CeRP
CENTER FOR RESEARCH ON PENSIONS AND WELFARE POLICIES

Working Paper 152/15

THE IMPACT OF EASY AND EARLY ACCESS TO OLD-AGE BENEFITS ON EXITS FROM THE LABOUR MARKET: A MACRO-MICRO ANALYSIS

Ewa Gałecka-Burdziak
Marek Góra

December 2015

Ewa Gałecka-Burdziak[♣]

Marek Góra[♦]

The impact of easy and early access to old-age benefits on exits from the labour market: a macro-micro analysis[♠]

Abstract:

We analyse whether easy and early access to old-age benefits tempts workers to become inactive. We examine the impact of old-age benefits in the light of the discouraged worker effect in Poland, a country severely experiencing the problem of population ageing. We identify cyclical properties in activity and discouraged worker rates, and estimate a set of logistic regressions to identify the determinants of exits from the labour market. In the macro analysis, the added worker effect prevails over the discouraged worker effect. The discouraged worker effect arises with a delay of a few quarters. This process is asymmetric; in duration for females and in size for males. Females often permanently leave the market, and males more likely leave the market in downturns than re-enter in expansions. In a micro perspective, if the old-age benefit becomes the main source of income for the worker within a 1-year interval, the worker is 8 to 20 times more likely to leave the workforce compared to those who receive unemployment benefits or social welfare benefits. Thus, our findings are in favour of a higher retirement age, understood as the age when workers become eligible for the old-age benefits.

JEL classification: J14, J22

Keywords: old-age benefits, discouraged workers, discouraged worker effect, exits from the labour market, unemployment outflow, inflow to inactivity

[♣] Warsaw School of Economics, ul. Madalińskiego 6/8, 02-513 Warsaw, Poland, mailto: ewa.galecka-burdziak@sgh.waw.pl

[♦] Warsaw School of Economics, ul. Madalińskiego 6/8, 02-513 Warsaw, Poland, mailto: mgora@sgh.waw.pl, and IZA, Germany

[♠] Article prepared within a project financed by the National Science Centre Poland, project no. DEC-2012/05/N/HS4/00194.

Ewa Gałecka-Burdziak is a "START" Scholarship holder granted by the Foundation for Polish Science (FNP).

The paper has been presented at the 4th International Workshop on the Socio-Economics of Ageing held at Lisbon School of Economics and Management in Portugal and INFER Workshop on Applied Macroeconomics and Labour Economics held at Pablo de Olavide University in Seville, Spain.

1. Introduction

We ask the following question: to what extent does easy and early access to old-age benefits contribute to low activity rates of older workers? We examine this question in the framework of work discouragement. We hypothetise that easy and early access to old-age benefits demotivates workers, if they are not yet at the age when they are incapable of earning on their own. This statement is strong and ignores the social perspective. However, if we assume that workers start receiving old-age benefits earlier than when they are no longer able to earn on their own, we neglect the interests of younger workers whose remuneration has to finance this policy (Góra 2013).

A few factors affect the early exit from the labour market of older workers. Labour market institutions are designed in terms of age limits. To retire at 65 today is different from doing so a century ago. Employers use retirement as a cheap and easy means of restructuring staff, and view it as a subsidy. Politicians eagerly modify the retirement age, although today considerably less due to budgetary problems. Thanks to the "lump of labour fallacy", people perceive the number of jobs as fixed, so retirement of the older workers should improve the situation of younger workers (Saint-Paul 2004). Workers encounter incentives to retire earlier rather than later. In many developed countries, social security provisions impose heavy taxes on work incomes beyond the earliest retirement age (Gruber and Wise 1999). The workers who retire earlier rather than later, perceive it as a way of escaping the income-leisure trade-off.

We focus on the demotivation effect of old-age benefits only and analyse it in the light of the discouraged worker effect. The discouraged workers are persons who have demonstrated some labour force attachment, i.e. they are willing to work and ready to work and have been looking for a job within previous twelve months, but not in the previous four weeks due to certain reasons. If these reasons are job market related, workers enter or exit the

market. Thus, the participation rates[1] are pro-cyclical[2] with respect to GDP or counter-cyclical with respect to the unemployment rate. In contrary, the added worker effect causes an increase in the participation in response to a partner's job loss. Then, the participation rates behave inversely.

In a microeconomic perspective, research has identified the determinants of the workers' labour market status. Van Ham et al. (2001) look for discouragement at two stages of the search and matching process. Discouragement arises when an individual chooses inactivity to evade unemployment. The second option is when workers with lower employability seek work less intensively, so the search intensity distinguishes job seekers.

We believe that the availability of old-age benefits affects the job search behaviour and results in premature labour force withdrawal. If a person receives an old-age benefit or perceives it as a forthcoming income option, she can become discouraged from active job search. We focus on the outflow from unemployment to inactivity to check if the discouragement affects unemployed older workers who (soon will) decide on retirement.

Macroeconomic analyses have examined the behaviour of participation rates. Benitez-Silva (2002) proposed a formal dynamic model of the job search. Older persons remain active in the labour market beyond the traditional retirement age. They actively seek work, both on the job and when not employed, but their behaviour depends on the previous work attachment and health conditions. Darby et al. (1998) and O'Brien (2011) analysed cyclical properties of the participation rates. Darby et al. (1998) found that the discouraged worker effect was especially common among females aged 45-54. O'Brien (2011) proved[3] that the business cycle affects the activity rates of older males. In both articles, the effect was

[1] Compare Benati (2001) for a literature survey on methods used in the aggregate analyses.
[2] Cyclical properties of the activity rates can be disturbed if worker flows are persistent (Clark and Summers 1982).
[3] O'Brien (2011) also argues that the impact of social security pension values on participation rates is relatively small.

asymmetric. A cyclical downturn influences participation rates more than an expansion. Thus, the decrease in participation during a recession is higher than the increase during a boom. Maestas and Li (2006) analysed the search behaviour of older not employed workers and reported relatively low transition rates. Only half of the older job seekers found work, while 13% were discouraged[4]. The rest experienced health or income shocks, they made little job search effort or their reservation wages were relatively high.

We base our analysis on the Polish labour market. This choice stems from a number of reasons. Activity rates among persons aged 55+ in Poland are on average low compared to demographic characteristics observed in Europe in the 21st century[5]. In Poland there is a so-called minimum retirement age[6]. It is the earliest age at which a worker can retire. Employers may not lay off workers when they reach the retirement age. A worker may sue an employer for being fired above the minimum retirement age[7]. The present value of paid contributions and the age at which the retiree starts receiving the payment determine the value of the old-age benefits. This amount reduces or even negates the level of tax on continued work. These regulations were implemented with the pension reform of 1999. However, the effective phasing of them started in 2009. Thus, these legal conditions have just begun to affect the situation in the Polish labour market[8]. They have not become strong factors behind retirement decisions yet, but data show a recent increase in activity rates and the actual retirement age in Poland (see Eurostat)[9].

[4] By discouraged workers, Maestas and Li (2006) mean those job seekers who are willing to work at the prevailing wage rate but are unable to find a job.
[5] In 2013 44.0% as compared to for instance 54.8% in the Czech Republic, 67.4% in Germany, 77.7% in Sweden.
[6] Prospectively it will be 67 as the minimum age for both genders. That age is to be achieved gradually (from the beginning of 2013 each year 3months up from the initial 60 for women and 65 for men).
[7] Hazans (2007) shows how strong the effect of simultaneous work and old-age benefit income is. He proves that once the possibility of receiving old-age benefits simultaneously with labour income was introduced in 1996 in Estonia, the number of economically active persons aged 65-74 almost doubled in 2003.
[8] The previous pension system, although put down in 1999 left numerous early retirees. These are mostly women who used to retire after 30 years of employment, miners, army and police.
[9] Activity rate increased from 31.7% in 2004 to 44.0% in 2013 (OECD 2015).

In the following section, 2, we present macro and micro analyses of the discouraged worker effect and demonstrate cross-correlations between the cyclical components of the analysed variables and the selected macroeconomic indicators. We examine the relationship between both the activity rate and the discouraged worker rate to the unemployment rate, looking for asymmetry in the duration or size of the discouraged worker effect. In a microeconomic perspective, we approximate the discouraged worker effect by the outflow from unemployment to inactivity, and identify factors that entice older workers to withdraw from the job search. We focus on the roles of old-age benefits and the business cycle. In section 3, we discuss the results, and in section 4 we present our conclusions.

We primarily contribute to the literature by analysing the impact of the availability of old-age benefits on the activity of older workers. We check if these benefits tempt workers to exit the labour force. These benefits may demotivate workers from further job search activity, causing low participation rates. In macroeconomic perspective, we seek for the asymmetry in the in size and duration of the effect. We find a time-varying discouraged worker effect. The added worker effect prevails at first. Then the discouraged worker effect arises. It is asymmetric in intensity (stronger in recessions than expansions) and length (certain workers left the workforce permanently). In a microeconomic perspective, females and older workers are more likely to withdraw from the labour market. The availability of old-age benefits multiplies the probability of withdrawal from the labour market.

2. Micro and macro findings

We analysed the population in Poland aged 50+. These persons demonstrate a low participation in the labour force. In 2013, the participation rate was 34% for persons 50+. The average age of new old-age benefits recipients was less than 60 for both males and females (in 2013). Around 3% of those 50+ indicated that retirement was the main reason they did not seek employment. Reaching the eligibility age for the old-age benefits had been the main

reason for quitting work[10] for 57.5% of those aged 50-69 who were inactive and were receiving old-age benefits (LFS data for 2012). Simultaneously, 50% of those receiving old-age benefits and continuing work did so primarily to provide sufficient personal/household income (LFS data for 2012).

2.1. Is the discouraged worker effect present in the aggregate perspective?

We used aggregate data on the activity rates and discouraged worker rates[11] in the period 2000-2013. We focused on the following age groups: males aged 45-64 or 45+, and females aged 45-59 or 45+. The lower bound of the age limits reflects the age groups provided in the aggregate LFS time series. The upper bounds (59 or 64) reflect the minimum[12] retirement age. The macroeconomic indicators used for reference included gross domestic product (GDP in PLN millions, chain linked volumes, reference year 2005) and unemployment rates.

Table 9 in the Appendix contains the summary statistics for the selected variables. The average activity rate for males aged 45-64 equalled 0.662 ± 0.014 and decreased to 0.495 ± 0.008 for those 45+. For females aged 45-59 the average participation rate equalled 0.604 ± 0.036 and decreased to 0.331 ± 0.011 for those 45+. Discouraged worker rates were higher for the subsample of the working age population, 0.024 and 0.018 for males, and 0.037 and 0.034 for females. All series displayed a high degree of persistence. Monthly autocorrelation coefficients were higher for the participation rates than for the discouraged worker rates. We used ADF, KPSS and Phillips-Perron tests to check for the unit root and stationarity in the data (Table 1). We argue that time series are I(1).

[10] The SHARE data produce an analogous conclusion. Moreover, health status had only a minor impact on the decision when to leave the labour force (Myck et al. 2014).
[11] By the discouraged worker rate we mean the ratio of the number of discouraged workers to the population.
[12] The reform increasing the retirement age came into force in 2013.

Table 1. ADF, Phillips-Perron and KPSS tests statistics.

Variable	Test statistics ADF	Phillips-Perron	KPSS
	I(1) vs. I(2)		
male activity rate 45-64	-7.760	-7.760	0.126
male activity rate 45+	-6.422	-6.453	0.077
female activity rate 45-59	-5.546	-5.704	0.606
female activity rate 45+	-7.980	-8.044	0.208
male discouraged worker rate 45-64	-7.729	-7.857	0.076
male discouraged worker rate 45+	-8.141	-8.361	0.091
female discouraged worker rate 45-59	-6.754	-6.754	0.068
female discouraged worker rate 45+	-6.491	-6.491	0.084
GDP	-5.533[a]	-3.129	0.171
unemployment rate	-2.131	-3.989	0.167
	I(0) vs. I(1)		
male activity rate 45-64	-0.260	-0.217	0.868
male activity rate 45+	-0.956	-1.294	0.618
female activity rate 45-59	1.031	0.449	0.384
female activity rate 45+	-1.688	-1.613	0.217
male discouraged worker rate 45-64	-2.524	-2.524	0.148
male discouraged worker rate 45+	-2.682	-2.696	0.141
female discouraged worker rate 45-59	-1.709	-1.773	0.578
female discouraged worker rate 45+	-1.595	-1.702	0.385
GDP	0.538	0.280	0.895
unemployment rate	-1.320	-0.829	0.661

Notes: The tests for hypothesis I(0) vs. I(1) include the intercept in the test equation. The ADF and Phillips-Perron tests for hypothesis I(1) vs. I(2) assume no constant in the test equation. The KPSS test for hypothesis I(1) vs. I(2) includes the intercept in the test equation. [a] – The test equation includes the intercept.

Source: authors' calculations.

We examined the relationship between the activity rates, discouraged worker rates and the variables that describe the macroeconomic situation. We applied a band-pass Christiano-Fitzgerald filter and high-pass Hodrick-Prescott filter and computed the correlation coefficients between the cyclical components of the particular series (see Table 2). Most of the coefficients imply that the activity rates were counter-cyclical with respect to the GDP or pro-cyclical with respect to the unemployment rate. The discouraged worker rates produced contrary correlations. We broadened the findings when we looked at the lags. Statistically significant correlation coefficients of the expected sign were between (Table 10 in the

Appendix): (i) female activity rates and GDP lagged by 10 periods or more, (ii) female activity rates and unemployment rate lagged by 7 periods or more, (iii) male discouraged worker rates and GDP lagged by 2 periods or more, (iv) 45+ female discouraged worker rate and GDP lagged by 9 periods or more, (v) male discouraged worker rates and unemployment rate lagged by 2 periods or more and (vi) 45+ female discouraged worker rate and unemployment rate lagged by 5 periods or more.

Table 2. Correlation coefficients between cyclical components of male and female activity rates, male and female discouraged workers rates, GDP and unemployment rate computed on the basis of the CF and HP filter estimates.

	Christiano-Fitzgerald filter		Hodrick-Prescott filter	
Variable	GDP	unemployment rate	GDP	unemployment rate
male activity rate 45-64	-0.326*	0.259	-0.079	0.048
male activity rate 45+	-0.699	0.206	0.190	0.031
female activity rate 45-59	-0.443**	0.541***	-0.364***	0.545***
female activity rate 45+	-0.326*	0.500***	-0.207	0.491***
male discouraged worker rate 45-64	0.308*	-0.183	-0.305**	0.251*
male discouraged worker rate 45+	0.345*	-0.200	-0.327**	0.270**
female discouraged worker rate 45-59	0.028	-0.045	-0.122	0.091
female discouraged worker rate 45+	-0.010	-0.007	-0.174	0.134

* - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level.

Source: authors' calculations.

We sought the relationship between either the activity rate or discouraged worker rate and the macroeconomic indicator. We searched for the long-term relationship and tested for potential asymmetry in the adjustment process. We found two interesting results (see Table 3). The first equation describes how the female activity rate (for females 45+) depends on the unemployment rate (lagged by 10-periods).

$$female\ activity\ rate_t\ (for\ females\ 45+) = \alpha_0 + \alpha_1 unemployment\ rate_{t-10} + \varepsilon_t$$

The second equation displays how the unemployment rate (for males 45+ lagged by 5 periods) affects the male discouraged worker rate (for 45+ males).

$$male\ discouraged\ worker\ rate_t\ (for\ males\ 45+) = \alpha_0 + \alpha_1 unemployment\ rate\ (for\ males\ 45+)_{t-5} + \varepsilon_t$$

The equations revealed stable long-term relationships. In both specifications the residuals suffered from autocorrelation, but once we added the AR(1) term, the results remained virtually unchanged[13]. The models approached a new equilibrium within 4 or 2 quarters respectively. The coefficients of the positive and negative correction terms differed. In the female participation equation, the $\hat{\varepsilon}_t^+$ coefficient was not statistically different from zero. The $\hat{\varepsilon}_{t-1}^-$ coefficient proved this equation returned to equilibrium within 2.5 quarters after the negative shock. The Wald test statistics confirmed that these coefficients differed. We did not find statistically significant asymmetry in the duration of the effect in the male discouraged worker rate equation.

Another equation for females allowed for asymmetry in the short- and long-term simultaneously and produced results that were more detailed. Regular ECM estimations indicated that the changes in the unemployment rate inversely affected the participation rates in the short-term and in the long-term. In the long-term we got similar results to the previous ones. The model quickly returned to a long-term equilibrium after the negative shock, but once the unemployment rate increased, the changes were very long lasting. In the short-term, the coefficient of the deviation in the unemployment rate implied a one-directional change in the activity rate. Once we separated positive and negative deviations in the unemployment rate, the results differed. The negative change in the unemployment rate entailed a decrease in the activity rate. The positive deviation demonstrated a statistically insignificant coefficient. The coefficients of the $\Delta\text{unemployment rate}^+$ and $\Delta\text{unemployment rate}^-$ variables differed statistically significantly (based on Wald test statistics).

[13] The only difference is that p-value of the $\hat{\alpha}_1$ in the female activity rate equation is just above 0.05.

Table 3. Female activity rate regressed on the lagged unemployment rate, and male discouraged worker rate regressed on the lagged male unemployment rate, long-term, ECM and asymmetric ECM estimates results.

	Female activity rate (45+)		Male discouraged worker rate (45+)	
	coefficient	standard error	coefficient	standard error
		Long-term relationship		
$unemployment\ rate_{-10}$	-0.129***	0.025		
$unemployment\ rate_{-5}\ (males\ 45+)$			0.039***	0.009
$\bar{R}^2$	0.360		0.286	
LM (p-value)	41.295 (0.00)		14.94 (0.00)	
ADF (p-value)	-2.172 (0.03)		-3.290 (0.00)	
		Error Correction Model		
$\Delta unemployment\ rate$	0.240**	0.100		
$\Delta unemployment\ rate_{-3}\ (males\ 45+)$			-0.081**	0.035
$\hat{\varepsilon}_{t-1}$	-0.267***	0.080	-0.449***	0.108
$\bar{R}^2$	0.247		0.280	
LM (p-value)	2.281 (0.12)		1.065 (0.35)	
ADF (p-value)	-5.951 (0.00)		-6.214 (0.00)	
		Error Correction Model – long-term asymmetry		
$\Delta unemployment\ rate$	0.324***	0.109		
$\Delta unemployment\ rate_{-3}\ (males\ 45+)$			-0.077**	0.036
$\hat{\varepsilon}^{+}_{t-1}$	-0.104	0.123	-0.376**	0.154
$\hat{\varepsilon}^{-}_{t-1}$	-0.404***	0.112	-0.521***	0.152
$\bar{R}^2$	0.280		0.271	
LM (p-value)	2.00 (0.15)		0.769 (0.47)	
ADF (p-value)	-7.30 (0.00)		-6.352 (0.00)	
Wald test long-term asymmetry (p-value)	1.71 (0.095)		0.669 (0.51)	
		Error Correction Model – short-term and long-term asymmetry		
$\Delta unemployment\ rate^{+}$	-0.214	0.238		
$\Delta unemployment\ rate^{-}$	0.636***	0.161		
$\Delta unemployment\ rate^{+}_{-3}\ (males\ 45+)$			-0.068	0.058
$\Delta unemployment\ rate^{-}_{-3}\ (males\ 45+)$			0.013	0.233
$\hat{\varepsilon}^{+}_{t-1}$	0.108	0.144	-0.263	0.194
$\hat{\varepsilon}^{-}_{t-1}$	-0.651***	0.144	-0.536***	0.159
$\bar{R}^2$	0.361		0.206	
LM (2 lags) (p-value)	1.003 (0.38)		0.109 (0.90)	
ADF (p-value)	-6.697 (0.00)		-6.792 (0.00)	
Wald test short-term asymmetry (p-value)	-2.514 (0.02)		-0.983 (0.33)	
Wald test long-term asymmetry (p-value)	3.080 (0.00)		1.080 (0.29)	

* - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level. Data seasonally adjusted. Dependent variable: quarterly female activity rate (45+) or male discouraged worker rate (45+).

Source: authors' calculations.

We verified the asymmetry in the effect duration for females, and estimated the TAR-ECM and M-TAR ECM specifications (Enders and Granger 1998; Enders and Siklos 2001). We assumed the threshold at the level $\tau = 0$ or estimated it. The M-TAR specification with a threshold value -0.0024 produced statistically significant results (see Table 4). The threshold cointegration t-Max test indicated that variables were not cointegrated, but the alternative test $\rho_1 = \rho_2 = 0$ led to a contrary outcome. Enders and Siklos (2001) proved that the second test can have more power than to the first one. The $\rho_1 = \rho_2$ hypothesis result

implied threshold cointegration. The model returned faster to equilibrium after the negative impulse.

Table 4. Results of the threshold cointegration tests for the female activity rate equation.

Parameter, Hypotheses	Female activity rate (45+)			
	Pattern of adjustment			
	TAR		M-TAR	
τ	0	-0.0097	0	-0.0024
ρ_1 (above threshold)	-0.185	-0.086	-0.007	0.005
	(0.147)	(0.114)	(0.123)	(0.096)
ρ_2 (below threshold)	-0.116	-0.359	-0.386**	-0.813***
	(0.133)	(0.214)	(0.161)	(0.201)
$\rho_1 = \rho_2$	0.130	1.257	3.491*	13.461**
t-Max value	-0.874	-0.757	-0.058	0.048
$\rho_1 = \rho_2 = 0$	1.110	1.706	2.886	8.152*

* - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level. Standard errors reported in parentheses.

Source: authors' calculation.

Apart from the asymmetry in the length of the adjustment process, we analysed the asymmetry in the size of the discouraged worker effect over the business cycle. We applied the solutions proposed by Darby et al. (1998) and O'Brien (2011). The first paper defines the dummy variable. It equals one from the period when the cyclical component of GDP reaches a peak until the trough, and zero elsewhere. In our model, the dummy variable coefficient was not statistically significant. Thus, the impacts from the cyclical downturn and the economic recovery on the discouraged worker rate were comparable in size.

O'Brien (2011) follows Connolly (1997). The framework defines the following variables:

$\Delta unemployment\ rate^{+} = \Delta unemployment\ rate$ if $\Delta unemployment\ rate > 0$ and 0 otherwise,

$\Delta unemployment\ rate^{-} = \Delta unemployment\ rate$ if $\Delta unemployment\ rate < 0$ and 0 otherwise.

The two variables produce the cumulated positive and negative changes in the unemployment rate:

$$cumulated_t^{+} = cumulated_{t-1}^{+} + \Delta unemployment\ rate_t^{+}$$

$$cumulated_t^- = cumulated_{t-1}^- + \Delta unemployment\ rate_t^-$$

Asymmetry arises when the coefficients of the cumulated responses differ significantly. We estimated the equation of the male discouraged worker rate (45+).

Table 5. Model results allowing asymmetry in the male discouraged worker rate equation.

	Male discouraged worker rate (45+)	
	coefficient	standard error
Intercept	0.016***	0.001
$cumulated^+$	0.014**	0.006
$cumulated^-$	0.006**	0.002
ρ	0.641***	0.111
$\bar{R}^2$	0.574	
ADF (p-value)	-6.869 (0.00)	
Wald test for the asymmetry response (p-value)	1.842 (0.07)	

* - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level. Data seasonally adjusted. Dependent variable: quarterly male discouraged worker rate (45+). ρ represents the $AR(1)$ coefficient in the error term.

Source: authors' calculations.

Estimation results (Table 5) indicate that the male discouraged worker rate experienced asymmetric responses to the cyclical fluctuations. At a 10% significance level, the Wald test statistics proved that the increase in the male discouraged worker rate (45+) in a recession was larger than the decrease during an economic recovery.

2.2. Do old-age benefits discourage workers from the job search?

By looking at labour force participation, we wanted to identify factors that affected worker withdrawal from the labour market. We broadened the standard definition of the discouraged worker effect. We wanted to determine to what extent old-age benefits discouraged workers from active job search. We treated these benefits as an alternative source of income. They could be already paid out or shortly available to eligible workers. We focused on the outflow from unemployment to inactivity and approximated the discouraged worker effect by this outflow. Thus, by discouraged workers we meant those who had stopped seeking a job during the 1-year interval.

We based the quantitative analysis on individual yearly LFS data for the period 2004-2010. We referred either to workers aged 50-59 (females) and 50-64 (males) or to

workers aged 50+ (females and males). Alike in the aggregate analysis the upper bound of the age limit reflects the minimum retirement age. The whole sample consisted of more than 5000 individuals, 34% of whom had withdrawn from the job search within the 1-year interval. If we narrowed the sample to the working age population, 33% of more than 5000 individuals moved from unemployment to inactivity. Males constituted 57% of the sample. Around ¼ of the workers indicated old-age benefits as a source of income in t_0 while for 12% this benefit was the main source of income. Almost half of the workers had sought work for 13 months or more and $^2/_3$ of the workers had vocational or primary education. The distribution of either the duration of unemployment or the educational level did not significantly differ among those who moved from unemployment to inactivity or for those who remained unemployed.

At first, we looked at unemployed individuals who were receiving old-age benefits in t_0 and compared their status after the 1-year interval (Table 6). Females and older workers were more likely to leave the labour force. Negative deviations in the unemployment rate led to an increase in the probability of labour market withdrawal.

Next, we checked if workers had decided to participate in the market regardless of whether they were receiving old-age benefits in t_0 or not (Table 7). Similar conclusions arose: females and older workers were more willing to move from unemployment to inactivity. Negative changes in the unemployment rate made workers more likely to exit the labour force. If the old-age benefits constituted any source of income in t_1, the workers were more than twice as likely to withdraw from job search.

Finally, we directly identified the impact of old-age benefits and looked at the workers who were not receiving any kind of old-age benefits in t_0 (Table 8). Females and older workers were more likely to leave the labour force. A decrease in the unemployment rate raised the probability of older worker outflows from the market. If the old-age benefit became a source of income in t_1, the workers were 4.7 times more likely to move from

unemployment to inactivity. When we differentiated the main sources of income in t_1, the workers who received old-age benefits were 8 times more likely to leave the workforce than those who received unemployment benefits in t_1 and even 20 times more likely to leave the workforce than those who received social welfare benefits in t_1.

Table 6. Logistic regression of moving from unemployment to inactivity for workers receiving old-age benefits in t_0.

	Workers receiving old-age benefits in t_0			
	odds ratio	standard error	odds ratio	standard error
Age (years):				
50-54	1		1	
55-59	1.747***	0.268	1.748***	0.267
60-64	4.094***	1.342	3.746***	0.887
>65			3.068***	1.050
Sex:				
Males	1		1	
Females	1.441**	0.211	1.460***	0.198
$\Delta unemployment\ rate^{-}$[a]	0.827***	0.040	0.866***	0.039
Log likelihood	-582.66		-640.32	
LR	42.95 (df=4)		57.99 (df=5)	
p-value	0.00		0.00	
McFadden's Adj. R^2	0.036		0.043	
Sensitivity	45.92%[b]		53.02%[c]	
Specificity	68.46%[b]		64.86%[c]	
Correctly classified	60.41%[b]		60.40%[c]	

Notes: [a] – refers to a 1 percentage point change in the negative change in the unemployment rate. [b] – cut off level in the classification table 0.3571 (based on the share of the outflow in the whole sample). [c] – cut off level in the classification table 0.3772 (based on the share of the outflow in the whole sample). * - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level. The sample comprises individuals aged either 50-59 (females) and 50-64 (males) or workers aged 50+, yearly data for the time period 2004-2010. Sample size for the workers aged 50-59 (females) and 50-64 (males) – 927 observations, for the workers aged 50+ – 1010 observations.

Source: authors' calculations.

Table 7. Logistic regression of moving from unemployment to inactivity for the workers receiving or not receiving old-age benefits in t_0

	Workers receiving or not receiving old-age benefits in t_0			
	odds ratio	standard error	odds ratio	standard error
Age (years):				
50-54	1		1	
55-59	2.135***	0.213	2.102***	0.208
60-64	6.593***	1.469	4.602***	0.840
>65			2.974***	1.014
Sex:				
Males	1		1	
Females	1.607***	0.151	1.519***	0.137
$\Delta unemployment\ rate^{-a}$	0.716***	0.023	0.736***	0.023
Old-age benefits as a source of income in t_1:				
NO	1		1	
YES	2.285***	0.236	2.284***	0.231
Log likelihood	-1471.27		-1539.94	
LR	276.51 (df=5)		296.78 (df=6)	
p-value	0.00		0.00	
McFadden's Adj. R^2	0.082		0.088	
Sensitivity	60.47%[b]		62.27%[c]	
Specificity	66.51%[b]		65.86%[c]	
Correctly classified	64.76%[b]		64.79%[c]	

Notes: [a] – refers to a 1 percentage point change in the negative change in the unemployment rate. [b] – cut off level in the classification table 0.2892 (based on the share of the outflow in the whole sample). [c] – cut off level in the classification table 0.2987 (based on the share of the outflow in the whole sample). * - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level. The sample comprises individuals aged either 50-59 (females) and 50-64 (males) or workers aged 50+, yearly data for the period 2004-2010. Sample size for the workers aged 50-59 (females) and 50-64 (females) – 2676 observations, for the workers aged 50+ – 2769 observations.

Source: authors' calculations.

Table 8. Logistic regression of moving from unemployment to inactivity for workers not receiving any kind of old-age benefit in t_0.

	Workers not receiving any kind of old-age benefit in t_0			
	odds ratio	standard error	odds ratio	standard error
Age (years):				
50-54	1		1	
55-59	2.607***	0.343	2.106***	0.289
60-64	9.713***	2.952	7.763***	2.387
Sex:				
Males	1		1	
Females	1.733***	0.216	1.816***	0.235
$\Delta unemployment\ rate^{-}$[a]	0.696***	0.029	0.750***	0.031
Old-age benefits as a source of income in t_1:				
NO	1			
YES	4.714***	1.023		
Main source of income in t_1:				
Old-age benefit[b]			1	
Unemployment benefit			0.121***	0.070
Social welfare[c]			0.048***	0.021
Invalidity allowance			0.155***	0.072
Log likelihood	-874.51		-841.02	
LR	230.57 (df=5)		297.54 (df=7)	
p-value	0.00		0.00	
McFadden's Adj. R^2	0.110		0.142	
Sensitivity	62.53%[d]		64.56%[d]	
Specificity	68.61%[d]		70.44%[d]	
Correctly classified	67.07%[d]		68.95%[d]	

Notes: [a] – refers to a 1 percentage point change in the negative change in the unemployment rate. [b] – old-age benefits – pension or retirement benefits, [c] – social welfare – social benefit, non-income source, dependent. [d] – cut off level in the classification table 0.2533 (based on the share of the outflow in the whole sample). * - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level. The sample comprises individuals aged either 50-59 (females) and 50-64 (males) or workers aged 50+, yearly data for the period 2004-2010. Sample size for both models – 1749 observations.

Source: authors' calculations.

We considered employed workers separately. Old-age benefits constituted a source of income for 15% of the employed workers. For 13% of the employed workers the old-age benefits were the main source of income. Around 7% of the employed workers in t_0 moved to inactivity in t_1, and 59% of those workers stated they did not seek work because they were receiving old-age benefits. Simple logistic regressions proved that workers were more likely to withdraw from the labour force when they became eligible for old-age benefits. However,

the models experienced poor statistical properties and we have not identified any other influential variables that could indicate the discouraged worker effect.

3. Discussion

The results produced some interesting findings. In a macroeconomic perspective, it appears that the added worker effect prevails over the discouraged worker effect. The discouraged worker effect arises with lag. When economic conditions worsen, workers at first increase their job search activity, most probably to compensate for the decrease in household income. As time elapses, they become discouraged with the unsuccessful job search and leave the labour market. This substantial delay can be partially explained by the inertia in the labour market and the fact that it takes time until a new equilibrium is reached.

ECM estimates yielded comparable conclusions. The discouraged worker effect arises once we analyse an unemployment rate lagged by 5 to 10 quarters. It is rather long lag, but it seems to be characteristic of the Polish labour market. For example, in 2002-2004 Poland experienced jobless growth. In the short-term, the added worker effect prevailed. Once we split the unemployment rate deviations into positive and negative changes, the negative change in the unemployment rate induced a decrease in the activity rate. It looks that when it is easier to find a job, some workers become 'less active' and do not take part in the search and matching process[14].

We found the discouraged worker effect asymmetric in size and duration. The female participation rate returned much faster to long-term equilibrium after a negative shock to the unemployment rate. This means that decreases in the unemployment rate result in temporary increases in the activity rate only. On the other hand, once the unemployment rate increases, females leave the market almost permanently. The findings of the threshold ECM estimations are consistent with the asymmetric ECM results and reinforce the conclusions. The male

[14] Gałecka-Burdziak and Pater (2014) draw analogous conclusions with respect to the working age population.

discouraged worker rate model produces asymmetry in the size of the effect. More males decide to leave the market when it is harder to find a job, compared to the number of those who start actively seeking a job once employment finding chances improve.

The logistic regression estimations proved that females and older workers are more likely to leave the workforce. The outflow from unemployment to inactivity is susceptible to business cycle fluctuations. It appears that negative changes in the unemployment rate induce workers to leave the labour market. Thus, when the unemployment rate decreases and it should be easier to find a job, the workers leave the market. This suggests that older workers are less active in the labour market, what confirms stylized facts.

Our findings prove that the old-age benefits increase the probability of withdrawal from the labour market. We get this result regardless of whether workers are already receiving the benefit or are to receive it within a one-year period. We have found that if a worker was not receiving the old-age benefit in t_0 and the old-age benefit became a source of income in the following year (t_1), then the worker was 4.7 times more likely to refrain from the job search. If, in turn, a worker was not receiving the old-age benefit in t_0 and the old-age benefit became the main source of income in the following year (t_1), then the worker was 6 times more likely to withdraw from the job search than those who were receiving an invalidity allowance, 8 times more than those who were receiving unemployment benefits, and 20 times more than those who were receiving social welfare benefits. These findings mean that eligibility for an old-age benefit generates a strong push out from the labour market.

The aforementioned qualitative findings are consistent with some of the results from the SHARE analysis. Myck et al. (2014) show that older workers and those who become eligible for old-age benefits are more likely to leave the labour market. The participation is positively related to health status; yet at the same time, health does not significantly differentiate the timing of the outflow from unemployment to inactivity.

4. Concluding remarks

In this study, we performed an empirical analysis of the discouraged worker effect among older workers. We broadened the standard definition of this effect to identify to what extent easy and early access to old-age benefits contributes to the widely observed low activity rates among older workers. We treated old-age benefits as an alternative source of income to remuneration – either as already available or as a forthcoming option.

We based the quantitative analysis on macroeconomic LFS data (2000-2013) and LFS individual data (2004-2010). Being cautious in the qualitative interpretation of the results, we drew a number of conclusions. The cyclical properties of the activity rates varied over time. The discouraged worker effect occurred among older workers but it appeared to vary over time as well. The added worker effect prevailed at first; the discouraged worker effect arose after some delay. The effect was asymmetric in intensity and length. A larger effect arose after a negative shock to the unemployment rate; it looks that more people leave the workforce during a recession than re-enter the labour market in an expansion. The results indicate that workers leave the workforce almost permanently. Interestingly, in the short-term, when job finding chances increase, the participation rates decrease as well.

We found that females and older workers were more likely to withdraw from labour market participation. Workers who received old-age benefits (and treated them as the main source of income) were 8 to 20 times more likely to leave the workforce compared to those who received either unemployment benefits or social welfare benefits.

Budgetary constraints and their projections are usually an argument in debates on the retirement age and the need to raise it. The public hardly ever agrees with that need. The data do not permit us to draw strong and robust qualitative conclusions. However, we perceive our paper as a minor contribution to the complexity of arguments for a higher retirement age, which we understand as the age of the availability of the old-age benefits. The benefits seem

to contribute to premature withdrawal from the labour market. At the macro level this entails an increased fiscal burden and a welfare loss. Analysed from the labour market perspective, these benefits paid to the very old individuals are a natural part of a social safety net, but these benefits paid to the not-yet-old are not necessarily so needed. Premature withdrawals mean stronger down pressure exerted on the net remuneration for work. The working generation has to bear this higher cost arisen by the old-age benefits eligibility. Higher remuneration for work could be possible, if the benefits were not paid out to the not-yet-old.

The argument of potentially higher remuneration for the working generation when old-age benefits are not paid to not-yet-old individuals goes beyond purely fiscal statements and may help encourage people to stay in employment rather than retire. We see the need to extend the analysis in order to directly account for the impact of old-age benefits on workers intentions concerning labour market participation.

References

1. Benati L. (2001), Some empirical evidence on the 'discouraged worker' effect, Economics Letters, 70, 387-395.
2. Benitez-Silva H. (2002), Job Search Behavior at the End of the Life Cycle, Center for Retirement Research at Boston College WP 2002-10, December.
3. Clark K., Summers L. (1982), Labor Force Participation: Timing and Persistence, The Review of Economics Studies, vol. 49, no. 5, Special Issue on Unemployment, 825-844.
4. Connolly G. (1997), The Influence in Reducing the Male Full-time Unemployment Rate in Australia, paper presented to the 26th Conference of Economists, University of Tasmania, 27-29 September 1997.
5. Darby J., Hart R., Vecchi M. (1998), Labour Force Participation and the Business Cycle: A Comparative Analysis of Europe, Japan and the United States, Working Papers 9802, Business School - Economics, University of Glasgow.

6. Enders W., Granger C. (1998), Unit-Root Tests and Asymmetric Adjustment With an Example Using the Term Structure of Interest Rates, Journal of Business and Economic Statistics 16, 304-311.
7. Enders W., Siklos P. (2001), Co-integration and Threshold Adjustment, Journal of Business and Economic Statistics 19, 166-177.
8. Gałecka-Burdziak E., Pater R. (2014), Discouraged worker effect – evidence for Poland, manuscript.
9. Góra M. (2013), Political economy of pension reforms: selected general issues and the Polish pension reform case, IZA Journal of Labour & Development 2013, 2:2 (doi:10.1186/2193-9020-2-2) http://www.izajold.com/content/pdf/2193-9020-2-2.pdf
10. Gruber, J., D. A. Wise (ed.) (1999), Social Security and Retirement Around the World, University of Chicago Press.
11. van Ham M., Mulder C. H., Hooimeijer P. (2001), Local underemployment and the discouraged worker effect, Urban Studies, September, 38, 10, 1733-1751.
12. Hazans M. (2007), Looking for the workforce: the elderly, discouraged workers, minorities, and students in the Baltic labour markets, Empirica, 34, 319-349.
13. Maestas N., Li X. (2006), Discouraged Workers? Job Search Outcomes of Older Workers, University of Michigan Retirement Research Center Working Paper WP 2006-133.
14. Myck M., Najsztub M., Oczkowska M. (2014), Dynamika rynku pracy i zmiany w sytuacji materialnej osób w wieku 50+, [in:] Chłoń-Domińczak A. (ed.) Portret generacji 50+ w Polsce i Europie. Wyniki badania zdrowia, starzenia się i przechodzenia na emeryturę w Europie (SHARE), Instytut Badań Edukacyjnych, Warszawa http://ibmed.ayz.pl/share/files/publikacje/ibe-raport-krajowy-SHARE.pdf.
15. O'Brien M. (2011), Discouraged Older Male Workers and the Discouraged Worker Effect, Australian Journal of Labour Economics, 14 (3), 217-235.
16. OECD (2015), *OECD Labour Force Statistics 2014*, OECD Publishing.
17. Saint-Paul, G. (2004), Why are European Countries Diverging in their Unemployment Experience?, Journal of Economic Perspectives 18, no. 4 (Fall 2004), 49-68.

Appendix

Table 9. The main statistical properties of variables, 1999 – 2013.

	male activity rate 45 - 64	male activity rate 45+	female activity rate 45 - 59	female activity rate 45+	male discouraged worker rate 45 - 64	male discouraged worker rate 45+	female discouraged worker rate 45 - 59	female discouraged worker rate 45+
Mean	0.662	0.495	0.604	0.331	0.024	0.018	0.037	0.034
Median	0.658	0.495	0.599	0.334	0.023	0.017	0.037	0.033
Stand. Deviation	0.014	0.008	0.036	0.011	0.003	0.002	0.007	0.006
Monthly autocorr.	0.884	0.933	0.940	0.890	0.773	0.742	0.856	0.866
Min	0.642	0.481	0.549	0.302	0.019	0.014	0.023	0.023
Max	0.695	0.508	0.681	0.347	0.031	0.023	0.052	0.048
No. of observations	56	56	56	56	56	56	56	56

Source: LFS, data seasonally adjusted, authors' calculations.

Table 10. Correlation coefficients between cyclical components of male and female activity rates, male and female discouraged workers rates and lagged GDP and unemployment rate computed on the basis of the HP filter estimates.

	Hodrick-Prescott filter							
Variable	male activity rate 45-64	male activity rate 45+	female activity rate 45-59	female activity rate 45+	male discouraged worker rate 45-64	male discouraged worker rate 45+	female discouraged worker rate 45-59	female discouraged worker rate 45+
GDP_{-1}	-0.193	0.050	-0.302	-0.193	-0.235	-0.280*	0.159	0.068
GDP_{-2}	-0.038	0.134	-0.141	-0.115	-0.295*	-0.337**	0.176	0.054
GDP_{-3}	0.025	0.142	-0.032	-0.031	-0.343**	-0.382**	0.244	0.093
GDP_{-4}	0.146	0.046	0.013	-0.070	-0.384**	-0.420***	0.323**	0.145
GDP_{-5}	0.144	-0.026	0.076	-0.036	-0.425***	-0.451***	0.335**	0.134
GDP_{-6}	0.066	-0.137	0.168	0.043	-0.461***	-0.475***	0.296*	0.077
GDP_{-7}	-0.008	-0.241	0.206	0.002	-0.485***	-0.491***	0.265*	0.034
GDP_{-8}	-0.185	-0.323	0.204	0.017	-0.514***	-0.505***	0.151	-0.089
GDP_{-9}	-0.234	-0.289	0.287*	0.156	-0.537***	-0.508***	-0.035	-0.279*
GDP_{-10}	-0.224	-0.262	0.364**	0.262*	-0.542***	-0.503***	-0.153	-0.395***
GDP_{-11}	-0.257	-0.256	0.376**	0.304**	-0.529***	-0.479***	-0.268*	-0.500***
GDP_{-12}	-0.260	-0.158	0.449***	0.440***	-0.484***	-0.428***	-0.299**	-0.513***
u_{-1}	0.219	0.249	0.446***	0.397***	0.186	0.248	-0.174	-0.111
u_{-2}	0.197	0.208	0.298**	0.248	0.307**	0.364**	-0.131	-0.015
u_{-3}	0.180	0.204	0.160	0.149	0.426***	0.474***	-0.084	0.086
u_{-4}	0.168	0.191	0.017	0.083	0.538***	0.574***	-0.036	0.184
u_{-5}	0.168	0.172	-0.123	-0.020	0.636***	0.661***	0.012	0.278*
u_{-6}	0.165	0.132	-0.262*	-0.152	0.718***	0.730***	0.059	0.362**
u_{-7}	0.163	0.106	-0.382**	-0.277*	0.780***	0.780***	0.105	0.436***
u_{-8}	0.170	0.082	-0.447***	-0.367*	0.818***	0.804***	0.154	0.504***
u_{-9}	0.195	0.089	-0.509***	-0.413***	0.823***	0.794***	0.202	0.558***
u_{-10}	0.234	0.100	-0.575***	-0.471***	0.799***	0.755***	0.238	0.587***
u_{-11}	0.235	0.051	-0.598***	-0.505***	0.752***	0.699***	0.248	0.580***
u_{-12}	0.228	-0.015	-0.611***	-0.610***	0.682***	0.623***	0.239	0.545***

* - significant at the 10 per cent level, ** - significant at the 5 per cent level, *** - significant at the 1 per cent level.

Source: authors' calculations.

Latest CeRP Working Papers

N° 152/15	Ewa Gałecka-Burdziak Marek Góra	The impact of easy and early access to old-age benefits on exits from the labour market: a macro-micro analysis
N° 151/15	Margherita Borella Flavia Coda Moscarola	The 2011 Pension Reform in Italy and its Effects on Current and Future Retirees
N° 150/15	Anna Lo Prete	Labour market institutions and household consumption insurance within OECD countries
N° 149/15	Flavia Coda Moscarola Ugo Colombino Francesco Figari Marilena Locatelli	Shifting Taxes from Labour to Property. A Simulation under Labour Market Equilibrium
N° 148/15	Flavia Coda Moscarola Elsa Fornero Steinar Strøm	Absenteeism, Pension Reforms and Grandmothers
N° 147/14	Matteo Morini Simone Pellegrino	Personal Income Tax Reforms: a Genetic Algorithm Approach
N° 146/14	Mariacristina Rossi Eva Sierminska	Single again? Asset and portfolio changes due to widowhood shock
N° 145/14	Johannes G. Hoogeveen Mariacristina Rossi Dario Sansone	Drivers of performance in primary education in Togo
N° 144/14	Elsa Fornero	Economic-financial literacy and (sustainable) pension reforms: why the former is a key ingredient for the latter
N° 143/14	Kees de Vaan Daniele Fano Herialt Mens Giovanna Nicodano	A Reporting Standard for Defined Contribution Pension Plans
N° 142/14	Elisabetta Cagna Giulio Casuccio	Equally-weighted Risk Contribution Portfolios: an empirical study using expected shortfall
N° 141/14	Massimo Baldini Costanza Torricelli Maria Cesira Urzì Brancati	Family ties: occupational responses to cope with a household income shock
N° 140/14	Cecilia Boggio Elsa Fornero Henriette Prast Jose Sanders	Seven Ways to Knit Your Portfolio: Is Investor Communication Neutral?
N° 139/14	Laura Bianchini Margherita Borella	Cognitive Functioning and Retirement in Europe
N° 138/13	Claudio Morana	Insights on the global macro-finance interface: Structural sources of risk factors fluctuations and the cross-section of expected stock returns
N° 137/13	Claudio Morana	New Insights on the US OIS Spreads Term Structure During the Recent Financial Turmoil
N° 136/13	Anna Lo Prete	Inequality and the finance you know: does economic literacy matter?

The full series is available at: http://www.cerp.carloalberto.org/category/publications/working-papers/