CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
Vol. 12, No. 2(2016), pp. 21–40

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THE STABILIZING ROLE OF UNEMPLOYMENT BENEFITS IN POLAND

Abstract

This study examines the impact of unemployment benefit system in stabilizing the economy in Poland in 2008-13. The goal is to answer the question: by how much do the automatic stabilizers in the Polish unemployment benefit system lower the volatility of aggregate demand? The effectiveness of unemployment benefits` automatic response to demand decline is measured using short-term elasticities of employment and government expenses for unemployment benefits with respect to output and marginal propensity to consume out of temporary change in income. To evaluate if automatic stabilizers have no delayed impact on the economy the IRF function in three variable VAR model is used.

The paper concludes that unemployment benefits dampened consumption volatility by approximately 0,008% GDP. Impulse responses were used to simulate the dynamic response of disposable income and individual consumption to government's unemployment benefit payouts. Small stabilizing effectiveness of unemployment compensation can be explained by law rate of unemployed entitled to receive the compensation and also by the fact that insurance benefit payouts for unemployed people accounted only for 0,8% of total government expenses..

JEL Classification Code: **E62, E21, E32**.

Keywords: automatic stabilization, private consumption, business cycle.

Introduction

Stabilizing role of unemployment benefits is that they provide temporary partial compensation for the loss of earnings caused by unemployment. Since earnings decline often goes with the decline in households' consumption, increase in unemployment generally leads to dampen economic growth. Thus cyclical gov-

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ernment's expenses on unemployment compensation cushion the economy from the negative results of recession by helping to maintain the consumer purchasing power. Then, unemployment benefits do in a stabilizing manner. They increase automatically during recessions when the rate of unemployment is getting higher and decrease in periods when economic activity and employment rise.

This study examines the impact of unemployment benefit system in stabilizing the economy in Poland in 2008-2013. More concretely, the goal is to answer the question: by how much do the automatic stabilizers in the Polish unemployment benefit system lower the volatility of aggregate demand? The effectiveness of unemployment benefits` automatic response to demand decline is measured using short-term elasticities of employment and government expenses for unemployment benefits with respect to output and marginal propensity to consume out of temporary change in income. To evaluate if automatic stabilizers have no delayed impact on the economy the IRF function in three variable VAR model is used.

The paper is structured as follows. The first chapter provides a brief overview of the legislative enactments that affect the performance of unemployment benefit system in Poland in 2008-2013. Chapter II reviews relevant earlier studies concerning the stabilizing role of unemployment benefits. In chapter III model is estimated and the effectiveness of unemployment benefits as automatic stabilizers is calculated. The last chapter summarizes the results and concludes.

Unemployment benefit system in Poland in 2008-2013

Act of 20 April 2004 on the promotion of employment and labor market institutions introduces eligibility requirements to receive unemployment benefits in Poland. According to the Act unemployed is a person who is jobless, aged from 18 to retirement age, able and ready to work full-time and does not not possess agricultural land in excess of 2 ha.

The right to unemployment benefit is granted to a registered unemployed person if there are no proposals of suitable employment, no referral to subsidized job, apprenticeship, on-the-job-training. The person during the period of 18 months preceding the day of registration should be employed for a period of at least 365 days or perform other profitable tasks and reach remuneration that equals to at least of the minimum remuneration and from which the contribution to the Labour Found had been paid. Unemployed persons can receive unemployment insurance for 6 or 12 months. 6 months – in case of the unemployed who during the period of receiving the benefit, reside in district where the unemployment rate on the 30th June of the year preceding the date of acquiring the right to benefit did not exceed 150% of the national average unemployment rate. A year – in case of the unemployed who during the period of receiving the benefit, reside in the district where the unemployment rat on the 30th June of the year preceding

the date of acquiring the right to benefit exceeded 150% of the national average unemployment rate or in case of the unemployed at the age 50 or more who have at least 20 years of unemployment benefit eligibility period.

The amount of unemployment benefit depends on the seniority and the period of receiving the benefit. The level of benefit is calculated once a year, on the 1st of June, and also the benefit is a subject to indexation by consumer prices growth index in previous year.

Table 1. The monthly level of unemployment benefit in 2008-2013

Period of the validity		80 per cent of benefit (persons having less then 5 years of unemployment benefit eligibility period)	100 per cent of benefit (persons having from 5 to 20 years of unemployment benefit eligibility period)	120 per cent of benefit (persons having more then 20 years of unemployment benefit eligibility period)
2007.06.01-2008.05.31		430,70 PLN	538,30 PLN	646,00 PLN
2008.06.01-2009.05.31		441,50 PLN	551,80 PLN	662,20 PLN
2009.06.01-2009.12.31		460,00 PLN	575,00 PLN	690,00 PLN
2010.01.01-2010.05.31	In the period of first three months of unemployment benefit eligibility	573,60 PLN	717,00 PLN	860,40 PLN
	In the period of subsequent months of unemployment benefit eligibility	450,40 PLN	563,00 PLN	675,60 PLN
2010.06.01-2011.05.31	In the period of subsequent months of unemployment benefit eligibility	593,70 PLN	742,10 PLN	890,60 PLN
	In the period of subsequent months of unemployment benefit eligibility	466,20 PLN	582,70 PLN	699,30 PLN
2011.06.01-2012.05.31	In the period of subsequent months of unemployment benefit eligibility	609,20 PLN	761,40 PLN	913,70 PLN
	In the period of subsequent months of unemployment benefit eligibility	478,40 PLN	597,90 PLN	717,50 PLN
2012.06.01-2013.05.31	In the period of subsequent months of unemployment benefit eligibility	635,40 PLN	794,20 PLN	953,00 PLN
	In the period of subsequent months of unemployment benefit eligibility	498,90 PLN	623,60 PLN	748,30 PLN
2013.06.01-2014.05.31	In the period of subsequent months of unemployment benefit eligibility	658,90 PLN	823,60 PLN	988,30 PLN
	In the period of subsequent months of unemployment benefit eligibility	517,40 PLN	646,70 PLN	776,00 PLN

Source: Act of 20 April 2004 on the promotion of employment and labor market institutions.

Law changes concerning eligibility requirements to receive unemployment benefits which went into effect in 2010 do not improve benefits' stabilization function. According to Central Statistical Office of Poland people in Poland have been searching for a job for a year on average (Świech, 2013). Then most unemployed after three months period receive lower amount of compensation which reduces the level of their disposable incomes.

Stabilizing performance of unemployment benefits depends strongly on the rate of jobless people eligible for receiving the compensation and on the level of government expenses for unemployment insurance.

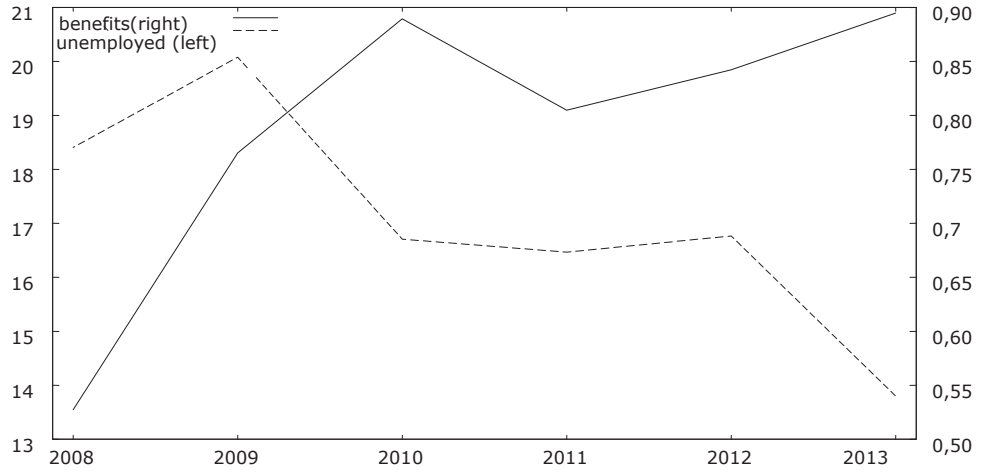

Figure 1. Share of eligible jobless for receiving the compensation in total number of registered unemployed and share of benefit payouts in total government expenses in Poland in 2008-2013.

Source: Calculations performed using GRETL based on source data from Public Employment Services.

In 2008–2013 benefit payouts for unemployed people accounted for 0,8% of total government expenses. In the same time, number of unemployed entitled to receive insurance decreased. In the analyzed period of time it was only 17% of all registered jobless in Poland. There are several reasons of that state of affairs. Firstly, majority of registered unemployed, these are long term unemployed who do not have rights to claim the benefits. Secondly, to be eligible for receiving the benefit, unemployed during the period of 18 months preceding the day of registration should reach remuneration that equals to at least of the minimum remuneration. According to Polish Ministry of Labor and Social Policy about 3,7% of employed people work for less than minimum salary on basis of junk contracts

(Marczuk, 2013). Thirdly, in the employment agencies there are registered from 30 to 40% people who officially have never worked. These unemployed are only interested in health insurance which they obtain while getting status of being unemployed. In fact they earn income in underground economy.

Literature Review

D.W Elmendorf and J. Furman (Elmendorf, Furman, 2008, p. 10-19) define criteria for a good stabilizer. As Elmendorf and Fuhrmann argue, fiscal stabilization should be timely, targeted and temporary. Fiscal policy tools can only stabilize the business cycle if they work in a timely matter. While automatic stabilizers usually have other, additional goals beyond smoothing the business cycle, the more targeted they are on macroeconomic stabilization, the larger the stabilization effect they can provide to the economy. Finally, by definition, their payments should only be temporary as by definition an economy will only be the downswing period for part of the business cycle and it is in the nature of automatic stabilizers not to increase the already large long-run budget deficit.

Politically, an automatic stabilizer should be transparent and robust to attempts of manipulation by national governments. Transparent here means that its payment flows should be easy to understand and logical not only to insiders, but at least to the interested public. Robust here means that it should not adversely affect the incentives of national governments for employment-friendly reforms and that it should not be possible by national governments to induce payment flows by altering minor details of their statistics or labor market legislation (European Commision, 2013, p. 3-4).

Over the last decade, the stabilization impact of the unemployment insurance system has not been a primary focus of attention for many economists. That is not surprising, given the fact that the 2000's have provided quite long period of uninterrupted economic growth in global economy. The latest studies were published by the way the assessment of fiscal policy efficiency after financial crisis which officially started with the collapse of Lehman Brothers.

Vroman, using the econometric model supported by Economy.com of Moody's Investor Service, examined the performance of unemployment insurance system as an automatic stabilizer of economic activity in the USA in the period from the third quarter of 2008 to the second quarter of 2009. In the USA the cyclical response of regular unemployment benefits during recessions is often enhanced through legislation. Specifically, during recessions, typically there has been some form of federally financed unemployment benefit extension. In 2008-2009 the unemployment benefit program incorporated three levels of benefits:

1. Regular unemployment benefits – they are paid up to 26 weeks for most eligible persons.

2. Temporary (or emergency) federal benefits – they flow to qualified claimants who have exhausted their regular benefits and are paid under conditions set by emergency federal legislation up to 53 weeks.
3. Federal-State Extended Benefits – are available in periods when unemployment-related triggers activate the Federal-State Extended Benefits program. They become available only by an act of the U.S. Congress These benefits are paid up to 73 weeks.

Combining all unemployment benefit system`s components, overall, the unemployment benefit program prevented roughly 18 percent of the decline that would have otherwise occurred in aggregate real output (Vroman, 2008, p. 4).

It is worth underlying that combined payouts under the unemployment benefit system total reached $128 billion in 2009. The $128 billion represented 0.9 percent of GDP in 2009, the second highest percentage over the 63 years between 1947 and 2009 (Vroman, 2008, p. 15).

Dolls, Fuest and Peichl, using microsimulation models for 19 European countries (EUROMOD) and the US (TAXSIM), analyzed the effectiveness of the tax and transfer systems in the European Union and the US to act as an automatic stabilizer in the latest economic crisis. They found that unemployment benefits alone absorb 19% of the shock in Europe compared to just 7% in the US (Dolls, Fuest, Peichl (2010), p. 15). In their study the Authors analyzed only the first level of American unemployment insurance system (regular unemployment benefits) which explains such a big difference between the US and European Union.

Chimerine, Black and Coffey stress that only the regular benefits program is the most fully automatic: regular UI benefits flow to qualified unemployed workers immediately, without any external policy intervention required. Extended and supplemental benefits go beyond the definition of automatic stabilizers (Chimerine, Black, Coffey, (1999), s. 12-13).

Comparing the role of automatic stabilizers for demand smoothing in European Union: it is the biggest in Denmark, Sweden, Germany and Netherlands and the smallest in Estonia, Italy, Greece and Poland (Dolls et al. (2010), p. 16).

Darby and Melitz examined the cyclical responsiveness of government expenditure on health, retirement benefits, incapacity benefits and sickness pay as well as unemployment compensation in the group of 21 members of OECD from 1982 to 2003. They found that expenditures on health, retirement, incapacity and sick pay react prominently to the cycle and are more effective in demand stabilization than unemployment benefits. Automatic stabilization was estimated as the automatic impact of an extra percentage-point of output gap on an extra percentage-point of budget surplus relative to output. Darby and Melitz calculated that every percentage point of an output gap yields around 0.06 of a percentage-point of unemployment compensation. But there is also 0.3 of a percentage point of additional social spending on health, retirement, incapacity and sick benefits. The

extent of automatic stabilization through all elements of social expenditure on households therefore is five times larger than the part coming from unemployment compensation alone (Darby, Melitz, (2008), p. 722-723).

McKay and Reis estimated that transfer payments to the unemployed and those on food stamps have been quite effective stabilizers, contributing to a lower variance of output by 13% (McKay, Reis (2012), p. 35). They also found that the traditional Keynesian channel used to support automatic stabilizers is quantitatively weak. While raising the disposable income of consumers during recessions increases aggregate demand and output, this has a small effect over the business cycle. According to McKay and Reis a more important channel for stabilization was redistributing resources from richer agents, that have lower marginal propensities to consume and change their labor supply as their after-tax wealth changes, towards poorer agents, with higher marginal propensities to consume and are without a job so cannot decrease hours worked any further (Ibid., p. 31). At the same time, because this redistribution provides social insurance against idiosyncratic shocks, households hold fewer assets to self-insure, which raises the volatility of consumption in response to aggregate shocks (Ibid., p. 2).

Conclusions from presented literature on the countercyclical effects of the unemployment insurance program are presented below:

- the cushioning effect of unemployment benefits depends on the one hand on marginal propensity to consume and on the other on the value of government benefit payouts which usually is related to the size of public sector;
- the role of unemployment benefit as automatic stabilizer may be enhanced by extended programs aimed to unemployed but they are not completely automatic in their economic stabilization role;
- relatively low values for automatic stabilization effects of unemployment compensation are fund comparing to automatic movements in health spending, pensions, incapacity benefits and sick pay.

Estimating the automatic response of unemployment benefits in Poland in 2008-2013

Basis of the methodology to assess the automatic response of unemployment benefits is simple Keynesian model. Its main assumption is that the consumption is a function of disposable income. Disposable income is the amount left to a household after paying taxes and receiving transfers from government.

To estimate the cushioning impact of unemployment benefits, the methodology proposed by M. Mackiewicz and P. Krajewski (Mackiewicz, Krajewski, (2008), pp. 12-18) is used.

Value of government expenses for unemployment benefits can be calculated using the following equation:

$$WZ = U \cdot wz \tag{1}$$

where: WZ – denotes government expenses for unemployment benefits, U – denotes number of unemployed and wz – denotes the average value of unemployment benefit.

As mentioned above, unemployment benefits counteract business cycle fluctuations through changes in households` disposable incomes and smoothing the consumption. To estimate how effective unemployment benefits in reducing consumption fluctuations a simple "Keynesian-like" formulation is used:

$$\frac{\Delta C}{\Delta Y} = \frac{\Delta C}{\Delta Y^{dys}} \cdot \frac{\Delta Y^{dys}}{\Delta WZ} \cdot \frac{\Delta WZ}{\Delta Y} \tag{2}$$

where: Y – denotes GDP, Y^{dys} – denotes disposable income and C – denotes consumption.

Presuming that:

$$\frac{\Delta Y^{dys}}{\Delta WZ} = -1 \tag{3}$$

the following expression is obtained:

$$\frac{\Delta C}{\Delta Y} = -\frac{\Delta C}{\Delta Y^{dys}} \cdot \frac{\Delta WZ}{\Delta Y} \tag{4}$$

Short-term elasticity unemployment benefits payouts in relation to GDP is defined as:

$$E_{WZ,Y} = \frac{\Delta WZ}{\Delta Y} \cdot \frac{Y}{WZ} \tag{5}$$

The assessment of the effectiveness of unemployment benefits is performed using marginal propensity to consume (MPC) out of temporary changes in income, then:

$$\frac{\Delta C}{\Delta Y} = -\frac{\Delta C}{\Delta Y^{dys}} \cdot \frac{\Delta WZ}{\Delta Y} \tag{6}$$

and finally, the unemployment benefits' effectiveness as automatic stabilizers can be estimated using the expression:

$$\frac{\Delta C}{\Delta Y} = -c \cdot E_{WZ,Y} \cdot \frac{WZ}{Y} \tag{7}$$

The higher ΔC/ΔY in absolute value, the more effective unemployment benefits in smoothing consumption and GDP.
Developing the formula of short-term elasticity unemployment benefits payouts in relation to GDP, the following expression is obtained:

$$E_{WZ,Y} = \frac{\Delta WZ}{\Delta Y} \cdot \frac{Y}{WZ} = \frac{\Delta(U \cdot wz)}{\Delta Y} \cdot \frac{Y}{WZ} = \left(\frac{\Delta U}{\Delta Y} \cdot wz + U \cdot \frac{\Delta wz}{\Delta Y} \right) \cdot \frac{Y}{WZ} = \frac{\Delta U}{\Delta Y} \cdot \frac{WZ}{U} \cdot \frac{Y}{WZ} + \frac{\Delta wz}{\Delta Y} \cdot \frac{U \cdot Y}{U \cdot wz} = \frac{\Delta U}{\Delta Y} \cdot \frac{Y}{U} + \frac{\Delta wz}{\Delta Y} \cdot \frac{Y}{wz} \tag{8}$$

Presuming that the average unemployment benefit per unemployed does not change during the business cycle, i.e.: Δwz=0, the following expression is obtained:

$$E_{WZ,Y} = \frac{\Delta U}{\Delta Y} \cdot \frac{Y}{U} \tag{9}$$

Presuming that:

$$U = ZS - Z \tag{10}$$

where: ZS denotes labor resources and Z denotes number of persons employed. Presuming that labor resources do not change in the short time, using (10), the formula of short-term elasticity unemployment benefits payouts in relation to GDP is given by:

$$E_{WZ,Y} = \frac{\Delta U}{\Delta Y} \cdot \frac{Y}{U} = -\frac{\Delta Z}{\Delta Y} \cdot \frac{Y}{Z} \cdot \frac{Z}{U} = -\frac{\Delta Z}{\Delta Y} \cdot \frac{Y}{Z} \cdot \frac{ZS - U}{U} = -\frac{\Delta Z}{\Delta Y} \cdot \frac{Y}{Z} \cdot \frac{\frac{ZS}{ZS} - \frac{U}{ZS}}{\frac{U}{ZS}} = -\frac{\Delta Z}{\Delta Y} \cdot \frac{Y}{Z} \cdot \left(\frac{1-u}{u} \right) \tag{11}$$

where: $u = \frac{U}{ZS}$

Base to estimate short-term elasticity unemployment benefits payouts in relation to GDP $\left(\frac{\Delta Z}{\Delta Y} \cdot \frac{Y}{Z} \right)$ is the following equation:

$$Z_{t,i} = \alpha_0 + \alpha_1 GDP_{t,i} + \varepsilon_{t,i} \tag{12}$$

where: $Z_{t,i}$ – denotes the dynamic of employment growth in relation to corresponding quarter of previous year, $PKB_{t,i}$ – denotes the dynamic of GDP growth in relation to corresponding quarter of previous year, t denotes number of year; i – denotes number of quarter.

Equation (12) estimation was performed with the classical least squares method using GRETL software. The estimation results show there is autocorrelation of the residuals in the model, so the relation between dynamic of GDP growth and the dynamic of employment growth was estimated based on the equation:

$$Z_{t,i} = \alpha_0 + \alpha_1 GDP_{t,i} + \tau_{t,i} \tag{13}$$

where: $\tau_{t,i} = \rho \cdot \tau_{t-1,i} + \varphi_{t,i}$, for $i = 1$

Table 2 reports the results of the regression:

Table 2. The equation (13) parameters estimations

	α_1	α_0
Parametr estimation	-0,28***	1,3
R^2	0,98	
DW	2,01	

Source: Calculations performed using GRETL.

Obtained the equation (13) parameters estimations show that GDP was statistically significant determinant of employment during analyzed period of time. Negative employment elasticity growth may reflect adjustment mechanisms on labor market caused by negative economic shock. Labor market adjustment mechanisms may have different forms: from the pressure to cut the wages through reducing of working time to employment reducing (Kwiatkowski, Wlodarczyk, (2013), p. 4-6). Scale of quantitative employment adjustment depends on institutional factors such as employment protection and fixed-term employment (Ibidem, p. 9). The stronger employment protection laws, the smaller unemployment growth in crisis. To assess the level of employment protection, described and calculated by OECD, Employment Protection Legislation (EPL) indicator is used. EPL indicator range in integer values from 0 to 6, with higher values representing stricter regulation. Value of EPL for Poland is 2 which means that Poland is amongst the most flexible economies for regular employment. There is a strong relationship between employment elasticity and fixed-term contracts. The higher rate of fixed-term contracts of employment, the higher level of employment protection. For employer work force reduction cost is so high that

more profitable for him is to stash away the labor force. In 2012 in Poland share of fixed-term contracts in total employment was one of the highest among OECD countries (Ibidem, p. 10).

Low level of employment protection in Poland has not enhanced employment stabilization in crisis. Although there was no recession in Poland (two consecutive quarters of negative economic growth), the output growth was so low that led to unemployment growth. Estimates show that a real GDP growth rate should be at least of about 3 per cent to create new jobs (Komuda, 2013).

Presuming that the average unemployment rate came in at 12 per cent and also estimation result of short-term employment elasticity in relation to GDP, short-term elasticity unemployment benefits payouts in relation to GDP on the level of 2,05 is received. It means that increase in real GDP by 1 per cent entails the increase in unemployment benefits payouts by about 2 per cent.

To assess the effectiveness unemployment benefits as automatic stabilizers, marginal propensity to consume out of temporary changes in income should be calculated (c). To calculate c parameter Keynesian consumption function was estimated:

$$W_t = \beta_0 + \beta_1 D_t + E_t \tag{14}$$

where: W_t – denotes households` expenses per person (in PLN), $D_t$ – denotes households` disposable income (in PLN).

Because of lack quarterly data concerning households` expenses per person and disposable income in 2008-2013, disaggregation of annual time series to quarterly figures was used to estimate the model.

Equation (14) estimation was performed with the classical least squares method. The estimation results show there is autocorrelation of the residuals in the model. To remove serial autocorrelation in residuals to a linear regression, Cochrane-Orcutt method was applied (Górecki, s. 131). The equation (14) parameters estimations are shown in Table 3.

Table 3. The equation (14) parameters estimations

	β_1	β_0
Parametr estimation	0,57***	312,5
R^2	0,95	
DW	1,62	

***Variable significant at significance level of 1%.

Source: Calculations performed using GRETL.

β_1 parameter describes marginal propensity to consume out of permanent changes in income. As mentioned above, to assess the automatic stabilizers effectiveness MPC out of temporary changes in income should be taken into account because it reflects output fluctuations during the business cycle. Then c parameter was calculated using the formula:

$$c = \left(\frac{\Delta W}{\Delta D} \cdot \frac{D}{W} \right) \cdot \frac{W}{D} \tag{15}$$

where: $\left(\frac{\Delta W}{\Delta D} \cdot \frac{D}{W} \right)$ – denotes elasticity of expenses per person with respect to disposable income. It was estimated as β_1 parameter in equation (14).

Having calculated expenses per person – disposable income ratio in analyzed period of time (0,84), the value of marginal propensity to consume out of temporary changes in income is 0,48. Estimated values of MPC (0,57 i 0,48) are close to Permanent Income Hypothesis (Friedman, 1957, Modgiliani i Brumberg, 1954) which postulates that marginal propensity to consume out of temporary changes in income is lower than out of permanent income.

Based on equation (7), the effectiveness of unemployment benefits in smoothing consumption fluctuations was estimated. The obtained score is 0,008 per cent. It means that from 2008 to 2013 1 per cent GDP decrease led to increase unemployment benefit payouts and households' disposable incomes and as a result to increase in consumption by 0,008% GDP.

Small amount of unemployment benefits and low rate of jobless people eligible for receiving the compensation decide that this tool of passive fiscal policy is the least effective comparing to other European Union countries.

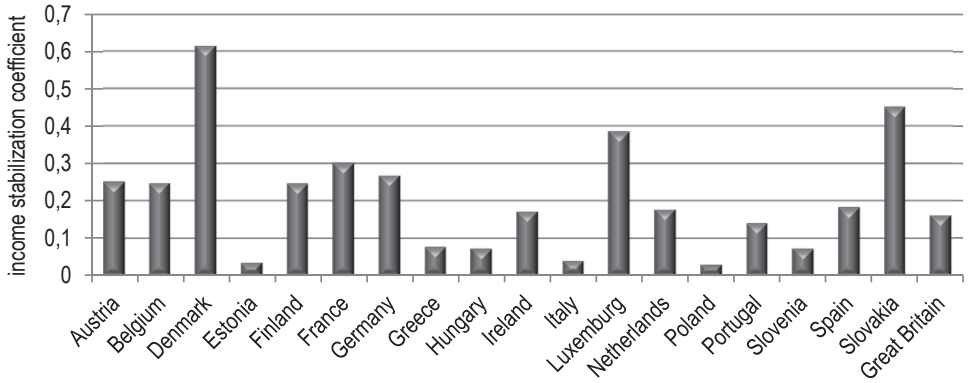

Figure 2. Stabilizing performance of unemployment benefit in European Union countries during financial crisis

Source: Dolls, Fuest, Peichl (2010), s. 16.

Stabilizing performance of unemployment benefits system depends on social policy model. Generally the more generous system of unemployment insurance, the bigger role of this system for demand smoothing. Negative relationship between the size of public sector and effectiveness of automatic stabilizers are confirmed by numerous empirical research . Baunsgaard and Symansky suggest that there are ways to enhance the automatic stabilizers without raising the size of government. This can be done by introducing targeted cash transfer programs and well-designed public work programs temporarily during economic crises (Baunsgaard, Symansky, 2009, p.13).

In order to assess if unemployment benefits work in a timely matter, the VAR analysis is presented. The three variable VAR is of the form:

$$CSWZ_{i,t} = \mu_1 + \sum_{i=1}^{k} \alpha_{1k} CSWZ_{i,t-k} + \sum_{i=1}^{k} \beta_{1k} C_{i,t-k} + \sum_{i=1}^{k} \varphi_{1k} Y_{i,t-k}^{dys} + \varepsilon_{1t} \tag{16}$$

$$C_{i,t} = \mu_2 + \sum_{i=1}^{k} \alpha_{2k} C_{i,t-k} + \sum_{i=1}^{k} \beta_{2k} CSWZ_{i,t-k} + \sum_{i=1}^{k} \varphi_{2k} Y_{i,t-k}^{dys} + \rho_{1t} \tag{17}$$

$$Y_{i,t}^{dys} = \mu_3 + \sum_{i=1}^{k} \alpha_{3k} Y_{i,t-k}^{dys} + \sum_{i=1}^{k} \beta_{3k} CSWZ_{i,t-k} + \sum_{i=1}^{k} \varphi_{3k} C_{i,t-k} + \lambda_{1t} \tag{18}$$

where: *CS WZ* – denotes cyclical element of unemployment benefits spending (in mln PLN); *C* – denotes individual consumption (in mln PLN) and Y^{dys} – denotes disposable income (in mln PLN).

All the above mentioned time series have a quarterly frequency and cover the period from the first quarter of 2008 to the fourth quarter of 2014.

The cyclical element of unemployment benefits spending was estimated on the basis of formula introduced by van den Noord (van den Noord, 2000, p. 18):

$$CSWZ = \frac{1 - \left(\frac{Y^*}{Y}\right)^{E_{WZ,Y}-1}}{Y} \cdot WZ \tag{19}$$

where: Y^* – denotes the level of potential output.

Before the VAR model estimation it was necessary to specify stationarity of the analyzed time series. To this purpose the Augmented Dickey-Fuller Test (ADF) was used.

Table 4. ADF test with constant and trend

Time series	Order of integration
CS WZ – cyclical element of unemployment benefits spending	I(0)
C – individual consumption	I(I)
Y^{dys} disposable income	I(I)

Source: Calculations performed using GRETL.

It can be seen from the table 4 that only the variable *CS WZ* is a stationary series. The ADF test also assumes that the variables: *C* and Y^{dys} integrated of order 1. Non-stationary variables might lead to spurious regression. In this case the results might suggest a statistically significant relationship between the variables in the model, when in fact this is just evidence of contemporaneous correlation. Non-stationary time series could be converted to a stationary time series by taking first differences of the *C* and Y^{dys}. The series that is stationary with the first difference is said to be integrated of order one.

For the purposes of the analyses, two lags period (two quarters) between explanatory variables was adopted. The choice of lag lengths is in line with results of the information criteria of the Akaike, Schwartz-Bayesian and the Hannan-Quinn models. According to these criteria, a model with two lags length is characterized by the biggest information capacity.

Another stage of the analysis was an estimate of structural parameters of the VAR model. Results of the parameter estimate of the VAR model consisting of 3 equations are in the Appendix 1. Obtained estimates confirmed statistically significant relationship between the cyclical element of unemployment benefits spending and individual consumption. Additionally, according to the reported Ljung-Box (Q) test, residuals from the VAR model have no *autocorrelation*. The Doornik-Hansen test for multivariate normality confirms the presence of a normally distributed random variable. Test for Multivariate ARCH Effects confirms homoscedasticity of random variables.

Below one can see respective graphs of the impulse response functions of individual consumption and disposable income to a one-time unit change of unemployment benefit payouts and also IRF of individual consumption to a one-time unit change of disposable income.

The impulse responses given in figure 2 indicate a sharp fall in disposable income after a shock to unemployment benefits payouts. This conclusion confirms that stabilization effect of unemployment benefit is rather small. Negative influence of unemployment benefits payouts to disposable income can be explained by the fact that data describing disposable income refers to all households in Poland during 2008-2013. The data does not describe the households which members

lost their job and have registered unemployed status. As mentioned above 17% of all registered jobless in Poland is entitled to receive insurance. Unemployment benefit system dampen fluctuations in the level of economic activity by its impact on disposable income and consequently on the level of consumption. It can be seen from the figure 2 that unemployment benefits transfer payments shock leads to immediate rise of individual consumption in the first quarter after the occurrence of the shock and after the next three quarters stabilization occurs. Although during 2007-2009 Polish economy experienced reduction in real output, the level of annual disposable incomes and individual consumption was not reduced. Hence, a shock change in disposable income by a unit leads to immediate rise of individual consumption in the first quarter, reaching maximum in the 4th quarter after the subsequent quarters stabilization occurs.

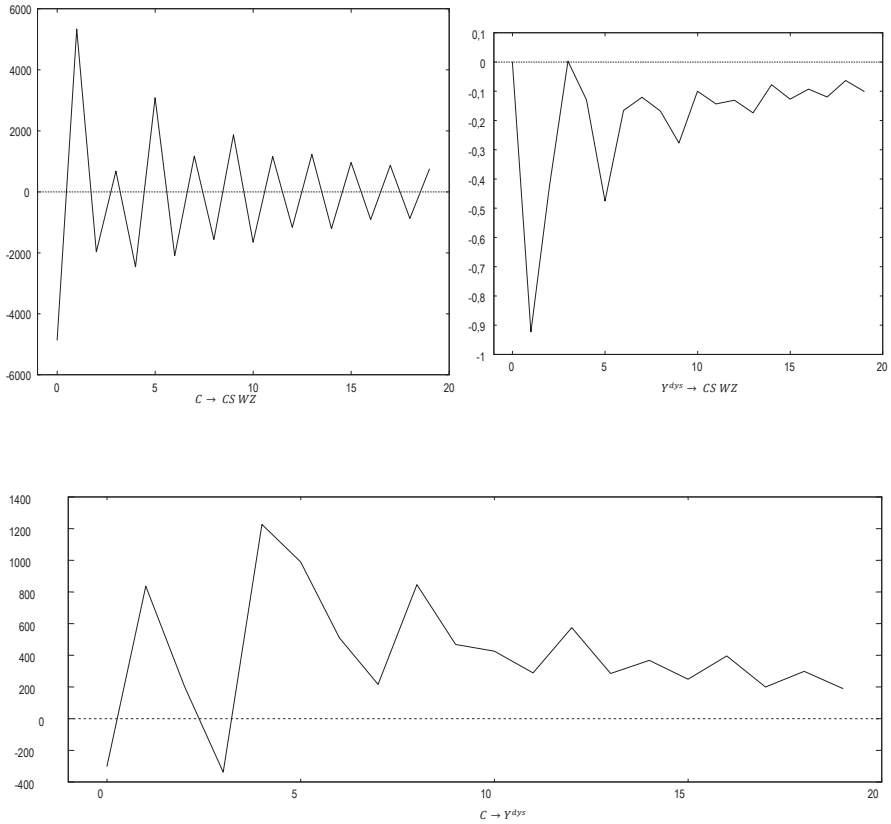

Figure 3. IRF of individual consumption and disposable income to a one-time unit change of unemployment benefit payouts and of individual consumption to a one-time unit change of disposable income in Poland in 2008-2013

Source: Calculations performed using GRETL.

The last stage of the analysis is the decomposition of the variance residual of subsequent factors which determines individual consumption, in order to estimate the impact of these factors on the variability of consumption in Poland.

Table 5. The error variance decomposition in the cyclical element of unemployment benefits spending equation (in %)

The number of quarters after shock	Y^{dys}	*CS WZ*	*C*
1	2,4198	97,5802	0,0000
2	2,4211	96,8343	0,7446
3	1,8396	73,2981	24,8624
4	3,4185	63,9614	32,6202
5	3,2777	66,1308	30,5915
6	3,2874	68,2337	28,4790
7	3,0932	66,0486	30,8582
8	3,0985	63,7580	33,1434
9	3,0939	63,6055	33,3006
10	3,0104	64,1367	32,8528
11	2,9336	63,8417	33,2247
12	2,8888	63,1721	33,9391
13	2,8757	62,9046	34,2197
14	2,8363	62,9609	34,2027
15	2,8013	62,8954	34,3033
16	2,7740	62,6927	34,5333
17	2,7608	62,5414	34,6979
18	2,7417	62,5053	34,7530
19	2,7252	62,4674	34,8074
20	2,7105	62,3966	34,8928

Source: Calculations performed using GRETL.

On the basis on the data from above Table, it can be noted that changes in cyclical element of unemployment benefits spending hardly explain disposable income variance in the short run as well in the long run. In the short- and long-run, only about 3% of changes in consumption in Poland can be accounted for by a change in disposable income. As mentioned above, it results from the law share of unemployment benefits payouts in total government spending. Much higher is the role of cyclical expenses for unemployment compensation in accounting for individual consumption variances in the short- and long-run. In the short-run, about 25% of consumption changes can be explained by changes in the cyclical element of unemployment benefits spending. This effect increases significantly

as the time passed from the moment of change in this factor. In the long-run, the change in cyclical expenses for unemployment compensation accounts for around 35% of individual consumption changes. It can be explained by multiplier effect of government spending. Unemployment benefits transfers payments affect disposable incomes of unemployed persons and consumption expenditures set off the chain induced derivative spending.

Conclusions

The paper performed empirical analysis of the stabilizing role of unemployment benefit compensation in Poland in 2008-2013. I found that the effectiveness of unemployment benefits in smoothing consumption fluctuations in Poland is very weak. In the time of reduced GDP growth, 1 per cent GDP decrease led to increase unemployment benefit payouts and households` disposable incomes and as a result to increase in consumption by 0,008% GDP. On the basis of VAR model estimations, I could affirm that the cyclical expenses for unemployment benefits were quite an important factor which substantially determined the level of consumption in Poland during 2008-2013. Furthermore, the analysis confirmed that unemployment benefits as automatic stabilizers work without any information and implementation lags. Small stabilizing effectiveness of unemployment compensation can be explained by law rate of unemployed entitled to receive the compensation and also by the fact that insurance benefit payouts for unemployed people accounted only for 0,8% of total government expenses.

According to research, the cyclical response of regular unemployment benefits during recessions can be enhanced through temporary programs directed to unemployed. However, this can create great a deal of controversy. Firstly, opponents of the temporary programs directed to unemployed indicate that these programs may weaken job search incentives. In case of Polish economy, where the average sum of unemployment benefit represents half of minimum remuneration, this argumentation is rather irrelevant. Secondly, in principle, extended and supplemental benefits go beyond the definition of automatic stabilizers. And thirdly, it is not without importance the consequences of enlarged public expenses for public finances especially that the frames of national fiscal policies are determined by Stability and Growth Pact and Maastricht Treaty. To improve stabilizing performance of unemployment benefits, the government should increase the sum of compensation, extend its duration and ease the compensation requirements` rules. But what will be the net effect of such operations? Will demand increase be enough to cover the negative impact of augmented public expenses? However, going into greater detail concerning these issues would be beyond the framework of this paper, nevertheless they make area for further research.

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Online databases

General Statistical Office of Poland – Macroeconomic Indicators.

Public Employment Services – Labor Market Statistics

Appendix 1. Results of the parameter estimate of the VAR model

```
VAR system, lag order 2
OLS estimates, observations 2008:4-2013:4 (T = 21)
Log-likelihood = -143,12372
Determinant of covariance matrix = 166,86741
AIC = 15,3451
BIC = 16,2404
HQC = 15,5394
Portmanteau test: LB(5) = 45,761, df = 27 [0,0135]

Equation 1: d_D_dys

                Coefficient       Std. Error     t-ratio     p-value
  ------------------------------------------------------------------------
  d_D_dys_1       1,25457          0,246110        5,098      5,098   ***
  d_D_dys_2      -0,355373         0,232354       -1,529      0,1470
  d_csw_1      -417,605          1161,07          -0,3597     0,7241
  d_csw_2       574,772          1155,09           0,4976     0,6260
  d_spo_ind_1     4,13754e-05      0,000388273     0,1066     0,9165
  d_spo_ind_2     0,000223109      0,000285890     0,7804     0,4473

Mean dependent var             12,24452   S.D. dependent var            5,926329
Sum squared resid             263,3441    S.E. of regression
4,190021
R-squared                          0,931615   Adjusted R-squared
0,908820
F(6, 15)                34,05790   P-value(F)                            6,52e-08
Rho                     0,007398   Durbin-Watson                     1,930807

F-tests of zero restrictions:

All lags of d_D_dys             F(2, 15) =   42,240 [0,0000]
All lags of d_csw               F(2, 15) =  0,16083 [0,8529]
All lags of d_spo_ind           F(2, 15) =  0,31082 [0,7375]
All var variables lag order 2   F(3, 15) =  0,97349 [0,4312]
```

Equation 2: d_csw

	Coefficient	Std. Error	t-ratio	p-value	
d_D_dys_1	-1,29218e-05	0,000121672	-0,1062	0,9168	
d_D_dys_2	8,94089e-05	0,000114871	0,7783	0,4485	
d_csw_1	-0,571720	0,574009	-0,9960	0,3350	
d_csw_2	-2,20127	0,571056	-3,855	0,0016	***
d_spo_ind_1	9,36694e-08	1,91955e-07	0,4880	0,6326	
d_spo_ind_2	-5,42489e-07	1,41338e-07	-3,838	0,0016	***

Mean dependent var	0,000128	S.D. dependent var	0,003204
Sum squared resid	0,000064	S.E. of regression	0,002071
R-squared	0,687009	Adjusted R-squared	0,582679
F(6, 15)	5,487461	P-value(F)	0,003489
Rho	-0,033951	Durbin-Watson	1,960026

F-tests of zero restrictions:

All lags of d_D_dys	F(2, 15) = 1,3974 [0,2776]
All lags of d_csw	F(2, 15) = 8,9447 [0,0028]
All lags of d_spo_ind	F(2, 15) = 7,4717 [0,0056]
All var variables lag order 2	F(3, 15) = 5,3798 [0,0103]

Equation 3: d_spo_ind

	Coefficient	Std. Error	t-ratio	p-value	
d_D_dys_1	27,1104	368,987	0,07347	0,9424	
d_D_dys_2	-101,754	348,363	-0,2921	0,7742	
d_csw_1	2,47832e+06	1,74076e+06	1,424	0,1750	
d_csw_2	6,20055e+06	1,73181e+06	3,580	0,0027	***
d_spo_ind_1	-0,215760	0,582129	-0,3706	0,7161	
d_spo_ind_2	1,63267	0,428628	3,809	0,0017	***

Mean dependent var	2121,576	S.D. dependent var	11203,50
Sum squared resid	5,92e+08	S.E. of regression	6281,999
R-squared	0,772753	Adjusted R-squared	0,697004
F(6, 15)	8,501262	P-value(F)	0,000385
Rho	-0,027058	Durbin-Watson	1,998319

F-tests of zero restrictions:

All lags of d_D_dys	F(2, 15) = 0,15449 [0,8582]
All lags of d_csw	F(2, 15) = 8,6660 [0,0032]
All lags of d_spo_ind	F(2, 15) = 7,3132 [0,0061]
All var variables lag order 2	F(3, 15) = 5,2974 [0,0109]