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The impact of the recession on health care expenditure — How does the Czech Republic, Hungary, Poland and Slovakia compare to other OECD countries?

by

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The impact of the recession on health care expenditure – how does the Czech Republic, Hungary, Poland and Slovakia compare to other OECD countries?

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In the past few years, several papers have been published in the international literature on the impact of the economic crisis on health and health care. However, there is limited knowledge

on this topic regarding the Central and Eastern European (CEE) countries. The main aims of this study are to examine the effect of the financial crisis on health care spending in four CEE countries (the Czech Republic, Hungary, Poland and Slovakia) in comparison with the OECD countries. In this paper we also revised the literature for economic crisis related impact on health and health care system in these countries. OECD data released in 2012 were used to examine the differences in growth rates before and after the financial crisis. We examined the ratio of the average yearly growth rates of health expenditure expressed in USD (PPP) between 2008-2010 and 2000-2008. The classification of the OECD countries regarding "development" and "relative growth" resulted in four clusters. A large diversity of "relative growth" was observed across the countries in austerity conditions, however the changes significantly correlate with the average drop of GDP from 2008 to 2010. To conclude, it is difficult to capture visible evidence regarding the impact of the recession on the health and health care systems in the CEE countries due to the absence of the necessary data. For the same reason, governments in this region might have a limited capability to minimize the possible negative effects of the recession on health and health care systems.

1. Introduction

Due to the financial crisis and the subsequent economic crisis, in 2009 many countries experienced a large decrease in gross domestic product (GDP). In the European Union's (EU) 27 member countries the average decrease of real GDP was 4.3% according to EUROSTAT data. Financial and economic distress has already had wide-reaching social and political consequences, including falling incomes, growing inequalities and huge increases in unemployment (WHO 2013). Many countries implemented austerity policies and where bailouts were needed financial rescue packages were set, with controversial results (Karanikolos et al. 2013). The need for a shift towards restoring sound fiscal conditions has often implied substantial cuts in public spending (OECD 2013). Health care was one field of these budget cuts. Austerity conditions impacted both public and private expenditure on health care, and the continuous growth of health expenditure was halted (OECD 2013; WHO

2013; Klazinga 2012). The drop in the growth of health expenditure might have uncertain impacts on the health and well-being of the population and cause challenges for governments to maintain the scope and quality of health care services.

In the past few years, several papers have been published in the literature on the impact of the economic crisis on health and health care. Some of the papers examined the effect of the economic crisis on health outcomes and behaviour (e.g. mortality rates, suicide rates, alcohol consumption) (e.g. Stuckler et al. 2011), while others presented the reform measures implemented in the countries as a response to the financial crisis (e.g. Karanikolos et al. 2013; Rechel et al. 2013). Numerous papers focussed on Greece and on countries which were more affected by the recession (e.g. Kousoulis 2013; Vandoros et al. 2013).

However, there is limited knowledge on the impact of the economic recession on health and health care in the Central and Eastern European (CEE) countries, although these countries might have been effected similarly, or even more severely than high income countries. In the CEE member states of the EU, which joined in 2004 or after, the average drop in GDP was almost twice as the drop in countries in the euro-zone (-4.4%). Except for Poland, all of these countries experienced recession, with losses ranging from 4.5% in the Czech Republic to 17.7% in Latvia.

Also, most of these countries have been struggling with the deficit of the health care budget for the last two decades, during which sequences of health care reforms were implemented to contain costs with doubtful success (Gaál et al. 2011; Boncz et al. 2006; Boncz et al. 2004; Gulácsi et al. 2002; Baji et al. 2012). For these countries the economic crisis is now another challenge to deal with.

This paper aims to review and analyse the evidence on the impact of recession in four CEE countries, namely the Czech Republic, Hungary, Poland, Slovakia, often called the Visegrád group. The main objective of the paper is to analyse the effect of the financial crisis on health care spending in these countries compared to the average of Organisation for Economic Co-operation and Development (OECD) member states. We aim to examine how the four CEE countries compare to other OECD countries in terms of changes in health care expenditure after the economic recession. We are also interested how the changes of health expenditure in these countries compare to the other OECD countries and also whether the drop of GDP in the OECD countries is associated with the decrease of health care expenditure.

2. Methods

To examine the effect of the financial crises on health care spending in different OECD countries, we use the OECD's health data released in 2012. The dataset contains data related to health expenditure, health care resources, health care activities, health status as well as risk factors for 34 countries. The analysis was carried out in Stata 11.

To examine the differences in growth rates before and after the financial crisis, a "relative growth" component was developed, which indicates the ratio between the annual growth rates of health expenditure in USD purchasing power parity (PPP) between 2008 and 2010 (the average of 2008/09 and 2009/10 growth rate) and the average annual growth rate of health expenditure between 2000 and 2008 (the average of growth rates for 2000/01, 2001/02, 2002/03, 2003/04, 2004/05, 2005/06, 2006/2007 and 2007/08). This measure can capture the short term impact of the economic recession on the growth of health expenditure by indicating the relation between the growth of health expenditure before and after the economic crisis.

The "relative growth" component is ≥1 when the growth of health expenditure after the crisis is equal to or greater than the average growth rate before the crisis. It is <1 & ≥0 when health expenditure continued to grow, although at a lower rate, or stagnated after the crisis (i.e. positive, but lower growth rate for the period 2008 to 2010). It is <0 when health expenditure started to decrease after the financial crises.

To examine differences between countries with different health expenditure structure, a "development" component was created by using principal component analysis (PCA) which suppresses information on the main characteristics of the health care system (health expenditure and life expectancy) of a country. PCA is a frequently applied method in the literature on health economics to reduce the dimensions of different health and health care indicators, as these indicators are often strongly correlated (See the most famous examples in: van der Gaag – Wolfe 1991; Wagstaff 1986). The "development component" used in this paper also reduces dimensions of three of the most important input and outcome indicators, and captures them in one factor," As for input indicators we included per capita expenditure on health care as well as the share of GDP spent on health care – these are the most frequently applied measures of health expenditure (Gerdtham – Jönsson 2000). We also found it useful to include an outcome indicator, life expectancy, in the PCA. Due to the limited number of observations (34 OECD countries) it is not suggested to use more variables in the PCA analysis, to maintain the adequate degree of freedom for the estimations. The component is supposed to capture the most important differences across countries regarding health care

financing, and provide more valid conclusions than the separate use of the variables. The following data from OECD Health Data 2012 were used for the PCA analysis:

- health expenditure as a percent of GDP in 2010 or the latest available year,[1]
- expenditure on health care in USD PPP in 2010 or the latest available year,[2]
- life-expectancy in 2010 or the latest available year.[3]

This principle component ("development") explains 73.1% of the variance of the three variables. The details of the PCA analysis can be found in Appendix 1. We used this component to generate a "development" score for each country, which was then standardized, i.e. the variable was rescaled to a mean of zero and a standard deviation of one. In this way positive values indicate countries with higher expenditure (both as a percent of GDP and in real terms) and higher life expectancy, while negative scores indicate the opposite.

Finally, in the dimension of the two new variables created (the "relative growth" component and the "development score") we carried out a hierarchical cluster analysis to distinguish different groups of countries. For this cluster analysis we used the Ward method, which ensures homogeneity and relatively equal sizes of the groups. Differences between the variables were calculated using the method of Euclidean-distance.

3. Results

As a result of the economic crisis the positive growth of real health care spending per capita (USD, PPP) was halted in the majority of the OECD countries, and in some countries the expenditure started to decline. Figure 1 shows the average growth rates of real health expenditure per capita of the OECD countries before (from 2000 till 2008) and after (from 2008 till 2010). Hungary experienced a decrease in health expenditure after 2008 (-0.7%). While in Slovakia and the Czech Republic, the average growth rate slowed after the crises, but remained relatively high (3.8% and 5.6% respectively), compared to other OECD countries.

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[1] Australia 2009, Japan 2009, Luxemburg 2009, Turkey 2008.
[2] Australia 2009, Japan 2009, Luxemburg 2009, Turkey 2008.
[3] Italy 2009, Canada 2008.

Figure 1 The average growth rates of real health expenditure per capita before (from 2000 to 2008) and after (from 2008-2010)
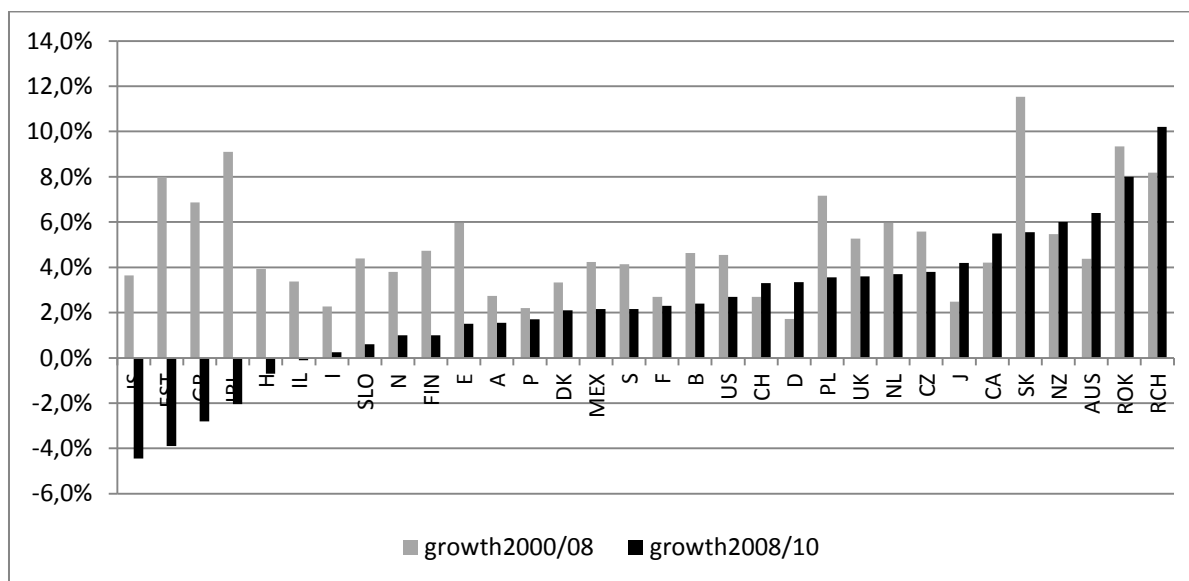
Source: OECD health data 2012, based on Klazinga (2012).

Figure 2 shows the countries in the dimensions of the "relative growth" component ("y" axis) and the standardized "development score" component ("x" axis). The "x" axis indicates the standardized values of the scores of countries on the "development" component created by PCA. Negative values are associated with lower expenditure (both as a percent of GDP as well as in real terms), and lower life expectancy, positive values mean the opposite. The "y" axis indicates the "relative growth" component, as described in the methods section.

We have not found significant correlation between the "development" component and the relative growth rate of health expenditure per capita.[4] This suggests that countries with similar health expenditure structures reacted quite differently to the crises. This finding supports the need for cluster analysis, to create homogenous clusters to further explore the changes in health expenditure.

Out of the 34 OECD countries, 32 countries were classified into four different clusters (See Figure 2):

- Cluster 1: Australia (AUS), Canada (CA), Japan (J), New Zealand (NZ) and Switzerland (CH),

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[4] The correlation is 0.2182, p=0.2226 for all 33 observations, the correlation is 0.2867 p=0.1179 if we exclude USA and Luxemburg from the analysis as outliers.

- Cluster 2: Austria (A), Belgium (B), Denmark (DK), France (F), Germany (G), The Netherlands (NL), Norway (N), Sweden (S), United Kingdom (UK) and the United States (US).
- Cluster 3: Czech Republic (CZ), Estonia (EST), Hungary (H), Poland (PL), Slovakia (SK), Mexico (MEX), South-Korea (ROK), and Chile (RCH).
- Cluster 4: Finland (FIN), Greece GR), Italy (I), Ireland (IRL), Island (IL), Israel (IS), Portugal (P), Slovenia (SLO) and Spain (E).

Luxemburg was excluded from the cluster analysis as an outlier, because it would have formulated a single group itself. Turkey was also excluded due to missing data.

Figure 2. Classification of the OECD countries regarding "development" and "relative growth"
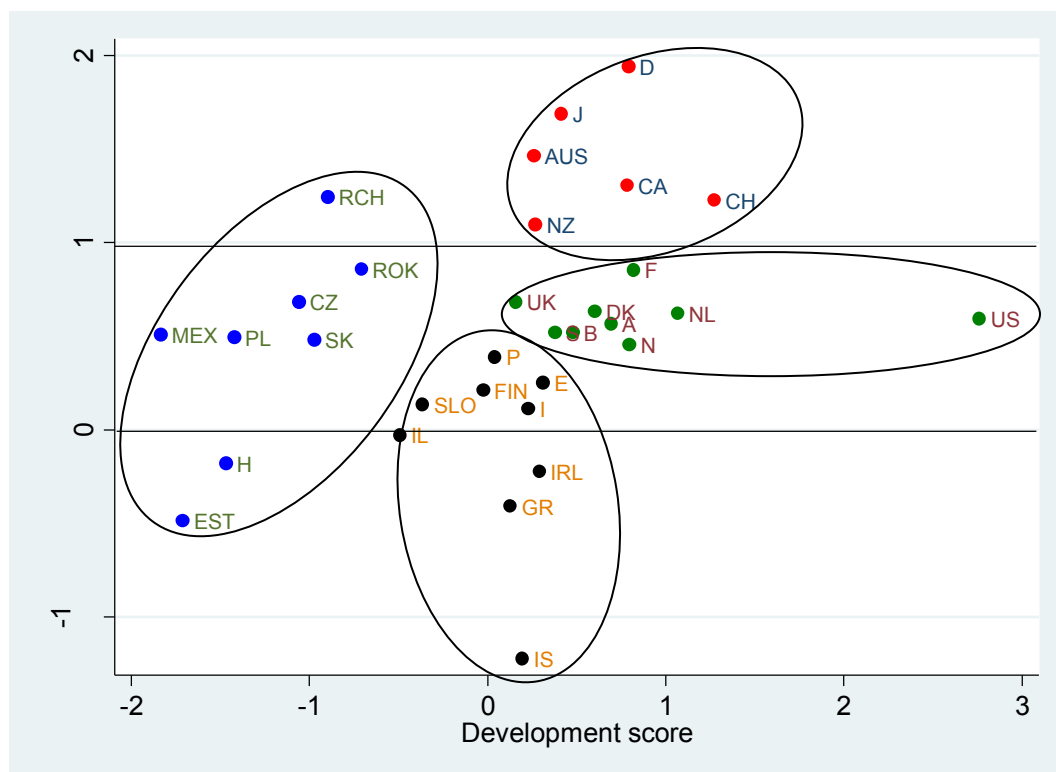
Note: The X axis indicates the standardized "development" principal component. The Y axis indicates the relative growth rate of health expenditure per capita (the average annual growth rate after the crises between 2008 and 2010 divided by the average annual growth rate between 2000 and 2008.

These clusters significantly differ in terms of health expenditure as a percent of GDP, health expenditure in real terms, life expectancy, the ratio of the average growth rate of health

expenditure from 2000 to 2008, and from 2008 to 2010. Descriptive statistics of the four clusters and the results of an ANOVA analysis are presented in Table 1.

Countries in the first two clusters have the highest health care expenditure (as a percent of GDP and in real terms as well) and the highest life expectancy (see Table 1). The difference between the two groups is that in Cluster 2 (A, B, DK, F, G, NL, N, S, UK, US) we observe a moderate drop in the growth rate compared to countries in Cluster 1 (AUS, CA, J, NZ, CH), where health expenditure is growing. Cluster 3 countries (CZ, EST, H, PL, SK, MEX, ROK, RCH) have the lowest "development" score, have the lowest expenditure and life expectancy. In this group the relative growth rate dropped about 50% on average, but remains positive. We can observe a greater drop in Hungary and Estonia, a lower one in Poland, Slovakia and the Czech Republic and even an increase in Chile. In countries belonging to Cluster 4 (P, E, FIN, I, SLO, IRL, GR, IL, IS) we observe the highest drop in the growth rates. The development scores of these countries are around the average.

Table 1. Descriptive statistics by cluster and the results of ANOVA

Cluster	Total health exp. PPP (USD) 2010	Total health exp. as a % of GDP (%) 2010	Life expectancy (years) 2010	Average growth rate 2000/08 (%)	Average growth rate 2008/10 (%)
1	3963.3	10.5	81.2	3.5	4.8
2	4741.1	11.4	80.0	3.9	2.4
3	1552.1	7.4	76.4	7.2	3.6
4	2937.8	9.3	80.6	5.0	-0.5
Total	3290.8	9.6	79.5	5.0	2.3
ANOVA-test					
F	18.37	10.10	17.55	5.73	5.75
p	<1%	<1%	<1%	<1%	<1%

The four CEE countries examined belong to cluster 3 due to their low development score and relatively high drop in the increase of health expenditure. The highest drops in health care expenditure can be observed in Hungary. In the rest of the countries the growth of health expenditure declined, but remained positive.

We also examined the association between the drop of GDP growth rates after the crises and the relative growth of health expenditure.We have found significant and positive correlation (0.68, p=0.0000) between the relative GDP per capita growth (calculated similarly as the

relative growth for health expenditure) and the relative growth rate for health expenditure[5] (see Figure 3). This suggests that the fall in GDP growth rate is followed by a decline in health care spending growth rate. Figure 3 also shows that in some countries health care expenditure continued to increase despite the drop or the stagnation in GDP per capita (e.g. Luxemburg (L), Germany (D), Switzerland (CH), Canada (CA), Japan (J)). The Czech Republic and Slovakia seem to fit the fitted regression line and the drop in the growth rate is in line with the drop in GDP. However in Hungary (HU) and Poland (PL), situated below the fitted line, the decline in the growth rate of health expenditure was higher than expected based on the GDP drop. The same is observed for countries most affected by the crises, Greece (GR), Iceland (IS) and Ireland (IRL).

Figure 3. Association between the "relative growth" of health expenditure and GDP per capita in OECD countries
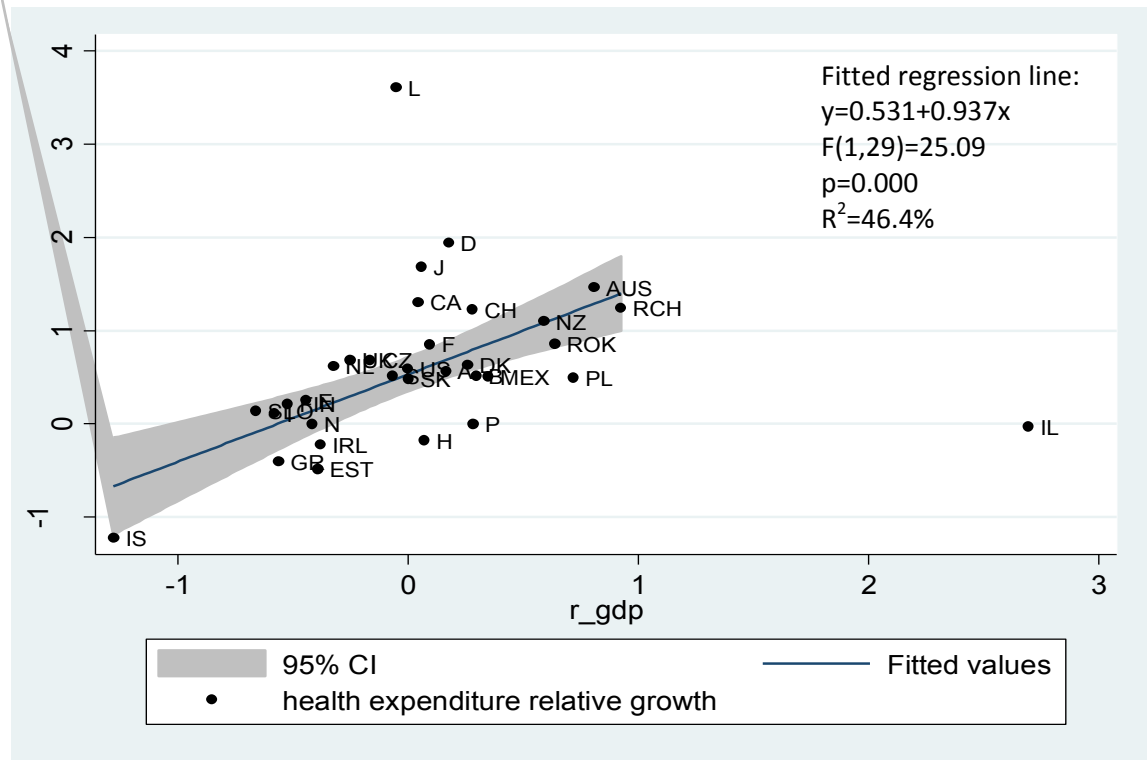
Note: Israel (IL) and Luxemburg (L) were excluded from the calculations as outliers. The grey area illustrates the 95% confidence interval for the fitted regression line. The X axis indicates the relative growth rate of GDP per capita (the average annual growth rate after the crises between 2008 and 2010 divided by the average annual growth rate between 2000 and 2008). The Y axis indicates the relative growth rate of health expenditure per capita (the average annual growth rate after the crises between 2008 and 2010 divided by the average annual

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[5] Luxemburg and Israel as outliers were exluded from the analysis.

growth rate between 2000 and 2008). A linear regression was fitted to the observations, the characteristics of the regression line are shown on the graph as well. Source of data: OECD health data 2012, OECD statistics.

4. Discussion and conclusions

The major findings of the study are the following. First, we find that countries with similar "development" levels (in terms of health expenditure) reacted quite differently to the economic recession. This justifies the application of cluster analysis, which helps to distinguish homogenous groups of countries. We found differences in the changes in the growth of health expenditure among countries with a high development score: For example Canada, Germany, Japan, Australia, New Zealand experience no drop in the growth of health expenditure, while in others growth started to halt (e.g. UK, the Netherlands). This also stands for the four CEE countries examined.

Second, the drop in GDP is found to be a strong predictor of the changes in the growth of health care expenditure after the economic recession. In most of the countries where the GDP drop was higher, the drop in the growth rate of health expenditure was also higher, except for the countries like Canada, Japan, Germany and Switzerland. The countries hit hardest by the economic crisis have witnessed the biggest decreases in health expenditure growth (like Ireland and Greece), which is confirmed by other studies as well (e.g. OECD 2013). Regarding the four countries examined, the drop in health expenditure was in line with the drop of GDP, except for Hungary, where we observe an even higher drop than expected based on the drop of the GD. This might be the result of other parallel policy measures, but also indicate the sensitivity of the Hungarian health care financing on the macroeconomic environment.

Since our method only captures the changes in health expenditure and not capable of capturing or explaining the structural changes, it is difficult to interpret whether the observed decrease in the growth of health expenditure was the result of cost-containment measures implemented as a reaction to the crisis. As mentioned in the introduction, these countries have been struggling with deficits for the last two decades, and very often "loose fiscal periods" were from time to time followed by austerity measures which resulted in the fluctuation of health care expenditure even before the crisis (Boncz et al. 2006; Baji et al. 2012). Thus in some cases we cannot claim causality. For example, in Poland there was an ongoing reform of the health care system during the examined period, however the cost-containment measures were not specifically related to the crisis (Vogler et al. 2013). Regarding the Czech Republic

there has been little visible impact of the economic crisis on healthcare. The government even significantly increased physicians' salaries in 2011 by approximately 10-15% from 2012, and promised a 1.5 to 3-fold increase in salaries in 2013 (Remešová – Dospiva 2011). Despite repeated announcements and attempts since 2006, there has been no massive hospital closing and no major increase in patient co-payments. In Hungary, the decreasing drug budget is a frequently mentioned example of the negative impact of the recession on the health care (see Figure 4). A significant cut of the drug budget was reported from 2011 to 2012. However this change is partly due to the fact that full outpatient reimbursement for drugs distributed by pharmacies (biological agents with 100% reimbursement) was converted into an "itemized reimbursement scheme", similarly to single-use devices, implants, high-value surgical procedures and the high-cost drug therapies, which represent a 34.5 billion HUF amount (Héjj 2012). [6] Furthermore, the implementation of a blind biding mechanism of pricing and reimbursement of generic drugs also resulted in savings of 35 billion HUF (7 billion HUF as co-payment and 28 billion HUF from the National Health Insurance Fund's drug budget) in 2012. Taking this into account we might conclude that the effective drug budget was even higher in 2012 than in 2011.

Figure 4. The Hungarian budget for prescription drugs, (1 euro = 300 HUF)

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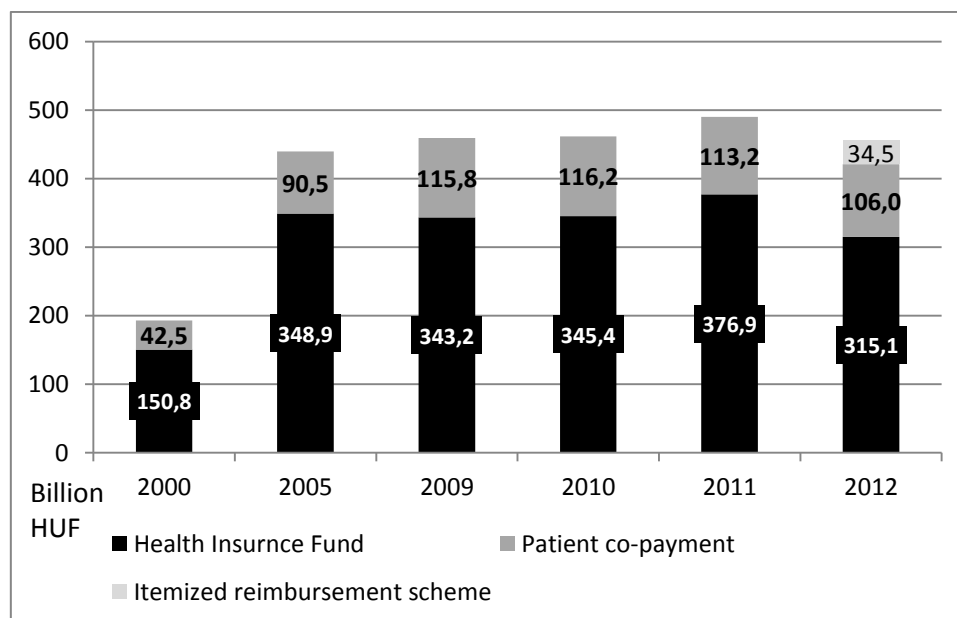
[6] In addition to this, a budget spent on vaccines by the National Public Health Office is estimated to be 10 billion HUF per year.

According to our knowledge,[7] only a limited number of studies have been published so far in English language peer-reviewed journals on the impact of economic recession on health outcomes and in the EU member states CEE countries. The majority of the studies from the CEE region are focused on the Baltic countries. According to the findings of these papers, the Baltic states have experienced decreases in mortality rates despite the economic recession (Kalėdienė – Sauliūnė 2013; Kristjuhan – Taidre 2012). However, Strukcinskiene (2011) found that after an improvement since 2002, suicide mortality among the 15-19 age group was again high during the economic crisis in 2008-2009 in Lithuania. Analysing national statistics, Lai and Habicht (2011) found an observable decline in alcohol consumption in Estonia from 2008, however the decline can partly be explained by restriction policies which had been implemented since 2005.

Only one paper from Hungary was identified, which examined the association of suicide and unemployment rates (Fountoulakis et al. 2014) during this period. Baumbach – Gulis (2014) examined eight European countries including the Czech Republic, Slovakia and Poland, where the suicide rates increased by 7.6%, 22.7% and 19.3% respectively, from 2000 to 2010.

In the paper of Vandoros et al. (2013), Poland was used as a comparator country of Greece. Based on data from an international survey, the authors found that self-rated health status dropped in Greece during the economic recession compared to Poland, where GDP growth was still positive in 2009. This finding is supposed to provide evidence on the causality of the recession and declining self-rated health status, however the authors also highlight some important limitations of using this quasi-experimental approach. Association between self-

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[7] Based on a literature search in the Medline database (the largest database for biomedical literature) between 1 January 2008 and 1 May, 2014 with the following search strategy: ("economic downturn"[All Fields] OR "economic crisis"[All Fields] OR "financial crisis"[All Fields] OR austerity[All Fields] OR recession[All Fields]) AND (("health"[MeSH Terms] OR "health"[All Fields]) OR "health care"[All Fields] OR "healthcare"[All Fields]) AND ("Central and Eastern Europe"[All Fields] OR "Central and Eastern European"[All Fields] OR "Central Europe"[All Fields] OR "Central European"[All Fields] OR "Eastern European"[All Fields] OR "Eastern Europe"[All Fields] OR ("bulgaria"[MeSH Terms] OR "bulgaria"[All Fields]) OR Bulgarian[All Fields] OR ("romania"[MeSH Terms] OR "romania"[All Fields]) OR Romanian[All Fields] OR ("hungary"[MeSH Terms] OR "hungary"[All Fields]) OR Hungarian[All Fields] OR "Czech Republic"[All Fields] OR Czech[All Fields] OR ("slovakia"[MeSH Terms] OR "slovakia"[All Fields]) OR Slovak[All Fields] OR Slovakian[All Fields] OR ("slovakia"[MeSH Terms] OR "slovakia"[All Fields] OR ("slovak"[All Fields] AND "republic"[All Fields]) OR "slovak republic"[All Fields]) OR ("poland"[MeSH Terms] OR "poland"[All Fields]) OR Polish[All Fields]) AND ("2008/01/01"[PDAT] : "2014/05/01"[PDAT]).

rated health status and physical and mental health is still to be proved, and international comparison, namely using Poland as a control country is also not without controversies.

Also, only a few English language papers published in peer reviewed journals present the health care reforms and austerity measures implemented in the CEE countries related the financial crisis.[8] Vogler et al. (2011) analysed pharmaceutical policies applied during the financial crisis in 33 European countries (including CEE) using a questionnaire. According to the conclusions most of the European countries apply cost-containment measures to control pharmaceutical expenditure, regardless of the economic crisis. As for the CEE countries, Poland also drafted a law to significantly reform the pharmaceutical reimbursement system in order to contain costs despite of positive growth, while in the Baltic countries reforms were rather considered as a response to the crises.

The impact of the economic recession on the analysis of the utilization of health care is a potential topic of interest of further research. In the countries examined in this paper, unnecessary care is a recognized problem (OECD 2012).[9] According to the OECD, health care systems are generating significant health outputs, such as doctor's consultation and hospital discharges, but there are problems with the quality of health services and the need for reforms to improve efficiency (OECD 2012). In this case the potential decrease of health care resources due to the economic crises is not necessarily to be interpreted as "we have less chance to perform good quality efficient health care", but rather as "we have less money to waste for unnecessary care".

The worsening level of quality of care could be another sign of the economic recession. However, we have not identified any paper analysing this issue in the CEE region. There are some studies, which suggest that service quality is lower in CEE compared to the more developed countries. Cserháti et al. (2002) found that the Hungarian mortality rate 4 months after a hip fracture operation is significantly higher compared to that in Sweden. Another study presented evidence that hospital infection related health outcomes in different risk

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[8] Some of the papers provide an overview of the health care system, with a specific emphasis on health care reforms (Mitenbergs et al. 2012; Gulácsi et al. 2012; Radu et al. 2009). Mitenbergs et al. (2012) give a detailed explanation of the reforms carried out in Latvia due to the financial crises. Gulácsi et al. (2012) gives an overview of the health technology assessment systems of Hungary, Poland and the Czech Republic, and provides some examples from these countries on budget cuts due to the recession. Radu et al. (2009) focus on the challenges due to the financial crisis in Romania. Two papers focus on Croatia (Škaričić 2010; Ostojić et al. 2012). One of them presents the results of a qualitative study where the recession was identified as one of the challenging external factors regarding the perspectives of the Croatian health care system.

[9] Similarly to Greece, the country with the highest number of MRI and CT scans per 10 000 persons among the OECD countries.

groups are less favourable in Hungary compared to patients in the United States (Gulácsi et al. 2000). It would be interesting to examine whether the crisis led to a further decline in service quality in the CEE countries.

Some papers argue that in the period of economic recession there might be a higher need for data and research to make evidence-based decisions on cost-containment and budget cuts in order to ensure the efficient use of resources (Gulácsi et al. 2012). Although the literature linked to the economic crisis is rich and rapidly growing, in the field of health care there has only been a limited number of publications related to the CEE countries thus far. This problem is not specific to the recent crisis, as sufficient data on epidemiology, disease burden, health care utilisation and quality of care are in general lacking in the CEE region for national policy makers. As Karanikolos et al. (2013) noted, in the absence of up-to-date morbidity and mortality data, the effect of the crisis on health is impossible to analyse.

Also, there are some studies which suggest that the data which are available are often unreliable in these countries (e.g. Péntek et al. 2007; Érsek et al. 2010) As an example, the European Collaboration on Dementia (EuroCoDe) workgroup estimated to that there were 131,995 individuals in Hungary suffering from the disease in 2008, while Hungarian national statistics recorded only 7,393 Alzheimer cases in 2007 (Érsek et al. 2010).[10] However, in order to measure the effect of the recession on health outcomes, valid prevalence and incidence data would be essential. The literature is rich in economic crisis related publications in health care, but the transferability of research results from more developed countries to the CEE countries is very limited due to a series of important differences, including demography, standard practice, unit costs, and financing of the health care system.

The impact of the recession on the role of health technology assessment (HTA) in decision making would also be an interesting topic to examine. It is a widely shared opinion that the need for health economics and HTA in decision making processes is increasing due to more and more serious budget constraints caused by the recession, and increasingly demanding policy makers and funders who require greater evidence for new and existing therapies. Poland and Hungary established their HTA agencies, but the functioning of these is not without notable controversies and weaknesses as described by various authors (Gulácsi et al. 2012; Ozieranski et al. 2012).

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[10] Although dementia can have other etiologies than Alzheimer disease, the gap between the two numbers is too large. Data from time-series confirm that it was not a single mistake in 2007 but a systematic error over a decade.

Appendix 1.

Appendix Table 1. Results of the PCA analysis

Number of observations	34			
Number of components.	1			
Trace	3			
Rho	0.7307			
KMO	0.5770			
Component	**Eigenvalue**	**Difference**	**Proportion**	**Cumulative**
Comp1	2.19	1.51	0.73	0.73
Comp2	0.69	0.57	0.23	0.96
Comp3	0.12	.	0.04	1.00

Appendix Table 2. Pairwise correlation matrix of the variables and the PCA score

	Health expenditure PPP US$ (2010)	Health expenditure % of GDP (2010)	Life expectancy (2010)	Development score
Health expenditure PPP US$ (2010)	1.0000	-	-	-
Health expenditure % of GDP (2010)	0.8686	1.0000	-	-
Life expectancy (2010)	0.4910	0.3860	1.0000	-
Development score	0.9456	0.9107	0.6844	1.0000

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