



Federal Institute for  
Research on Building,  
Urban Affairs and  
Spatial Development  
within the Federal Office for  
Building and Regional Planning

A background image of three smooth, stacked stones in shades of blue and grey.

## Contract Study Regional Challenges in the Perspective of 2020 – Phase 2: Deepening and Broadening the Analysis

The impact of the economic crisis on regional disparities and  
vulnerabilities (Self standing part of deliverable 8)

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### *Update October 2011*

*As recent regional and harmonised labour market data was published by Eurostat in early autumn 2011, we decided to update the vulnerability calculations that partly had been based on national data after the first publication of the study. Exposure indicators for the following key vulnerabilities have been replaced:*

*'Manufacturing in crisis':*

*'Development of employment in manufacturing 2008-2009' (national level) has been replaced by 'development of employment in total industries except construction 2008-2010' (Nuts 2 regional level).*

*'Construction in crisis':*

*'Development of employment in construction 2008-2009' (national level) has been replaced by 'development of employment in construction 2008-2010' (Nuts 2 regional level).*

*'The financial sector in crisis':*

*'Development of employment in financial intermediation, real estate, renting and business activities 2008-2009' (national level) has been replaced by 'development of employment in financial intermediation, real estate, renting and business activities 2008-2010' (Nuts 2 regional level).*

*'Households in crisis':*

*'Development of total employment 2008-2009' (national level) has been replaced by 'development of unemployment 2008-2010' (Nuts 2 regional level).*

*The result was a more regionally differentiated picture than before; however, the main trends prevail. The descriptions and analyses of the respective maps have been updated accordingly.*

*Project team, October 2011*

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## Executive Summary

The financial crisis was triggered in the US in 2007, subsequently developed into the fiercest economic crisis since the 1930s to hit a majority of developed countries, and still continues at the time of writing in early 2011. In Europe, the industrial motors that got off relatively easily – such as Germany, Sweden, Slovakia and the Czech Republic – have restarted, but the structural deficits in many countries and, more alarming, in the Union as a whole, persist. Ireland, Greece and Spain still remain in unfavourable situations with financial and real estate markets still disordered and public debts potentially exceeding safe levels. Other countries, such as Portugal, Romania, Italy, France, the UK and Lithuania, still struggle to reach growth levels that could lead to the economic path they were on before the crisis. Therefore, at the outset it must be mentioned that this crisis paper can only illustrate a snapshot of the economic developments, mainly the status 2010. For that reason, a strong focus was on regional differences rather than on more global predictions for the near-term future.

To explore the regional implications of the economic crisis on regional disparities and vulnerabilities, the analysis centred on five key issues that emerged from the financial and economic crisis (cf. the similar groupings in EC 2009-2):

- II The crisis of capital and durable goods industries;
- II The crisis of the real estate market and the construction sector;
- II The crisis of the financial sector itself;
- II The crisis of household incomes;
- II The crisis of increasing government deficits boosted by the crisis and related counteractions.

For each of these topics, regional vulnerability indices were calculated using a number of indicators. It is important that the results have to be seen as a potential vulnerability rather than the real outcome of the crisis. On one hand, comparable regional indicators that describe the crisis effects, i.e. for the years 2008 and 2009 at least, have been hardly available at the time of the analysis. On the other hand, there are many crisis effects – especially on a regional level – that are hard to foresee as the crisis event was unprecedented and a number of unexpected developments occurred even during the study period.

Looking at the results, the dispersion of vulnerable regions across Europe differs widely depending on the issue examined.

In the **manufacturing** focus, the Nordic countries, the UK, and some industrial regions of the Eastern European New Member States are among the most vulnerable. Additionally, traditionally industrialized regions in other member states, such as Ireland, Northern Italy, central Austria or Southern Germany are concerned. The least vulnerable regions across the Union are more rural regions, where agriculture and tourism are important. However, at the time of writing the manufacturing sectors in most countries affected are on the rise again. When demand on the world market started to increase again, these regions were amongst the first to recover. Only regions where the industrial mix is in more need of structural reforms continue to struggle.

The **construction** sector is in contrast not elastic to global demand, but to the local financial and real estate markets and to public and private investments. Therefore, the picture differs widely from the analysis of other industrial activities. Economic ‘boom’ regions of the last decade and tourist regions are among the most vulnerable concerning building activities: the Baltic states, Ireland, the UK, Spain and many coastal regions in the Mediterranean. But also Norwegian, Danish, Austrian and Belgian regions have an increased construction sector vulnerability. The construction sector is much less likely to recover quickly. During the crisis, excess capacities were widely capitalised with public orders (deficit spending, mainly on infrastructure and renovation of buildings). The private housing markets have still not recuperated.

The **financial** sector upheavals concentrated in the large financial capitals of Europe (such as London, Paris, Luxemburg, Switzerland, Cyprus, Frankfurt and many capital and other major cities) and in regions with overheated real estate markets such as Spain. Countries in which the banking sector was highly exposed to the financial crisis, but which had considerable bail-out measures taken include Sweden, Denmark and Austria. These countries’ banks are highly engaged in the New Member States. This dependence on foreign capital is also the reason why the financial sector in the New Member States themselves has shown been less sensitive in the analysis.

The sectoral turbulences discussed in the first three sections had effects on **households’**

income as worsening order situations and declining construction activities lead to overcapacities and the danger of job reductions. The highest growth rates in unemployment rates from 2008-2010 with more than 200% (from around 5% up to more than 15%), took place in Estonia and Lithuania. Unemployment more than doubled in this period in most of Denmark, Ireland, Estonia, Iceland and parts of the UK and Spain. Generally, 267 out of 318 regions analysed faced a rise in unemployment. Due to the high share of affected economic activities, Northern Italy, the Czech Republic, and some UK, Romanian and Dutch regions are explicitly vulnerable.

To counterbalance, many countries issued stimulus packages targeted at labour markets (e.g. short-term work) and tax relieves. The secondary effects of such public interventions, the bank bail-outs and the general decrease in tax revenue do also stress the **sovereign debt** levels. The highest average general government deficits during the crisis (above 5% in 2008 and 2009) have been faced in Spain, France, Greece, Ireland, Latvia and Lithuania, Poland, Portugal, Romania and the UK. Countries that in 2007 already had a higher debt level than 60% of GDP (Maastricht convergence criteria) were Belgium, Germany, France, Greece, Italy, Portugal and Malta. The calculation aggregate vulnerability towards increasing sovereign debts did also take a look at the countries' potential to increase revenues and to cut down expenditures (adaptive capacity for the near future). Ireland, France and Greece are the most vulnerable regions for short-to medium term budgetary constraints according to the methodology applied. Greece and Ireland scores very low owed to the excessive deficits during the crisis. France has the least critical indices. Also vulnerable for various reasons are Belgium, Portugal, Spain, Italy, Germany, the Netherlands, the UK, Cyprus and Austria. All these countries have relatively high deficit and

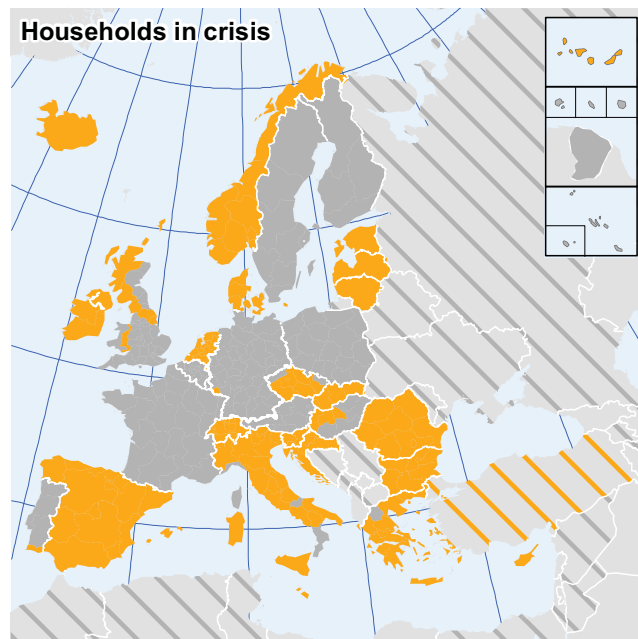
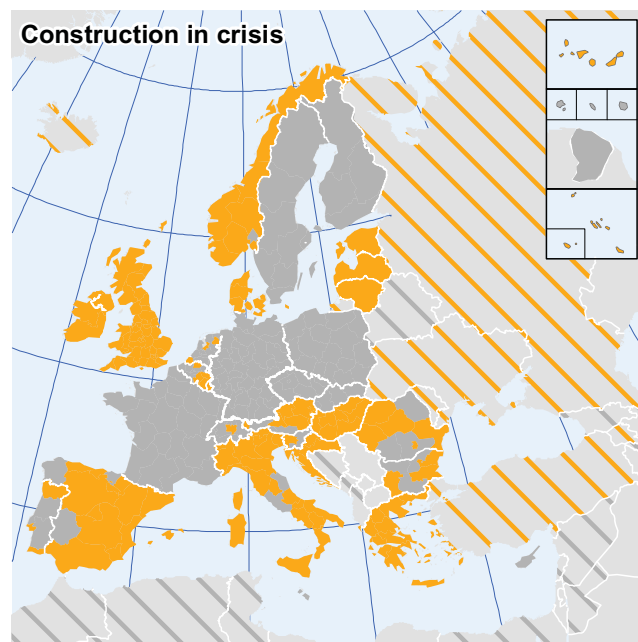
debt levels and a low potential to raise taxes or reduce administrative costs.

The effects of the financial and economic crisis on Europe's eastern and southern neighbours have been relatively moderate. The reason for this is mainly that these countries are far less integrated in world trade and therefore the international financial and commodity market breaks did not have major consequences. However, a number of manufacturing or tourism regions e.g. in Turkey did definitely suffer, but generally to a lesser extent than most member states. Some neighbouring countries in Eastern Europe (such as Ukraine and the western Balkans) are closely connected to the EU financial sector as, either directly through their private sector or through the local banking sectors owned mainly by Western banks which did cause cross-border turbulences during the financial crisis. Concerning, most of the neighbourhood countries (except for oil exporters) have fragile public finances, but in fact low debt levels compared to the EU average. The more vulnerable countries in the EU neighbourhood in this respect are Morocco, Egypt, Jordan and Lebanon.

Although forecasts have been permanently revised during the last months based on higher growth than expected especially for European leading economies Germany and the UK, economic growth in the EU as a whole continues to be low (Portugal, Spain, Italy) or even negative (Greece, Romania, Iceland). Still there is a good portion of uncertainty in the medium and long-term perspective. Under a conventional business cycle interpretation, a period of slow growth or recession would be followed by a period of growth. Given the harshness of the crisis, there is still a serious risk of a structural change in growth in the direction of either very sluggish recovery to former growth levels or a completely lost decade of growth.

Map I Financial and economic crisis vulnerability at a glance (following page)

# Economic crisis vulnerability at a glance



## Legend

### EU and recognised candidate countries, EFTA

- Most vulnerable regions and vulnerable regions
- Prepared regions

### Neighbouring countries (simplified methodology)

- more vulnerable
- less vulnerable
- Not enough data

0 1.000 2.000 3.000 4.000  
Kilometres

*Regional Challenges in the Perspective of 2020, Vulnerability Indices  
Indicator data source  
Eurostat except where indicated*



Map developed by ÖIR  
© December 2010

## Manufacturing in crisis

### Exposure:

- Development of GVA in manufacturing 2007-2009
- Developm. of employment in manufacturing 08-10

### Sensitivity:

- Share of total employment in selected manufacturing activities (%)

## Construction in crisis

### Exposure:

- Development of GVA in construction 2007-2009
- Development of employment in construction 08-10

### Sensitivity:

- Share of total employment in construction activities

## The financial sector in crisis

### Exposure:

- Development of GVA in financial intermediation; real estate, renting and business activities 07-09
- Development of employment in financial intermediation; real estate, renting and business activities 2008-2010

### Sensitivity:

- Share of GVA in financial intermediation, real estate, renting and business activities

## Households in crisis

### Exposure:

- Development of unemployment 2008-2010

### Sensitivity:

- Share of total employment in selected manufacturing activities
- Share of total employment in construction activities

## Indicators

### Adaptive capacity:

- Average fiscal stimulus aimed at businesses 2009 & 2010 in % of GDP (EC DG Ecfm: Public Finances in EMU 2010)

### Adaptive capacity

- Average fiscal stimulus aimed at public investments 2009 & 2010 in % of GDP (EC DG Ecfm: Public Finances in EMU 2010)

### Adaptive capacity:

- Public interventions in the banking sector 09 in % of GDP, guaranteed and effective (EC DG Ecfm: Public Finances in EMU 2009)

### Adaptive capacity:

- Fiscal stimulus aimed at households and labour markets 2009 & 2010 in % of GDP (EC DG Ecfm: Public Finances in EMU 2010)
- Unemployment benefits in % of GDP

Regional Challenges in  
the Perspective of 2020





# 1. Introduction

The present Commission study *Regional Challenges in the Perspective of 2020 – Phase 2: Deepening and Broadening* expands the analysis presented in the 2008 European Commission publication *Regions 2020 – An Assessment of Future Challenges for EU Regions*. It identifies possible impacts of present and upcoming pivotal European challenges on regional disparities and regional development potential in the perspective of 2020.

*Globalisation, demographic change, climate change, secure, sustainable and competitive energy, and social polarisation*, in addition to the *economic and financial crisis*, are the major challenges with which Europe is confronted today and will be confronted in the medium- and long-term. While these challenges all have different regional impacts, the European regions each have a specific vulnerability towards them. To assess these regional peculiarities, the concept of regional vulnerability, which is borrowed from environmental impact assessment, is expanded to include socio-economic objects of investigation. It distinguishes between a region's strength of exposure towards an influence, the specific regional sensitivity and the capacity of a region to adapt to negative impacts. Additionally, the study broadens the perspective of its precursor by including the neighbouring countries to the south and east. It serves as an information source for the regional policy implementation of the *Europe 2020* strategy for smart, sustainable and inclusive growth put forward by the Barroso Commission in March 2010.

To conduct the study, a group of thematic (economy, energy, meteorology, regional development) and cross-cutting experts was assembled. Additionally, three workshops each with 30-40 external and Commission experts provided peer review and discussion of project findings. A scientific board consisting of five independent academic experts served as an internal sounding board which provides consistency and review.

The results are presented on the NUTS 2 geographical level (in most Member States medium-level provinces) and mainly examine the time span until 2020; however, hints for further outlooks are also provided. It takes into account different underlying development paths based on assumptions regarding the manner in which the way out of the financial crisis will progress.

This self-standing document, produced in the scope of the study, serves to identify the short- to medium-term implications of the economic crisis on regional disparities and vulnerabilities. Furthermore, the report shall identify the potential impacts of the crisis on long-term structural indicators of regions in terms of regional disparities and vulnerabilities as well as public finances. Additionally, some actual and possible impacts on mitigation and adaptation strategies towards the other challenges investigated in the general study will be discussed.

In the chapter *Methodological remarks* the most important scientific tools that were used for the study will be summarized. The chapter *The policy context of Europe 2020* will present the initial point of the analysis. In the subsequent chapter the regional vulnerabilities towards the challenges of the *Financial and economic crisis* will be assessed. Following the thematic chapters, the chapter *Integrated discussion of future challenges for EU regions* will discuss the combined effects of the crisis and the challenges from the main document also available on the DG Region website. In the end, the chapter *Conclusions for Regional Challenges in the Perspective of 2020* will highlight the main findings.



## 2. The policy context of the study

After the original "Regions 2020" raised considerable interest in the Member States and the Regions, discussions pointed to the need for a deeper and broader analysis in order to better contribute to the debate on the future of Cohesion Policy. The financial and subsequent economic crisis triggered in 2007 posed new challenges to politicians and administrations alike. At the same time the revision of the Lisbon Strategy has been prepared by the second Barroso Commission and adopted in 2010.

*Europe 2020: A European strategy for smart, sustainable and inclusive growth* (EC 2010-2) is a 10-year strategy proposed by the European Commission on 3 March 2010 for reviving the European economy that expands upon the (only partly successful) Lisbon strategy. It aims at "smart, sustainable and inclusive growth" with greater coordination of national and European policy heavily influenced by the European and global economic crisis that has wiped out years of economic growth and job creation. But also without the crisis or the long-term challenges of globalisation, pressure on resources or ageing would still intensify.

The new strategy centres on overcoming the crisis and preparing the economy of the EU for the next decade. It shows ways, in which Europe can achieve intelligent, sustainable and integrative growth, create new jobs and give orientation to our societies. Europe 2020 sets out a vision of Europe's social market economy for the 21st century and puts forward three mutually reinforcing priorities that should facilitate high levels of employment, productivity and social cohesion:

- II *Smart growth*: developing an economy based on knowledge and innovation.
- II *Sustainable growth*: promoting a more resource efficient, greener and more competitive economy.
- II *Inclusive growth*: fostering a high-employment economy delivering social and territorial cohesion.

The strategy identifies five headline targets that the European Union should aim for in order to boost growth and employment. These are:

- II To raise the employment rate of the population aged 20–64 from the current 69% to at least 75%.
- II To achieve the target of investing 3% of GDP in R&D, in particular by improving the conditions for R&D investment by the private sector, and to develop a new indicator to track innovation.
- II To reduce greenhouse gas emissions by at least 20% compared to 1990 levels or by 30% if the conditions are right, increase the share of renewable energy in final energy consumption to 20%, and achieve a 20% increase in energy efficiency.
- II To reduce the share of early school leavers to 10% from the current 15% and increase the share of the population aged 30–34 having completed tertiary education from 31% to at least 40%.
- II To reduce the number of Europeans living below national poverty lines by 25%, thus lifting 20 million people out of poverty.

These headline targets are broken down in turn into seven topical flagship initiatives called *innovation Union*, *youth on the move*, *a digital agenda for Europe*, *resource efficient Europe*, *industrial policy for the globalisation era*, *an agenda for new skills and jobs*, and *European platform against poverty*. The strategy proposes an integrated approach, which implies the necessity of mobilising sub-national actors for the success of the strategy; a necessity that has been identified as one of the failures of the Lisbon Strategy in the past.

The study *Regional Challenges in the Perspective of 2020* serves as a Regional Policy information source that analyses the related challenges and relates them to the Europe 2020 strategy.



### 3. Methodological remarks

#### The concept of regional vulnerability

The methodological heart of this study is the application of the concept of regional vulnerability to socio-economic analysis. Based on the definition given by the Intergovernmental Panel on Climate Change (IPCC), in the context of which this concept has been used in the past, the notion of vulnerability is defined as a function of regional exposures and sensitivities towards the analysed challenges and the regional adaptive capacities that are available to mitigate the impact exerted by the challenges.

*Regional exposure* describes the way and the intensity in which the European regions are affected. In the crisis analysis this means for example decreasing sales volumes or the loss of jobs. Exposure is the variable that is supposed to change dynamically according to overall trends. *Regional sensitivity* defines how a region will behave in relation to an exposure and thereby reflects the structural character of a region. This might be described by the regional importance of certain economic activities that are especially exposed to the international crisis. A function of a given exposure in a region and its present sensitivity then builds the (potential) regional impact.

*Regional adaptive capacity*, as the third variable, is the ability of a region to adjust to this impact or to cope with any other consequences. In many cases the adaptive capacity is defined by variables that describe the (policy) intervention potential (e.g. economic wealth); however, in many cases socio-economic conditions provide a more solid adaptive base. This can be included by considering policy response to the crisis such as fiscal stimuli but also jobs available in sectors not exposed to the crisis. Finally, *regional vulnerability* represents the synthesis of the three elements as a function of (potential) regional impact and regional adaptive capacity. This means that a region with high adaptive capacity is less vulnerable, more resilient and better prepared

than one with the same impact level but lower adaptive capacity.

This concept is schematically pictured in Figure 1. The subsequent function of vulnerability is based on White (et al., 2005):

$$(1) V = f(E, S, AC)$$

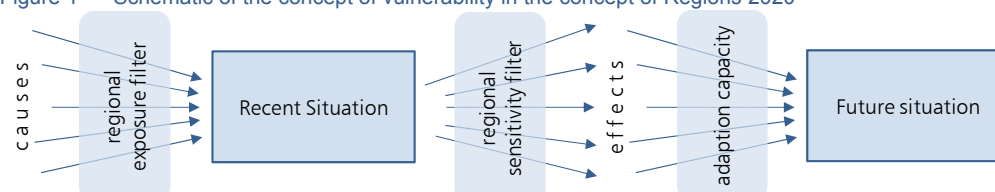
where E = Exposure, S = Sensitivity, AC = Adaptive capacity

In practice, the different dimensions of regional vulnerability must of course be filled with statistical indicators. As the analysed challenges exhibit a very complex nature, more than one indicator must usually be used for analysis. In order to reduce this complexity, it was decided to split the challenges into topical *key issues* based on an initial literature research. This makes it possible to avoid overly aggregated indicators that are hard to interpret and enables the challenges to be broken down into a manageable number of indicators available on a regional level.

#### The creation of composite and integrated vulnerability maps

In order to produce easily readable and interpretable vulnerability maps, these fairly heterogeneous indicators must be aggregated and combined. For aggregation, the method of z-transformation, also known as standardization or auto-scaling, was used. The indicators are made comparable by observing the present means and standard deviations of a sample of indicators and then setting the mean to zero and the standard deviation to one in every row of indicators, which enables the simple aggregation of indicators. In order to avoid a data range-related bias of the indicators, the respective weight of indicator values was set the same. Additionally, each indicator has been polarised according to its influence on the regional vulnerability (a rising indicator value increasing the regional vulnerability was set positive and vice versa).

Figure 1 Schematic of the concept of vulnerability in the concept of Regions 2020



Source: Spatial Foresight

In the next step, the standardised indicators have been aggregated to composite exposure, sensitivity and adaptive capacity indices. A pragmatic approach was used in this respect as the indicators to be combined in some cases retained completely different types of information.

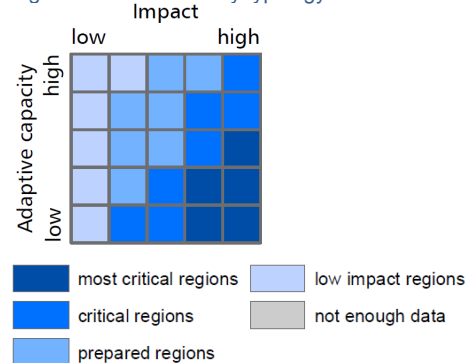
Logical disjunctions and conjunctions were used as a form of meta-level weighing: the *conjunction* joins two or more indicators, which means all indicators have the same influence on the composite index. In practice this was expressed by the simple arithmetic mean of all indicators. For most aggregate indices in the project the conjunction was used to avoid losing any information. A *disjunction* selects one of two or more indicators. In practice the indicator that has the most extreme influence on vulnerability was selected. The disjunction is useful when all individual indicators by themselves cause discrete and comparable levels of exposure, sensitivity or adaptive capacity.

Finally, the results of the steps presented so far were categorised for presentation in the thematic maps. For easy processing, a five-part ordinal scale based on the mean values of 0 (always 0 for the z-transformed indicators) and shares of standard deviation (always -1 or +1 for the z-transformed indicators) were used:

- II equal to or below negative standard deviation: *well below average*
- II above negative standard deviation but below 1/3 negative standard deviation: *below average*
- II above 1/3 negative standard deviation and below 1/3 positive standard deviation: *average*
- II above 1/3 standard deviation but below total positive standard deviation: *above average*
- II equal to or above positive standard deviation: *highly above average*.

This resulted in impact and adaptive capacity indices for all analysed NUTS 2 regions and for each key issue within the five challenges. To create an index for vulnerability another method besides aggregating the normalised indicators was chosen, owing to the difficulties in some key issues in defining meaningful indicators for adaptive capacity that go beyond rather trivial GDP numbers. A typology that combined impact and adaptive capacities into four classes was chosen and is presented in Figure 2.

Figure 2 Vulnerability typology



It resulted in four types of regions:

- II the impact is either greatly below average or below average and the adaptive capacity greatly above average: *low impact regions*
- II the adaptive capacity is higher than the impact or both are average: *prepared regions*
- II the adaptive capacity is the same or slightly lower than the impact: *vulnerable regions*
- II the impact is above average and the adaptive capacity is below: *most vulnerable regions*.

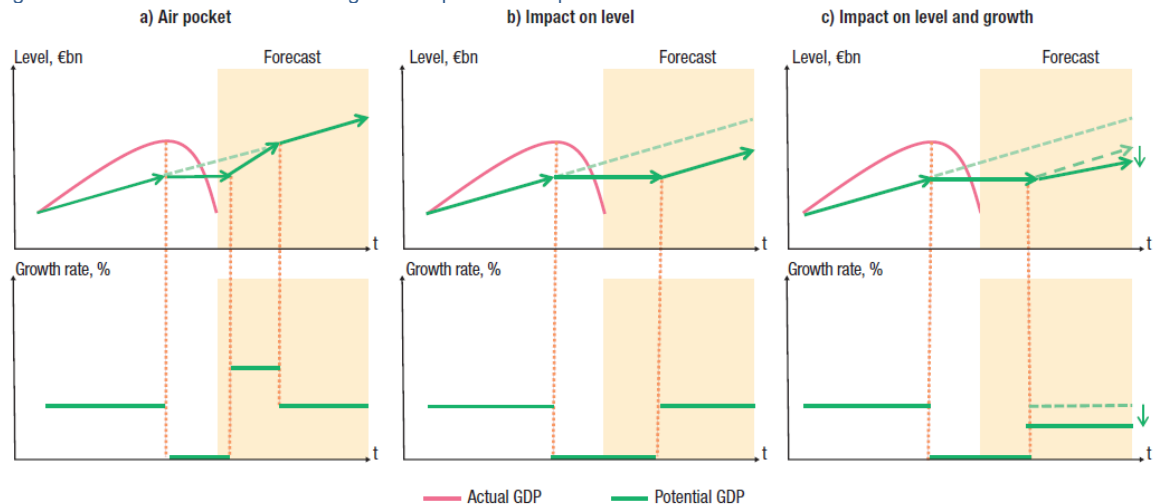
### The definition of the scenarios

The mid-term effects of the crisis up to 2020 determine the framework for the study and this self-standing crisis document. In the theoretical work done on the crisis in Europe (e.g. EC 2009-3, Banque de France 2009) the following three scenarios have been envisaged (see Figure 3) as derived from research on previous crises:

- (a) An “air pocket” (Banque de France 2009) or “recovery” (EC 2009-3) scenario in which potential output and output growth are not lastingly affected by the crisis and recover quickly;
- (b) A scenario in which the level of potential output is lastingly affected because growth returns only gradually to pre-crisis levels;
- (c) A scenario in which both the level of potential output and its growth rate are lastingly affected.

The Europe 2020 strategy incorporated these potential growth paths. Due to the vast number and the complexity of indicators used in the vulnerability approach, the (vulnerability of the) scenarios have not been established quantitatively. As even short-term GDP forecasts are not reliable in times of crisis, a more qualitative approach was taken. Also taking GDP modelling into account (e.g. EC 2009-1), the growth of the overall output does not allow for deductions of either sectoral or regional diversities or disparities.

Figure 3 Three scenarios for level/growth of potential output



Source: Banque de France 2009

On an economic level, the activity mix must be estimated largely according to recent trends, i.e. the tertiary sector still will see growth, yet at the expense of the primary and secondary sectors. However, it can be expected that for the ambitious 2020 goals the share of knowledge and research-intensive activities will have to increase, albeit grounded upon an existing industrial base in the regions. On the other hand, production costs in emerging economies are steadily rising and the gap in competitiveness might narrow. Still this closing of the productivity gap is certainly starting from quite varying levels. For instance, the crisis showed that some Mediterranean countries still lag behind in competitiveness. At the challenge level, certainly not all five challenges will behave according to the growth scenarios. Greenhouse gas emissions, for example, tend to rise with the increase of economic output, which poses the challenge of achieving a low carbon economy; just as income disparities do not automatically fade away with a rising GDP. At a regional level, it can be suggested that not the entire Union will develop according to one of these scenarios. Some

regions might recover faster than others, while others (for instance structurally weak regions or regions with permanent macro-economic imbalances) might suffer from lower levels of growth than indicated prior to the crisis, also in the mid-term, even if policies address their deficits properly. However, it must be admitted that becoming competitive requires time, particularly if deep reform of labour market, social welfare and education systems are needed. Regions with solid structural backgrounds that are, for instance, focusing on upcoming growth technologies might make a quick full recovery. However, these are predictions that are even shaky in non-crisis times. There is already some evidence in 2010 that some regions which suffered most from the crisis are also among the fastest to recover.

Regions that got off relatively easily during the 2008/2009 shock (mostly service-oriented regions) will have continuous but weaker positive growth rates for the short term (Bank Austria 2010, EC 2010-3).



## 4. The economic crisis

Obviously the impact of the economic crisis on the regional challenges in Europe is both a valuable and fascinating topic to investigate. Unfortunately, far-reaching analyses of regional impacts are still constrained by data availability. At the time of writing, data for the years after 2007/2008 (according to the topic) have not been collected on a regional level. Furthermore, the crisis did not hit most labour markets before 2009. However, some studies (e.g. Bank Austria 2010, EC 2010-3) have been conducted regionally based on estimation data for 2010. This has led to the fact that most of the general information about the genesis of the crisis will be provided on a macro scale. As for the effects of the crisis on specific economic sectors, it was attempted—at least for selected sector—to bring the focus down to the regional scale.

As primary sources we have tapped on Eurostat data for short-term economic analysis, the European Labour Force Survey (ELFS), the short-term business statistics (STBS) and the European Restructuring Monitor (ERM), which are four EU-wide data sources that permit the development of an evidence-based depiction of the crisis' effects in Europe. However, with this temporal proximity all of these data sources are only available at the national level. This introduction chapter presents highlights of the most recent data from these databases. In the subsequent vulnerability analysis theses short-term developments will be combined with pre-crisis regional structural data in order to deliver regionalised conclusions.

### Genesis and cause(s) of the economic crisis

The global economic crisis was preceded by financial crisis (starting from the banking sector) which started in early summer 2007 when the U.S. subprime crisis began. The U.S. subprime crisis resulted in a range of financial losses and bankruptcies triggered by the fact that rising housing prices in the U.S. had evolved into a real estate bubble in which more and more borrowers could no longer serve their loan rates. This was partly because of previously rising interest rates starting off from very low levels<sup>1</sup> and partly because loans were mostly granted to borrowers with little creditworthiness. The subprime crisis is regarded as the trigger to the global crisis that began in 2008 and continues as of the time of

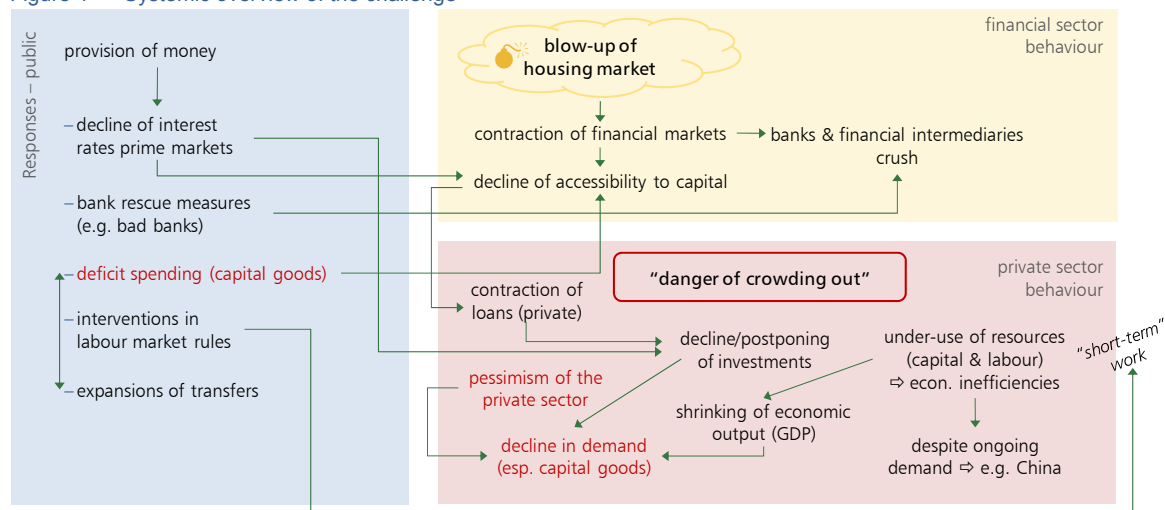
writing. In February 2008, the U.S. economic recovery plan (the *Economic Stimulus Act of 2008*) was adopted as law in order to counteract an impending cyclical downturn in the United States. In September 2008, the International Monetary Fund estimated losses for the financial system of 1.3 trillion U.S. dollars, part of which is now handled by write-downs and capital increases.

The exposure of at least some EU countries to the U.S. subprime crisis was revealed in the summer of 2007 when the first payments from U.S. investment funds were suspended. This caused an increase of rates charged by banks to each other for short-term loans and subsequently for loans of the non-financial sector. By that time a large part of the real economy was already hit and began heavily affecting the labour markets a couple of months after, similar to other major crises before. In the autumn of 2008, with the potential for global bank runs, European governments were forced to guarantee the liabilities of their banks in bailouts. However, banks lending to the non-financial corporate sector continued to taper off. The banking sectors of the European emerging markets and as a result the whole economies were heavily dependent on external capital markets and when world capital markets froze in 2008, these declined as well (UN 2009-1).

Figure 4 shows the mutual links between the major factors of the financial market, the private and the public economic sectors. It illustrates a complex interplay: while the origin of the crisis can be found in the financial and real estate sectors, the effect of the time-shifted influences on the real economy and the public sector triggered further instabilities. The pessimism of the private sector and the suddenly increasing difficulties in the procurement of capital lead to a decline in demand – both for consumer goods and investments. In many countries, public interventions to fight the crisis comprised: deficit spending, labour market measures and tax reductions. However, capital-intensive policy responses, especially for bank rescues (e.g. in Ireland), in combination with declining tax revenues, put serious constraints on public finances; a phase of the crisis that Europe has yet to overcome. What becomes clear as well, when looking at the systemic relations, is the danger that these public responses (especially the deficit spending in the form of capital goods provided by the state) may lead to a crowding out of private demand for capital.

<sup>1</sup> In June 2003, the Federal Funds rate was lowered to 1% in order to stabilize the American economy after the dot.com crisis.

Figure 4 Systemic overview of the challenge



This will happen as soon as private investment and consumer demand recovers (as to be observed in late 2010 and early 2011) and states at the same time seeking capital in the markets to serve their deficits.

In the following sections the crisis effects on the macro-scale, the specific sectors and the influence of the crisis on labour markets and public finances will be explained in more detail.

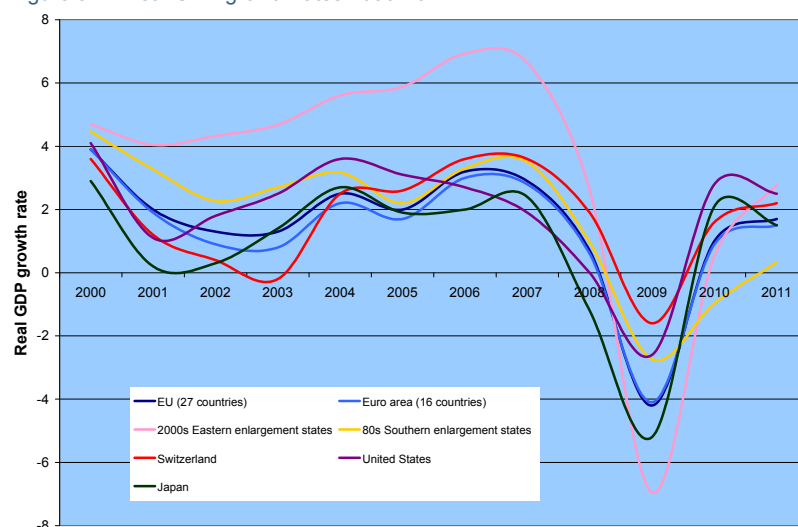
#### The effects on the macro-scale: GDP development in Europe during the crisis

In Europe, the real economy recession showed notable differences in geographical and temporary patterns. From the fourth quarter of 2006 to the fourth quarter of 2007, GDP in current prices still grew in all member states with an EU27 average of 2.5%. In 2007 recession had already hit Ireland and Spain where similar speculative housing

bubbles as in the U.S. burst. From the fourth quarter of 2007 to the fourth quarter of 2008, most member states already faced a downturn with an EU27 average of -1.6% (see annex). The decline in GDP was only partly reflected in employment; in many countries employment still increased, illustrating the lagging effect of any downturn in economic activity on jobs (still less than in previous crises). Only in Spain did the decline in GDP (which was less than the EU average) seem to have affected the employment situation immediately (ERM REPORT 2009). In the fourth quarter 2008-2009 comparison, almost all countries finally faced serious breakdowns in GDP and every single one did in employment.

Figure 5 shows growth rates of (real) GDP from 2000 until 2009 and Eurostat forecasts for 2010 and 2011.

Figure 5 Real GDP growth rates 2000-2011



Source: Eurostat national accounts (2010 & 2011 forecasts)

An analysis of the real GDP growth rates all over Europe between 2000 and 2011 shows the consequences of the economic crisis quite clearly. Due to the tight capital markets, national economies were confronted with financing difficulties in combination with pessimistic investment and consumption behaviours, which lead to drastic downturns in GDP growth rates, with the year 2009 being a significant bump in the road of economic growth. In 2009 a worldwide shrinking of economies was observed with Estonia, Lithuania and Latvia showing GDPs shrinking up to 18%. The rest of Europe faced GDP contractions of around 4%. The only exception has been Poland with the only positive growth rate in Europe.

This could be explained on one hand by the strong domestic consumption and on the other hand by the fact that Poland's export is largely based on consumables, food and agricultural products which were not significantly affected by the crisis. Additionally, Poland adopted the largest temporary stimulus measures of all CEE countries. Time will tell if the Polish growth during the crisis will prove to be sustainable. However, one has to keep in mind that the GDP represents only one side of the coin: as the case of Greece shows, the public sector and especially the structural deficits therein contributed significantly to the economic instability as well (also see section 'political responses to the crisis and their consequences').<sup>2</sup>

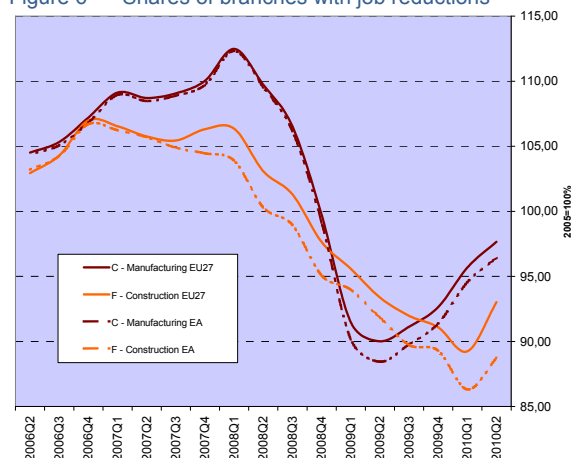
### Sectoral developments and labour markets

As described in the previous chapters, the economic crisis stemmed from the combination of a contraction of the financial markets and short-term pessimistic behaviour of the private sector, resulting in a shrinking economic output. Although the public sector quickly commenced with interventions, the private sector has been the main focus of interest as both the source and a victim of the crisis. Therefore the following chapter will provide an overview of the development of various economic sectors (including their labour markets) during the crisis. As pointed out above, the main decline in output has been concentrated on export-oriented, durable and consumer goods industries, with textiles, machinery, automobiles and also the construction sector (due to the crash

in some national real estate markets) being hit especially hard. This can be explained by the short-term reactions of the private sector to the contraction of the loan market. Investments, as well as purchases of capital goods and durable consumer goods (e.g. cars), were postponed or dismissed.

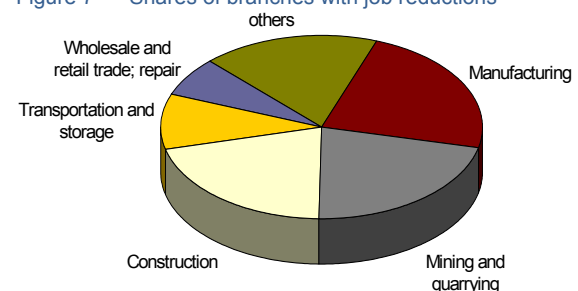
In the EU27, production of electrical equipment, machinery and motor vehicles fell between 12% and 25% from 2006 up to the fourth quarter of 2009 and in basic metals by 18% (industry sectors quarterly development see annex). Unlike the crisis in the early 1990s, however, output also fell in service sectors, especially wholesale and retail. Figure 6, Figure 7 and Table 1 show the branches that had to cut the most jobs between 2008 and 2009. Mining, manufacturing and construction were the most critical industries, whereas mining is of minor significance in absolute employment numbers compared to the other two branches. In manufacturing, textiles and clothing, wood and wood products, rubber and plastic products, basic metals and fabricated metal products, machinery, electrical, optical and transport equipment as well as manufacturing of furniture were the branches most exposed.

Figure 6 Shares of branches with job reductions



Source: Eurostat Short term business statistics

Figure 7 Shares of branches with job reductions



Source: Eurostat Labour Force Survey

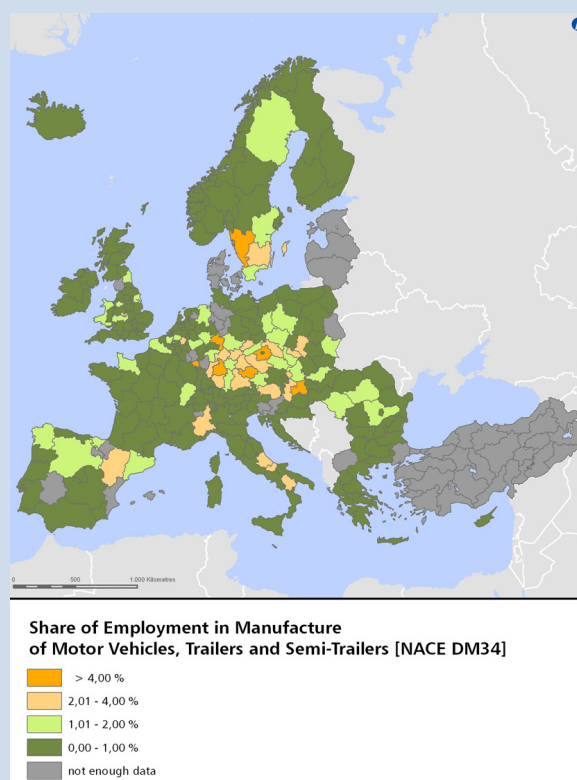
<sup>2</sup> By the end of 2009, as a result of a combination of the international crisis, uncontrolled spending and inflated public structures, the Greek nation faced its most severe economic crisis in ages, with the second highest budget deficit (after Ireland) as well as the second highest debt (after Italy) to GDP ratio in the EU.

## Box 1: Automotive industry regions

Worldwide, one of the sectors hardest hit by the crisis is the automotive industry, since vehicle purchases are largely discretionary, can easily be postponed, and are often purchased on credit, which is scarce as a result of the shattered financial markets. Media coverage and special political rescue operations, such as scrapping premiums, confirmed the harshness of the crisis in this sector. In March 2009, sales were 23.5 per cent lower in the US and 47 per cent lower in the Russian Federation than a year before. In Germany, by far the EU's largest manufacturer, production in February 2009 was down 65 per cent from a year before (UN 2009-2). In the second half of 2010, however, it seemed to have recovered completely from the crisis dip as one of the first sectors.

Automotives are concentrated in only a handful of regions in Europe, mostly around the traditional European car manufacturers and their more recent offshoring dependencies in Eastern Europe, e.g. Stuttgart with *Mercedes-Benz*, Central Bohemia with *Škoda*, Lower Bavaria with *Audi*, West Sweden with *Volvo* and *Saab*, Piedmont with *Fiat* and *Lancia* or the Bratislava Region with the *Volkswagen* dependency near the Austrian border. In Romania (*Dacia*) Spain (*Seat*) and France (e.g. *Peugeot* and *Renault* in and around Paris), important manufacturers are also present but do not contribute as much to regional employment due to the local industry structure.

Map 1 Employment in automotive industries



Source: Eurostat Structural Business Statistics)

Generally, the labour markets in the EU did not start to notably weaken until the fourth quarter of 2008 and deteriorated further in 2009. In the second quarter of 2009, the unemployment rate had increased by 2.2 percentage points from its 6.7% low one year earlier (EC 2009-2). In 2008, minor losses in certain sectors were considerably small in most countries compared to the size of their labour markets and could be compensated by newly established workplaces in other sectors. Spain was the only Member State already showing a massive loss in the construction sector following the breakdown of its national real estate

market. The UK already suffered from losses in the manufacturing sector, but was able to compensate for these through gains in the service sector. From 2008 to 2009, the job markets were finally in full contraction as all countries (again with the notable exception of Poland, cf. the GDP section) lost more jobs than new ones were created. Almost all countries lost the most jobs in the manufacturing sector. The breakdown of the labour market in the construction sector in Spain continued and also reached high levels in Ireland, the UK, Portugal, Latvia and Lithuania.

Table 1 Branches hit by the crisis

Activity	EU27 average job reduction 2008-2009	Member states most severely affected (higher job loss than EU27 average)
Manufacturing	-7.47%	United Kingdom, Estonia, Latvia, Spain, Denmark, Lithuania, Slovakia, Ireland, Sweden, Czech Republic, Finland, Slovenia, Romania, Netherlands, Belgium
Mining and quarrying	-6.94%	Ireland, Slovakia, Greece, United Kingdom, Spain, Italy
Construction	-6.71%	Luxembourg, United Kingdom, Belgium, Spain, France, Latvia, Netherlands, Slovakia, Lithuania
Transportation and storage	-3.13%	Ireland, Estonia, Lithuania, Spain, Luxembourg, United Kingdom, Portugal, Denmark, Greece
Wholesale and retail trade; repair of motor vehicles and motorcycles	-2.22%	Ireland, Estonia, Latvia, Lithuania, Spain, United Kingdom, Hungary, Finland, Denmark, Netherlands, Italy

Source: Eurostat Labour Force Survey

As mentioned in the GDP section, the effect of the economic shrinking on employment was comparatively small in all sectors due to the characteristic of labour markets of lagging behind macro-economic up- or down-turns. Up to the first quarter of 2009, the lost output in the engineering industries had led to only relatively small-scale job losses. In machinery and equipment, for instance, a production loss of over 20% in the first quarter of 2009 was associated with hardly any reduction in employment and a more than 40% loss in the production of motor vehicles led to a decline in employment of less than 6% (cf. Box 1). The implication of this development is that employment in the first quarter of 2009 was too high in relation to market long term demand, warranted by the level of output as short-time and part-time working, and various other labour-market initiatives did obviously cause some delays for the effects of contractions of the labour markets to show (ERM Report 2009). In the fourth quarter of 2009, job losses in some sectors were already larger (-12% in textiles, clothing and manufacturing of other non-metallic mineral products, around -9% in the manufacture of machinery and -12% in motor vehicles, compared to the fourth quarter of 2008). The limited increase in the unemployment observed so far for several European countries may be a sign of labour hoarding during the recession years. This appears to be confirmed by the changes in average hours worked per person on the payroll, which has been falling in most countries (EC 2009-2).

To some extent these outcomes are induced by the policy makers. To minimise the risk of unemployment in most countries, measures such as short-time work or sponsored jobs have been introduced or strengthened to keep people in employment so that the firms can hold on to most of their staff during the beginning of the crisis. However, to remain effective in the long run, considerable restructuring might be necessary as the economy recovers (e.g. construction, financial services and automotive industry).

#### Political responses to the crisis and their consequences

On 26 November 2008, the European Commission proposed a European Economic Recovery Plan (EERP) to cope with the effects of the global financial crisis on the economies of the member countries. It aims at limiting the economic slowdown of the economies through national economic policies, with measures extended over a period of two years. The plan combines short-term measures to stimulate demand and maintain jobs

and long-term measures to invest in strategic sectors, including research and innovation. The plan includes targeted and temporary measures amounting to 200 billion Euros, or 1.5% of EU GDP, using both the national budgets of the national governments, the budget of the EU and that of the European Investment Bank. The plan is scheduled for a period of two years.

In 2009 the largest fiscal stimuli have been enacted in Luxembourg (3.4% of GDP), Cyprus (2.7%), Spain (2.4%), the Czech Republic (2.3%), the UK (1.9%), Germany, Sweden and France (1.7%) and Finland and Poland (1.6%). In 2010, the largest stimuli were planned for Poland (3.2% of GDP), Finland and Sweden (2.7%), Germany and Cyprus (2.4%), Luxembourg (2.2%), Hungary (2.1%), Austria and Slovenia (1.8%), and Denmark (1.5%) (EC 2010-4). While the wealthier economies have been able to respond with considerable fiscal stimulus packages, some European accession economies and South European Member States have had limited fiscal options due to their structural dependency on foreign capital, notably Greece, Slovakia, Bulgaria, Estonia, Hungary, Lithuania, Latvia and Romania. The EERP comprises revenue and expenditure measures which pursue different aims towards the sources of the economic challenge, giving support to credit-constrained households and enterprises, supporting employment and directly increasing demand (i.e. increased public infrastructure investment is targeted at the construction sector).

Additionally, there have been interventions in the banking sector in a number of countries with banks strongly exposed to global financial markets – mainly providing liquidity and guarantees on bank liabilities, but also some full and some partial nationalisations (for an overview see annex). While some countries have so far gotten along with guarantees, the credit institutions in other countries already had notable effective expenditures because of engagements in the new member states and/or on global financial markets, particularly Austria, Belgium, Ireland, Sweden and the UK. The New Member States themselves showed only minor activities as most of their financial institutions are at least partly managed by foreign investors. Of course all of these above mentioned public measures are to be seen as 'safety nets' rather than monetary interventions. Their main aim and effect is rather creating of trust than inducing real overall economic growth.

The financial crisis itself and the large amounts of stimulus packages and other state interventions put severe pressure on public budgets, most notoriously in Greece, but to a lesser extent also

in Ireland, Italy, Spain and Portugal. Concern about rising government deficits and debt levels across the globe together with a wave of downgrading European Government credit soundness has created an alarm in financial markets. Actually, some Member States, such as Greece, Spain or the Baltic States, have already had to reverse their stimulus measures by passing comprehensive austerity packages. However, it has to be kept in mind that the structural deficits, to which the crisis-induced debts amount, surpass even many countries' pre-crisis Maastricht stability goals. Before the Maastricht criteria were put in place, some governments had general gross debt levels of more than 100% of GDP (Belgium, Italy, and Greece). The challenge for the forthcoming decade in many countries will rather be to service and decrease these structural deficits, which might lead to a crowding out of private investments and bring about national austerity programmes at the same time. In the mid- and long run these measures will put the competitiveness of countries at risk: damping of private economic activity together with austerity programmes in the field of education, training and health care reduce future innovation and growth

#### Most recent developments

The latest macroeconomic developments (e.g. Euro-indicators news release 35/2011) show a generally better recovery than anticipated. This development is expected to continue in 2011. Especially German exports have leveraged the euro zone in the second quarter to achieve the highest growth in over three years, outperforming the U.S. economy. In the largest economy of the currency area, GDP grew by 2.2% with the other

euro countries lagging behind. In Greece, the recession even worsened as GDP decreased by 1.5% compared to the previous quarter with the drastic Greece austerity programme having a negative impact. However, analysts expect moderate growth for the rest of the year (Financial Times Germany, 13 August 2010).

#### Key vulnerabilities

The extent to which the financial crisis and the subsequent recession have been affecting the individual Member States of the European Union and their regions strongly depends on their initial structural conditions and associated vulnerabilities. Following the topical splitting approach presented in the methodological remarks, the major impact can be grouped into five key vulnerabilities of regions that basically all influence each other (cf. the systemic picture in Figure 4), as well as the other challenges analysed in the main document (cf. the similar groupings in EC 2009-2):

- II The crisis of the capital and durable goods industries;
- II The crisis of the real estate market and the construction sector;
- II The crisis of the financial sector;
- II The crisis of household incomes;
- II The crisis of increasing government deficits boosted by the crisis and related countermeasures.

The indicators used for describing the vulnerability towards these crisis issues and the maps produced with them are presented in the following sections.

## Manufacturing in crisis

Countries and regions that rely on specific industries are more exposed to the sharp contraction of world trade. These industries are the manufacturing of export-oriented capital investment goods and durables for households. Exemplary regions can be found, for example, in Germany, the Netherlands, Austria, Ireland or Slovakia. This vulnerability analysis will illustrate these regions.

### The indicator system for regional vulnerability

The **exposure** of the manufacturing sector to the crisis is measured by the *GVA development in manufacturing 2007-2009* in order to depict the output gap the economy faced in this respect. The values for this period are available at the national level. To introduce the (temporally shifted) reaction of labour markets, the *employment development of manufacturing 2008-2010* (NUTS 2 regional level) is added to the aggregation.

As described in the introduction, certain sectors from mainly export-oriented capital and consumer durable goods industries such as textiles, machinery and vehicles have been more affected than others. A complete selection of the branches' NACE codes can be found in the annex. The *share of total employment of (these) selected activities* forms the **sensitivity** of regions at the NUTS 2 level.

The **adaptive capacity** in this respect is measured by the *proportion of the national stimulus packages concerted in the EERP aimed at the business sector* (in average % of national GDP in 2009 and 2010). However, these measures only ease the hardest negative impacts during the crisis (cf. IMF 2010). Nonetheless, we are aware that this is a limited approach that does not take into account the hardly foreseeable endogenous growth potentials of the manufacturing industries. It is quite obvious that

competitiveness of the industry would also need to be considered as part of the adaptive capacity of a region. However, this concept is rather multifaceted (comprising wages, labour law, technological status, capital market regulations etc.), which lead to the decision to concentrate solely on the public sector in this analysis.

### The role of neighbouring countries and cross-border effects

In the EU's neighbouring regions, the manufacturing sector is less important and, with some exceptions, their industries are largely not as export-oriented as in the EU (cf. Map 2).

Map 2 Europe and its neighbourhood: total exports as a share of GDP

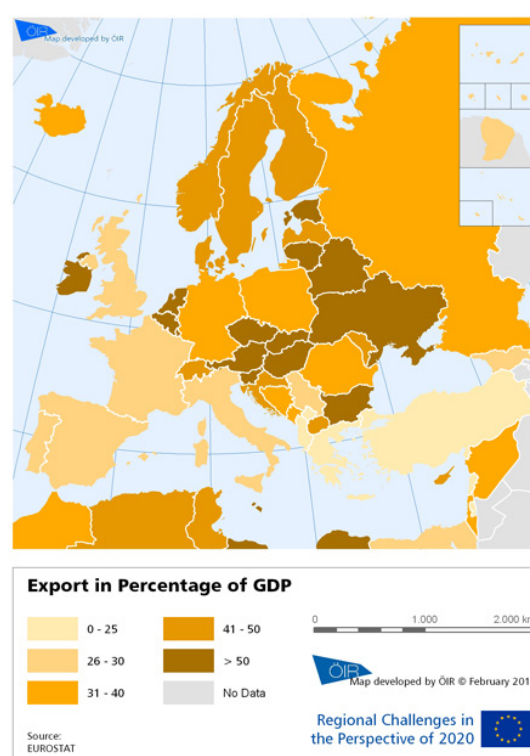
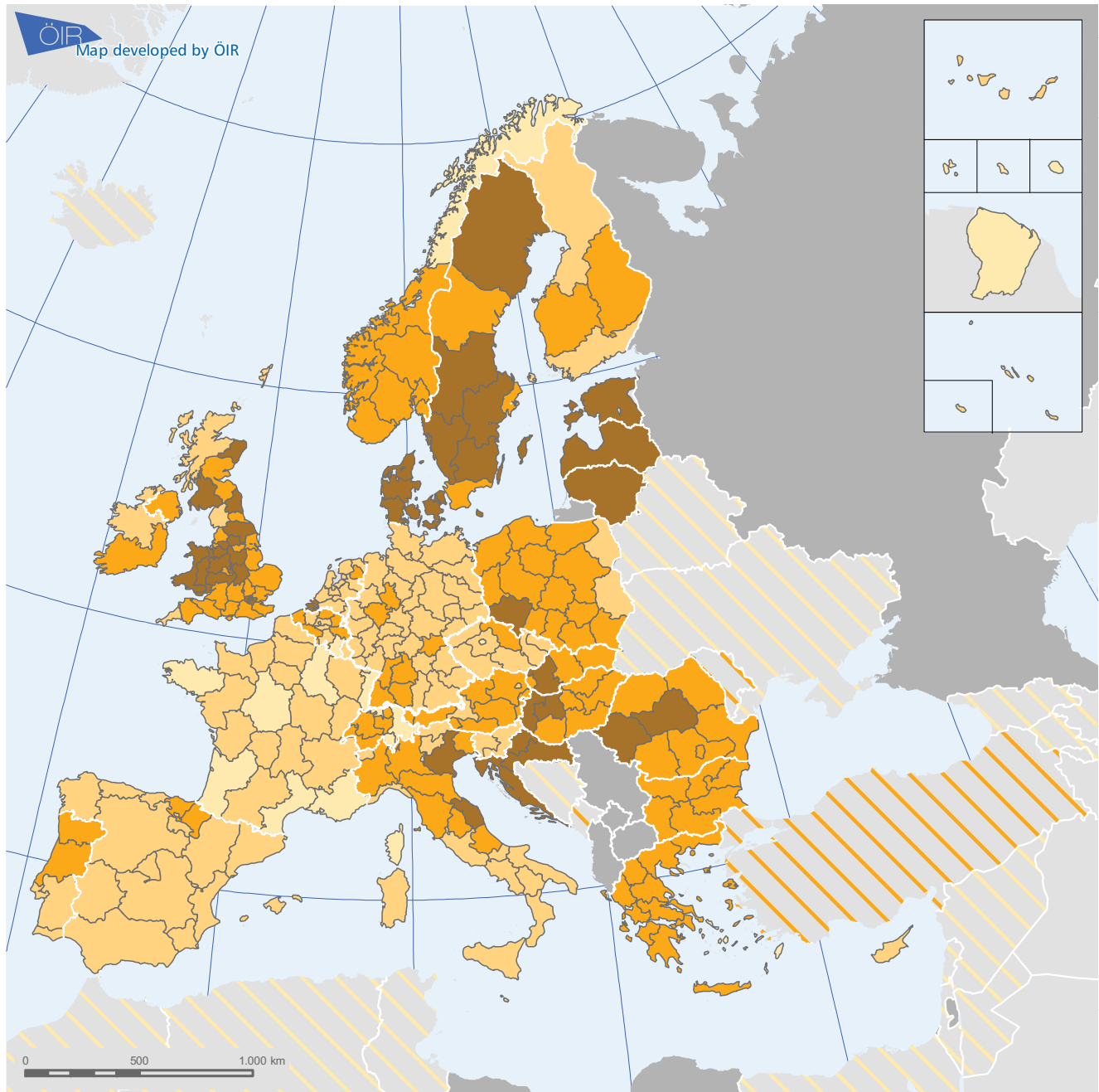


Table 2 Indicators used for 'Manufacturing in crisis' vulnerability in NUTS 2 regions

	Indicator	Minimum	Mean	Maximum	SD
Exposure	GVA growth in manufacturing 2007-2009	-31% (UK)	-15%	+10% (BG)	9
	development of employment in total industries except construction 2008-2010	-43% (Inner London, UK)	-9%	+15% (Cumbria, UK)	8
Sensitivity	Share of total employment in selected manufacturing activities	0.16% (Autonomous City of Melilla, ES)	11%	59% (Zeeland, NL)	7
Adaptive capacity	Fiscal stimulus aimed at businesses 2009 & 2010 in % of GDP	0% (various countries)	0.60%	1.90% (FR)	0.54

Map 3 Key vulnerability 'Manufacturing in crisis' (following page)

# Manufacturing in crisis - Vulnerability

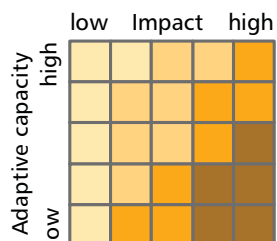


## Vulnerability of Regions linking the impact with the adaptive capacity

- most vulnerable regions
- vulnerable regions
- prepared regions
- low impact regions
- not enough data

Indicators describing exposure:  
 - GVA growth in total industries except construction 2007-2009  
 - development of employment in total industries except construction 2008-2010

Indicators describing sensitivity:  
 - Share of total employment in selected manufacturing activities



Indicators describing adaptive capacity:  
 - Average fiscal stimulus aimed at businesses 2009 & 2010 in % of GDP  
 (Source: EC DG Ecfm: Public Finances in EMU 2010)

## Neighbouring Countries (simplified methodology)

- more vulnerable
- less vulnerable
- not enough data

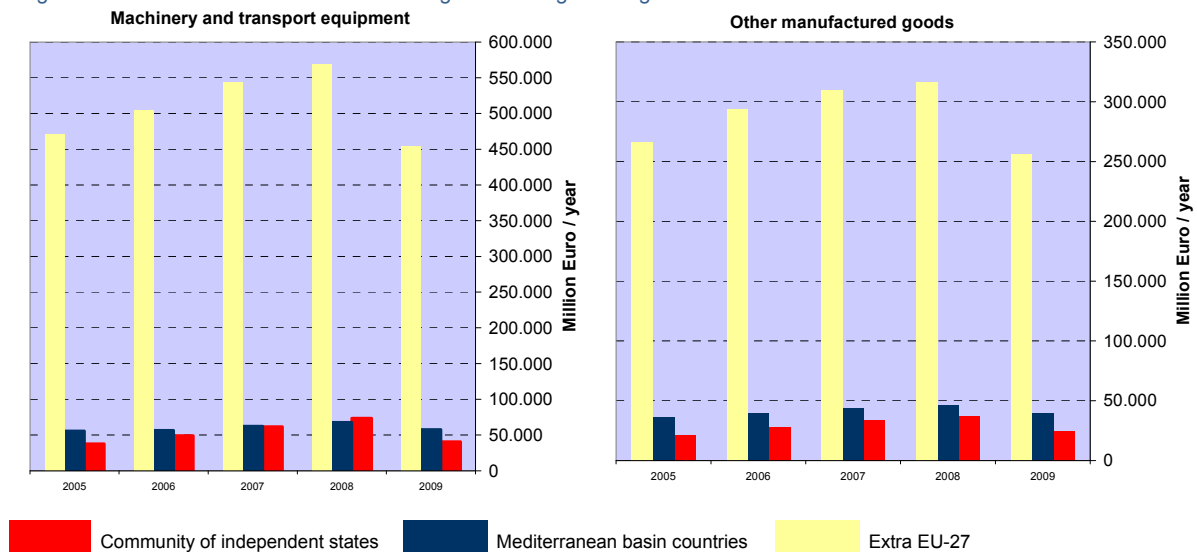
Indicators describing Neighbours:  
 - GVA growth in manufacturing 2007-2009

Data source Eurostat except where indicated. Detailed indicator description in the annex. Indicators have been standardised via z-transformation and polarised according to the influence on vulnerability.

Regional Challenges in  
the Perspective of 2020



Figure 8 Extra-EU trade of manufactured goods to neighbouring countries



Source: Eurostat external trade database

The Mediterranean countries have weathered the economic crisis so far. The region has, of course, felt an indirect impact of the crisis through external channels, goods exports and inward investment in industry. While the impact on individual economies varied, GDP decelerated rather than contracted. Relatively narrow export bases and weak trade links in many countries, which have constrained long-term growth, muted some of the effects of a collapse in global demand.

In the CIS countries (plus Georgia), average GDP growth collapsed from 8.3% in 2008 to an almost mirror image of – 8.0% in 2009, a remarkable 16.3% change in a single year. Only two countries escaped open recession: oil-exporter Azerbaijan and Belarus. The main influence that the contraction in neighbouring countries had on the EU27 is the decline of inland consumption that contributed to decreasing European exports of manufactured goods during the world economic crisis. However, compared to global European exports, the share of the neighbouring countries is of minor significance. Although the export of machinery and transport equipment into the former CIS countries declined by 45% between 2008 to 2009, its share of total external exports is only 9%. In the Mediterranean countries, machinery exports fell by 15% at a share of 13% of total exports in 2009 (see Figure 8).

#### The vulnerability map

The strongest GVA declines in manufacturing activities at the beginning of the crisis have been faced in Germany, Denmark, the Baltic countries, Spain, Finland, Italy, Ireland, Slovenia, Sweden and the UK. In contrast, the breaks in employment

were much less dramatic in all of these countries except for Spain, the Baltic States, Ireland and the UK. This was mainly due to labour policy measures (short-term work, etc.). The relative regional importance of export-oriented sectors makes countries vulnerable where output losses were rather small but still the regional importance of the manufacturing activities causes a high overall vulnerability: the Czech Republic, Western Slovakia, Western Hungary and Western Romania.

Generally, traditional manufacturing areas in the advanced Western economies show relatively high impacts. However, the resilience of manufacturing towards external shocks can vary according to structural differences such as diversity, innovation and research orientation of the respective sectors, as suggested by initial evidence from the manufacturing sectors in Austrian regions. For instance, the Austrian provinces of Upper Austria and Styria have a similar dependency on industry; both have about 40% of GVA generated in the secondary sector with a high share in the automotive sector. Both suffered breakdowns in GDP in the crisis, but while Upper Austria has a much more diversified (durable and consumer goods) and technology-oriented manufacturing mix—and thereby managed to keep its losses close to the Austrian average—, Styria depends very much on the single sector of automobiles and affiliated industries, which resulted in the most severe GDP and job losses of all Austrian regions. For 2010 and 2011, analyses forecast a recovery in both regions, but much quicker in Upper Austria (Bank Austria 2010). In Europe, the industrial motors of the countries that got off relatively easily – such as

Germany, Sweden, Slovakia or the Czech Republic – has restarted again but the structural deficits in many countries and, more alarming, as the union as a whole, persist.

As mentioned, there are some implicit adaptive capacities already included in the labour market development in the regions where employment did not decrease to the same amount as output. The other adaptive capacities analysed are stimulus measures aimed at the general business sector. They were most prominent in Germany, France, Spain, the Czech Republic and Slovenia. In other countries, governments decided instead to target households or infrastructures for stimuli. This leads to the conclusion that the overall potential (!) manufacturing vulnerability (Map 3) is highest in countries with high impacts and low business stimulus: Denmark, Sweden, Slovakia, the UK, the Baltic States and parts of Romania and Hungary.

Still vulnerable are Northern Spain, Northern Italy, Southern Ireland, Bulgaria, Greece and parts of Belgium, Germany, Poland, Finland and Austria.

Of the Non-EU member states, the impact of the crisis on manufacturing was highest in Turkey and Croatia. Norway and Switzerland did not suffer from serious manufacturing breakdowns but on the other hand only issued relatively small fiscal stimulus packages compared to the Member States which is why they appear as vulnerable on the vulnerability map. No comparable fiscal stimulus data for Turkey and Iceland was available. For the European neighbourhood and Turkey solely the GVA development in manufacturing was used as a simplified indication for vulnerability. Compared to the European average, only Turkey, Moldova and Montenegro faced sharper declines.

## Construction in crisis

In a number of countries, housing markets had been overvalued before the crisis and the connected construction industries grew strongly but unsustainably. Strong increases in real house prices have been observed in the past years in the United Kingdom, France, Ireland, Spain and the Baltic countries (EC 2009-2). In some of these countries, especially in Spain, Ireland and the Baltic states, this has been associated with buoyant construction activities. The very high sensitivity of these countries (and regions) is a result of the great dependency of housing activities on the financial markets

**adaptive capacity** is measured by the proportion of the *national stimulus packages concerted in the EERP for increased investment expenditure* (in average % of national GDP in 2009 and 2010). This is a policy tool that largely targets the construction sector in the form of new transport infrastructures, renovation of buildings, etc. This can only give a hint of the industry's potential to drive through the crisis years and does not indicate long-term sustainability.

### The role of neighbouring countries and cross-border effects

The construction sector of some neighbouring countries has been hit by the crisis to a similar extent as in more affected European regions, most notably in the three Caucasian republics, Jordan and the Lebanon (EC-2010-5). Many infrastructure activities, especially in the CIS countries (plus Georgia), were affected because of foreign investments temporarily running dry. At the time of writing, however, investments are already catching up.

### The indicator system for regional vulnerability

The **exposure** of the construction sector towards the crisis corresponds to manufacturing, measured by the *GVA development in construction 2007-2009* (national) and *employment development in construction 2008-2010* (NUTS 2 regional). The share of total employment in construction makes up the **sensitivity** of regions on a NUTS 2 level. The

Table 3 Indicators used for 'Construction in crisis' vulnerability in NUTS 2 regions

	Indicator	Minimum	Mean	Maximum	SD
Exposure	GVA growth in construction 2007-2009	-43% (UK)	-4%	+31% (SK)	16
	Development of employment in construction 2008-2010	-50% (Southern and Eastern, IE)	-8%	+34% (Pomorskie, PL)	14
Sensitivity	Share of total employment in construction activities	1% (Zuid-Holland, NL)	7%	43% (Zeeland, NL)	4
Adaptive capacity	Fiscal stimulus aimed at public investments 2009 & 2010 in % of GDP	0% (various countries)	0.54%	2.5% (CY, PL)	0.62

A more important issue in this respect is that many EU27 construction companies have strong ties to Eastern European building markets. As a result a number of Western European building companies faced losses in the EU14. Still, compared in absolute numbers to the sector downturn in some EU countries, the losses in neighbouring countries are of minor significance. Additionally, financially more flexible countries did adopt strong infrastructure stimuli. In Russia, for instance, a seven-year programme worth more than 400 billion Euros to upgrade and expand the country's transportation infrastructure has been passed (Davis Langdon 2009). Another neighbourhood link is that a notable number of workers in EU construction firms are hired in neighbouring countries. However, it cannot be expected that the crisis will influence this fact significantly.

#### The vulnerability map

The countries that had the largest economic downturns in construction GVA were Denmark, Spain, Greece, Ireland, Estonia, Luxemburg, Latvia (-43%! ), Lithuania, Sweden and the UK. In particular Spain, the UK, Ireland and the Baltic states each experienced a considerable real estate bubble that burst. This was immediately reflected in a reduction of jobs in the construction sector. In the other affected counties, the crisis did not carry over to the labour market. The regional sensitivity in the most exposed countries does not draw a very concise picture, since the construction sector is spread out at the regional level in a diverse way. Only in Flevoland, South Holland and a number of tourism regions (the Algarve, Northern Portugal, the Aosta Valley and Corsica) is the construction sector of high regional importance, which makes these regions vulnerable. Conversely, the manufacturing sector is only of minor importance in Sweden, which is

why the potential impact in there is average at best.

The labour market development used to describe the exposure already contains some implicit adaptive capacity. Additionally, stimulus measures aimed at public infrastructure investments were included for the final vulnerability index. The highest shares of state support dedicated to investment projects could be found in Spain, Germany, Poland, Cyprus and Estonia. In South-Eastern Europe and Italy little efforts have been made so far to support the construction sector. This results in the overall vulnerability (Map 4) which leads to the most vulnerable regions being found in Ireland, the Algarve in Portugal, the Aosta Valley, most parts of the UK, parts of the Netherlands, Latvia and Lithuania and parts of Greece. Additionally, Denmark, Spain, Austria, Italy, Estonia, Hungary and Romania are affected to a high degree.

It is probable that in regions with overheated housing markets, e.g. Spain, Ireland, the UK and any mentioned tourist regions there will be a considerable shakeout of the sector owed to a previous overheated boom. In industrially strong and urbanised regions, the construction sector might soon return to previous growth rates, given that the overall performance of these regions will recover.

As in manufacturing, Norway did not suffer from highly negative developments in the building sector, but the relatively small infrastructure stimulus package leads to it being categorised as vulnerable. No comparable fiscal stimulus data for Turkey and Iceland were available. However, measured solely by the GVA development, Russia, Ukraine, Moldova and Turkey are the more vulnerable nations in which construction declined more than the European average.

#### The financial sector in crisis

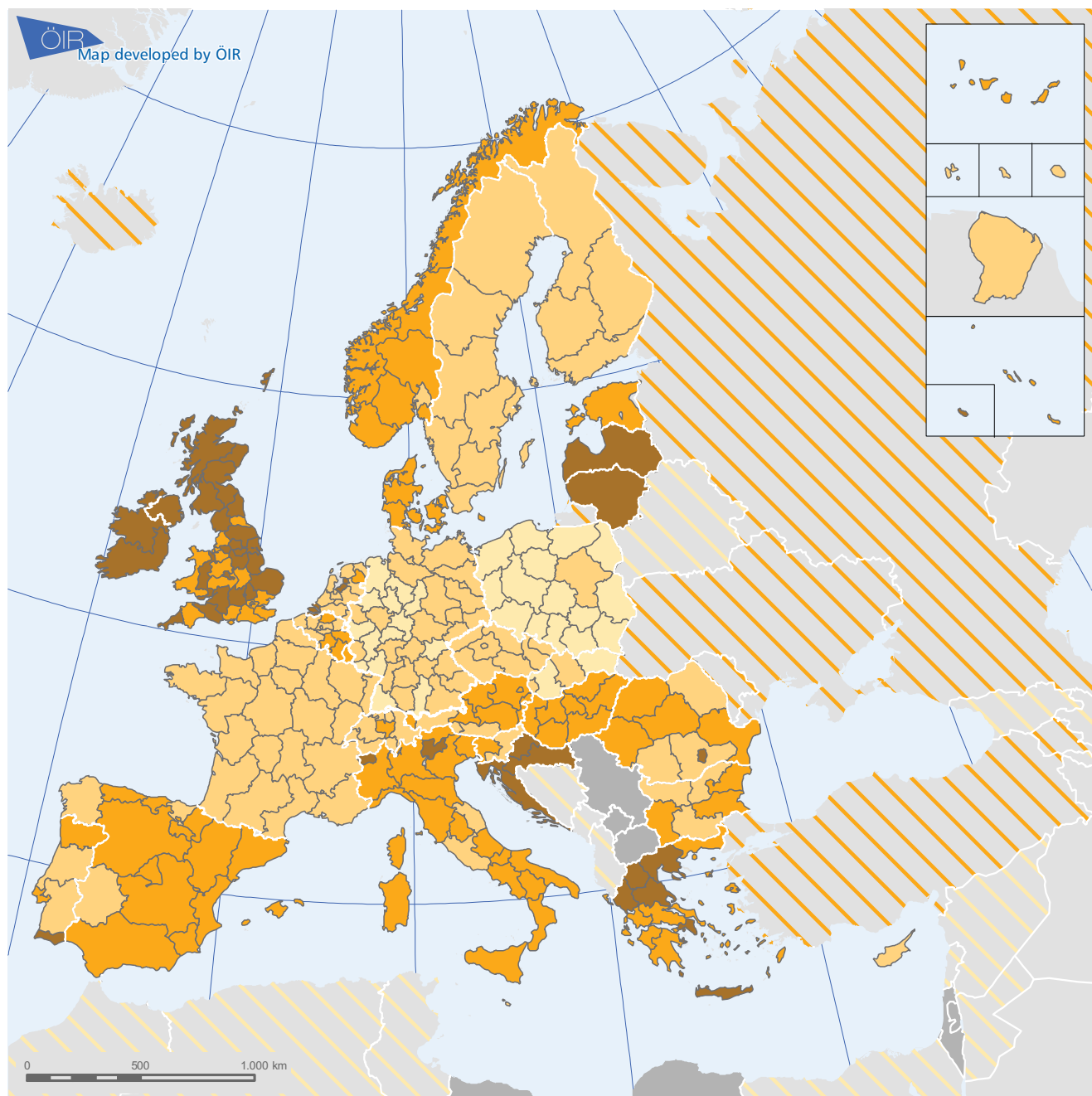
Countries—or actually urban regions in most cases—that house large financial centres, such as the United Kingdom, Ireland and Luxembourg, are obviously more exposed to financial turbulence than others. Additionally, countries which are the home base of cross-border banking activities in struggling emerging economies in Central and Eastern Europe are also likely to be more strongly

affected (notably Austria, Belgium and Sweden, with Sweden being exposed to the Baltic economies).

The impact of the crisis of the financial sector is difficult to localise on regions, because of the systemic and volatile nature of the industry that only depends on territory to a minor extent.

Map 4 Key vulnerability 'Construction in crisis' (following page)

# Construction in crisis - Vulnerability



## Vulnerability of Regions linking the impact with the adaptive capacity

- most vulnerable regions
- vulnerable regions
- prepared regions
- low impact regions
- not enough data

Indicators describing exposure:  
 - GVA growth in construction 2007-2009  
 - development of employment in construction 2008-2010

Indicators describing sensitivity:  
 - Share of total employment in construction activities

	Impact	
	low	high
Adaptive capacity	high	<span style="display: inline-block; width: 15px; height: 15px; background-color: #FFD700; border: 1px solid black;"></span>
	low	<span style="display: inline-block; width: 15px; height: 15px; background-color: #8B4513; border: 1px solid black;"></span>

Indicators describing adaptive capacity  
 - Average fiscal stimulus aimed at public investments 2009 & 2010 in % of GDP  
 (Source: EC DG Ecfm: Public Finances in EMU 2010)

## Neighbouring Countries (simplified methodology)

- more vulnerable
- less vulnerable
- not enough data

Indicators describing Neighbours:  
 - GVA growth in construction 2007-2009

Data source Eurostat except where indicated. Detailed indicator description in the annex. Indicators have been standardised via z-transformation and polarised according to the influence on vulnerability.

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### The indicator system for regional vulnerability

The **exposure** of the financial sector to the crisis corresponds to manufacturing, measured by the *GVA development in financial intermediation, real estate, renting and business activities 2007-2009* (national) and the *employment development in financial and insurance activities 2008-2010* (NUTS 2 regional). For regional **sensitivity**, the GVA share in the group of NACE sectors J and K (financial intermediation, real estate, renting and business activities) is chosen as an indicator. These include real estate activities (which were also hit heavily by the financial crisis and therefore fit into the sub-challenge) and various business activities (which were hit by the financial crisis to a lesser extent).

The **adaptive capacity** is measured by *public aids for the banking sector*, including liability guarantees and effective capital injections as a combined potential for the sector to survive the crisis (in average % of national GDP in 2009). Even if only considering effective transactions, in many countries the public banking rescue packages had much larger volumes than the stimuli packages. Apart from effective payments and bank nationalisations, guarantees and liabilities try to psychologically stabilise the capital markets in order to provide a sustainable recovery for the European 'real' economies.

### The role of neighbouring countries and cross-border effects

The banking sector in the Eastern neighbours was initially affected, but has since cooled down as liquidity support from the monetary authorities and international financial institutions has prevented a systemic crisis. No major bankruptcies were observed in the regional financial system, and the bank systems remained well capitalised. The financial sector in most of the Mediterranean neighbouring countries generally has been sheltered from the crisis due to their low degree of integration into the global markets (EC 2010-5).

Most relevant of all, there are serious cross-border effects with neighbouring countries and inside the

EU27. The financial linkages within Europe are economically significant as most New Member States are highly dependent on Western European banks, either directly through their private sector or through the local banking sectors owned mainly by Western banks. Also, in Ukraine and the Western Balkans European banks own a fair share of the local banking sector. Austria, Germany, Sweden (for the Baltic states) and Italy account for the largest share of these claims (Árvai et al. 2009).

### The vulnerability map

GVA losses for financial institutions have been recorded in Estonia, Hungary, Ireland, Lithuania, Sweden and the UK. Nevertheless, compared to the developments in manufacturing or construction, they were less significant. Interestingly, most job losses in the financial sector for the period 2008-2009 came about in countries with a growing GVA in 2007-2009: Belgium, the Czech Republic, Slovakia, Spain, Greece, the Netherlands and Portugal. Regionally, the most important shares of the financial sector can be found in most of the European capital regions (e.g. in the regions of Berlin, Prague, Vienna, Budapest, Madrid, Lisbon, Stockholm, Rome, Paris). Furthermore, almost the entire UK, southern France, Cyprus, a number of German specialised financial regions (e.g. Frankfurt, Munich, Hanover) and the Benelux countries faced a highly above average impact.

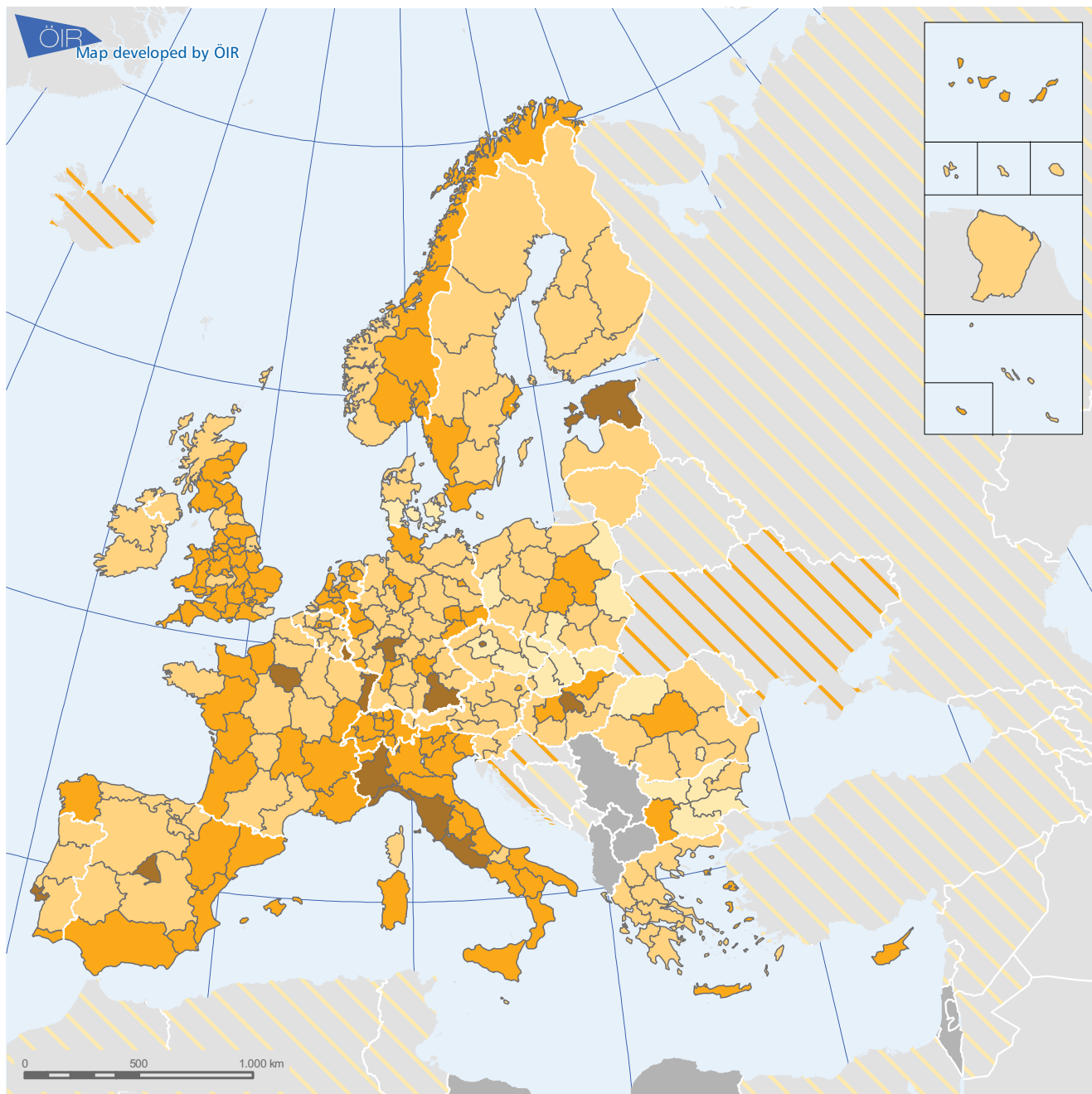
The highest bank rescue packages including capital injections, liquidity support and guarantees on bank liabilities in relation to national GDP were issued in Austria, Denmark, the Netherlands, Sweden and the UK. It should be noted that by far the highest public budget for *effective* bank support (liquidity and capital injections) – excluding guarantees – had been passed at this point in the UK, Ireland and the Netherlands. Also in Austria, Belgium, Latvia and Luxemburg, notable amounts had been invested by the state in the financial sector.

Table 4 Indicators used for 'The financial sector in crisis' vulnerability in NUTS 2 regions

	Indicator	Minimum	Mean	Maximum	SD
Exposure	GVA growth in financial intermediation; real estate, renting and business activities 2007-2008	-18% (UK)	3%	+49% (SK)	116
	Development of employment in financial and insurance activities 2008-2010	-46% (Dorset and Somerset, UK)	-1%	+75 % (Nord-Vest, RO)	17
Sensitivity	Share of GVA in financial intermediation, real estate, renting and business activities	10% (Severozapad, CZ)	23%	58% (Inner London, UK)	6
Adaptive capacity	Public interventions in the banking sector 2009 in % of GDP (guaranteed and effective)	0.00% (various)	28.67%	243.80% (DK)	39.69

Map 5 Key vulnerability 'The financial sector in crisis' (following page)

# The financial sector in crisis - Vulnerability



## Vulnerability of Regions linking the impact with the adaptive capacity

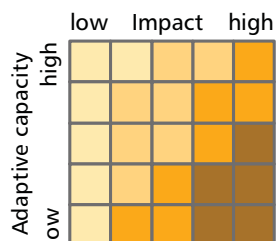
- most vulnerable regions
- vulnerable regions
- prepared regions
- low impact regions
- not enough data

Indicators describing exposure:

- GVA growth in financial intermediation; real estate, renting and business activities 2007-2009
- development of employment in financial and insurance activities 2008-2010

Indicators describing sensitivity:

- Share of GVA in financial intermediation, real estate, renting and business activities



Indicators describing adaptive capacity:

- Public interventions in the banking sector 2009 in % of GDP, guaranteed and effective
- (Source: EC DG Ecfm: Public Finances in EMU 2009)

## Neighbouring Countries (simplified methodology)

- more vulnerable
- less vulnerable
- not enough data

Indicators describing Neighbours:

- GVA growth in financial intermediation; real estate, renting and business activities 2007-2009

Data source Eurostat except where indicated. Detailed indicator description in the annex. Indicators have been standardised via z-transformation and polarised according to the influence on vulnerability.

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Combining the impact of the crisis with the bank rescue efforts (Map 5), several European capital cities with less intensive bank support measures (the regions of Prague, Budapest, Madrid, Lisbon, Rome, Paris) are most vulnerable. Furthermore, industrialised regions with an important financial sector are also observed to be most vulnerable (e.g. Milan, Turin and Genoa in Italy, Munich, Hamburg and Frankfurt in Germany) and Cyprus. Estonia, Southern France and the Netherlands are also vulnerable. However, these conclusions did not look at the real operational condition of the banking institutions.

Of the Non-EU member states, Iceland (and maybe Liechtenstein, though no data was available) has the highest impact because of the relatively large amount of job losses in the financial sector. The impact in Turkey was relatively low, although no adaptive capacity (banking rescue) data for Turkey and Iceland was available. Out of the neighbourhood policy countries, Ukraine was the only one that faced a higher decline in financial sector GVA than the EU average.

## Households in crisis

The turbulences the economic sectors have been confronted with, as discussed in the first three key vulnerabilities of this report, had the secondary effect of labour market contractions. Declining private investment and consumption has resulted in overcapacities on the supply side of the markets (see e.g. the price slump in the real estate market). However, as was explained in the introductory section in more detail, labour markets remained relatively stable in many countries in comparison to the shrinking of economic output.

This section deals with the regional effects of declining employment and its effect on household budgets.

### The indicator system for regional vulnerability

The **exposure** of private households towards the crisis is measured by the *unemployment development 2008-2010*.

For households' **sensitivity**, the *employment shares in the manufacturing and construction sectors* as presented above are added and used as an indicator of people primarily in danger of

losing their employment and therefore facing income cuts.

The **adaptive capacity** in this respect is measured by the *proportion of the national stimulus packages concerted in the EERP aimed at labour markets and directly at households* (in average % of national GDP 2009 and 2010).

### The role of neighbouring countries and cross-border effects

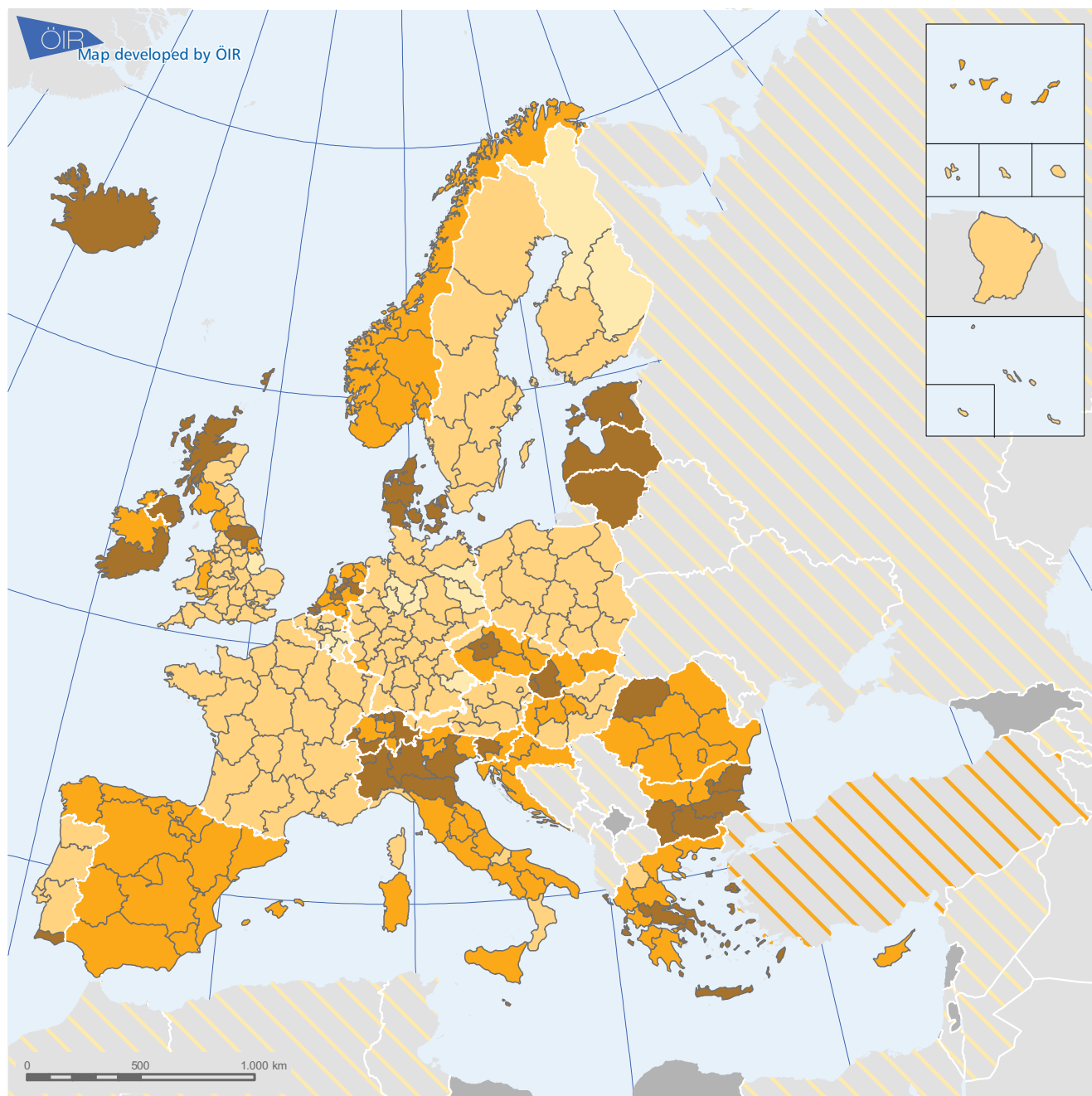
Labour markets in most neighbouring countries have suffered to some extent during the crisis, but the effects on the labour market have been minor due to the marginal global integration of their economies (with the exception of the fossil fuel exporting countries). Figure 9 presents average unemployment rates for the CIS and the Mediterranean countries and the most and least exposed single countries in this respect. However, neighbouring countries arguably have to increase efforts to enhance domestic demand and increase productivity in order to continue to catch up with higher income regions.

Table 5 Indicators used for 'Households in crisis' vulnerability in NUTS 2 regions

	Indicator	Minimum	Mean	Maximum	SD
Exposure	Development of unemployment 2008-2010	-34% (Mardin, TR)	37%	207% (Eesti, EE)	39
Sensitivity	share of total employment in selected manufacturing activities	0.16% (Autonomous City of Melilla, ES)	11%	59% (Zeeland, NL)	7
	Share of total employment in construction activities	1% (Zuid-Holland, NL)	7%	43% (Zeeland, NL)	4
Adaptive capacity	Fiscal stimulus aimed at households and labour markets 2009 & 2010 in % of GDP	-0.1% (LV)	1.44%	4% (SE)	0.94
	Unemployment benefits as a share of GDP	0.1% (EE)	1.15%	3.30% (BE)	0.75

Map 6 Key vulnerability 'Households in crisis' (following page)

# Households in crisis - Vulnerability

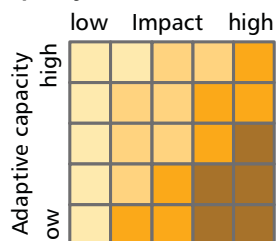


## Vulnerability of Regions

linking the impact with the adaptive capacity

- most vulnerable regions
- vulnerable regions
- prepared regions
- low impact regions
- not enough data

Indicators describing exposure:  
 - development of unemployment 2008-2010  
 Indicators describing sensitivity:  
 - Share of total employment in selected manufacturing activities  
 - Share of total employment in construction activities



Indicators describing adaptive capacity:  
 - Fiscal stimulus aimed at households and labour markets 2009 & 2010 in % of GDP (Source: EC DG Ecfm: Public Finances in EMU 2010)  
 - Unemployment benefits in % of GDP

## Neighbouring Countries (simplified methodology)

- more vulnerable
- less vulnerable
- not enough data

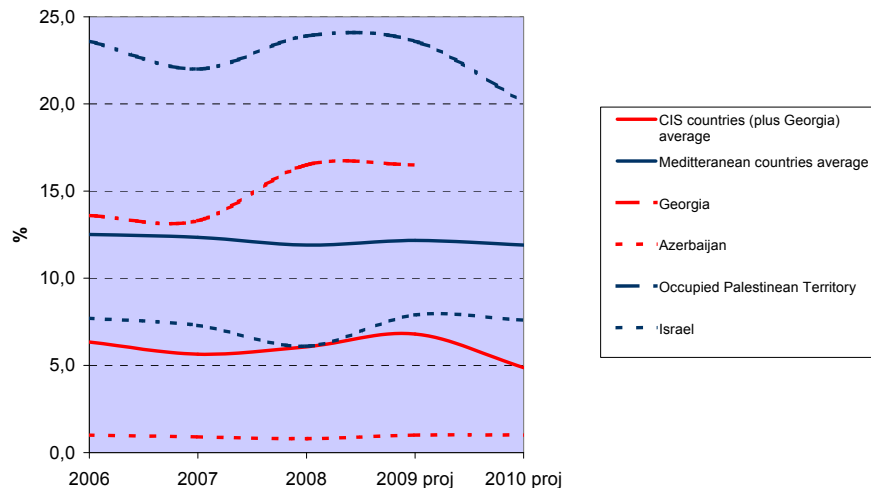
Indicators describing Neighbours:  
 - Development of unemployment 2008-2009

Data source Eurostat except where indicated. Detailed indicator description in the annex. Indicators have been standardised via z-transformation and polarised according to the influence on vulnerability.

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Figure 9 OECD projections for unemployment rates in the CIS and Mediterranean countries



Source: OECD Economic outlook 87 (OECD 2010-2)

### The vulnerability map

The highest growth rates in unemployment rates from 2008-2010 with more than 200% (from around 5% up to more than 15%), took place in Estonia and Lithuania. Unemployment more than doubled in this period in most of Denmark, Ireland, Estonia, Iceland and parts of the UK and Spain. Generally, 267 out of 318 regions analysed faced a rise in unemployment. The only countries where unemployment rates were notably stable to declining in this period were Germany and Luxembourg.

Losses in manufacturing and construction have so far not been offset by more job opportunities in the service sector. Interestingly, there are some very heterogeneous countries. Poland, for instance, featured many job losses in its Western manufacturing regions but was able to more than compensate for these with an increase in employment in the regions around its capital, Warsaw (EC 2009-2). In Southern Italy, where activity rates are generally lower than in Northern Italy, fewer jobs were lost than, for example, in the Padan Plain (EC 2010-3). In some structurally weak regions of Eastern and Northern Germany and Southern France, the downturn in manufacturing and construction GVA is not reflected in job losses at all. One of the reasons may lie in labour market measures such as short-time work.

The regional sensitivity based on selected sectors uses the same values already described in the manufacturing and construction sections of this report. Due to the high share of these vulnerable activities, Northern Italy, the Czech Republic, and some Swedish and Dutch regions are the most sensitive regions. However, the job losses there were not as explicit. In Bulgaria, even if it did not have very high impacts in manufacturing and construction, a relatively steep decline in employment in services caused a high household impact.

In Spain, Sweden, Finland, Germany, Austria and Hungary the highest fiscal stimuli were directed to the households, which saved those countries from higher vulnerability levels. Map 6 indicates that the overall potential vulnerability of households through the crisis is highest in Ireland, Northern Italy, Denmark, Slovenia, all three Baltic States and Bulgaria. Still potentially vulnerable at least in many regions are Spain, the UK, the Netherlands, Southern Italy, Romania, Greece, the Czech Republic, Slovakia and parts of Hungary.

In contrast, in some Swiss regions and Macedonia new jobs have been created. Iceland on the other hand had a drop in employment of almost 6% in one year. In Norway, very few jobs were lost but the poorly allocated stimulus package there results in Norway appearing vulnerable on the map.

## The sovereign debt crisis

This final section deals with the secondary effects of the public intervention that formed the basis for the countries' adaptive capacity during the crisis: the interventions into the banking sector, the real economy and households' purchasing power. This (partly) massive shifting of public funds is not without consequences: the measures to combat the crisis passed by national governments to varying extents (and coordinated at the European level) also stress the sovereign debt levels, to varying extents as well. Additionally, substantial output losses and one-time factors led to fiscal deficits in a number of countries. This key vulnerability is calculated at the national level.

### The indicator system for regional vulnerability

As **exposure** we use the crisis-induced *average general government deficit and surplus in 2008 and 2009*. Because of the most recent developments (excessive deficit and rescue packages for Ireland and Greece by the Commission and the IMF) this appears an approach of limited accuracy and probably will remain limited for months and years to come. Therefore, to provide at least some insight into the near future, the most recent *average general government deficit and surplus forecast 2010-2012* from DG Ecf's European Economic Forecast autumn 2010 (EC 2010-6) has been included.

The **sensitivity** is developed using the level of *pre-crisis general government debt (2007)* in order to illustrate the fiscal burdens of the past and the *structural primary balance of general government debt 2007*. The primary balance, i.e. the fiscal deficit without net interest payments, is a crucial determinant of the change in the debt ratio. For countries which already have a significant level of

debt, a weak structural primary balance is a risk that must be taken into consideration.

For **adaptive capacity**, two different parts are added to the picture. On one hand, the potential to relieve public finances in the absence of substantially cutting public benefits and services is indicated by the potential to increase revenues, which uses the *pre-crisis total revenues from taxes and social contributions* as an indicator. This is done following the consideration that Member States with a high share of taxes as a percentage of GDP might find it hard to increase taxation further. How feasible or easy that is will also depend on the political situation in the different Member States. The other option for decreasing debts is expenditure cuts. To illustrate the potential for expenditure reduction, the *government effectiveness index* collected by the World Bank Worldwide Governance Indicators project was used. Countries with an already highly efficient government have only limited possibilities to cut expenditures without reduction of government benefits or services. (It is very important that the adaptive capacity in this respect does not include the possibilities to generally reduce the government spending, only the potential to optimise the efficiency of the public sector without the reduction of social security, public funding etc.). Countries that score low in both will either have to increase taxes considerably or reduce public services and funding. The second area of adaptive capacity towards sovereign debt is the output growth after the crisis. Therefore, the *real GDP growth forecast 2010-2012* according to the European Commission/DG Ecf and the IMF were used. By using both of these reputable estimations it is expected that the error rate of the forecasts shall be reduced.

Table 6 Indicators used for 'The sovereign debt crisis' vulnerability

	Indicator	Minimum	Mean	Maximum	SD
Exposure	Average general government deficit and surplus in 2008 and 2009 as a share of GDP	-11.30% (IS)	-3.24%	14.40% (NO)	4.87
	Average general government deficit and surplus forecast 2010-2012	-17.23% (IE)	-4.74%	9.43% (NO)	3.29
Sensitivity	Pre-crisis general government debt (2007) as a share of GDP	3.80% (EE)	53.38%	103.50% (IT)	22.67
	Pre-crisis general government structural primary balance (2007) as a share of GDP	-13.10% (NO)	0.21%	5.80% (CY)	2.91
Adaptive capacity	Potential to increase revenues (pre-crisis total revenues from taxes and social contributions as a share of GDP)	23.71% (TR)	37.48%	79.50% (MT)	6.68
	Potential for expenditure reduction (government effectiveness index)	-0.14 (MK)	1.18	2.19 (DK)	0.65
	Average real GDP growth forecast 2010+2012 according to the EC	-2.03% (GR)	2.20%	5.83% (TR)	1.56
	Average real GDP growth forecast 2010+2012 according to the IMF	-1.84% (GR)	2.05%	5.03% (TR)	1.38

### The role of neighbouring countries and cross-border effects

Public finances in the Mediterranean countries and the EU's eastern neighbours deteriorated significantly in 2009 and especially in the latter region the public deficit was sizeable. As the Eastern neighbouring economies owe their recent growth rates to an economic model dependent on capital inflows from abroad, the breakdown of global credit markets shattered this growth strategy and they presently find themselves in a period of substantial macroeconomic vulnerability and scarcely able to finance any stimulus measures. Already some countries (Belarus, Ukraine, Armenia, Moldova, Serbia) have had to turn to the International Monetary Fund for support (UN 2009). However, the eastern countries' public finance position had been in better shape than most Mediterranean countries before the crisis as a result of reforms over the last decade. The dispersion in the public finance debt among the Mediterranean countries is large: Lebanon usually has the highest public debt ratio (exceeding 150% of GDP), while oil-exporter Libya has virtually no public debt (EC 2010-5). Direct effects of the sovereign debt crisis in neighbouring countries are not present, but if the financial instabilities in neighbouring countries persist in the mid-term, damages to the overall economic ties between the EU and the neighbouring countries are likely.

### The vulnerability map

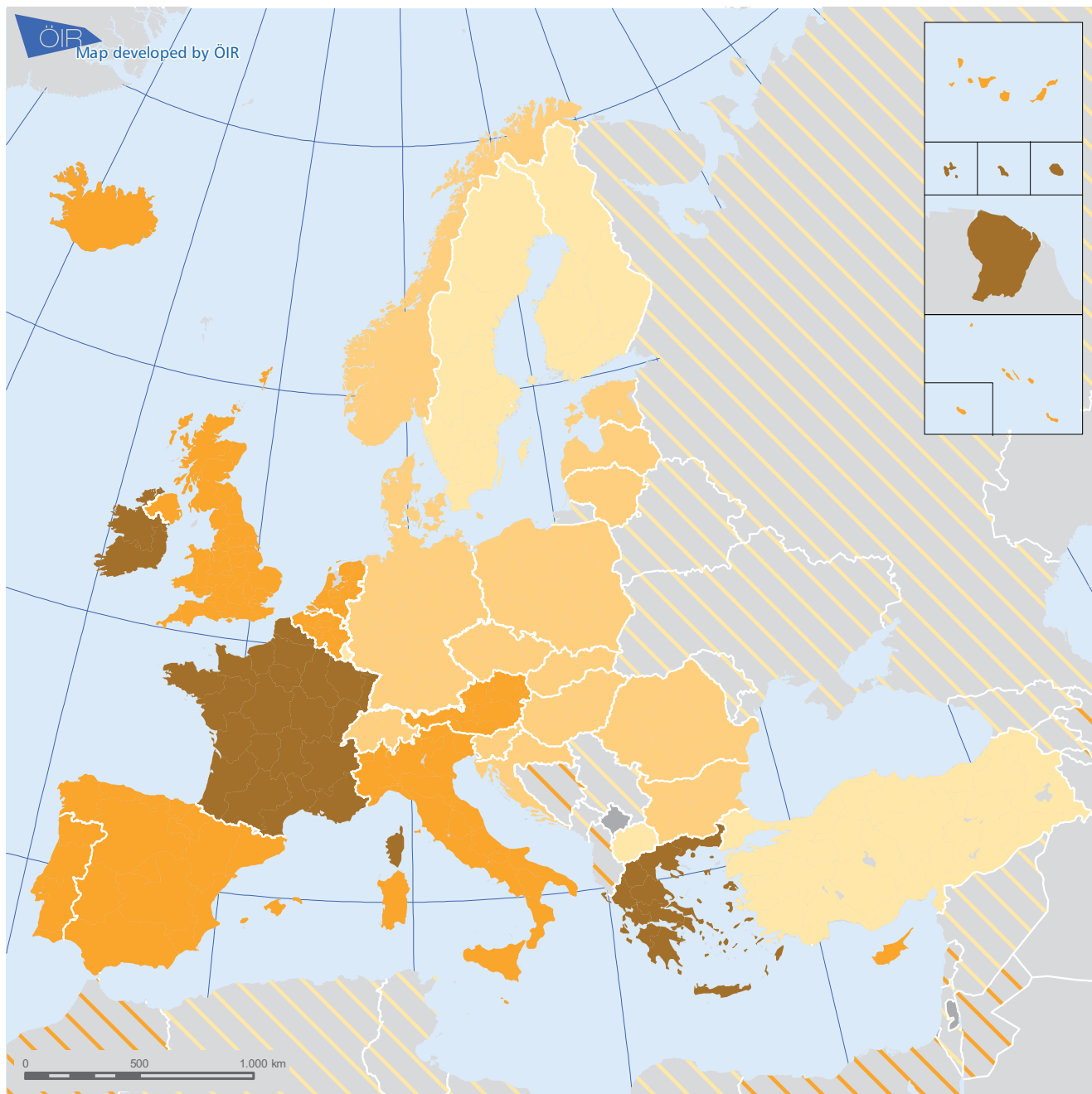
The highest average general government deficits in 2008 and 2009 (above 5%) have been faced in Spain, France, Greece, Ireland, Latvia, Lithuania, Poland, Portugal, Romania and the UK. The highest average deficits forecasted by the Commission during 2010-2010 are for Ireland (-

17% per year), the UK, Greece, Latvia and Lithuania. For the calculation of the regional sensitivity, the first indicator used was the pre-crisis general government debt. Countries that in 2007 had a higher debt level than 60% of GDP (Maastricht convergence criteria) were Belgium, Germany, France, Greece, Italy, Portugal and Malta. A second criterion for sensitivity was the general structural primary balance of the pre-crisis government, which should indicate whether there is a balanced budget that is neither the result of the economic cycle nor any interest payments from previous debts. A negative structural primary balance could be found in 2007 in the Czech Republic, France, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, Slovakia and the UK.

The two kinds of reduction potential for the general debt level form one part of the adaptive capacity. The pre-crisis total revenues from taxes and social contributions is highest (above 40%) in Austria, Belgium, Denmark, France, Italy and Sweden. These countries have very limited options for raising taxes without excessive additional burdens on their citizens. The lowest potential for expenditure reduction, without severely cutting public benefits (due to an already very efficient administration), can be found in Austria, Belgium, Germany, Denmark, Finland, France, Luxemburg, the Netherlands, Portugal, Sweden and the UK. In these countries, further cuts in public spending might also have strong impacts on public services. In GDP growth forecasts carried out by the Commission and the IMF, all Member States but Greece have positive average growth numbers over 2010-2012. In Cyprus, Spain, Ireland, Portugal and Romania they are significantly below the EU average.

Map 7 Key vulnerability 'The sovereign debt crisis' (following page)

# The sovereign debt crisis - Vulnerability



## Vulnerability of Regions linking the impact with the adaptive capacity

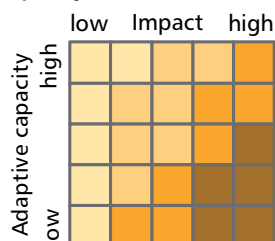
- most vulnerable regions
- vulnerable regions
- prepared regions
- low impact regions
- not enough data

Indicators describing exposure:

- Average general government deficit and surplus in 2008 and 2009
- Average general government deficit and surplus forecast 2010-2012

Indicators describing sensitivity:

- Pre-crisis general government debt in 2007
- General government structural primary balance in 2007- Real GDP growth forecast 2010+2011 (Source: IMF, December 2010, World Economic Outlook database)



Indicators describing adaptive capacity:

- Potential to increase revenues, pre-crisis total receipts from taxes and social contributions
- Potential for expenditure reduction, government effectiveness index (Source: World Bank Worldwide Governance Indicators project)
- Real GDP growth forecast 2010+2011 (Source: DG Ecf)

Data source Eurostat except where indicated. Detailed indicator description in the annex. Indicators have been standardised via z-transformation and polarised according to the influence on vulnerability.

## Neighbouring Countries (simplified methodology)

- more vulnerable
- less vulnerable
- not enough data

Indicators describing Neighbours:

- Pre-crisis general government debt (2007)

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According to the aggregated vulnerability towards increasing sovereign debts as a result of the economic crisis (and countermeasures against it) as pictured in 0, Ireland, France and Greece are the most vulnerable regions for short- to medium-term budgetary constraints.

However, the single indicators for these countries differ widely. Greece has very low scores for all three dimensions: exposure, sensitivity and adaptive capacity. Ireland only scores very low in exposure, owing to the excessive deficits during the crisis and the even more pessimistic prognosis by DG Ecfm. Still, Ireland's sensitivity is limited as its pre-crisis debt and the structure of it was favourable. Additionally, Ireland's capacity to adapt is higher—mainly a result of the country's low tax levels and thus the potential to create new revenues—and the Irish government has already put some measures in force to raise these tax levels.

Out of this triumvirate of countries, France has the least critical indices; however, all French indicators score equally below European average. For instance, in contrast to Spain or Ireland, France has had a high debt level before the crisis way above the Maastricht criteria. Compared to Portugal or Italy, France has a high annual structural deficit, mostly because of its costly social security and pension system. Finally, the share of taxes and social contributions in the French GDP is amongst the highest in Europe with around 43%. This, in contrast to more low-tax countries like Ireland or Portugal, limits the administration's possibilities to generate new incomes for adaptation in the short term. The argument taken in favour of France is that by far its economy is more competitive than those of the southern belt. This is referring to its superior growth potential which would still be enhanced when all structural reforms planned get implemented. It is the very mix of indicators used that ranks France amongst the most vulnerable of countries to public finances. This analysis is based upon the findings and growth forecasts as of October 2010. In the meantime, growth forecasts

for France have been adjusted slightly upwards to reach an average of around 1.73-1.9 % (IMF and Eurostat respectively) in 2011 and 2012.

These most vulnerable countries are followed by the vulnerable countries Belgium, Portugal, Spain, Italy, Germany, the Netherlands, the UK, Cyprus and Austria. All of these countries have relatively high deficit and debt levels and a low potential to raise taxes or reduce administrative costs. They are also very diverse. Deficit exposures significantly worse than the EU average have been recorded in Spain, Portugal and the UK. Of these three, Spain and the UK had relatively small debt levels before the crisis. Belgium and Italy face comparatively small deficits; however, their debt levels were close to 100% of GDP even before the crisis (both countries on the other hand have a low structural deficit). Finally, Austria, the Netherlands, Malta and Cyprus have notable but not alarming deficits and debts. Nonetheless, they have low adaptive capacities which is due to limited remaining opportunities for policy measures, either caused by a high share of taxes in government revenues (Austria, Cyprus, Malta), a low potential to cut administrative costs (Austria, the Netherlands) or lukewarm growth expectations (Cyprus, the Netherlands).

Of the prepared countries, Latvia, Lithuania and Poland are characterised by high deficit exposures. As their sensitivities are low and their adaptive capacities above average, they still appear to be prepared for the mid-term.

Of the Non-EU member states, only Iceland is vulnerable as a result of high deficits and little financial room to adapt. The other EFTA countries and Turkey have either very low debt levels or even had annual budgetary surpluses during the crisis (Norway, Switzerland).

For the neighbourhood policy countries, only the pre-crisis, general government debt could be provided due to a lack of reliable data. Compared to average EU debt levels, the more vulnerable countries in the EU neighbourhood are Morocco, Egypt, Jordan and Lebanon.



## 5. Integrated discussion of future challenges for EU regions

Looking at the different aspects of the crisis, a number of similarities across European countries can be observed. Without a doubt there are countries that have only experienced low impacts from the crisis due to economies that grew even during the crisis years, most notably Poland, Switzerland (with the exception of some financial upheavals) and Norway. Countries that had high impacts, but large fiscal stimulus packages that potentially threaten public budgets in the forthcoming years, are most importantly Spain,

France and the UK. Belgium, Germany and Austria will be better off if the recent growth that has begun will prove to be sustainable. The most prominent countries with high impacts from the crisis and small fiscal stimulus are Italy, Greece, Portugal and Ireland. Other countries had high impacts, but their relatively consolidated budgets allow for the expectation of fewer mid-term stresses, e.g. the Baltic countries, the Nordic states and most of the CEE countries. Table 7 gives an overview of these types.

### Interactions with other European challenges

The economic and financial crisis, together with fiscal policy measures adopted in the Member States, has started to have an impact on tax revenue. In 2008, EU27 general government tax revenue (including social contributions) fell to 40.5% of GDP, accounting for over 90% of total government revenue. The decline was more marked in the euro area, where the ratio fell from 41.5% in 2007 to 40.9% in 2008 (Eurostat 2010). In the context of this study, this means that possibilities to mitigate other upcoming challenges are harder as the public sector has to redirect funds into combating the crisis and faces fiscal constraints. Apart from that, some characteristics of the impacts and vulnerabilities that define the challenges for Europe 2020 are subject to the slowdown of economic growth. In this section, the five challenges are reviewed by means of their elasticity towards changes in the general conditions induced by the crisis.

both air and sea cargo volumes dropped, thereby affecting employment and production in the trade and transport sectors. With decreasing real incomes and rising insecurity concerning future incomes, people's propensity to travel was also reduced, which in turn affected the tourism sector. With a few exceptions, the crisis did not affect developing economies – those based on agriculture, mineral or fossil commodities and who rely strongly on inland consumption – to a high extent (cf. Map 8). This is why the international financial crisis led to a “crisis of globalisation” according to some authors. Nevertheless, the geographical position, differences in population developments and age structures, the socio-economic potential and the environment all pose significant challenges to the competitiveness of Europe in the global context. With reference to the EU 2020 Strategy, the global perspective needs to be further developed.

#### The crisis and the globalisation challenge

The globalisation challenge for Europe and the economic crisis are undoubtedly related. Without global trade flows and global financial interlinkages the crisis would not have spread as quickly and as radically across the majority of the developed and emerging economies of the world. As international trade was drastically reduced,

#### The crisis and the demographic change challenge

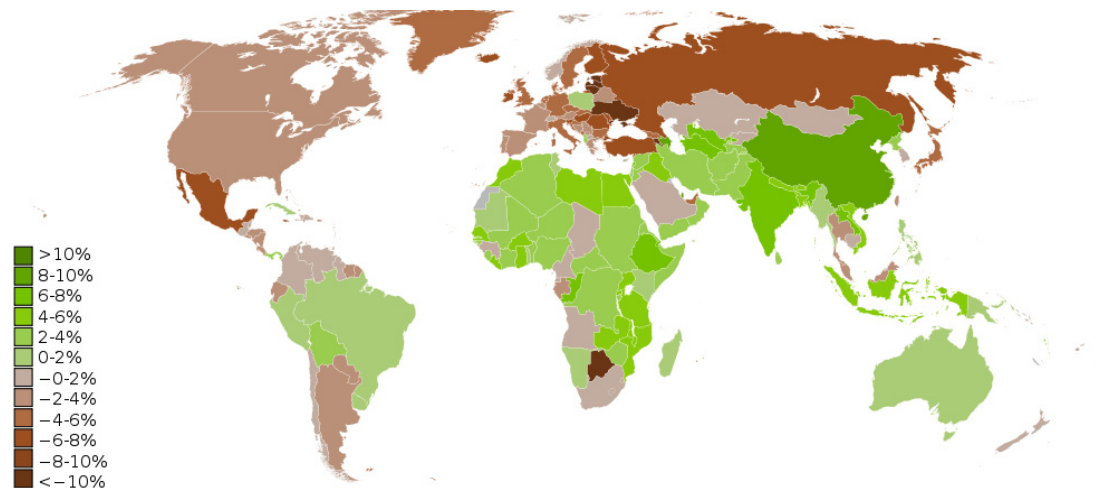
Distinct influences of the economic crisis on demographic change up to 2020 are unlikely. An ongoing loss in economic power and global competitiveness for Europe (*lost decade*) might in the very long run lead to lower fertility rates because of dismal economic prospects.

Table 7 Types of regional vulnerabilities

	Relatively high impact of the crisis		Relatively low impact of the crisis
	High potential impact on sovereign debts	Low potential impact on sovereign debts	
Relatively large fiscal stimulus	Spain, France, Austria, Germany, UK, Netherlands	Latvia, Denmark, Sweden, Finland, Luxemburg, Slovenia	Poland, Cyprus
Relatively small fiscal stimulus	Italy, Belgium, Greece, Portugal, Ireland, Hungary	Slovakia, Czech Republic, Lithuania, Estonia, Romania, Bulgaria, Croatia	Norway, Switzerland, Malta
Fiscal stimulus not analysed	Iceland		Turkey, FYR Macedonia

Source: ÖIR

Map 8 World map showing GDP real growth rates for 2009



Source: [en.wikipedia.org/wiki/Late-2000s\\_recession](http://en.wikipedia.org/wiki/Late-2000s_recession) (based on CIA World Factbook estimates)

The economic depression in the short term does, however, influence migration issues. At the moment labour markets in Europe as well as in the U.S. are virtually closed. The crisis recovery path will define how long this situation will last and how fast labour markets will become more flexible again. Since the labour markets of some countries that attracted many foreign job seekers in the past, such as Ireland, Spain or the UK, have suffered from the crisis the hardest, this issue might also have territorial impacts within Europe. Additionally, a very important concern for long-term sovereign debts is the challenge of ageing population, which is covered by the demographic change challenge in the main *Regional challenges* report. Experts agree that the growing share of supported elderly people will play a much more crucial role for public finances in many countries in the future than recent economic developments do. A very detailed and comprehensive coverage of this topic can be found in the Commission's 'Sustainability Report 2009' (EC 2009-5).

#### The crisis and the climate change challenge

Interestingly, the economic crisis might have contrasting effects on at least one aspect of the challenges for Europe 2020. With an ongoing recession (*lost decade*) greenhouse gas emissions will decrease much more than under recent growth conditions. However, in the medium and longer-term, the economic crisis may lead to higher emissions on account of weak fossil energy prices and financing difficulties potentially delaying or preventing investments in clean energy technologies, thereby increasing reliance on fossil-fuel capacity. Thus, the recovery from the recession may cancel any short-term greenhouse gas emission benefits. Due to the economic crisis it might be more difficult to find public financing for mitigation and adaptation measurements.

#### The crisis and the energy challenge

The economic and financial crisis has significantly weakened energy demand mainly due to the decline in industrial production, transportation and leisure activities. A decrease in energy demand, especially in OECD countries, has contributed to a recent decline in international prices of oil, natural gas and coal. There is also clear evidence that energy investments in most regions and sectors dropped sharply in 2009. In addition, a collapse in investments in forms of renewable energy like hydropower from the private sector and through public funds was recorded. Against this backdrop, it is expected that the effects of the crisis on investments in the EU energy sector and the EU's increasing dependence on imports of fossil fuels from non-EU countries will affect regional competitiveness and that some regions may be more exposed than others.

#### The crisis and the social polarisation challenge

The current economic crisis will leave marks on the European economy that will affect the labour market with a time delay. Wages and subsequently the income of private households dropped considerably. As outlined in the analysis in this paper, the crisis may lead to an increase in structural unemployment and in this respect to an growing segment of the population in danger of poverty, especially combined with the threats to public finances and social transfers. The increasing pressure on social transfer payments due to the sovereign debt crisis might also pose a threat to any social policy measures, such as youth education, trainings for the unemployed and life-long learning initiatives. If the first evidence indicates that regions with structural deficits may be more affected by the crisis in the long run, this might also be an issue for social cohesion within Europe.

## Mid- to long-term scenarios

Gauging the future impact of the crisis on potential growth is important because growth is a main determinant of the development of the standard of living in the medium and longer run. It is also an important determinant of economic slack – i.e. the output gap – in the short-term, which in turn defines the potential space for short-term policy. However, making predictions on the mid- to long-term impact of the current crisis is a bit like reading tea leaves. Nevertheless, there is some evidence from the analysis of previous crises and their effects on different sectors that will be presented in the section ahead.

### Manufacturing

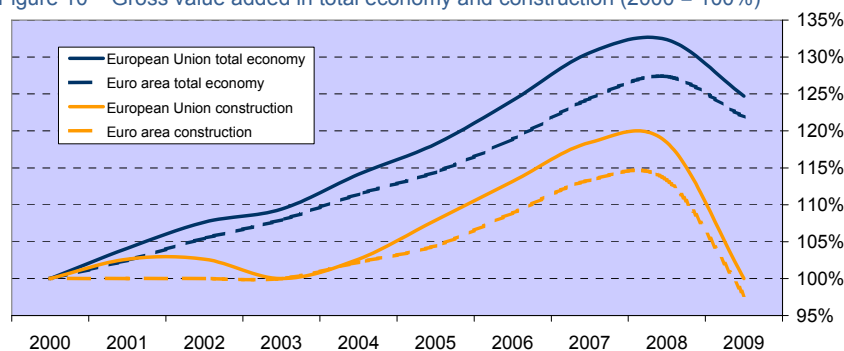
The potential output of the manufacturing industries in the future is assumed to depend on three factors: available capital, employment and total factor productivity. Potential output has been significantly affected in the short-term because of the decline in the existing capital stock, both through an increase in the capital depreciation rate (bankruptcies, accelerated capital scrapping, etc.) and through falling investment. Additionally, the downturn of the investment cycle has slowed the pace of capital accumulation. On account of this, it is possible that the level of potential output could decline, at least during the coming years. Moreover, if investment picks up only gradually after the recession, the impact on the capital stock could last for a long time and be the deciding factor as to whether Europe will face only a *sluggish recovery* or will have to cope with a *lost decade*. But in the long-term, in a balanced growth regime, the capital stock would expand, as would value added and hence potential output (Banque de France 2009). In order to manage the *sustainable recovery*, capital has to again become more readily available once the shock in the banking sector has been absorbed. Additionally, the crisis constraints could prompt companies to

cut back on research and development (R&D) in the manufacturing sector. In this case the potential output would be impacted by a permanent loss of potential human capital. Furthermore, a global crisis like the present one has the indirect effect of narrowing free-riding possibilities in innovation (making use of other countries'/firms' R&D activities) (Banque de France 2009). In other words, a global crisis might have a direct impact on the state of global technological progress. The sectoral reallocation of activity triggered by any large-scale crisis could also lead to a decline in the level or even the growth of factor productivity, influenced by changes in the size and relative importance of certain sectors. This would ultimately contribute to a decline in the level or growth of productivity in the entire economy. However, the crisis could also speed up the disappearance of less productive companies or sectors.

### Construction

The construction sector is very elastic towards the development of the overall economy and tends to be affected even more intensely during recessions as investments freeze. The early 2000s recession caused a veritable decline in construction output, as did the present crisis (Figure 10). Astonishingly, the curves for the construction sector very much resemble a *lost decade* scenario. With prominent infrastructure stimulus packages in many countries, the worst effects could be absorbed, but once the public investments have been phased out, the sector will again very closely follow the overall output development. On account of this, it is probable that even in an overall sluggish recovery construction will face a permanent loss due to lower growth rates, especially in markets where residential markets broke (e.g. Spain, the UK, Ireland).

Figure 10 Gross value added in total economy and construction (2000 = 100%)



Source: Eurostat

## Financial sector

Given remaining uncertainties about the economic outlook and fragilities in the financial sector, it is almost impossible to predict how the financial sector will develop according to different scenarios. The development will depend to a large degree on the mix of policy instruments, such as stock exchange, turnover or transaction taxes and the general regulations of the financial markets. Without a doubt, a solid, stable and healthy financial sector able to finance the real economy will be crucial. At the moment, it looks like some formerly highly productive financial centres such as the City of London are experiencing a reduction in activity.

## Private Households

Basically, the growth rate of potential employment depends on the growth of the working age population, which is not directly affected by the crisis. There are, however, special short- to mid-term crisis effects in structural unemployment. Since an abrupt increase in overall unemployment entails a lagged rise in long run unemployment, it also causes a higher structural unemployment. Workers who have been unemployed for a longer period tend to become less attractive to employers as knowledge diminishes over time and the job seekers potentially lose contact with the labour market and awareness of job offers (OECD 2010-1). This has been described as the *hysteresis effect* (a concept borrowed from physics and first used in this context by Blanchard and Summers, 1986), which has been discovered to be a major structural issue in the recovery from an economic shock. These long-term unemployed may prevent real wages from falling sufficiently to get priced back into the labour market. This is due to long periods of unemployment, which can increase their reservation wage as a consequence of social security preserving their level of subsistence. This also leads to a loss of human capital and may contribute to a *lost decade* scenario. There is empirical evidence that previous estimation work based on past historical evidence underestimates the degree to which the long-term unemployment increases (OECD 2010-1). Therefore, to achieve a *sustainable recovery* it is essential to keep the labour force in the employment process through transition measures, such as the case in a number of Member States. As a combination of employment and public budgetary issues, poverty and associated issues like public health or child mortality may suffer in some areas as a consequence of rising unemployment and dissolving social security nets. Countries and

regions that are already especially sensitive (structural deficits) to these issues might be struck harder in the mid- to long-term than others.

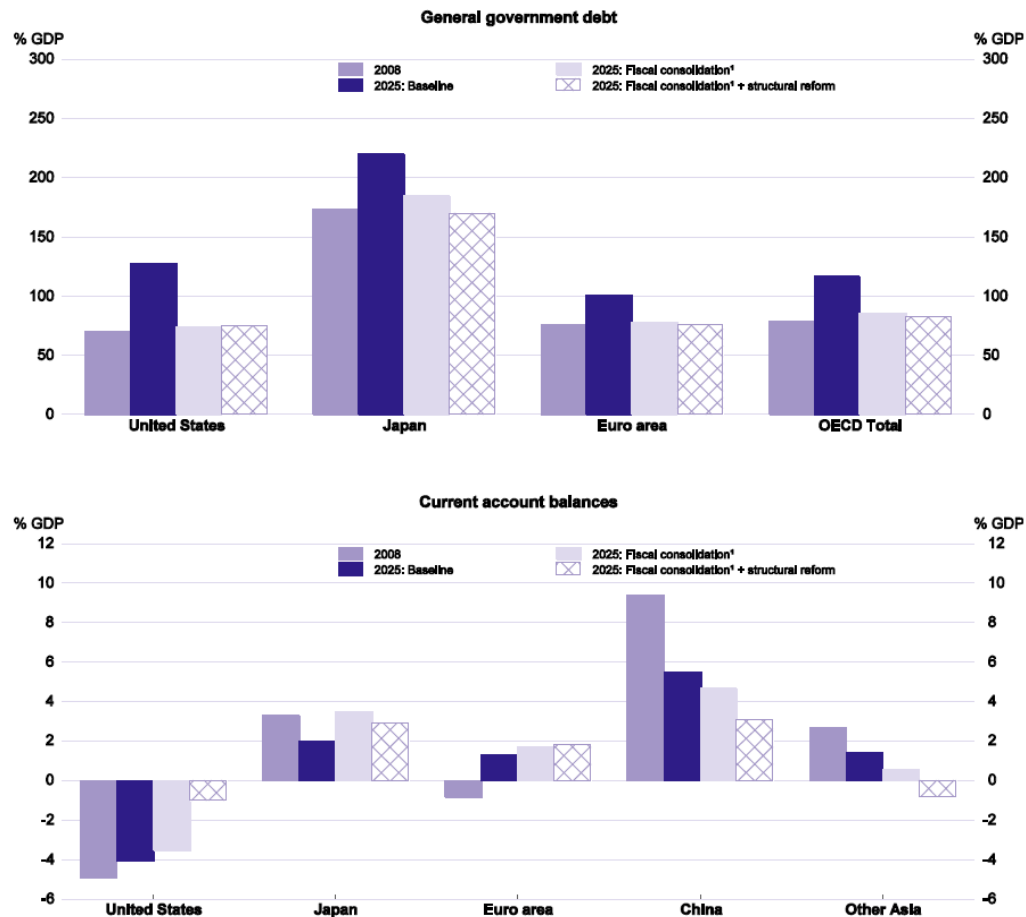
## Sovereign debts

Available long-term projections (e.g. OECD 2010-2, EC 2009-5, EC 2010-4) show that, in the absence of an ambitious effort to consolidate government accounts and structural reforms, with a one-off fiscal consolidation the pre-crisis balance would not be fully restored (OECD projections in Figure 11). There would still be unbearable increases in debt interest and pension expenditure, as well as on healthcare and long-term care during the coming decades. This is—as already analysed—only partly an impact of the crisis as high structural debt levels, substantial interest payments and of course the challenge of an ageing population are in place for years in many EU countries. Rising government expenditures and prospects of an ever-increasing debt would be an obstacle to a sustained and long-lasting recovery and balanced economic growth. Nevertheless, punctual fiscal expansion to counter recession and longer-term fiscal sustainability can be compatible if economic agents trust the austerity measures.

If, on the other hand, a durable widening of debt is expected, fiscal support will lose its effectiveness and can become counterproductive when the crisis climax has been overcome and one enters a phase of recovery (EC 2009-1). Past experiences show that crises even constitute a window of opportunity when the urgency of sustainable structural reforms becomes clear to the general public.

Some of the countercyclical measures themselves can have positive structural impacts and may therefore stabilise or even accelerate growth in the long run. For example, if measures on short-time work are relaxed quickly enough after the onset of a crisis, the link between employment and workers can be preserved (Pisani-Ferry, van Pottelsberghe, 2009). Training measures can anticipate loss of human capital and R&D support during a crisis can prevent a permanent loss of technological progress. It is important to avoid measures that not only have a high budgetary cost but also create a permanently unfavourable impact on potential output. For instance, early retirement measures to combat unemployment, though easy for policy makers to implement due to their social acceptance, cause a decline in the activity rate and therefore lower the actual growth and fiscal sustainability (Banque de France 2009).

Figure 11 A comparison of major governmental imbalances across scenarios until 2025



Source: OECD Economic outlook 87 (OECD 2010-2, p. 260)

Certainly, it is essential that governments should not overestimate the ease with which some of them have financed their deficits in the past. In the aftermath of the financial crisis, in the case of *sluggish recovery* or *lost decade* scenarios government revenues will be much lower and expenditures higher. This can have significant financial and real consequences when risk premiums on long-term bonds, as in the case of Greece or Spain, suggest that markets no longer consider sovereign debt low-risk, which causes a downward spiral of more debt. Countries with a relatively weak fiscal system and a high degree of dependence on foreign investors, such as the New Member States, generally face larger spreads on their debts. Persistently high levels of public debt can drive down capital accumulation, productivity growth and long-term potential growth and can pose significant risk to the prospects for future monetary stability (Cecchetti et al., 2009). How to tackle these issues without jeopardising the incipient recovery will be the key challenge facing European governments for the years to come.

One topic in this context may become crucial for European Regional Policies: After the fiscal stimuli

of 2009 and 2010 came the first major austerity packages to relieve public finances in which a major issue in all countries were cuts in administration costs and technical infrastructures (cf. media reports, e.g. BBC June 2010 on <http://news.bbc.co.uk/2/hi/europe/10162176.stm>).

A notable danger lies in the combination of stressed public finances and cuts in administration that might leave structural and regional development funds lacking co-financing and administrative capacities in the mid-term, thereby preventing future-oriented (and concerted) innovation and infrastructure measures from being realised. This can cause a chain reaction in actual output growth by not correcting structural deficits.

### Interdependencies

The five key challenges of the crisis can be seen as a sort of a pyramid. Whereas the manufacturing sector's primary short-term threats (capital availability) are a result of the financial sector crisis, the construction sector is suffering from capital availability as well as from decline in industries. Households are then mostly affected by the sectoral decline in employment. Public

countermeasures and declining tax revenues form the basis of the sovereign debt threats. Table 8 gives an overview of the short- to medium- and long-term effects of the crisis on the structural indicators identified in the key issue chapters. Generally, in the short- to medium-term up to approximately 2012-2015 the differences between scenarios are relatively blurred as growth will not notably differ. From a regional point of view, there is empirical evidence that structurally weak regions with, for example, low competitiveness in global markets because of a lack of innovation, inadequate industry mixes or infrastructural deficits, suffered more from the crisis than others (Bank Austria 2009, EC 2010-3). If reforms do not manage to correct these structural deficits after the recession, a negative impact not only on output level (*sluggish recovery*) but also on growth (*lost decade*) might affect these regions. This may include a number of factors:

- II An increase in the cost of capital effected by real economic adjustments in the financial sector;
- II Credit restrictions and higher borrowing costs for the real economy during the restructuring of banks and a changed attitude towards risk;
- II A permanent loss of human capital with more long-term unemployment as a result of the

initial shock during the crisis years (hysteresis effect), especially in inflexible labour markets;

- II Growing protectionism in world trade could have a negative effect on export-oriented countries;
- II A year-lasting postponement of private household consumption and business investment;
- II A permanent increase in the government share of the economy with a higher tax burden required to finance higher public spending and debt.

Although many analysts at the time of writing have revised their forecasts for 2010 and 2011 based on higher than expected growth, especially for the European leading economies Germany and the UK, economic growth in the EU as a whole continues to be low or even negative in some countries. Still, there is a fair level of uncertainty in the medium- and long-term perspective. Under a conventional business cycle interpretation, a period of slow growth or recession would be followed by a period of growth. Given the harshness of the crisis, there is still a serious risk of a structural change in growth in the direction of either a very sluggish recovery to former growth levels or a completely lost decade of growth.

Table 8 Short, mid- and long-term structural effects of the crisis according to different scenarios

Scenarios	Short- to medium-term trends	long-term trends
Manufacturing in crisis		
Sustainable recovery		-
Sluggish recovery	<div><div>:: increased depreciation</div><div>:: disturbed investment cycle</div><div>:: financial constraints</div><div>:: capital ageing caused by a drop in investment</div></div>	<div><div>:: higher cost of capital</div><div>:: cut back on R&amp;D</div><div>:: sectoral reallocation</div></div>
Lost decade		<div><div>:: higher cost of capital</div><div>:: cut back on R&amp;D</div></div>
Construction in crisis		
Sustainable recovery		-
Sluggish recovery	<div><div>:: declining orders caused by a drop in investments and capital availability</div></div>	-
Lost decade		-
The financial sector in crisis		
Sustainable recovery		-
Sluggish recovery	<div><i>dependent on policy measures and regulations</i></div>	
Lost decade		<div><div>:: a drain of financial centres from the EU</div></div>
Households in crisis		
Sustainable recovery		-
Sluggish recovery	<div><div>:: loss of income</div><div>:: decreasing domestic consumption</div></div>	<div><div>:: hysteresis effect (increasing structural unemployment)</div></div>
Lost decade		
The sovereign debt crisis		
Sustainable recovery		-
Sluggish recovery	<div><div>:: high short term deficits triggered by fiscal stimulus measures</div></div>	<div><div>:: unbearable increases in debt interest</div><div>:: co-financing of EU structural funds put into question</div></div>
Lost decade		<div><div>:: sustainable household consolidation put into question</div><div>:: decreases in public debt if structural reforms are eased by the crisis</div></div>

Source: ÖIR based on Banque de France 2009

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## Country abbreviations

AL	Albania	LB	Lebanon
AM	Armenia	LI	Liechtenstein
AT	Austria	LT	Lithuania
AZ	Azerbaijan	LU	Luxembourg (Grand-Duche)
BA	Bosnia and Herzegovina	LV	Latvia
BE	Belgium	LY	The Great Socialist People's Libyan Arab Jamahiriya
BG	Bulgaria	MA	Morocco
BY	Belarus	MD	Moldova
CH	Switzerland	ME	Montenegro
CY	Cyprus	MK	Former Yugoslav Republic Of Macedonia
CZ	Czech Republic	MT	Malta
DE	Deutschland	NL	Netherlands
DK	Denmark	NO	Norway
DZ	Algeria	PL	Poland
EE	Estonia	PS	Occupied Palestinian Territory
EG	Egypt	PT	Portugal
ES	Spain	RO	Romania
FI	Finland	RS	Serbia
FR	France	RU	Russian Federation
GE	Georgia	SE	Sweden
GR	Greece	SI	Slovenia
HR	Croatia	SK	Slovak Republic
HU	Hungary	SY	Syrian Arab Republic
IE	Ireland	TN	Tunisia
IL	Israel	TR	Turkey
IS	Island	UA	Ukraine
IT	Italia	UK	United Kingdom
JO	Jordan	XK	Kosovo (under United Nations security council regulation 1244)