degree was possible due to the well-skilled labour force. Additionally, they note that issues such as shortages of qualified labour in some sectors and mismatch between skills taught by the education system and the demands of the labour are becoming increasingly seen as a potential threat to the future of economic growth in the region. Consequentially, high-quality data on demand for skills on the labour market must be collected.

Material and Methods – How to Measure Skills?

There are two possible approaches how to measure the demand for skills; one involves studying publicly available sources, such as job postings, the other is based on surveying workers and companies. Both approaches have been attempted.

The approach based on analysis of the existing material faces the problem of ever increasing fragmentarization of the labour markets. In a free market economy, there is no central authority for filling vacancies. Employers commonly look for specific employees on an ad hoc basis, determining skills needed based on the specific position and then look for a candidate possessing these skills. Internet is being increasingly important here, in particular the online career websites such as Monster or Randstat. In Slovakia, the local career website profesia.sk listed six times more job vacancies at any point of time in 2006, than the official number of vacancies registered by the Slovak Statistical Office. [7]

Jobs advertised at the career sites are, nevertheless, not representative for the entire labour market. Naturally, in order to take advantage of the website, the user has to possess technical means and skills to use computer with an internet connection to access and navigate the website. The jobs advertised at the portals are, therefore, of the kind that can be reasonably expected to attract candidates with access to the website. More elementary professions are still being advertised through more traditional communication channels. Additionally, the career sites do not usually list top management positions. [7] Such positions are being typically filled through head hunters contacting selected individuals directly. Nevertheless, internet also plays a role in this segment as evidenced by the rise of the professional social network LinkedIn.com.

Due to the fact that different segments of the labour market use different online and offline resources to look for jobs, any analysis of a specific channel can only tell us something about a specific segment of the labour market. Additionally, international comparisons are very difficult, because labour markets – with a possible exception are still very much organized on a national level. Consequentially, analysis of job postings comes with serious limitation in scope of what it can cover.

The survey-based approach presents a solution to these shortcomings. Standardized surveys designed to gather data across countries are regularly organized to gather longitudinal and cross-sectional data on developments across countries; a typical example is the EU-wide Eurobarometer survey capturing opinions of European citizens in all individual member states on variety of subjects. Additionally, sampling methods enable researchers to gain a representative overview of the whole populations, addressing the week point of the material-based approach, which only covers a specific segment of the population.

Many surveys contain questions such as "What is your occupation?", offering the respondent to choose from a standardized aggregated list of occupations such as the International Standard Classification of Occupations (ISCO) by the International Labour Organization (ILO). The ISCO classification assigns skill levels to the individual occupations. [8] Such efforts are problematic, because they are associated with strong assumption that the occupations are the same across sectors and countries, and because it seems impossible to test the occupations' skill levels empirically on a global scale. Efforts to connect the skills to the actual tasks performed by a worker have shown more promise. The connection between tasks and skills is evident by the employers' tendency to focus on tasks that need to be performed in a job instead of explicit listing of skills when filling a position. [9] An example is the web based survey online at the URL

www.euroocupations.org between 2007 and early 2009, where respondents were asked to rate how often a jobholder in a specific occupation performs specific tasks from a list and how difficult the tasks are. Both experts on jobholders were surveyed. The survey has shown a degree of disagreement of the task sets across occupations, both between and inside the surveyed countries. At the same time, the survey shown a decent degree of agreement between the tasks associated with occupations by labour market experts and workers. [10]

The main determinant of successful use of a survey is the ability to obtain sufficient number of respondents, particularly to have sufficient observations for the occupations with the smallest share of jobholders. The www.eurocupations.org survey struggled to obtain a designed minimum for ten ratings for a range of included occupations. [10] The need to cover many occupations with significant number of ratings results in the need for large sample size, which can be costly to obtain. The most cost effective way of gathering large amounts of data in several countries in a short period of time is the use of volunteer web surveys. This modern method of gathering data has caused a heated debate in the academic circles, particularly in regards to the representativeness of the data. [11] Nevertheless, the most recent methodological research demonstrates that data obtained through these surveys are valuable source of information and the methodological issues associated with them can be mitigated for example by use of weighting or when they are used in an explorative way. [12]

Implementation of tasks measurement in the WageIndicator survey

The global survey on wages and working conditions run in more than 80 countries by the Amsterdam-based WageIndicator Foundation has been chosen for our efforts to measure skills through tasks due to its global reach and established audience. Several

hundreds thousands of volunteers around the world already answered the survey, in which they reported their occupation in the way, that it can be associated with the ISCO coding. By asking respondents globally to rank a set of tasks specific to their chosen occupation group, we will gain the ability to analyse not just the association between occupations and tasks (and implicitly skills) but also the correlation with other factors such as wage, gender, age, ethnicity, industrial sector and so forth. This way, we can determine which skills are valued in specific segments of the labour market.

For its ISCO-08 update ILO prepared task descriptions for all 433 4-digit occupational units in the classification. Each occupational unit has between 5 and 15 tasks. We included task descriptions for 427 of the 433 occupational units. For six so-called 'not-elsewhere-classified occupational units' no descriptions were included, as these descriptions reflect a garbage can of tasks in residual occupations. The 427 occupational units on average have 7.58 tasks. Respondents are asked to tick how frequently they carry out each task on a 5-points scale from daily to never.

The list of 3237 tasks has been prepared and translated. The tasks questions will be initially included in Argentina, Australia, Belarus, Belgium, Brazil, Indonesia, Kazakhstan, Mexico, Netherlands, Russia, South Africa, Spain and the United Kingdom. These countries have been selected because they represent different regions around the world and have a decent response rate to the WageIndicator survey.

For its survey question 'What is your occupation', the WageIndicator web survey employs a lookup database that consists of approximately 1,700 occupational titles, all coded according to ISCO-08. Each ISCO-08 4 digit occupational unit comprises of at least one, but mostly more than one occupational title.

The actual implementation is based on the custom-built WageIndicator survey engine which allows inclusion of search trees through an Application programming

interface (API), which allows the user to look up his or her occupation from the database by selecting it from a list or by typing it in the textbox with auto-complete functionality. A respondent is given a standardized list of aggregated occupations in his own language as shown on the Figure 1. Based on his or her choice, a set of tasks is associated with the respondent's occupation based on the aggregated the ISCO-08 4 digit level. The tasks are then displayed to the respondent as visible on Figure 2.

Conclusion

This paper describes the design of a web survey aiming to measure how frequent tasks are carried out for 427 occupational units, covering the very large part of national labour markets. The study aims to explore occupational demarcation lines: to what extent are occupations different from each other, or to phrase it differently, to what extent are occupations coherent units when taking into account the tasks carried out. Once sufficient data is collected, expected by summer 2014, analysis will be conducted with respect to the similarity of tasks performed within occupations. Break downs by country as well as age groups and gender are foreseen.

Acknowledgements

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Figure 1. Occupation search tree in the WageIndicator Survey (Source: Authors)

What is your occupation?
If your occupation is not in the list, please select the one that comes closest

Agriculture, nature, animals, environment
Care, children, welfare, social work
Cars, mechanics, technicians, engineers
Cleaning, housekeeping, garbage, waste
Clerks, secretaries, post, telephone
Commercial, shop, buy and sale
Construction, fittings, housing
Education, research, training
Finance, banking, insurance
Food manufacturing
Guards, army, police
HRM, labour intermediary, organisation
Health care, paramedics, laboratory
Hospitality, tourism, leisure, sports
IT, automation, telecommunication
Industrial production, manufacture, metal
Language, library, archive, museum
Legal, administration, inspection, policy

Databases
Hardware, network
Helpdesk
Internet
Software
Support services (internal)
Telecommunication

Database administrator (dba)
Database designer
Database or network professional, all other

Figure 2. Choice of tasks for data workers (Source: Authors)

How often are you engaged in the following tasks?

	Never				Daily
Designing and developing database architecture, data structures, tables, dictionaries and naming conventions for information systems projects	○	○	○	○	○
Designing, constructing, modifying, integrating, implementing and testing database management systems	○	○	○	○	○
Conducting research and providing advice on the selection, application and implementation of database management tools	○	○	○	○	○
Developing and implementing data administration policy, documentation, standards and models	○	○	○	○	○
Developing policies and procedures for database access and usage and for the backup and recovery of data	○	○	○	○	○
Performing the operational establishment and preventive maintenance of backups, recovery procedures, and enforcing security and integrity controls	○	○	○	○	○

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