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The Great Recession: A Comparison of Recession Magnitudes in Europe, USA and Japan

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Abstract: In this article recession magnitudes in Europe, the USA and Japan during the Great Recession are compared. The strongest recessions (of severe category) occurred in Latvia, Lithuania and Estonia, while recessions in Japan and the USA were significantly weaker. Even the strongest recession (in Latvia) was found smaller in its magnitude than the Great Depression 1929-1933 in the USA. Hence, comparisons of the Great Recession to the Great Depression in the literature are somewhat exaggerated.

Keywords: Europe, Japan, recession, recession magnitude, USA.

JEL: E32, O47, O51, O52, O57

1. Introduction

The Great Recession began in the summer 2007 in the USA by a collapse of the financial sector followed by a sharp decline of market stocks all over the World. In the 2nd quarter of 2008 also European Union and Japan fell into a recession. The crisis culminated in 2009, by 2010 many national economies returned to the growth, but in the second half of 2011 economies mainly from European periphery experienced another deep recessions.

The name 'Great Recession' reflects the deepness of the crisis as well as it draws attention to the Great Depression in the USA 1929-1933, the largest economic downturn experienced in a developed world in the 20th century, see e.g. Romer (1990). Both recessions were compared in literature recently, see e.g. Aiginger (2010), Barufaldi (2008), Collyns (2008), Gascon (2009), Eichengreen and O'Rourke (2010) or Newson (2009).

The aim of the article is to provide a comparison of recession magnitudes ('deepness' or 'strength') of European countries, USA and Japan from the first quarter of 2008 to the present days. For this comparison recession magnitude scale based on a mean decline of gross domestic product (GDP) during a time of a recession from Mazurek and Mielcová (2013) was used, see section 2 for details.

This comparison can be useful in two ways: firstly, it enables to identify the most affected countries by the Great Recession, so they can be provided by a financial aid from European Union funds or organizations such as International Monetary Fund. Secondly, it enables to put the current recessions in a historical perspective by a comparison with recessions of the past.

2. Methodology

Economic recession is defined as a period of time when nation's GDP declines for at least two consecutive quarters in a quarter-to-quarter comparison (a *technical definition* of a recession). This definition enables measuring and comparing recessions in terms of their duration and mean GDP decline during a recession.

The concept of the magnitude of an economic recession was introduced by Mazurek and Mielcová (2013):

Definition: Let D be the number of consecutive quarters with negative quarterly changes in real GDP. Let p_1, p_2, \dots, p_D be (negative) percentage changes from the preceding period in real GDP for the respective D quarters, $|p_i| < 100$. Let the mean percentage decline G of real GDP for the respective D quarters be given as:

$$G = 100 - \sqrt[D]{\prod_{i=1}^D (100 + p_i)} \quad (1)$$

If decimal numbers p_i are used then the formulae (1) can be written as follows:

$$G = 1 - \sqrt[D]{\prod_{i=1}^D (1 + p_i)} \quad (1')$$

But in the relation (2) G must be in (%). Then the recession magnitude M is given as:

$$M = \log_2(10DG) = \frac{\log(10DG)}{\log 2} = \frac{\log D + \log G + 1}{\log 2}, \quad (2)$$

$$\text{where } D \geq 2 \text{ and } G \geq 0.1 \quad (3)$$

Also, four categories of recession (from the mildest *minor* category to the strongest *ultra* category) were proposed by Mazurek and Mielcová (2013), see Table 1.

Table 1. Categories of recessions.

Category	Magnitude	Example
minor	$1 \leq M < 5$	Japan, 2012
major	$5 \leq M < 7$	Germany, 2008-2009
severe	$7 \leq M < 9$	Latvia, 2008-2009
ultra	$M \geq 9$	The Great Depression, 1929-1934, USA

Source: Mazurek and Mielcová (2013).

3. Historic recessions

To put results provided in the next section into a historical perspective, some well-known recessions with their magnitudes are shown in Table 2.

The highest recession magnitudes (category *ultra*) were found in Ukraine and Russia after the collapse of the Soviet Union in 1991. Also, the Great Depression 1929-1934 in the USA was classified as *ultra* category recession (but note that the figures are only estimates calculated from yearly GDP growth rates, as quarterly data were not available).

During Asian financial crisis in 1997-1998 a recession in South Korea was estimated to be of *major* category, while Thailand's recession was of *severe* category. Argentine economic collapse in 2001 was classified as *severe* as well.

Table 2. Recession magnitudes of selected recessions of the past.

Country	Period	Duration D (quarters)	Mean GDP decline G (%)	Magnitude M
Ukraine	1991-1999	36	2.29	9.7
Russia	1991-1996	24	2.38	9.2
USA	1929-1933	16	3.34	9.1
Argentina	2001-2002	4	4.04	7.3
Thailand	1997-1998	5	3.0	7.2
South Korea	1997-1998	3	2.85	6.4

Source: Mazurek and Mielcová (2013).

4. The Great Recession – data and results

For the evaluation quarterly changes of gross domestic product (GDP) at market prices in a quarter-to-quarter comparison were used from Eurostat (2013) from the 1st quarter of 2008 to the 2nd quarter of 2013 (the last data available). The data were adjusted for seasonality and working days. However, GDP data are often subject of later revisions, so the results (recession magnitudes) might change in future slightly.

Eurostat provides the data for 35 countries (and EU and Eurozone), including 33 European countries, USA and Japan. The data for Greece were available only until the first quarter of 2011, for Serbia until the third quarter of 2012.

During examined period 56 recessions were found altogether, and their magnitudes were evaluated by relations (1) and (2), results are shown in Table 3 in the alphabetical order. Recession classification is provided as well. Four examined countries escaped recession, namely Slovakia, Poland, Macedonia and Bulgaria.

The strongest recession occurred in Latvia, Lithuania and Estonia, these three recessions were the only recessions classified as *severe*. Other 35 recessions were of *major* category and 18 recessions were classified *minor*. None recession was *ultra*. The longest recession took place in Portugal, the sharpest decline of GDP was experienced by Latvia. From these results it is clear that the Great Recession is nowhere near to the Great Depression of 1929-1934, and that opposite claims, see e.g. Eichengreen and O'Rourke (2010), are somewhat exaggerated.

Figure 1 provides a look at economic development of examined period for three major World's economies: European Union, USA and Japan. As can be seen, the Great Recession hit the hardest at the end of 2008 and during the first half of 2009, then a short period of recovery occurred followed by a rather stagnation in 2012.

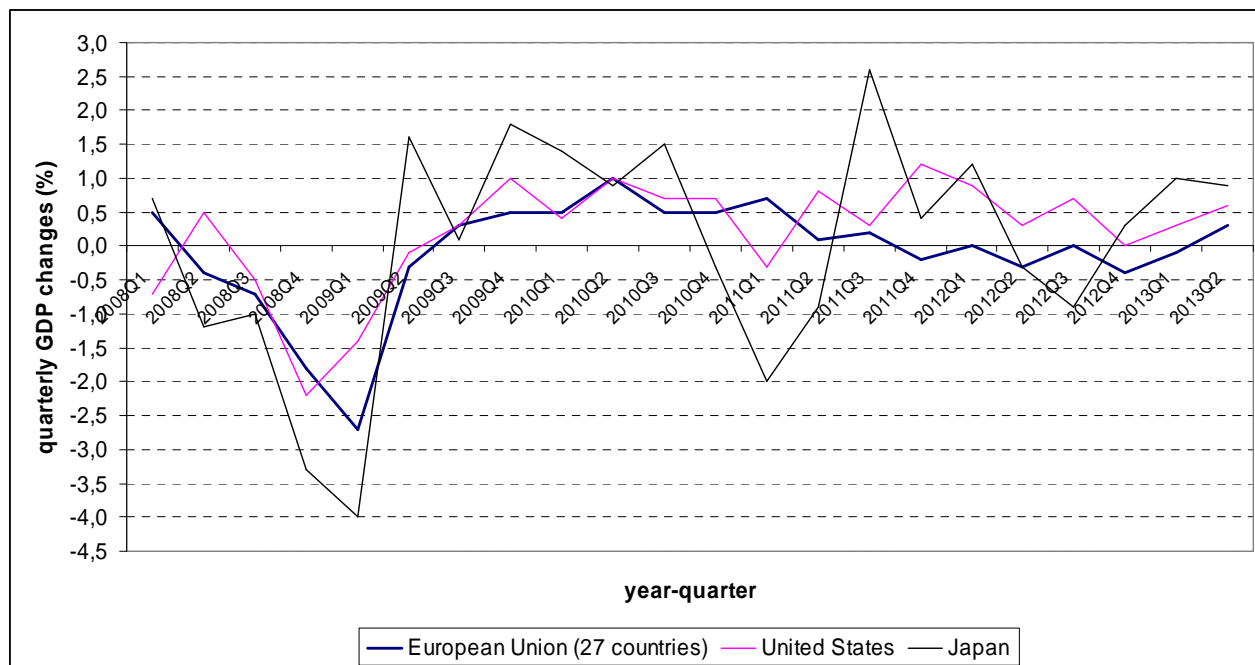


Fig. 1. GDP growth of EU, USA and Japan. Source: Eurostat (2013).

Table 3. Recession magnitudes of European countries, USA and Japan (in the alphabetical order).

Country	Period	Duration D (quarters)	Mean GDP decline G (%)	Magnitude M	Category
Austria	2008Q2-2009Q2	5	1.02	5.7	major
Belgium	2008Q3-2009Q1	3	1.47	5.5	major
Croatia (1)	2008Q3-2010Q2	8	1.21	6.6	major
Croatia (2)	2011Q3-2012Q4	6	0.48	4.9	minor
Cyprus (1)	2009Q1-2009Q4	4	0.73	4.9	minor
Cyprus (2)	2011Q3-2013Q2	8	1.06	6.4	major
Czech Rep. (1)	2008Q4-2009Q2	3	1.91	5.8	major
Czech Rep. (2)	2011Q3-2013Q1	6	0.48	4.9	minor
Denmark (1)	2008Q3-2009Q2	4	2.05	6.4	major
Denmark (2)	2011Q3-2011Q4	2	0.25	2.3	minor
Denmark (3)	2012Q4-2013Q1	2	0.40	3.0	minor
Estonia (1)	2008Q3-2009Q3	5	4.01	7.6	severe
Estonia (2)	2013Q1-2013Q2	2	0.15	1.6	minor
Finland (1)	2008Q1-2009Q2	6	1.82	6.8	major
Finland (2)	2012Q2-2013Q1	4	0.70	4.8	minor
France (1)	2008Q2-2009Q1	4	1.10	5.5	major
France (2)	2012Q4-2013Q1	2	0.15	1.6	minor
Germany	2008Q2-2009Q1	4	1.76	6.1	major
Greece (1)	2008Q4-2009Q3	4	0.88	5.1	major
Greece (2)	2010Q1-2010Q4	4	1.90	6.2	major
Hungary (1)	2008Q2-2009Q3	6	1.46	6.4	major
Hungary (2)	2012Q1-2012Q2	2	1.00	4.3	minor
Iceland (1)	2008Q1-2008Q2	2	0.75	3.9	minor
Iceland (2)	2008Q4-2009Q1	2	2.88	5.8	major
Iceland (3)	2009Q3-2010Q1	4	1.78	6.2	major
Ireland (1)	2008Q1-2009Q4	8	1.52	6.9	major
Ireland (2)	2012Q3-2013Q1	3	0.53	4.0	minor
Italy (1)	2008Q2-2009Q2	5	1.47	6.2	major
Italy (2)	2011Q3-2013Q2	8	0.59	5.6	major
Japan (1)	2008Q2-2009Q1	4	2.4	6.6	major
Japan (2)	2010Q4-2011Q2	3	1.07	5.0	major
Japan (3)	2012Q2-2012Q3	2	0.60	3.6	minor
Latvia	2008Q2-2009Q3	6	4.49	8.1	severe
Lithuania	2008Q3-2009Q2	4	4.17	7.4	severe
Luxembourg	2008Q2-2009Q1	4	2.45	6.6	major
Malta (1)	2008Q4-2009Q1	2	2.75	5.8	major
Malta (2)	2011Q1-2011Q2	2	0.35	2.8	minor
Netherlands (1)	2008Q4-2009Q2	3	1.57	5.6	major
Netherlands (2)	2011Q2-2012Q1	4	0.38	3.9	minor
Netherlands (3)	2012Q3-2013Q2	4	0.50	4.3	minor
Norway	2009Q1-2009Q2	2	0.9	4.2	minor
Portugal (1)	2008Q2-2009Q1	4	1.05	5.4	major
Portugal (2)	2010Q4-2013Q1	10	0.74	6.2	major

Table 3 (cont.). Recession magnitudes of European countries, USA and Japan (in the alphabetical order).

Country (Union)	Period	Duration <i>D</i> (quarters)	Mean GDP decline <i>G</i> (%)	Magnitude <i>M</i>	Category
Romania (1)	2008Q4-2009Q2	3	2.86	6.4	major
Romania (2)	2009Q4-2010Q1	2	0.75	3.9	minor
Romania (3)	2011Q4-2012Q1	2	0.95	4.2	minor
Serbia (1)	2008Q3-2009Q2	4	1.1	5.4	major
Serbia (2)	2011Q2-2012Q1	4	0.8	5.0	major
Slovenia (1)	2008Q3-2009Q2	4	2.49	6.6	major
Slovenia (2)	2011Q3-2013Q2	8	0.61	5.6	major
Spain (1)	2008Q3-2009Q4	6	0.85	5.7	major
Spain (2)	2011Q2-2013Q2	9	0.38	5.1	major
Sweden	2008Q1-2009Q1	5	1.55	6.3	major
Switzerland	2008Q4-2009Q1	2	1.7	5.0	major
United Kingdom	2008Q2-2009Q2	5	1.46	6.2	major
United States	2008Q3-2009Q2	4	1.1	5.4	major

Conclusions

A comparison of recession magnitudes during the Great Recession revealed that the strongest recessions occurred in the Baltic, Ireland and Finland, and these recessions were comparable in their magnitudes to the infamous Argentine 2001-2002 crisis. On the other hand Slovakia, Poland, Macedonia and Bulgaria escaped a recession during the selected period.

Major economies of the continent, Germany, UK, France and Italy experienced major recessions as well as Japan and USA, moreover, Japan suffered three consecutive recessions.

None of examined recessions reached the magnitude of the Great Depression; however, the data for Greece were not available since 2011, and in the second half of 2013 around dozen of national economies were still in a recession, so their magnitudes are going to increase in future.

As for the future research, economists may focus on explanations why some countries or regions were more affected by the Great Recession than others, while the results of the presented study might be used by policy makers to advocate the financial help for the most suffering regions.

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