

DO CHILD AND ELDER CARE INFLUENCE WORKTIME OF POLISH EMPLOYEES?

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ABSTRACT

Economic activity is an important issue, and it depends on many determinants. The aim of our research is the identification of the most important factors which affect the female and male employees' worktime in Poland. The research is provided on the basis of individual data, originating from Polish Labour Force Survey. In our study, we estimate econometric models, which are built for: the whole sample and separately for women and men. The models describe number of working hours provided by employees (in a month prior to the survey), which is explained by the characteristics of the employee and workplace. In the study we found out that there are different effects of distinguished factors to the male and female employees' activity. These differences are especially visible for the variables related to respondents' family situation, education level and occupation.

Key words: economic activity, worktime, child care, elder care, workplace's characteristics, employee's attributes

JEL codes: C21, E24, J13, J23

INTRODUCTION

Economic activity is an important issue, and the simplest way to measure it is so-called participation rate which refers to the number of people who are either employed or are actively looking for a job. Therefore, the participation rate measures the active portion of an economy's labour force. In developed countries, it is assumed that participation rate for men and women should be high and similar. Usually Scandinavian countries are given as an example of good practice in labour market.

The reasons of low participation rate are usually connected with different economic features, but the household's situation should be also taken into account. The impact of family policies to economic activity is considered in Jaumotte [2003], van Ham and Mulder [2005], Gehringer et al. [2014], Ferragina [2017], Hook and Paek [2018] among others.

There are different family duties however in our research we consider only care providing, i.e. child and elder care. The former is discussed in literature quite often [Correll et al. 2007, Gangl and Ziefle 2009, Budig and Hodges 2010, Napari, 2010, Cukrowska 2011] and many problems seem to be solved by appropriate parenthood policy. Whereas problems concerning elder care are seldom investigated and there is usually lack of the family policy solutions dedicated to the elderly although ageing of societies profoundly impacts families in majority of developed countries. There is also no doubt that informal elder care responsibilities affect the employment [Viitanen 2010, Bauer and Sousa-Poza 2015] since care providers substantially reduce working hours or give up job [Johnson and Lo Sasso 2006]. According to Resolution 238 of the Council of Ministers of 2013, two thirds of informal caregivers in Poland are

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unemployed or they gave up job, and others share care duties with professional work. Caregivers are usually women, daughters and wives of the elderly and mothers or grandmothers of children.

The aim of our research¹ is identification of the most important factors which affect economic activity in Poland. However, in contrast to the majority of research, we consider only employees and their economic activity is measured by the number of hours spent at work. In other words, worktime is used as a proxy of activity in labour market, and we use not macro but micro data. In the study, investigation is provided applying individual data, originating from Polish Labour Force Survey (Badanie Aktywności Ekonomicznej Ludności – BAEL). Research concerns female and male employees' worktime, regarding the duties concerning child and elder care. In our analysis, we estimate econometric models, which are built for: the whole sample and separately for women and men. The models describe logarithms of number of working hours provided by employees (in a month), which are explained by individual attributes of employees together with features regarding their family situation, and workplaces characteristics.

DATA AND MODEL CONSTRUCTION

The original Polish Labour Force Survey of first quarter of 2009 data base contains 54,666 records [GUS 2009]. For our research we selected respondents who declared that they were working during the month preceding the survey. We also removed all records with incomplete data concerning the defined features which are needed in our investigation. As a result, the sample used in our research contains observations regarding 7,044 respondents, among them 3,293 women and 3,751 men.

We construct econometric models describing worktime, represented by the natural logarithms of number of hours overworked by respondents in the month preceding the survey:

$$\ln(y_i) = \sum_{k=1}^K (\alpha_k \cdot x_{ki}^1) + \sum_{l=1}^L (\beta_l \cdot x_{li}^2) + \sum_{n=1}^N (\gamma_n \cdot x_{ni}^3) + \varepsilon_i$$

where:

- y_i – working hours provided by employees;
- x_{ki}^m – explanatory variables ($m = 1, 2, 3$) representing (1) respondents' family structure; (2) employees; (3) workplace controls;
- $\alpha_k, \beta_l, \gamma_n$ – regression parameters;
- ε_i – regression residual.

There is rich literature concerning wages and its determinants. Remuneration depends not only on hourly wages but also on worktime. Economic activity depends on many factors such as: level of education, place of living, occupation, economic sector of employment, hourly wages and family situation which are also used in description of wages [Grajek 2001, Blau and Kahn 2006, 2011, Cukrowska 2011, Witkowska 2012, 2013].

In our study, we assume that explanatory variables in the models describing worktime should be similar to the ones used in the models of wages, i.e. both quantitative and qualitative. Qualitative variables are represented by nine dummies, which are presented in Table 1 where the symbol of the variable together with its description, information about number of variants for each variable (in parenthesis) and the reference variant are given.

The former describes age (*AGE*) and age squared, hourly wages (*WAG*) together with eight variables related to the family situation (*NUM*) which are described in Table 2. It is worth mentioning that we selected six different sets of variables describing situation in family. It is done to provide more profound analysis for distinguished situations concerning child and elder care, and the fact not all "family" variables should be included in one model at the same time because some information is repeated by more than one variable. The specification of the models is given in

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Table 1. List of dummies

Variable	Dummies description of (number of variants)	Reference variant
<i>GEN</i>	gender (2)	women
<i>REL</i>	relationship with the head of the household (2)	not a household head
<i>MAR</i>	marital status (2)	not married
<i>RES</i>	size class of the place of residence – number of inhabitants (6)	countryside
<i>EDU</i>	education (6)	lower than preliminary
<i>SIZ</i>	size of employee’s firm (6)	20–49 employees
<i>OWN</i>	ownership of the enterprise or institution (2)	private
<i>SEC</i>	sector of employment (4)	other
<i>OCU</i>	occupation (9)	industry workers

Source: Own elaboration.

Table 2. The sets of “family” variables – variables describing situation in family (NUM)

Number of	Data set					
	S1	S2	S3	S4	S5	S6
Persons (individuals) living in the household	+		+	+		
Children ≤ 5 years old		+	+			+
Children 6–15 years old		+				+
Children 16–18 years old		+				+
Persons 19–65 years old			+			
Elderly persons > 65 years old		+		+	+	+
Unemployed children living in the household				+	+	
Employed persons living in the household						+

Symbol + denotes that particular variable is included into the model.

Source: Own elaboration.

Table 2 (the sets of explanatory variables are denoted as S1, S2, ..., S6).

Models, describing working hours provided by employees during the month preceding the survey, are estimated using OLS method for the whole sample and separately for subsamples of men and women which is an ordinary approach [Grajek 2001, Blau and Kahn

2006, Witkowska 2012, 2013]. These models are denoted by letters, T, M and W, respectively. One should also notice that there are six model’s specifications due to variable sets, presented in Table 2. Therefore, symbols of models inform about the specification of the model and estimation sample. For instance, MT1 denotes the model containing the first set of “family”

variables S1 with only one variable describing count of persons living in the household (Table 2) estimated for all respondents while MW6 – the model containing the sixth set of “family” variables estimated for women.

EMPIRICAL RESULTS

Estimation results obtained for all 18 models are presented in Tables 3 and 4, in form of significance level of parameters and adjusted determination coefficients. Symbol: * denotes significance level $\alpha = 0.1$, ** for $\alpha = 0.05$, and *** for $\alpha = 0.01$; × denotes lack of variables. In our study we assume that variable is statistically significant if the null hypothesis can be rejected at significance level $\alpha = 0.05$ or less.

Taking into account quality of models, it is visible that the models estimated for the whole sample and for the subsample of women well describe the logarithm of monthly worked hours (adjusted R^2 is over 0.996) while the models estimated for the subsample of men do not explain the changes of the dependent variable since adjusted R^2 is below 0.125. It means that there must be different factors influencing time overworked by male employees during the month. However, the models, estimated for the whole sample, show that men spend significantly more time at work than women since the parameter standing by variable *GEN* is significantly bigger than zero.

Although we expect that explanatory variables may influence dependent variable differently for both genders, there are some factors which influence a worktime similarly in all models, i.e. regardless the sample used for their estimation. Positive and significant impact is observed for age and the economic sector. The former is quantitative variable, i.e. the increase of age causes the increase of the worktime. The latter is a set of dummies so the positive parameters standing by them mean that the dependent variable increases for all variants of this feature in comparison to the reference variant, i.e. “other sectors”.

The significantly negative parameters are standing by: age squared, the type of ownership, and hourly wages. Negative parameter standing by squared age says that increase of age causes the increase of worktime but only to some extent. Variable describing

hourly wages is also quantitative therefore the negative significant parameter means that the higher wages make employees work shorter which seems to be quite transparent conclusion. The type of ownership is dichotomous variable thus negative value of the parameter means lower value in comparison to the reference variant: private. In other words, employees of public institutions spend less time in job than the ones working in private sector.

We may also distinguish factors which influence the worktime in different way for each gender. Being a household head significantly increases number of hours spent at work during a month in all models estimated for women while it is insignificant factor for men and the models estimated for the whole sample, with exception of the model MT3 (Table 3). Married women work significantly less than unmarried ones. The conclusion from the models estimated for the whole sample is the same while the parameter estimates standing by this dummy in the models estimated for the sample of men are positive in all models and statistically significant in models MM1 and MM5. These results suggest that married men work more than unmarried while in case of female employees, the situation is opposite.

Also dummies representing different size classes of the place of residence have different impact to the dependent variable since in case of men, the character of the resident place is insignificant. It means that regardless if they live in towns or cities with different number of inhabitants there is no difference of their working time in comparison to men living in the countryside. For women, significant increases are observed when they live in big cities over 100 thousand inhabitants, cities with 10–50, and 2–5 thousand citizens (except models MW2 and MW6) in comparison to countryside residents. It may be caused by the fact that in the countryside there is relatively not many jobs outside private farms and that kind of job might be treated by respondents as an unpaid housework.

Taking into consideration the level of education we notice differences between both genders. Again, the conclusions derived from the models estimated for the whole sample and for female employees are quite similar because for all levels of education higher than primary and lower vocational education, time

Table 3. Parameter estimates: general models (MT), for men (MM) and for women (MW)

Variable	Variable explanatory	Model																	
		MT1	MT2	MT3	MT4	MT5	MT6	MM1	MM2	MM3	MM4	MM5	MM6	MW1	MW2	MW3	MW4	MW5	MW6
AGE	age	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
	age ²	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
GEN	man	***	***	***	***	***	***	×	×	×	×	×	×	×	×	×	×	×	
REL	household head	*		***	*								**	**	***	***	**	**	
MAR	married	***	***	***	***	***	**		*	*	**		***	***	***	***	***	***	
RES	> 100 thousands	***	*	**	**	*	**						***	**	***	***	**	**	
	50–100 thousands																		
	10–50 thousands	**	*	**	**	**	*						***	**	***	***	**	**	
	5–10 thousands																		
EDU	2–5 thousands												**	*	**	**	**	*	
	university (at least PhD)	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	
	university	***	***	***	***	***	***						***	***	***	***	***	***	
	post secondary	***	***	***	***	***	***						***	***	***	***	***	***	
	vocational or general secondary	***	***	***	***	***	***						***	***	***	***	***	***	
SIZ	primary or lower vocational							**	**	**	**	**	**						
	≤ 10 employees	**	**	**	**	**	**												
	11–19 employees	**	**	**	**	**	**						**	**	**	**	**	**	
	50–100 employees	***	***	***	***	***	***						***	***	***	***	***	***	
	101–250 employees	***	***	***	***	***	***						***	***	***	***	***	***	
	> 250 employees	***	***	***	***	***	***						***	***	***	***	***	***	
OWN	public	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	
SEC	agriculture	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	
	industry	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	
	service	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	
OCU	managerial	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	
	professional	***	***	**	***	***	***	***	***	***	***	***	**	**	***	***	**	**	
	technical	***	***	***	***	***	***						***	***	***	***	***	***	
	clerical	***	**	**	**	***	**	*	*	*	*	*	***	***	***	***	***	***	
	sales and services	***	***	***	***	***	***						***	***	***	***	***	***	
	farmers, fishers etc.																		
	skilled workers	***	***	***	***	***	***	**	**	**	**	**	***	***	***	***	***	***	
	unskilled workers							***	***	***	***	***	***	***	***	***	***	***	
WAG	hourly wages	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	
NUM	persons in the household	***	×	***	***	×	×	×	***			×	×	***	×	***	***	×	
	children ≤ 5 years old	×		***	×	×		×	**	×	×	×	×			×	×	×	
	children 6–15 years old	×	**	×	×	×	**	×	**	×	×	×	**	×		×	×	×	
	children 16–18 years old	×	***	×	×	×	***	×	***	×	×	×	***	×	***	×	×	***	
	persons 19–65 years old	×	×	***	×	×	×	×	×	***	×	×	×	×	***	×	×	×	
	elderly persons > 65 years old	×		×	**			×	*	×	*	*	×	**	×		**	**	
	unemployed children	×	×	×	***		×	×	×	×			×	×	×	×	***	×	
	employed persons	×	×	×	×	×	**	×	×	×	×	×	×	×	×	×	×	***	

Source: Own elaboration.

Table 4. Adjusted determination coefficient of estimated models

Model	MT1	MT2	MT3	MT4	MT5	MT6	MM1	MM2	MM3
R^2 adjusted	0.9972	0.9972	0.9973	0.9972	0.9972	0.9972	0.1208	0.1242	0.1239
Model	MW1	MW2	MW3	MW4	MW5	MW6	MM4	MM5	MM6
R^2 adjusted	0.9962	0.9962	0.9963	0.9962	0.9962	0.9962	0.1211	0.1213	0.1242

Source: Own elaboration.

spending for job is significantly bigger. Whereas it is not a case of men who work significantly more than individuals with education lower than primary only if they are PhD or obtained higher scientific title. Men with primary and lower vocational education work significantly less than the ones without any education. In all other cases worktime seems to be the same.

Considering the influence of size of the workplace, we compare enterprises or institutions where respondents are employed, to the unit employing 20–49 employees. For the whole sample, all dummies have a significantly positive impact to working time. If the subsample of women is taken into account, the results are similar to the ones just mentioned with the exception of the smallest enterprises (i.e. with less than 10 employees). Whereas for men, size of the place of employment is insignificant in all models.

Occupation is also a feature which shows different impact on worktime if different group of respondents is considered. One can see that for the whole sample only professionals work significantly less than industry workers (which is the reference variant of this variable), while in the groups of farmers, fishers, etc. and unskilled workers there is no significant differences in comparison to industry workers. Other selected groups of occupation work significantly longer than reference variant of this variable. For the sample of male employees, significantly more time spent in the workplace is observed for managers and skilled workers, while significantly less for professionals. For the rest of occupations, the worktime does not significantly differ than for industry workers. Situation of female employees is completely different since for all occupations except farmers, fishers, etc., working time is significantly bigger than for industry workers.

Models denoted as M2 contain four variables representing number of children in different age and elderly persons. Models estimated for all respondents and men show the similar impact of these variables to the worktime i.e. it significantly increases when number of children in age 6–15 increases and decreases with the increase of count of children in age 16–18 years old, whereas number of children below 5 years old and elderly persons over 65 years old are not statistically significant. In case of women, the last-mentioned variable significantly rises the working time and number of children in age 15 or less (representing by two explanatory variables) does not significantly influence the dependent variable. Number of children in age 16–18 is significant with positive parameter estimate also when female employees are considered.

Models M5 contain number of elderly persons and unemployed children in the household, while models M4 include additionally number of persons in the household. All these variables are statistically significant in the model MT4, i.e. last-mentioned variable has positive impact whereas two others – negative, and these two variables are insignificant in the model MT5. When models M4 and M5 are estimated for men – all these variables are insignificant. Whereas for female employees, number of persons in the household has significantly positive impact and number of unemployed children is also significant, but the parameter shows that increase of this variable causes decrease of the working time in the model MW4. In the model MW5 parameter standing by number of elderly persons is significantly positive.

Models M6 contains variables describing number of children below 19 years old (three variables for different age intervals) children employed and elderly persons in the household. Number of employed persons and children from 6 to 15 years old have sig-

nificantly positive impact to the time spending in job, whereas number of children in age 16–18 has significantly negative influence in the model MT6. Similar results but with lack of significance of the variable describing number of elderly persons in the household are observed in the model MM6. For women, significant and positive parameters stand by number of employed and elderly persons, and negative – for the number of children in age 16–18.

CONCLUSIONS

In our research we consider only respondents working during the month preceding the Polish Labour Force Survey, omitting inactive portion of labour force. We attempt to answer if factors affecting level of economic activity differ for men and women. Among distinguished variables the same impact for both genders are observed for hourly wages, age and age squared, which are quantitative, and ownership of the workplace and economic sector which are qualitative features. Due to obtained results the increase of hourly wages causes the decrease of worktime, working time increase with age but only to some extent since the parameter standing by the age squared is negative. Employees from public sector work significantly less (in terms of working hour) than the ones from private sector. Time spent at work is significantly longer in agriculture, industry and service than worktime in other sectors. For the rest of variables, differences in the direction or strength of

influence are observed for at least one variant of variable. Details are presented in Tables 5 and 6, where sign in parenthesis denotes if the impact of variable is negative or positive, and bold letters point out models with opposite impact observed for both genders.

Among variables related to family situation (Table 5), we notice that each of them is significant at least in one model but they cause different effects for male and female employees. The positive impact on worktime is observed for number of: children in age 15 years and below, and persons aged 19–65 in models estimated for men. While significantly negative influence is visible for number of children in age 16–18, and number of persons living in one household. It means that increase of these variables causes the decrease of working time provided by male employees. The same impact is observed for these variables in models estimated for women. However, in the models MW1 and MW4 the increase of the number of persons on the household cause the decrease of worktime provided by female employees. The negative and significant parameter standing by the number of children who are not employed (in the model MW4) informs that women work less if this variable increases. Whereas the bigger number of grownup and employed persons (also aged more than 65 years old) causes that women’s worktime is longer.

To conclude, in our research we prove that the increase of number of children (unemployed) and the elderly in the household causes reduction of worktime (model MT5). However, this conclusion is not true for

Table 5. Models with significant “family” variables

Number of	Men	Women
Persons (individuals) living in the household	S3(-)	S1(+), S3(-), S4(+)
Children ≤ 5 years old	S3(+)	
Children 6–15 years old	S2(+), S6(+)	
Children 16–18 years old	S2(-), S6(-)	S2(-), S6(-)
Persons 19–65 years old	S3(+)	S3(+)
Elderly persons > 65 years old		S2(+), S5(+), S6(+)
Unemployed children living in the household		S4(-)
Employed persons living in the household		S6(+)

Source: Own elaboration.

Table 6. Models with significant qualitative variables

Variable	Variable explanatory	Men	Women
<i>REL</i>	household head		S1–S6(+)
<i>MAR</i>	married	S1(+), S5(+)	S1–S6(–)
<i>RES</i>	> 100 thousands		S1–S6(+)
	10–50 thousands		S1–S6(+)
	2–5 thousands		S1(+), S3–S5(+)
<i>EDU</i>	university (at least PhD)	S1–S6(+)	S1–S6(+)
	university		S1–S6(+)
	post secondary		S1–S6(+)
	vocational or general secondary		S1–S6(+)
	primary or lower vocational	S1–S6(–)	
<i>SIZ</i>	11–19 employees		S1–S6(+)
	50–100 employees		S1–S6(+)
	101–250 employees		S1–S6(+)
	> 250 employees		S1–S6(+)
<i>OWN</i>	public	S1–S6(–)	S1–S6(–)
<i>SEC</i>	agriculture	S1–S6(+)	S1–S6(+)
	industry	S1–S6(+)	S1–S6(+)
	service	S1–S6(+)	S1–S6(+)
<i>OCU</i>	managerial	S1–S6(+)	S1–S6(+)
	professional	S1–S6(–)	S1–S6(+)
	technical		S1–S6(+)
	clerical		S1–S6(+)
	sales and services		S1–S6(+)
	skilled workers	S1–S6(+)	S1–S6(+)
	unskilled workers	S1–S6(–)	S1–S6(+)

Source: Own elaboration.

model estimated separately for men and women. In case of male employees, the parameters are negative but insignificant, while for females – positive and significant only for number of elderly persons. The reason of such results may be giving up jobs, especially by women who are caregivers (such a case is omitted in our research). One should also notice that not all people in retirement age require care, and, to the contrary,

some of them might provide care for grandchildren. That might be the reason of positive and significant parameter standing by the variable representing number of the elderly in the household. It is also worth mentioning that application of variables which disaggregate (by age) number of children did not give expected results i.e. significant impact on number of hours overworked, except children in high school age.

Taking into account qualitative variables (Table 6) the most important results are:

1. If a woman is a household head, she spends in job more time than female employee who is not a head of family. There is no such effect for male employees.
2. Married women spend less time in the workplace than unmarried ones. For men this relation is either opposite or insignificant.
3. Female employees in cities with 2–5, 10–50 and over 100 thousand inhabitants work more than in the countryside. No significant dependency for this group of dummies is observed for men.
4. Women with general secondary or vocational and higher education spend more time in their job than uneducated female employees while such relation is observed only for men with university (PhD or higher) education. Male employees with general secondary or vocational education work less than uneducated employees.
5. Women employed in the workplaces with 11–19, and over 50 employees spend in their job more time than the ones who work in units employed 20–49 employees. Whereas there is no significant dependency for this group of dummies for men.
6. Women classified as: managerial, professional, technical, clerical, sales and services, skilled and unskilled workers work longer than industry workers. The same relation for male employees is observed for managers and skilled workers only whereas for unskilled workers this relation is opposite. The negative impact on worktime is visible also for professionals, while other variants of this variable are insignificant.

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CZY OPIEKA NAD DZIEĆMI I OSOBAMI STARSZYMI WPŁYWA NA CZAS PRACY POLSKICH PRACOWNIKÓW?

STRESZCZENIE

Aktywność zawodowa jest istotnym problemem, na który wpływa wiele determinant. Celem badań jest identyfikacja najważniejszych czynników oddziałujących na czas pracy pracowników w Polsce. Badania są realizowane na podstawie danych indywidualnych pochodzących z Badania Aktywności Ekonomicznej Ludności za pierwszy kwartał 2009 roku. W artykule przedstawiono modele ekonometryczne oszacowane dla całej próby oraz oddzielnie dla kobiet i mężczyzn. Modele opisują przepracowane godziny (w ciągu miesiąca poprzedzającego badanie), które są objaśniane przez indywidualne cechy pracowników, ich sytuację rodzinną oraz charakterystyki miejsca zatrudnienia. Badanie wykazało, że wyróżnione czynniki w odmienny sposób oddziałują na aktywność zawodową kobiet i mężczyzn. Te różnice są szczególnie widoczne w przypadku zmiennych odnoszących się do sytuacji rodzinnej, poziomu wykształcenia i zawodu respondentów.

Słowa kluczowe: aktywność zawodowa, czas pracy, opieka nad dziećmi, opieka nad osobami starszymi, charakterystyka miejsca pracy, atrybuty pracowników