

LIFE CYCLE INCOME OF WOMEN AND MEN IN POLAND¹

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Abstract: We examine the contribution of married and cohabited women and men to the joint income of the couple. We use individual income data from Household Budget Surveys for Poland in 2011 from a sample of 16,538 married and cohabited couples. The results of analysis show that contribution of men to total household income is higher than contribution of their female partners through the life cycle, controlling for type of a couple, education levels of genders and number of children. The contribution of married and cohabited women to total income of the couple remains almost flat during the life cycle.

Keywords: gender, income, life cycle, married, cohabited, couple, Poland

INTRODUCTION

The contribution of women to the household income is based in the historical trends of the labour force participation of women and the gender gap in earnings. The differences in earnings of women and men were explained in the context of the human capital theory due to the differences in individual characteristics like education, training and experience [Becker 1964, Mincer 1974]. More limited experience and less investment in education reduce the productivity of women which translates into lower wages. However, the human capital theory does not explain the discrimination and segregation of women at the labour

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markets which are based in unexplained prejudices [Becker, 1957; Oaxaca 1973; Blinder 1973].

The distribution of income of the couples is also determined by the patterns of marriage formation. Marriages tend to form between individuals who are in similar age, have similar level of education, similar status and live close to each other. Akerlof and Kranton (2000) incorporated the theory of identity from psychology and sociology into the economic model of human behaviour. Identity is associated with different social categories and how people belonging to these categories should behave. Gender categories are associated with specific behavioural prescriptions such as: a man should earn more than his wife.

The gender identity norms explain the marriage formation, likelihood to divorce, labour market participation of women, distribution of relative income within households and division of home production activities between partners [Bertrand et al 2013]. The authors used data for 1970 - 2010 from the US Census Bureau and 2008-2010 data from American community Survey. They noticed that couples where wife earns more than husband are less satisfied with their marriage and are more likely to divorce.

During the last decades women improved their educational background and in many countries, including Poland, their educational level exceeds the education level of men. Women have fewer children and shorter periods of employment interruptions. The gender pay gap still exists, although it has diminished since the 1970. However, it is fairly stable over the last decades. Median annual earnings of women fulltime workers in the United States are currently reported to be at 76% of earnings of men. The situation is similar in other countries. In Europe the gender wage gap is 82%, in Australia 82% and 82.4% in OECD [Lips 2013, p. 169].

Differences between women and men in professional experience still remain significant. However, human capital variables explain no more than 20-35% of differences in earnings [Plantenga, Remery 2006]. More important factors are the horizontal and vertical occupational segregation and the wage structure. Historically, women tend to work in different occupations and industries than men and have been segregated because of that. Even within occupations dominated by women, women are paid less than men. There is no broad occupational category in which the earnings of women equal those of men. Even within organizations, women and men with similar level of education and doing the same work are often assigned different job titles and work in different parts of company.

The gender pay gap tends to widen with age. It is smaller in the public sector than in the private sector, higher for married employees and significantly lower for singles [Plantenga, Remery 2006; Wechselbaumer, Winter-Ebmer 2005]. Ahituv and Lerman (2011) examined the relationship between job stability, wage rates and the marital stability. They used the panel data from National Longitudinal Survey [NLSY79] in which individuals were interviewed in 1994-2006. They have pointed out that married men work longer hours, work harder on the job, have lower absenteeism from work, and are less likely to be fired than single men. Married

men have higher wages than single men. Men in their first marriage have higher wages than those in their second marriage and divorced men have lower wages than married or remarried men. The difference increases with age and is similar among men with different levels of education.

Maître, Whelan and Nolan (2003) use European Community Household Panel (ECHP) data to look at the income contribution of the female partner to the household income in twelve European countries. Income from work of each individual includes wage and salary earnings and self-employment income. The mean contribution of women to the household income for full time working men and women in the ECHP 1996 study oscillates from 32% in Greece to 41% in the Netherlands. For the part time working women, the contribution of women to the household income stretches from 17% in Greece to 28% in Denmark. For the couples with no children the mean contribution of women varies from 23% in Greece to 35% in Denmark and UK. But for couples with 3 children below 6 years of age the mean contribution of women to the household income was less than 20% and only 7% in Germany.

When a woman has attained a tertiary education, her contribution is greater than for the secondary or lower than secondary level of education. For example, in Portugal the contribution of women to the household income reaches 20% for primary educated women, 28% for secondary educated and 42% for tertiary level of education of women. For other countries the women contribution rate is about 30% for tertiary education and is higher by about 10 percentage points than for the secondary level and about 20 percentage points for the lower than secondary level of education [Maître, Whelan and Nolan 2003, pp. 19-22].

Women contribution to the household income is highest for young couples in the age below 30. In every case the contribution of the female partner increases systematically with total income of the household. Female income plays a role in influencing whether a household is poor or not. The share of poor households below 60% of the median household income is 30% in Denmark and 27% in the United Kingdom when a female partner does not earn income. When the female income is added to the total household income, the share of poor households falls to 2.6% in Denmark and 9.9% in the United Kingdom (calculated from Table 8 in [Maître et al., 2003]).

Soobedar (2011) analyses the trends in the relative earnings of men and women in the household between 1994 and 2004 in the United Kingdom. She used data from the Family Resource Surveys for years 1994, 1997, 2001, 2004 for men aged 24-64 and women in partnership in the age 24-55. The author applied the semiparametric approach to quantify the impact of explanatory factors (male and female characteristics, patterns of mating) on the relative position of women within families. In this period hourly earnings in real terms increased more among the female partners (by 32%) than among the males (by 7%). The labour force participation increased by 0.5 percentage points for men and by 7 percentage points for women (p. 419).

The main factor which accounts for the increase in the relative female earnings share was the rising labour force participation of women. Alteration in the characteristics of females accounts on average for about 1/4 of the rise in the female breadwinner index, e. g. the relative female earnings share. Increases in returns of men to male characteristics have acted in the opposite direction. Bloemen and Stancanelli (2008) analysed couples in France between 1990 and 2002 where the wife was the main earner in the household. They concluded that female breadwinner families are mainly observed when the husbands are low educated and face labour market difficulties.

In this paper we examine the contribution of income of married and cohabited women and men to the joint income through the life cycle of the couple. To do this we first construct the life cycle age structure of married and cohabited couples in Poland. Then we analyze inputs of income of married and cohabited women and men to the household income during the life cycle of the couple, controlling for the education level of women and men and the presence of children. We examine the relative income of women and men in Polish households based on data from Household Budget Surveys in 2011.

DATA DESCRIPTION AND MATCHING OF COUPLES

We use the sample data for 37,099 households from Household Budget Surveys for Poland in 2011. The Household Budget Surveys are performed by Central Statistical Office (GUS) on a fully representative basis for Polish households.

The structure of the 37,099 households sample is the following:

- 25% of the sample consists of one-person households, mostly retired women, not sharing income with any other person,
- 62% of households are couples with or without children,
- 2% of all households are single parents, mostly women, with children,
- 11% of the sample consists of households with composite structure: the non-nuclear families or households with some members not relative to the head of the household. They may be composed of more than one adult man or more than one adult woman (Table 1).

In our analysis we consider the households consisting of one couple of a man and a woman who are formally married or declaring as living together (cohabited). There are 23,141 couples in the sample (62% of the total number of households). Married couples form 58% of all households (21,542 households) and the cohabited couples run 4% of all households (1,599 households).

Out of the sample of all couples we only examine couples with two streams of income earned by women and men. We omitted couples when only one person is earning or there is an income of a child. Finally our sample under study consists of 16,538 couples (45% of all households). Among them there are 15,237 formally

married couples (41% of all households) and 1,301 cohabited couples (3.5% of all households and 8% of couples under study) (Table 1).

Table 1. The structure of households in Poland in 2011

	Count	%
All households	37,099	100
One person households	9,203	25
Couples without children	6,643	18
married	9,203	
cohabited	670	
Couples with children	9,895	27
married	9,264	
cohabited	631	
Couples under study	16,538	45
married	15,237	41
cohabited	1,301	4
Single parents with children	630	2
Other households	10728	29

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

We use individual data on personal income earned from different sources (hired employment, self-employment, pension, farming) by married and cohabited women and men from the Household Budget Surveys of Polish households in 2011 (Table 2).

Table 2. Average monthly income of women and men in the couples (in zlotys)

	Men	Women
All households	2013	1492
One person households	1868	1599
Couples without children	2037	1495
married	2006	1465
cohabited	2302	1732
Couples with children	2601	1781
married	2614	1699
cohabited	2370	1557
Couples under study	2371	1655
married	2364	1649
cohabited	2341	1716
Single parents with children	2356	1948
Other households	1610	1273

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

The average personal income from different sources of women in Polish households is lower than the average income from different sources of men. Single women and men forming one person households earn lower income than is the average income for women and men in all households. Personal income of married and cohabited women is lower than income of married and cohabited men, though both are above the average income for men and women in all households. In couples without children the income of both women and men is lower than in couples with children due to a higher share of pensioners in the first group. In couples with children the income of women and men is higher in married than in cohabited couples.

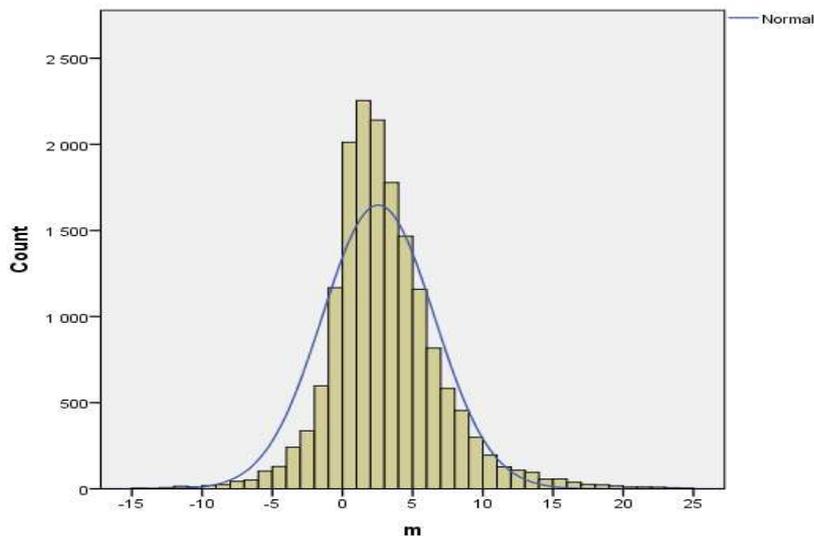
To examine the contribution of income of married and cohabited women and men to the joint income of the couple through the life cycle we have to construct the life cycle age structure of couples. To do this we first check for the age difference of women and men in couples. Then we analyze how women and men are matching in married and cohabited couples by the education level of genders.

We define the age difference of woman and man in the couple as:

$$\text{Age difference} = \text{age of man} - \text{age of woman}$$

The histogram (Figure 1) of age difference of women and men demonstrates that the age of partners is similar in most households in Poland. Married and cohabited men are older than women by 2.55 years on average (std = 3.99 and skewness = 8.15). The difference is rarely greater than 8 years. However, in some cases it may extend to 25 years.

Figure 1. Age difference between a man and a woman in the couple (age of man minus age of woman)



Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

Besides age, an important characteristic of matching of couples is the education level of both partners. Tables 3 and 4 exhibit the matching matrices by education levels of partners from a perspective of women (Table 3) and men (Table 4). The matrices reveal that it is easier for men than for women to find a partner with a similar level of education, as women are better educated than men in Poland.

Table 3. Matching of couples by education level of women and men - distribution for men

		Women - education level				Total
		Tertiary	Secondary	Vocational	Primary	
Men - education level	Tertiary	75.6	22.0	1.9	0.5	100.0
	Secondary	26.7	55.9	13.5	3.9	100.0
	Vocational	7.5	37.0	43.8	11.7	100.0
	Primary	2.3	17.7	24.4	55.6	100.0
Total		28,0	37.7	23.1	11.2	100.0

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

The proportion of women with tertiary education is 28% of the total number of female partners in couples and for male partners it is 22%. For the secondary education the proportion of women is 38% and 32% for male partners. The shares of female and male partners in couples with primary education are equal. The dominated education level of male partners is vocational (36%) and for female partners in couples it is secondary education (38%).

Table 4. Matching of couples by education level of women and men - distribution for women

		Women - education level				Total
		Tertiary	Secondary	Vocational	Primary	
Men - education level	Tertiary	59.4	12.8	1.8	0.9	22.0
	Secondary	30.0	46.7	18.5	11.0	31.5
	Vocational	9.7	35.6	69.0	37.8	36.3
	Primary	0.8	4.8	10.8	50.3	10.2
Total		100,0	100.0	100.0	100.0	100.0

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

As far as the matching of partners in the couple is concerned, men with tertiary education match with women of the same education level in 3 out of 4 of cases. Tertiary educated woman can match a partner of the same education level in 3 out of 5 of cases. A group of tertiary and secondary educated men chooses partners with similar education in 98% of their total matches, whereas in case of women it was in 90% of total choices of tertiary and secondary educated women.

INCOME OF MARRIED AND COHABITED WOMEN AND MEN

The contributions of women and men to the household total income are not equal. In all married and cohabited couples under study women provide on average 37% and men 63% of the household income. This relation differs between couples at different educational levels, but the differences are not large – they alternate around the proportion of 40 to 60 percent of the total household income for women and men and are quite stable. Even, if both partners are tertiary educated, women provide 39% of the family income. This is in conflict with the human capital theory but in accord with the discrimination theory [Becker, 1957, 1964]. The proportion of the woman income in the household rises only when a partner of the tertiary educated woman is less educated. The woman relative income goes up to 58% of the household income in case of primary educated male partner. Only in this last group of couples the income of a woman is higher than income of a man. It is exceptional and concerns a tiny share of the total number of households.

Table 5. Percent of household income contributed by married and cohabited women, by education level of women and men

		Women - education level			
		Tertiary	Secondary	Vocational	Primary
		% of household income contributed by woman			
Men - education level	Tertiary	39	31	23	27
	Secondary	46	36	29	31
	Vocational	48	38	32	30
	Primary	58	43	37	38

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

Table 6. Percent of household income contributed by married and cohabited men, by education level of women and men

		Women - education level			
		Tertiary	Secondary	Vocational	Primary
		% of household income contributed by man			
Men - education level	Tertiary	61	69	77	73
	Secondary	54	64	71	69
	Vocational	52	62	68	70
	Primary	42	57	63	62

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

The proportion of income provided by men rises to 70%-77% of the household income in the couples when a woman is less educated than a man. In the case of vocational and primary educated men the contribution of their income is

above 60% of total household income. It is true also for couples when women are more educated than their partners, except for the tertiary educated women and primary educated men (as described above).

The above structure of relative incomes of female and male partners in couples concerns the average incomes of all age groups. To examine the influence of the age of partners on their contribution to the household income we constructed five categories of married and cohabited couples through their life cycle. The categories take into account the age of partners, which - as we mentioned above - is mostly similar. Table 7 shows the construction of categories of married and cohabited couples through the life cycle of the couple. Table 8 shows the personal income earned by women and men during the life cycle of the couple.

Table 7. Life cycle categories of married and cohabited couples

< 35	both partners are less than 35 years old
< 45, max \geq 35	both partners are less than 45 years old but at least one is 35 years old or more
<55, max \geq 45	both partners are less than 55 years old but at least one is 45 years old or more
< 65, max \geq 55	both partners are less than 65 years old but at least one is 55 years old or more
max \geq 65	both partners are 65 years old or more

Source: Own calculations.

Table 8: Income of married and cohabited women and men during the life cycle of the couple

Age of women and men in the couple	Income [monthly in zlotys]		Income of woman as % of total household income	Number of children
	Men	Women		
< 35	2441	1301	35	1.23
< 45, max \geq 35	2601	1446	36	1.93
< 55, max \geq 45	2209	1440	39	1.43
< 65, max \geq 55	1868	1250	40	0.30
max \geq 65	1814	1188	40	0.02
Total	2238	1340	37	1.10

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

The female partner income is lower than income of male partner during the whole life cycle. Incomes of women and men in couples rise till the age of 45-55. The female partner income is rising slightly faster than the male partner income which may be due to longer training in her human capital. As a result, the relative income of female partners rises from 35% of the household income in young couples, below 35 years of age of both partners, to 39-40% of the couple income in

the age of 45 and above. It gives the average life income of the female partner of 37% of the life cycle income of the couple.

The number of children on maintenance that is increasing with the life cycle till the age of 35-45 seems to slow down the increase of female earnings. After the age 45, when the number of children in the family is decreasing, the female relative income starts rising. This is in accord with the life cycle theory. But the relatively low level of women share of the couple income during the whole life cycle cannot be explained only by the family developments. The human capital of women should also play a role. In Table 9 we present the women share in the household income during the life cycle of couples with the same education levels of both partners.

Table 9. Percent of household income contributed by married and cohabited women and men, with the same education level, during life cycle

	Tertiary		Secondary		Vocational		Primary	
	Men	Women	Men	Women	Men	Women	Men	Women
< 35	62	38	68	32	75	25	77	23
< 45, max >= 35	63	37	66	34	70	30	65	35
<55, max >= 45	59	41	62	38	68	32	63	37
< 65, max >= 55	58	42	60	40	64	36	61	39
max >= 65	59	41	59	41	62	38	60	40

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

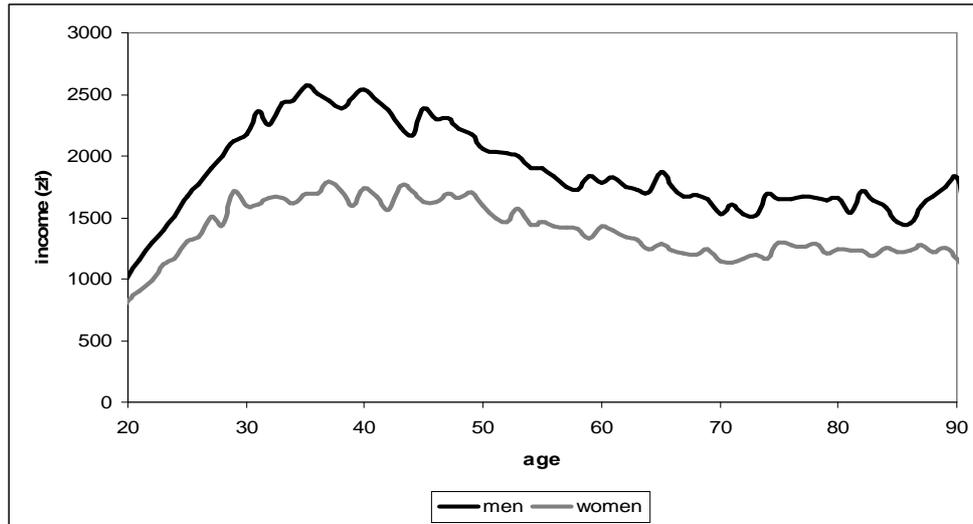
The contribution of income of married or cohabited man to the joint income of the couple with a female partner of the same education level is higher than the contribution of his female partner during the whole life cycle and at all education levels of partners. The male partner share is not lower than 58% (for older tertiary educated men) and reaches 77% for primary educated young men. The female partner share is rising with age through the life cycle at all levels of education but it does not exceed 41% of the total household income. Again, the relative life cycle income of female and male partners with tertiary education is the most striking.

The only difference of life cycle relative income between women of tertiary and lower education levels is such that tertiary educated women start with the higher earnings in young age as compared to less educated women. It is due to the higher level of education of women than men at the start of the career. However, later careers of women do not lead to an increase of women share in the family income during the life cycle. Finally, women with tertiary education end up in the age of above 55 with income that forms only 40% of the total family income, exactly in the same proportion as for other less educated women.

The reasons are multifold. The family development and children rearing affect women more than male partners [Time use survey for Poland, 2003-2004].

But the factors shaping the labor market and the discrimination practices towards women seem to be important as well. The life cycle pattern of female shares in the couple income reveals that the professional careers of married and cohabited women and men are not developing similarly and parallel.

Figure 2. Personal income of women and men by age in 2011 in Poland (monthly in zlotys)



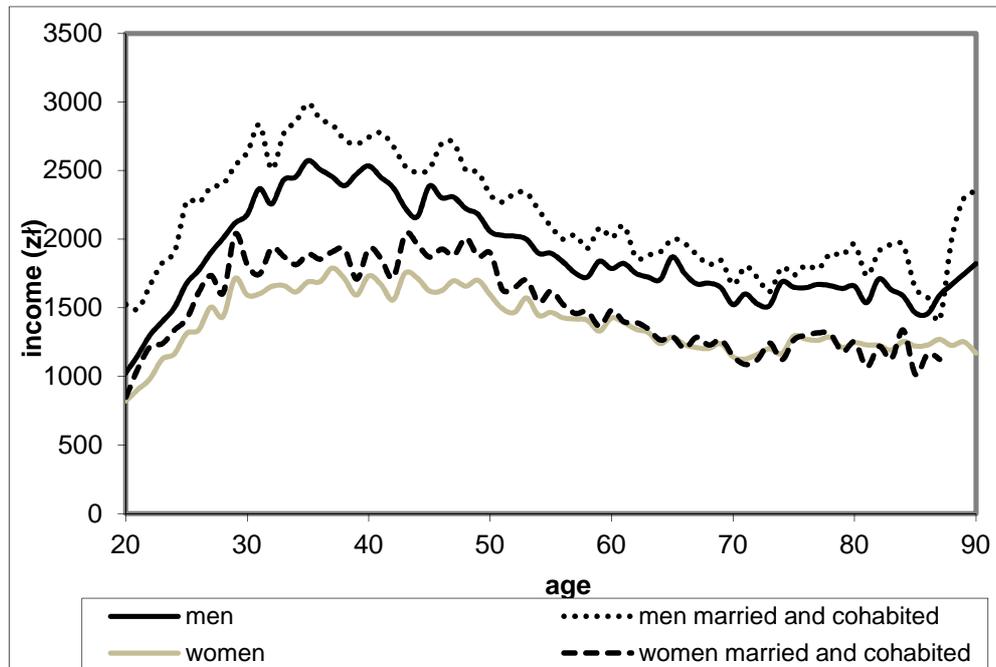
Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

The life cycle pattern of married and cohabited women and men resembles the age pattern of individual incomes of all women and men independently of their marital status. This last group consists of all women and men that either live in couples (formal or not) in nuclear or non-nuclear families, or live alone as one-person household, or share their income with other people (relatives or not). We do not consider children and persons being on maintenance and not having own source of income. Figure 2 exhibits the age profile of personal income of all women and men.

The difference between personal incomes of women and men is the biggest in the age between 30 and 40 due to the higher share of single households in this age group and the family obligations of women. Later in the life cycle, after the age of 55, the income profiles of women and men are parallel.

Comparing the age patterns of personal income of all women and men with income profiles of married and cohabited women and men we demonstrate the higher incomes of married and cohabited persons than the average personal income of all persons (Figure 3).

Figure 3. Personal income of women and men by age: all persons versus married and cohabited (monthly in zlotys)



Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

Married and cohabited men earn more from different sources during the whole life than is the average income for all men, also after retirement. Married and cohabited women also earn more than the average woman earns at all ages but only till retirement. This allows for reasoning that marriage or cohabitation and family obligations are not the decisive factors pushing the women incomes downwards in relation to men [Hunt 2010]. The reasons of lower earnings of women than men seem to be based in the labor market discrimination of women. In Figure 4 we compare personal incomes of women and men by age and employment status: hired workers versus self-employed persons.

Figure 4 exhibits the age profile of income of hired female workers that is placed below the income profile of hired male workers, till retirement. After retirement the opposite is a case. Age profiles of income of self-employed women and men are very volatile but generally above the levels of income by hired workers. Incomes of self-employed women sometimes surpass the income of hired male workers. In some cohorts above age 55, the self-employed women also earn more than self-employed men. Thus, the self-employment seems to be activity where the discrimination of women is lower than in the hired employment.

Figure 4. Personal income of women and men by age of hired workers and self-employed persons (monthly in zlotys)



Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

DATA ANALYSIS

We run the OLS regression to check for the determinants of a share of married and cohabited women income in the household income during the life cycle of the couple. Dependent variable is a share of income of married and cohabited women in the household income (in percent). Independent variables are:

- Tertiary education of woman – According to human capital theory higher human capital of women shall raise the life income of women and their share in total household income.
- Tertiary education of man - Due to life cycle theory human capital of men acquired by formal education can be increased by longer work experience of men than women who spend some years out of labor market bringing up children. This can lead to domination of men life earnings in the family income.
- Cohabiting of couples (versus married couples) – The cohabiting persons are expected to be more financially independent than married ones due to less

legally supported security for cohabiting couples than for married couples. The effect of cohabitation for women share in household income may be positive.

- Presence of children in age 0-2 – Expected effect on women share in total household income is negative, due to very probable breaks in career for women in the present legal status for sharing the maternity leave by parents in Poland (man can take only 2 weeks of parental leave).
- Presence of children in age 3-7 – The effect may be negative or positive depending on institutional basis and particular work organization for working mothers in specific industries and firms.

Life cycle age categories of couples:

- age35-44 – if both partners are less than 45 years old,
but at least one is 35 years old or more
- age45-54 – if both partners are less than 55 years old,
but at least one is 45 years old or more
- age55-64 – if both partners are less than 55 years old,
but at least one is 45 years old or more
- age>=65 – if both partners are 65 years old or more
- Household disposable income – The level of total disposable income of the household shall be neutral to the share of women income in it, but with very high household income there may be more social pressure for women to make them stop working and earning.

Variables *age35-44*, *age45-54*, *age55-64*, *age>=65* are the indicator variables for life cycle categories where category *age<35* (both partners are less than 35 years old) is a reference category.

Variables *woman_tertiary* and *man_tertiary* can be both equal to 1 when both partners have tertiary level of education, and can be equal to 0 when neither of partners has tertiary level of education.

Variables *child_0-2* and *child_3-7* can be both equal to 1 where the couple has children of age 0-2 years as well as children of age 3-7 years. These variables are both equal to 0 where there are no children in age 0-7 years.

Household disposable income is given in zlotys.

Using the variables defined above the equation estimated (OLS) is the following:

$$\text{woman share_of_income} = 13.702 \text{ woman_tertiary} - 3.768 \text{ man_tertiary} + 4.159 \text{ cohabited} \\ - 5.925 \text{ child_0-2} - 2.249 \text{ child_3-7} + 2.966 \text{ age35-44} + 5.774 \text{ age45-54} + 7.798 \text{ age55-64} + \\ 6.705 \text{ age>=65} - 0.000 \text{ household_income} + 36.766$$

The results of the regression analysis for determinants of the share of personal income of married and cohabited women in the total family income show that the women tertiary education increases the women share in total income of the couple by almost 14 percentage points. Tertiary education of men decreases the share of women personal income in the household income by 4 percentage points.

It says that tertiary educated men can earn more than their female partners of the same education level during the whole life cycle.

Table 10. Regression results for a share of income of married and cohabited women in the household income

Variable	Coeff.	t-value
woman_tertiary	13.702	15.612
man_tertiary	-3.768	-4.507
cohabited	4.159	5.973
child_0-2	-5.925	-11.272
child_3-7	-2.249	-5.711
age35-44	2.966	5.184
age45-54	5.774	8.570
age55-64	7.798	11.148
age>=65	6.705	9.138
household_income	-0.000	-3.594
const.	36.766	45.360

Note: All variables in regression are statistically significant with p-values less than 0.001.

Source: Own calculations based on data from Household Budget Surveys, Poland, 2011.

Cohabiting increases the share of women income in the total household income in relation to married couples, as expected. The presence of children decreases the female relative income in the family income, more for small children in age 0-2 years and less for children in age 3-7 years. It proves that taking care of children affects the income position of women in the family for long periods, not only for the maternity break.

The level of the household income does not seem to affect the women share in total income – its regression coefficient is near zero but is negative. It says that the women contribution to income of couples is similar at all levels of income.

The variable that positively and permanently affects the women share in total family income is the age of partners through the life cycle of the couple, including the retirement time. However this factor is not strong enough to equalize the contribution of married and cohabited women and men during the life cycle.

CONCLUSIONS

In this paper we have found that the contribution of married and cohabited men to the total household income of the couple is higher than of their female partners through the life cycle. The share of married and cohabited women in the joint income of the couple remains almost stable during the life cycle at the level about 40%. Married and cohabited couples have similar characteristics.

The results of the regression for determinants of women contribution to the household income show that the factors positively affecting women share in the family income are: a tertiary education of women, cohabitation and the age of partners through the life cycle of the couple. Male tertiary education and the presence of children affect negatively the contribution of women personal income to the family income.

The final conclusion says that the labor market discrimination of women rather than the family situation may be responsible for the lower contribution of women to the household income through the life cycle of the couple. One should however consider that the gender pay gap and the family situation are interrelated.

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