Impact of Financial Crisis on European Households

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Abstract
The main aim of this article is to discuss and compare impact of the recent financial crisis on the average European family, namely on the main indicators that have impact on household income and its well-being – unemployment rate, and wage dynamic. The dynamics of main indicators should influence household response – revealed in household expenditures, indebtness and savings dynamics. The analysis of main economic indicators is based on the quarterly and annual data for the period of 2000-2010. Results indicate that the household responses to financial crisis vary from country to country. For example, while German and UK households decreased liabilities (as well as mortgages) as a response to financial crises, French households tends to increase their loans. On the other hand, the ability and willingness to save is in general higher after the financial crisis than it was before. Thus, the analysis compares main indicators of all EU countries and tries to find the sources of variation among countries.

Keywords: unemployment rate, consumption, savings, debt, short and long term relationship
JEL codes: E210, C220

1. Introduction

The main inspiration to this paper was the work of Bernanke and Parkinson (1989), who described the era of the Great Depression in the US, and showed tendencies of main economic indicators. They revealed that during the crisis period, the inflation depended on the unemployment rate; even though the unemployment rate rose, data reveals self-correlated tendencies in unemployment rate trend. Moreover, productivity as well as wages were increasing during the studied period. Therefore, the main aim of this article is to discuss and compare impact of the recent financial crisis on main indicators that could have impact on household income and its well-being – unemployment rate, and wage dynamic. The dynamics of main indicators should influence household response – revealed in household expenditures, debt-to-income ratio, and savings dynamics. The analysis of main economic indicators is based on the quarterly and annual data for the period of 2000-2010. I would like to reveal possible long-term and short-term co-integration of unemployment rate and the household consumption as the main indicator of household possible reaction to expected or observed level of family income. Mutual influence of consumption and unemployment rate was already studied for example by Malley and Moutos, 1996. They have shown that the negative relationship between unemployment rate and consumption is a reflection of precautionary saving motives. On the other hand, Jacobson, Vredin, and Warne (1998) studied short-run and long-run relationship between unemployment rate and real wages on 1965-90 Swedish data; however the VAR model didn't reveal suitable results. Main differences between unemployment rate in Europe and in the US were described in Ljungquist and Sargent (2008) article; thus we can expect different results comparing to that of Bernane and Parkinson (1989). Another difference could be seen in the depth of the crises; Mazurek (2010) has evaluated the recent financial crisis and has shown that its magnitude is much smaller than that of the Great Depression.

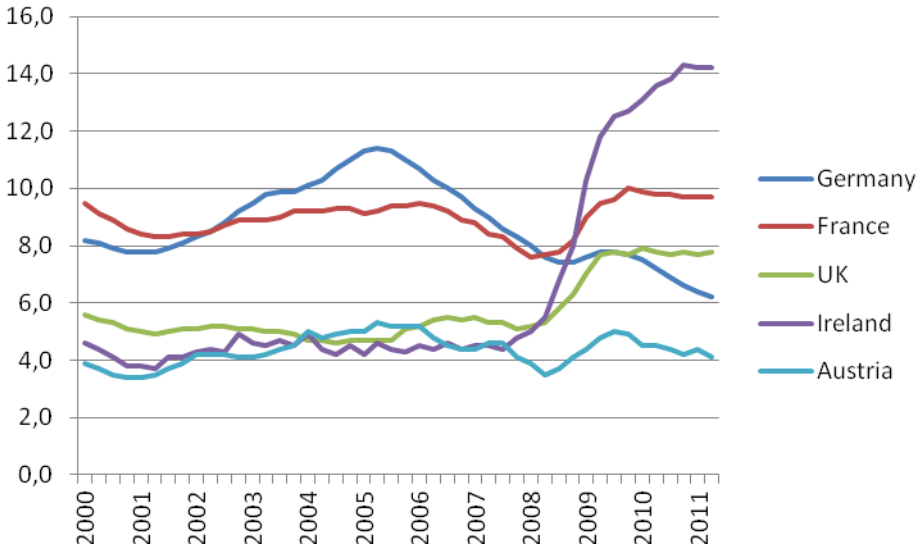
This article is organized as follows: the next section is devoted to description of main indicators in EU countries, the third section tries to detect the long-run and the short-run co-integration between the unemployment rate and the household consumption expenditures. The third section is followed by a short conclusion and list of references.

2. General Trends in Household Behavior

This analysis is based on the main economic indicators for the period of 2000-2010, namely quarterly seasonally adjusted unemployment rates, average gross annual earnings per employee, quarterly data of household expenditures, annual data on debt-to-income ratio (in %), and saving rates (in %). All data are available as the official OECD statistics. In order to simplify analysis and comments, the European countries were divided into five groups with respect to their geographical position.

The first group is composed of Germany, France, the United Kingdom, Austria and Ireland. The unemployment rate in these countries (see Figure 1) varied from about 4% up to 14% during the observed time periods.

Figure 1: Unemployment rate in Germany, France, United Kingdom, Ireland and Austria.



Source: Official OECD statistics http://stats.oecd.org.

The interesting point is that while the unemployment rate in Germany decreased since 2005 with the small upward shift in 2009 down to 6%, and unemployment rate in Austria stayed about 4%, both UK and France suffer the unemployment rate increase by 2 percentage points after 2008, and unemployment rate in Ireland increased by 9 percentage points up to 14%.

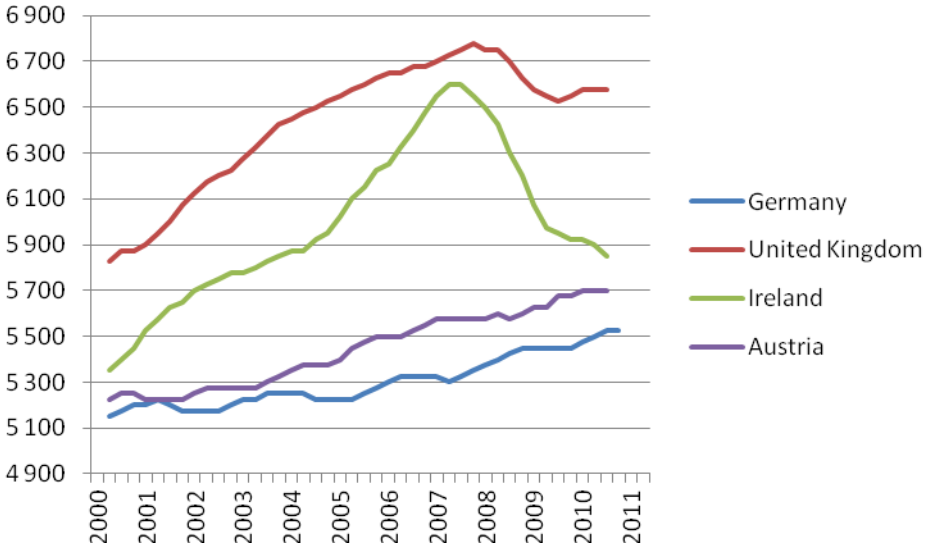
Wages in all five countries were slightly increasing, with two exceptions – the UK wages slightly decreased in UK after 2008, and the increase in wages in Ireland was steeper, on average, Irish workers were better off by 25% after the observed period.

Reaction of households on increasing unemployment rate, and average wages can reflect the average consumption. Data of seasonally adjusted consumption expenditures are given in Figure 2, data for the case of France were not available. Consumption in Germany and Ireland was increasing during the period, while it decreased after 2008 in UK and Ireland. The decrease in Ireland consumption is much deeper, and didn't stop in 2010, as in the case of UK.

Households in all countries in this group with the exception of Germany increased their debt. This increase was slower in Austria and France and quicker in the UK and Ireland. The increase stopped in UK after 2009, however it continues in Ireland (Figure 3).

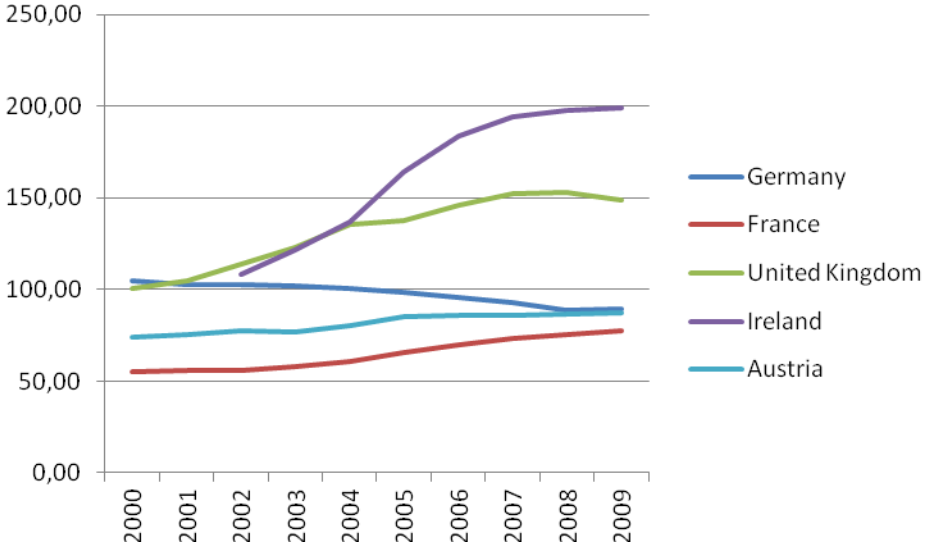
The last household behavior indicator is the household saving rate. During the observed period, household saving rates of Germany, and Austria had slowly increasing trend with decrease in 2009, while UK and Ireland households started to save more in 2008, and 2007, respectively.

Figure 2: Consumption expenditures in Germany, United Kingdom, Ireland and Austria.



Source: Official OECD statistics http://stats.oecd.org.

Figure 3: Debt-to-income ratio of households in Germany, France, UK, Ireland and Austria.

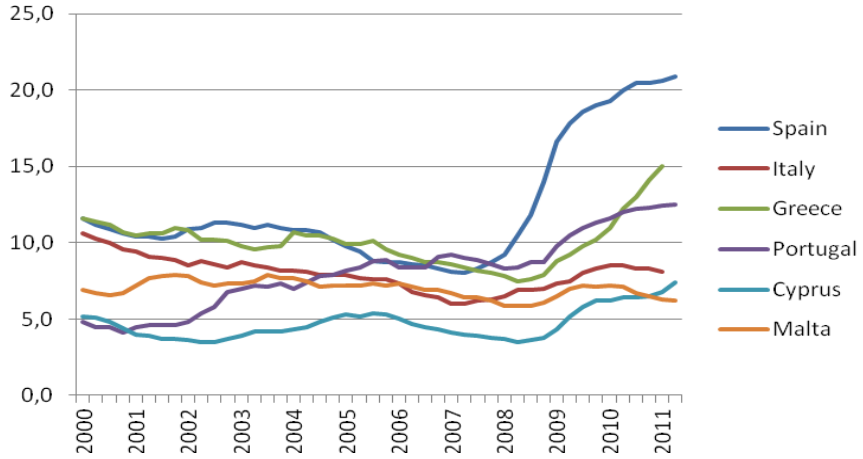


Source: Official OECD statistics http://stats.oecd.org.

The second group of countries is composed of Spain, Italy, Portugal, Greece, Cyprus and Malta (Figure 4). The unemployment rate in these countries increased after 2008, this trend did not stop till 2011; in Spain, Greece, and Portugal the actual unemployment rate is 20.9 %, 15 %, and 12.5 %, respectively.

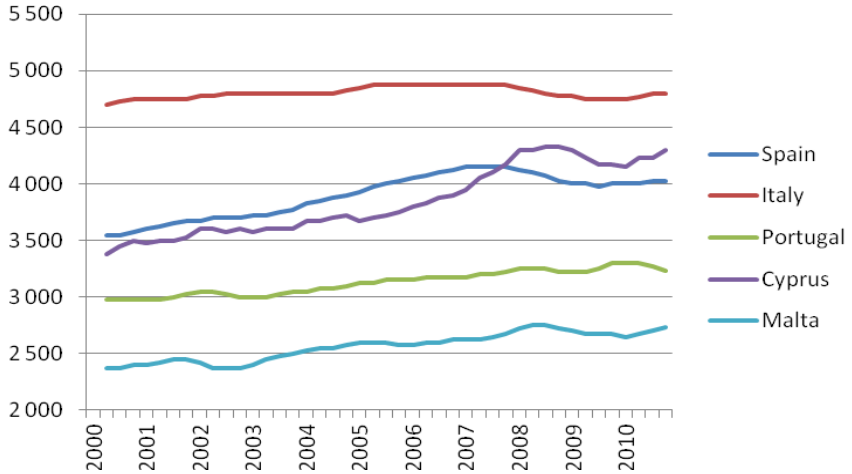
The wage dynamics is similar to the above countries, wages slightly increased, however, after 2009 wages in Greece decreased while trend in other countries stayed unchanged. Consumption expenditures (see Figure 5) decreased in Cyprus after 2008. The interesting point is that the decrease in Spanish consumption started in 2007, and was accompanied with decrease in debt-to-income ratio (Figure 6), and increase in savings. The debt-to-income ratio was increasing during the period in Italy and Portugal; however the savings were increasing after 2008, as well. Data on consumption, indebtness, and saving rate for Greece and Malta are not available.

Figure 4: Unemployment rate in Spain, Italy, Greece, Portugal, Cyprus, Malta.



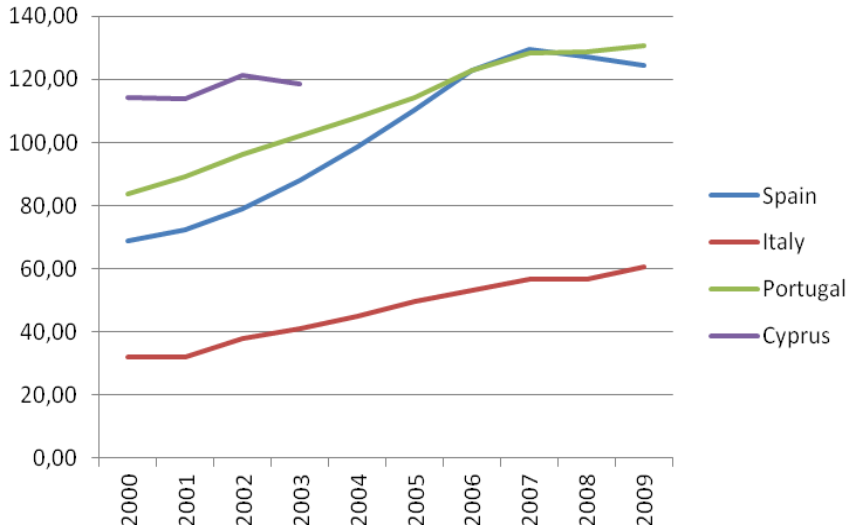
Source: Official OECD statistics http://stats.oecd.org.

Figure 5: Consumption expenditures in Spain, Italy, Portugal, Cyprus, Malta.



Source: Official OECD statistics http://stats.oecd.org.

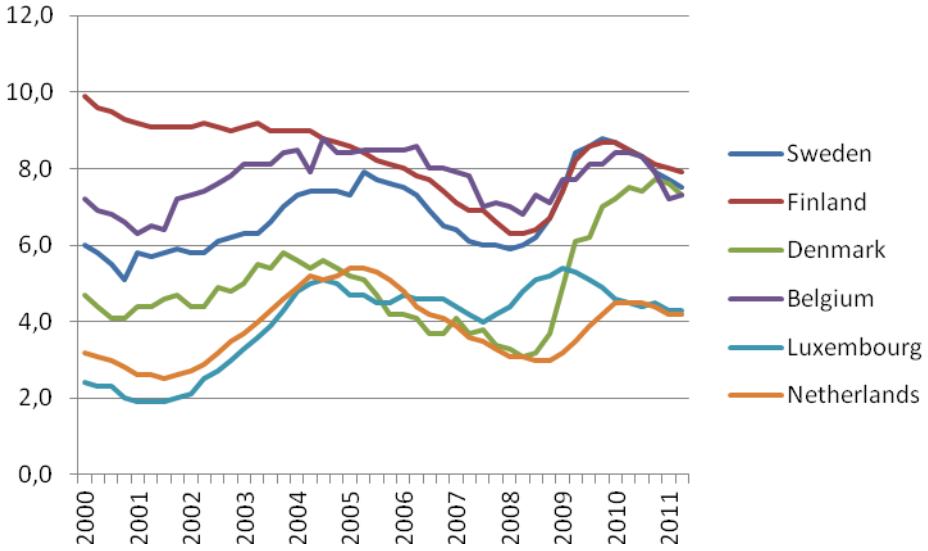
Figure 6: Debt-to-income ratio of households in Spain, Italy, Portugal, and Cyprus.



Source: Official OECD statistics http://stats.oecd.org.

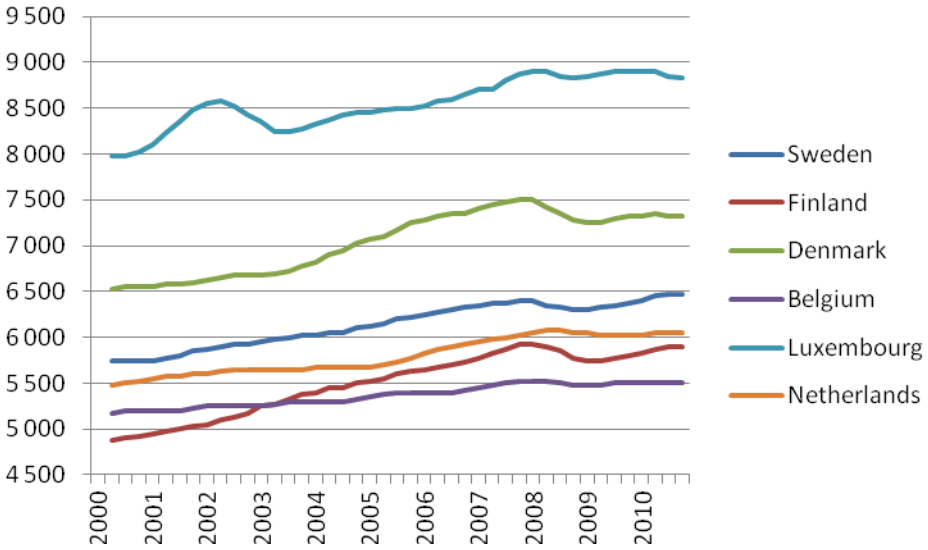
The third group of states is composed of Sweden, Finland, Denmark, Belgium, Luxembourg, and Netherlands. The unemployment rate in these countries increased after 2008, and decreased after 2010. The highest increase in unemployment rate is observed in Denmark, where the rate increased from 3% up to 8% (Figure 7). During the observed period, the average annual wages were increasing without any sudden changes. Consumption expenditures were increasing, as well, with short period of decrease in 2008 (Figure 8)

Figure 7: Unemployment rate in Sweden, Finland, Denmark, Belgium, Luxembourg, Netherlands.



Source: Official OECD statistics http://stats.oecd.org.

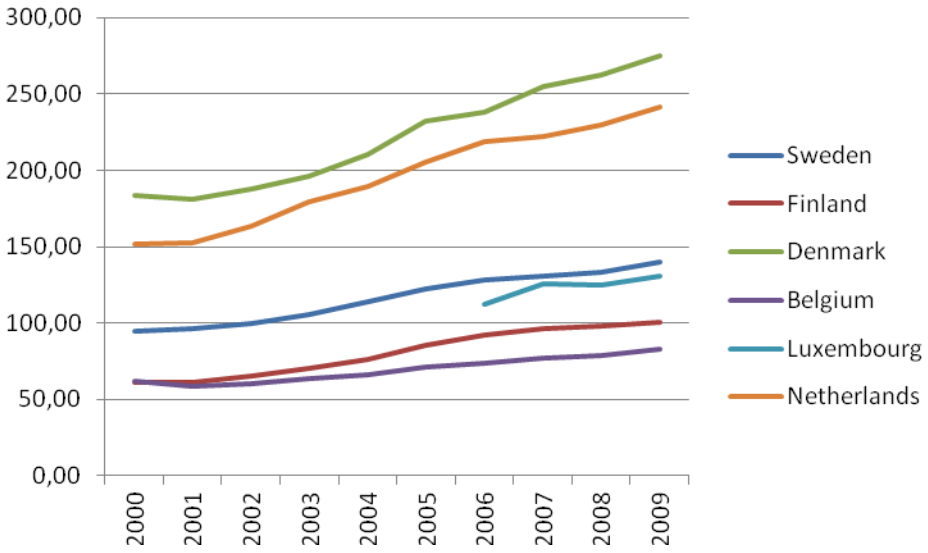
Figure 8: Consumption expenditures in Sweden, Finland, Denmark, Belgium, Luxembourg, Netherlands.



Source: Official OECD statistics http://stats.oecd.org.

In all countries of this group, the debt of household was increasing during the period (Figure 9), the debt-to income ratio at the end of the period was hugest in Denmark, and Netherlands, where it exceeded 250%, and 200%, respectively. Saving rates were decreasing at the beginning of the observed period; however they started to increase before the crises in 2007 in all countries from this group.

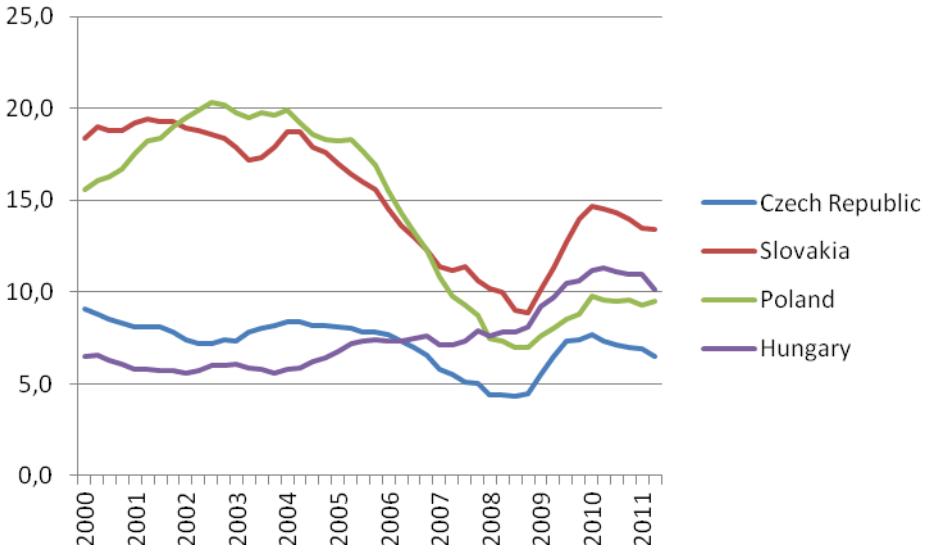
Figure 9: Debt-to-income ratio of households in Sweden, Finland, Denmark, Belgium, Luxembourg, Netherlands.



Source: Official OECD statistics http://stats.oecd.org.

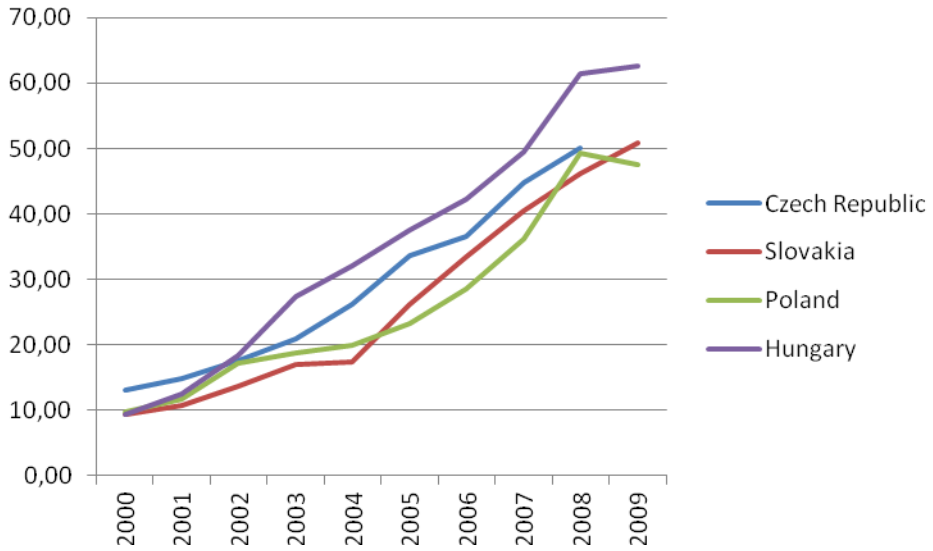
The fourth group of countries is composed of the Czech Republic, Slovakia, Poland, and Hungary. The unemployment rate of these countries was decreasing till 2008, then increased by about 30-50%, and started to decrease in 2010 (Figure 10). Average annual wages in these countries were increasing all the period with exception of Hungary, where wages started to decrease in 2008, and are still decreasing. Consumption expenditures in these countries stopped its increase in 2008. The indebtness increased from about 10% at the beginning of the observed period up to 50-60% at the end of the period (Figure 11). This increase is probably caused by better availability of loans and mortgages after 2000. Saving rate in Slovakia, Poland, and Hungary started to increase in 2008, while it was decreasing in the Czech Republic as the continuation of preceding trend.

Figure 10: Unemployment rate in the Czech Republic, Slovakia, Poland, and Hungary.



Source: Official OECD statistics http://stats.oecd.org.

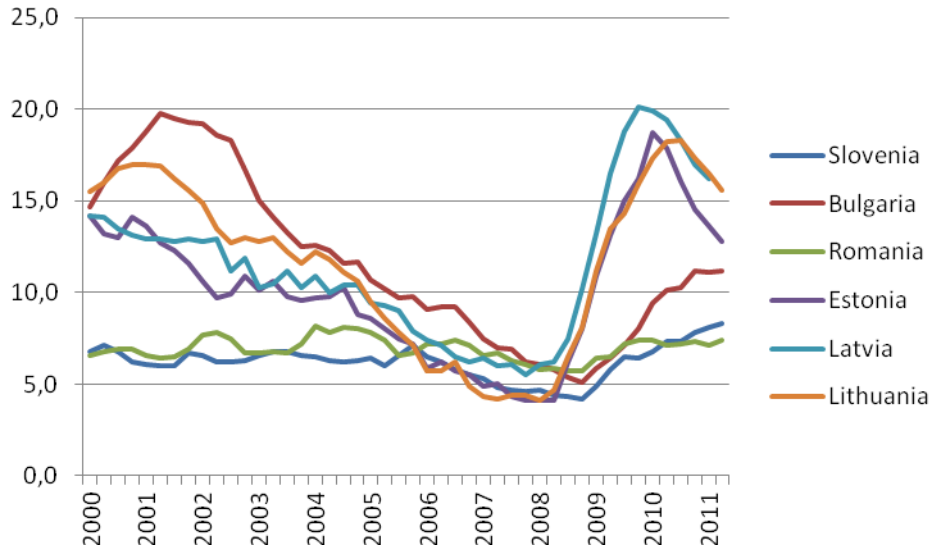
Figure 11: Debt-to-income ratio (%) of households in the Czech Republic, Slovakia, Poland, and Hungary.



Source: Official OECD statistics http://stats.oecd.org.

The last, fifth group is composed of Slovenia, Bulgaria, Romania, Estonia, Latvia, And Lithuania. The unemployment rate of these countries started to increase in 2008 (Figure 12), the unemployment rate peak reached 18-20% in Estonia, Latvia, and Lithuania, however the unemployment rate started to decrease in 2010. In Slovenia, Bulgaria, and Romania the increase was not so steep, however, the unemployment rate increase still continues.

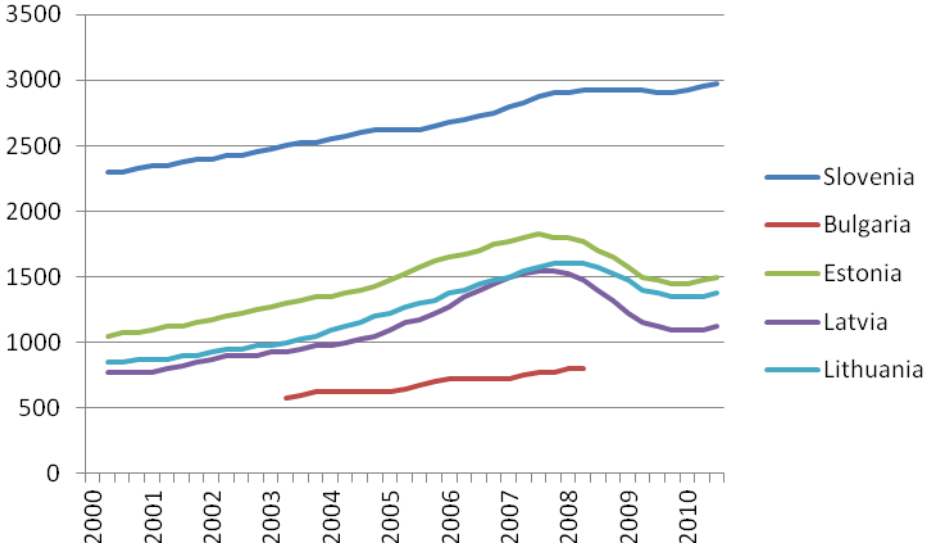
Figure 12: Unemployment rate in Slovenia, Bulgaria, Romania, Estonia, Latvia, Lithuania.



Source: Official OECD statistics http://stats.oecd.org.

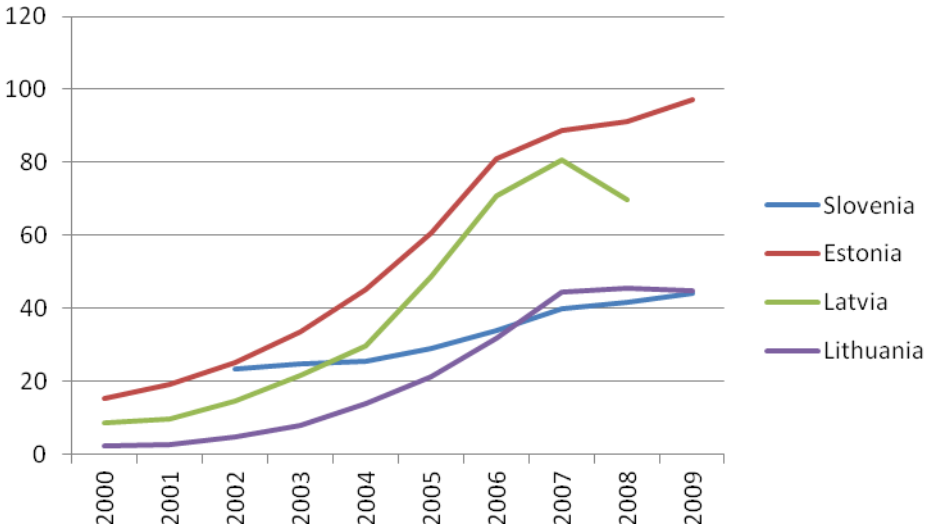
As a reaction of households on increased unemployment rate, the household consumption expenditures decreased after 2008 (Figure 13), with the exception of Slovenia. Debt-to-income ratio (Figure 14) increased from the beginning of the period, however decreased in Latvia and stopped its increase in Lithuania after 2007. Saving rates were very small, in Estonia, Latvia, and Lithuania they were even negative. However, after 2007 they began rise substantially. In Slovenia, saving rates were about 15% the whole period. Data on debt-to-income ratio and saving rates are missing for Romania, and Bulgaria.

Figure 13: Consumption expenditures in Slovenia, Bulgaria, Estonia, Latvia, and Lithuania.



Source: Official OECD statistics http://stats.oecd.org.

Figure 14: Debt-to-income ratio (%) of households in Slovenia, Estonia, Latvia, and Lithunia.



Source: Official OECD statistics http://stats.oecd.org.

In general, unemployment rate in EU countries increased after 2008. The wage dynamics stayed mostly unchanged – wage data showed increasing trend. Consumption expenditures, debt-to income ratio, and saving rates of household varied from country to country. However, from data, there can be seen the influence of unemployment rate on household expenditures. Thus, the aim of the next part of this article is to study the short and long-term influence of unemployment rat on household expenditures in EU countries.

3. Causality in Unemployment Rate and Household Expenditure Relationship

This part of the article is based on quarterly data of household consumption expenditures, and unemployment rate series. Both time series are seasonally adjusted, the series for France, Greece, and Romania were not available.

For explaining the household behavior during and after the crisis, the basic model expected that the household consumption expenditures (represented by variable *Cons*) are dependent on variable representing unemployment rate (*Unempl*):

$$Cons = f(Unempl) \quad (1)$$

In order to reveal possible cointegration relation between the two variables, we have to be sure, that the time series process for both variables is stable in first differences. This stability can be tested using Dickey-Fuller test. The Dickey-Fuller tests on *Unempl* and *Cons* variables revealed that the condition of stability in the first differences is broken only for the data on consumption in the United Kingdom and Hungary.

Estimation of model (1) reveals, that the negative relationship between the consumption and unemployment rate is observed in Germany, Italy, Malta, Denmark, Czech Republic, Slovakia, Poland, Slovenia, Bulgaria, Estonia, Latvia, and Lithuania. The positive relationship is observed in Austria, Portugal, Cyprus, Sweden, Belgium, Luxembourg, and Hungary.

Table 1: Results of OLS estimation of $Cons = \beta_0 + \beta_1 .Unempl + \varepsilon$, and results of p-value of Dickey-Fuller test of residuals from the estimated model. Estimated p-value lower than 0,05 indicate long-run relationship between *Cons* and *Unempl* variable in the country data.

	β_0	β_1	R^2	p-value
Germany	5656.92	-40.0011***	0.243543	0.030866
United Kingdom	6057.86	67.9458	0.059348	0.09834
Ireland	5985.54	1.13393	0.000107	0.4538
Austria	4925.09	118.380**	0.154356	0.9901
Spain	3856.04	3.62787	0.004961	0.3851
Italy	5108.77	-38.3114***	0.637017	0.7878
Portugal	2790.83	42.4049***	0.804821	0.809
Cyprus	3396.40	98.6905**	0.082228	0.7187
Malta	3526.41	-137.049***	0.373357	0.362
Sweden	5177.88	141.087***	0.358113	0.8749
Finland	7860.98	-284.096	0.625323	0.9473
Denmark	7047.47	-0.909290***	0.000010	0.7779
Belgium	4996.57	48.0090*	0.080021	0.9175
Luxembourg	7935.82	154.479***	0.396642	0.8072
Netherland	5722.64	20.7417	0.008694	0.8869
Czech Republic	2277.10	-74.4381***	0.441231	0.9432
Slovakia	2124.92	-48.1797***	0.834540	0.9051
Poland	1759.16	-28.3483***	0.745521	0.5987
Hungary	1395.48	29.5577**	0.149315	0.05531
Slovenia	3396.49	-122.750***	0.220117	0.9988
Bulgaria	949.543	-26.8044***	0.942053	0.4069
Estonia	1846.23	-40.3061***	0.426759	0.9761
Latvia	1501.19	-34.5623***	0.323448	0.9721
Lithuania	1668.75	-39.4049***	0.509751	0.9999

Source: author's calculations, outcome of gretl program.

We could hypothesize, that there exist the co-integration relation between consumption and unemployment variable, namely that household consumption is reacting to changing unemployment rates. In order to reveal this long-term relationship, we performed the Dickey-Fuller unit root test on residuals from the original OLS estimation denoted by (1). Results indicate that here is no long-term co-integration relationship between the two variables (see Tables 1 for more detailed results).

The last part of this section is devoted to discuss short-run causality in unemployment rates and consumption of EU countries. The used Granger causality test is based on comparison of unrestricted and restricted VAR model, estimated without additional explanatory variable. The Granger causality test uses an F-test conducted on the differences of a co-integrated relationship (Arlt, 1999). In general, the meaning of the expression "to Granger cause" is equivalent to the expression "to precede". Thus, the Granger causality describes time changes more than causality.

Results of statistically significant co-integration Granger causality tests of variables *Cons* and *Unempl* is given in Table 2. Number of lags was chosen the smallest from Akaike criterion, and Schwartz Bayesian criterion.

Table 2: Results of Granger causality tests, results are statistically significant at 5% level.

Country	Statement	Lags	F test	p-value
UK	"Change in household consumption precedes change in unemployment rate"	2	5.3419	0.0094
Ireland	"Change in household consumption precedes change in unemployment rate"	1	13.327	0.0008
Austria	"Change in unemployment rate precedes change in household consumption"	1	4.9736	0.0319
Spain	"Change in household consumption precedes change in unemployment rate"	1	12.110	0.0013
Cyprus	"Change in unemployment rate precedes change in household consumption"	1	9.4895	0.0038
Sweden	"Change in household consumption precedes change in unemployment rate"	1	5.9701	0.0193
Finland	"Change in unemployment rate precedes change in household consumption"	2	12.884	0.0001
Denmark	"Change in household consumption precedes change in unemployment rate"	1	12.662	0.0010
Netherland	"Change in household consumption precedes change in unemployment rate"	1	6.3364	0.0162
Slovakia	"Change in unemployment rate precedes change in household consumption"	1	10.729	0.0023
Estonia	"Change in household consumption precedes change in unemployment rate"	1	23.520	0.0000
Latvia	"Change in household consumption precedes change in unemployment rate"	1	18.727	0.0001
Lithuania	"Change in household consumption precedes change in unemployment rate"	1	8.6869	0.0055

Source: Source: author's calculations, outcome of gretl program.

Results show that in most countries, the change in household consumption preceded by one lag (three months) change in unemployment rate. This observation could have two possible explanations: households reacted to expected possible unemployment caused by crisis, or decreased demand of households (expressed as decrease in consumption) caused increase in unemployment rate.

3. Conclusions

The main aim of this article was to discuss and compare impact of the recent financial crisis on the average European family, namely on the main indicators that have impact on household income and its well-being – unemployment rate, and wage dynamic. The dynamics of main indicators influences household response – revealed in household expenditures, debt-to-income ratio and savings dynamics.

Comparison of data indicates that, in general, unemployment rate in EU countries increased after 2008. The wage dynamics stayed mostly unchanged – wage data showed increasing trend. Consumption expenditures, debt-to income ratio, and saving rates of household varied from country to

country. However, from data, there can be seen the influence of unemployment rate on household expenditures. Estimation of household consumption dependence on unemployment rate time series data reveals, that the negative relationship between the consumption and unemployment rate is observed in Germany, Italy, Malta, Denmark, Czech Republic, Slovakia, Poland, Slovenia, Bulgaria, Estonia, Latvia, and Lithuania. The positive relationship is observed in Austria, Portugal, Cyprus, Sweden, Belgium, Luxembourg, and Hungary. Moreover, in most countries, the change in household consumption preceded by three months change in unemployment rate.

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