1. Final publishable summary report

a) Executive summary

The project aimed at drawing lessons of the crisis for the future of Europe in a world of increased interconnectedness and weakened polity.

Structures of global governance were retained as the major drivers of this foresight exercise. It implied to look at the roles played by various actors: international institutions, nation states, companies and civil society organisations in conducting policies. The analysis of prospects up to 2030 has been constructed within a framework of differentiated scenarios that seeks to capture the challenges and possibilities for financial, economic and social policies under defined governance hypotheses.

Major global imbalances, be it household and sovereign debts, trade balances or financial flows, strongly impact policy orientations. The two decades under view have been assumed to be also strongly conditioned by important trends at work in the world economy, concerning demography and climate change but also major shifts in economic power towards the South and the East, following a liberalisation of trade and financial flows that was initiated at the turn of the 1980s and acquired some momentum in the 1990s. Conversely these trends had to be seen in a new context regarding the expansion of knowledge and technologies. Not only was the end of some non renewable resources in sight, influencing strongly the volatility and access security of markets, but conversely negative externalities of some technological developments strictly limited their uses, be it nuclear energy or biotechnologies.

In this initial context four global scenarios have been retained. The first global scenario (G1) outlines the likely consequences of an ongoing reduced government where the huge imbalances that followed the 2008 financial crisis are severely impeding growth and development in the OECD countries while slowing down the emerging economies in the East and in the South. In such context constraints set by demographic trends and climate degradation are difficult to meet. A second global scenario (G2) assumes that the USA and China find ways to accommodate global governance in their own interests in order to limit the constraints set above on their respective development. In a third global scenario (G3) the stress is put on some solidarity schemes which at regional levels alleviate the constraints and support development. A fourth global scenario (G4) assumes that this solidarity is straightforwardly global, forging a safety net for poor countries and regions and chiefly ensuring that the battle on environmental issues is relevantly led on a global scale. Attention is paid more specifically to the fate of Europe in the above global contexts.

The global scenarios G1 and G2 are not giving many opportunities to Europe, leading to a scenario of muddling through (E1), or even of break up (E2). Regionalisation (G3) gives the EU more room for manoeuvre, helping it to move forwards some more federalist form of union (E3 and E4), eventually through some strictly monitored multispeed adjustment schemes (E3). All these scenarios encompass different outcomes in terms of well being and political consequences on the various national scenes under view, all of which finally stresses the decisive responsibility of public policies in shaping the future of Europe in the world of 2030.

b) Project context and objectives

Our challenge was to capture, within a set of scenarios, the characteristics and implications of a variety of patterns that may occur in 2030 in all domains, be it political, economic, social, environmental or technological in Europe and in the world. The project aimed to take stock of long term trends identified in demography, environmental changes as well as to feature some of the effects of likely changes in technology and behaviours, but it also planned to take into account the important institutional transformations that could come out of the major crisis that the world economy is confronted with.

To reach this ambitious objective, in a comprehensive and consistent way, three types of approaches have been combined in a systematic way.

One approach was to use macro models, ensuring that the main interdependencies are taken into account. As one macro model cannot cover all the domains under view, the macro models we used are made to interact in ways which are facilitated, if not intermediated by the other two approaches.

The second approach took an institutional perspective whereby the main mechanisms of coordination, setting both the rules of behaviours but also the means to create new modes of coordination, are investigated and the various interests at stake accounted for. This political economy of institutions and institutional changes applies at both national and international levels. The present crisis, that burst in the most developed economies and is affecting all economies throughout the world, led us to put a specific emphasis on forthcoming and potential institutional changes.

The third approach stemmed from the by now long experience of foresight studies which proceed by asserting visions, based on specific thorough transformations impacting on all domains. This qualitative approach is informed and framed by the two other approaches. So much so that Georghiu and Keenan (2008) stress that “foresight could be summarised as an interactive approach producing shared visions of the future and joint actions in consequence”. Still foresight exercises are of many kinds and focus. The interactions we organized helped to select those issues which are the more relevant in the various domains retained in the call. This relevance was weighted in views of the various balance sheets exposed by the macro models and of the institutional trajectories likely to occur in the transformations of national and international relations.

This pattern, combining the three approaches, also explains that in the course of the project we started by taking stock of the various foresight exercises undertaken in various countries for the same 15 to 20 years horizon, then confronted these syntheses with the lessons drawn from macro models and analyses of institution dynamics.

Domains of research

The research plan comprised eight work packages focused on the following domains

- Macro model of world regions: supply and demand of goods and services, trade and employment (WP1)
- Financial markets and international regulation (WP2)
- Innovation and diffusion of technology and knowledge (WP3)
- Global development, demography and migration (WP4)
- Energy, primary resources and environmental challenges (WP5)
- International governance and regional economic integration (WP6)
- Well being and living conditions (WP7)
- Political economy and politics (WP8)

A **macro-model of world regions** (WP1) provided forecasts of shifts in supply and demand of goods and services that may be expected to take place at world level under alternative hypotheses about growth and cooperation between different world regions. Trade and investment flows were also tracked as well as the dynamics of productivity gains in various large sectors of activities. These foresight exercises facilitated use of common concepts and data across domains and provided a framework for integration of behavioural assumptions and governance scenarios. Historical data and an initial set of scenarios were available for use by all partners from the start of the project and extended in response to their requirements and recommendations.

The task in relation to **financial markets and international regulation** (WP2) was to clarify the interconnection between financial market regulation, evolution of market structures, price movements in financial markets, portfolio behaviour and the impact of these developments in other domains. Questions addressed include the historical and future role of the US dollar, Euro and other major currencies, with regards to the scale of financial flows between the USA, Europe and other regions and the impact of exchange rate volatility when financial systems and capital markets are integrated.

Specific issues in this domain include interrelationships between rules for the conduct of monetary policy and government finance, price movements (exchange rates, stock market indexes and interest rates), wealth effects (asset valuations and portfolio adjustment), impacts on trade and investment and macro-economic outcomes (growth of aggregate demand and inflation). Local developments with global consequences such as fiscal havens and criminal traffic also had to be considered for their direct (distortion) and indirect (dissuasion) impacts.

Research in the domain of **Innovation and technology diffusion** (WP3) helped to see how countries in various regions are forging ahead, catching up or lagging behind. It checked to what extent these dynamics relied on visible or invisible trade and foreign direct investment. It looked at the interaction between rules of competition (product norms, standards, IPR, tariffs…) and globalisation of financial markets, changing patterns of market control. It considered how this nexus impact the provision of public goods, the access to fossil energy and other non renewable primary resources. A central question in this domain is the feasibility of effective integration of low and middle-income countries and world regions in the global business arena and implications of their success for Europe and other high-income countries and regions. Efforts to constitute global networks of invisible transactions were also taken into account (see ERA and foresight studies).

Research related to **global development, demography and migration** (WP4) examined development prospects for low- and middle-income regions of the world taking into consideration demographic trends and the changing age structure of populations around the

world. Facing an ageing Europe, an African continent with low incomes and expanding demography will clearly place migration as a central issue to be dealt with in all scenarios for cooperative development. Research in this domain took into account the different types of migrations that can be observed and their diverse social and economic impacts.

A consortium of researchers from four Emerging Economies (Brasil, China, India and South Africa), whose participation in the project helped to investigate the part played by these fast-growing economies, contributed in major ways to the work package WP4 and to work package 1, the **macro-model of world regions.**
Work on **Energy, primary resources and environmental challenges** (WP5) helped to clarify another three major issues over the coming decades: a) the progressive exhaustion of cheap world oil and gas resources and their concentration on a limited number of countries b) the mitigation of climate change c) the rise of concerns about the environmental safety of large scale alternatives to fossil fuels (nuclear, biofuels). The responses to these intertwined issues depend critically upon the articulation between the negotiation of formal regulatory regimes (Kyoto framework, WTO) and the policies conducted at the regional and national levels. What makes numerical foresight necessary to disentangle the many facets of these issues is that the energy/environment interface depends, beyond the energy sector upon a) dynamics in sectors such as transportation, urban infrastructures, agriculture and land-use, energy-intensive industry, b) the global dynamics of the world economy, including industrial competition, trade flows and capital markets, with, at this latter stage, a critical role of the magnitude and sharing of the oil rents. This world package built on the capacity of the Imaclim model to couple explicit description of the technological dynamics in energy, transport, agriculture and industry with a general equilibrium framework of the world economy allowing for possible transitory disequilibrium due to the inertia of technical systems, imperfect foresight and market (and regulatory) failures. In parallel with the modelling exercises developed in WP1 it provided an ensemble of scenarios to better understand under what conditions, i.e. technical assumptions and prospects about the future of international negotiations, national systems of innovations can adjust to these new constraints and help European Economy to develop a robust economic strategy faced with this uncertain and quickly changing system. To do so, it focused a) on how various configurations of domestic EU policies (innovation policies, fiscal reforms, EU-ETS and sector specific policies) under various hypothesis about future climate regimes will change the distribution of oil and gas rents and how these changes will impact of the European economy b) on the various of uncertainty and their implication for the diffusion of technical change.

International governance and regional economic integration (WP6): the subject is directly imposed by the nexus of international interdependencies into which our contemporary world has grown. The system of international relations has evolved greatly in the mid 1970s with the end of the post war “modern capitalism” and a rise of economic liberalism soon followed by the demise of the socialist alternative. With a growing internationalisation of the world economy actors and relative position have evolved, eg the global governance has changed and is bound to continue to do so. Beyond the relationships between states and markets, new international institutions and civil society organizations have developed. In the last decade the globalization of finance has deeply marked this governance. The burst of the 2008 financial crisis challenged this primacy but its future remained open.

The focus of research on rule-making was meant to sharpen the understanding of the dynamics of governance groups and the way in which rules and normative-standards are defined and promoted. It required an understanding of asymmetries among countries and

blocs of countries that influence attitudes to global institutions and acceptance of global rules and normative standards. The research paid particular attention to the role and influence of Europe and that of less-well-represented world regions and interest groups. It therefore analysed the diversity of regional integration processes underway and how the present crisis is impacting these trajectories.

The research on **well being and living conditions** (WP7) was meant to clarify how people in the various countries and regions benefit from the growth trajectory from the present up to 2030. The current debate on indicators, as regards these topics, highlights that there is not always a clear link between well being and income levels as well as growth. As a consequence, the main research challenge was to use definitions and measures that allowed for, both, **objective** aspects of well being (those related to income and to availability of services such as health care, education, transport etc.) and **subjective** factors related to happiness.

Subjective well being can be defined as satisfaction with life and infrequent experience of negative emotions. A crucial finding of this strand of literature is that income seems to contribute to nations' well being up to a certain level. However, once basic needs are met (food, shelter, basic security etc.) on national level, the picture globally changes and higher income does not necessarily translate into a nation's higher well being while other factors, mainly cultural (e.g. collectivism, individualism), become important.

Factors such as the labour market, family relations, interactions with the State and social relationships generally and their interactions are part of a complex picture which was analysed in the project. The relationships between the present WP7 and WP1 (macro-model of world regions, especially concerning foresight exercises), WP4 (global development, demography and migration), WP6 (international governance and regional economic integration) were accounted for. The links with the findings of WP5 were also considered, since climate change represents a destabilising factor for well being and living conditions.

Political economy and politics (WP8): Major transformations will take place in the development of Europe up to 2030 as far as politics and policies are concerned. Cultural, social, economic, environmental and economic changes during this period will be strongly conditioned by the political backgrounds prevailing in countries and regions. Inequalities, poverty and social exclusion in large urbanised areas may well lead to political turmoil and instability. Populist movements could rise and impact accordingly internal and external policies. .
. Openess to trade, to financial or cultural cross border transactions could be hampered. Willingness to pursue regional integration processes where they occur could be slowed down or reversed. Special attention should be given to the political economy of Europe integration
Political economy helped to assess the feasibility of various trajectories. It also helped to see how ideologies channel or block transformations in our societies.

c) Main S&T results/foregrounds

This report provides a summary of main results per WP. For an overall summary of AUGUR results and perspectives, please download the final scientific report's executive summary on the homepage of the project website, www.augurproject.eu.

WP1 – Macro-model of world regions

The macro model of world regions has been developed as an instrument for integrating analysis in many domains ranging from Finance, Government Budgets, Public Debt, Trade, Investment and Energy to Demography, Migration, Employment and indicators of Well-Being. Across all these domains the macro modelling system provides historical series with annual observations from 1970 to the present day for the world divided into 19 countries and country groups (of which five make up Europe) together with a collection of scenarios for the period to 2030 illustrating the potential impact of alternative assumptions about future governance patterns and institutions in Europe and the world as a whole. By using an integrated global macro model AUGUR research teams have been able to visualize interdependencies between changing policy goals and constraints in different countries and world regions and outcomes in the different domains covered by the study.

Principal questions addressed

- Dependence of macro-economic outcomes, in particular trade, expenditure and income in each world region on developments in all domains mentioned above

- Impact on Europe of developments in other world regions and changes within Europe including ageing of the population.

- Implications of changing rules and patterns of compliance with regard to government debt, international finance, exchange rates, trade, energy, migration and other structural policies.

Historical databank and macro model

The CAM databank and macro model that formed the starting point for work in this project was updated progressively through the life of the project and expanded to include demographic breakdowns and employment data, track the split between carbon and non-carbon energy supplies and the growth of carbon emissions in each country and include a number of structural development and well-being indicators.

The macro model takes full account of the closed nature of the world as a system and accounting constraints that link financial and economic indicators conventionally used to trace developments in each national economy without imposing strong theoretical presumptions about longer-term trends of convergence or divergence.

Series for 130 territories distinguished in the databank are aggregated to present Europe as 5 regions (North, West, South, East and the UK) and the rest of the world as 4 countries (US, Japan, China and India) and 10 country groups distinguished by continent and income level. For each country or country group (termed bloc in the model) the model tracks around 50 behavioural variables that drive projected outcomes as well as a larger number of aggregates and ratios that feed back into projected behaviour and describe key results in each domain.

Definition of scenarios

At an early stage the macro model was used to generate indicative baseline projections illustrating the potential impact of long-term trends over the next two decades under ‘business

as usual' assumptions, in other words, in the absence of new policy initiatives. The baseline provided the background for consideration of trends in global governance with shifts in the weight of different world regions and possible changes in policy norms and intervention by the US, China, Europe and other country groups. Taking advantage of specific advice from research partners within Europe and from China, India and Brazil a number of different hypotheses about the governance framework in the world as a whole and Europe in particular have been translated into specific assumptions about changes in behaviour of key macro variables including government revenue and spending, trade preferences, energy policy and labour market policies as well as more speculative assumptions about developments in Europe including break-up or consolidation of the euro zone and introduction of a federal budget.

Policy implications

Scenario definitions and implied outcomes for Europe were reviewed intensively by all research groups participating in the project, considering potential feedbacks to political developments as well as implications for policy objectives and feasibility in each domain. In this way the macro model provided an essential framework for presentation of policy choices and related political issues at the conclusion of the project.

WP2 – Financial markets and international regulation

Methodological advances

Developing financial scenarios has been, perhaps, the most difficult part of the entire AUGUR project. At the time of writing financial structures are in flux. It is obvious that European banks are still facing severe strains, and that the financial sector is proving a severe inhibitor to real economy growth. Add to these financial industry issues the problems associated with sovereign debt and the reaction to the scale of indebtedness by national governments and the difficulty of developing meaningful scenarios is clear. There is emerging a better recognition of the need to monitor the structure of the balance sheets of financial institutions and of the role of gross financial flows in distorting those balance sheets. This gross analysis is a crucial adjunct to the more traditional analysis of international imbalances in terms of net flows.

However, within the general development of regulatory structures, two major negative trends have been identified;

First, the failure to develop a single framework leaves open the possibility of significant financial arbitrage, once again. Dampening financial arbitrage is a pre-requisite of effective international regulation. But there is not as yet any process in place that will handle the new issues of macro-prudential regulation of systemic risk at a global level. Since this area of regulation necessarily trespasses on territory previously reserved exclusively for treasury departments the failure to develop an international consensus is understandable – but nonetheless severely damaging to hopes of effective international regulation of the global financial market. The EU could and should take a lead in developing new international structures.

Second, regulation is becoming excessively complex. There is a war of mutually assured destruction underway between regulators and the financial markets as each side counters developments by the other by ever more complex structures/instruments. Just as in the case of fiscal policy, where complexity is the fount of evasion, so complexity in financial regulation

undermines the prospect of financial stability. With the developing structures of macro-prudential regulation there should be a serious reconsideration of the appropriateness of regulatory instruments, and of the balance between regulation as incentive (capital charges) and regulation as legal structure (Glass-Steagall). The debate over the content of regulation has not really begun. Instead the failed techniques of the past (notably risk-weighted capital charges) are being proposed with "enhancements". This is unlikely to prove a successful way forward. Once again the EU could take the lead in tackling the relationship between the structure of the financial services industry and the possibility of attaining financial stability.

European decision makers will confront major challenges in the next decade.
Firstly, on the cost of regulation, they will have to decide whether they prioritise short-run efficiency or long-run stability of the financial markets. This choice will depend on the optimum level of regulation and on their level of risk aversion.

Second, regulators will have to define what a bank is and how to regulate it. The related problem is the definition of the shadow banking system and the specific regulation that should be applied to this bank-like sector.

Third, with respect to regulatory arbitrage, national regulators have to opt either for stronger coordination or for some forms of capital controls.

Fourth, with regards to market complexity, the regulator must decide between complex custom made OTC financial instruments, adapted to the needs of individual participants, or more standardised instruments, which reduce complexity and enhance liquidity at times of stress.

Fifth, European decision makers have to determine if a single currency is the best option or if a multiple-currency regime, built on a common reference foundation, could be more efficient to deal with competitiveness and debt problems.

Decisions have to be made as to which form of globalisation would benefit Europe and the world. Financial integration potentially allows investors to better allocate their capital but it creates more complexity in the regulatory system, more interconnections and potentially bigger actors. In the context of growing internationalisation of financial markets, governments need to create the mechanisms capable of controlling the systemic risks that develop on an international scale.

Finally, there is a more fundamental question about the relationship between the financial sector and the real economy. The rapid growth of the financial sector relative to the real economy which is its "underlying" asset base, suggests a set of relationships between financial markets and economic performance that are not encompassed in current regulatory thinking – and certainly not within anything resembling the efficient markets hypothesis. What is needed is a more pragmatic concern with the financial health of the real economy, and with the structure of financial services that might best serve the needs of industry and of households that make up that real economy.

WP3 – Innovation and technology diffusion

Work in WP3 was structured into 4 work modules:

Module 1
Global patterns of trade specialisation, international production integration and catching-up

Module 2
Internationalization of business services; trends in services vs. goods specialization and the role of services in international production integration

Module 3
Technology generation, technology adoption; changing global patterns of innovation activity and transfer mechanisms

Module 4
The role of business organisation in international patterns of integration, innovation activity and technology transfer

Modules 1 and 2: International trade specialisation and growth and convergence patterns

Changes in global trade patterns are characterised by the fast growth in a select group of emerging market economies (particularly in East and Southern Asia); other parts of the developing world continue to have a marginal impact on international trade flows; there is evidence for 'club convergence' rather than general convergence of developing countries with income levels in advanced economies. Non-linearities and threshold features of catching-up processes were investigated in Stoellinger (2011, Oct). Catching-up processes go along with strong up-grading processes in trade specialisation (see Stoellinger, 2011, Sept) and strong inroads by the group of successful catching-up economies in medium- and high-tech goods trade are being recorded. In business services there remains a strong dominance of advanced Western economies and this will remain a feature of international trade specialisation (see Pindyuk, 2011, Nov). Trade in services involves prominently so-called Mode 3, i.e. supply through subsidiaries), and hence business services trade is strongly linked to international investment patterns and its role in the international production integration. By most indicators of international integration (see the papers by Stoellinger, Pindyuk, Hunya) there is strong evidence of 'regionalist integration', i.e. much stronger trade and production linkages between groups of economies which are geographically close and are often linked through preferential trade agreements . This is particularly the case for European economies, but increasingly also for Asian economies.

Module 3: Technology generation, technology adoption; changing global patterns of innovation activity and transfer mechanisms

The vast majority of R&D and patent activities are still held/conducted by a small number of advanced economies, but some emerging economies (particularly China and Korea) have seen a rapid expansion of innovation activities. Internationalisation of R&D has been increasing in recent years; R&D flows follow FDI very closely. The majority of patent applications takes place in traditional sectors such as electrical appliances, transport, medicine, etc. as well as in computer technology; rapidly expanding areas in patent activity are IT methods for management; digital communication, nano-technology etc. though these still account for a small share of overall patent applications (see Foster, 2011, Nov). Given the continued concentration of R&D and patenting activity in advanced economies, technology up-grading in the vast majority of developing countries depends on technology transfer. Technology diffusion is strongly linked to what happens to trade and FDI; particularly internationalization of R&D tends to be determined largely by FDI flows. Regionalisation leads to enhanced

patent protection amongst members of the regional grouping; there is also an increased tendency to deal with IPR through bilateral treaties (see Foster and Breitwieser, 2011, Oct). This enhances innovation within the group but could also increase patent protection in general due to MFN clause of the WTO.

Module 4: **The role of business organisation in international patterns of integration, innovation activity and technology transfer**

International business organisations (IBOs) are so far still dominated by European and US firms; these have still dominant positions in FDI (M&A and greenfield); however, there is also rapid growth of IBOs from a range of emerging economies, particularly BRICS, from a low initial level (see Hunya, 2011, May and Sept). IBO is sensitive towards transactions costs (transport, energy) and also to risk factors (governance, political-economic stability/instability). IBOs are driven by flexibility considerations, differential market growth and cost factors. IBOs are often based on complex packages of international integration involving goods and services trade and international and global sourcing, logistic coordination, knowledge flows and knowledge protection. All of this imposes demands on policy and institutional setting and co-determines regional vs. global business activity. European IBOs have strong further scope in regionalist and neighbourhood settings and there are differences in strategies by MSEs vs. large corporations.

B. Scenario analysis:

The analysis of scenario settings with regard to the topics covered by WP3 constituted am major part of the work undertaken in WP3 in the final year of the project and the results of this analysis have been presented in AUGUR deliverables 3.3 and 3.4 (see Landesmann et al, 2012, May, and Landesmann, 2012, Dec). We summarise here some of the main assessments with regard to the 4 principal European and Global scenario combinations explored in the AUGUR project.

B1 Struggling On – Reduced government scenario:

In this scenario technology transfer and catching-up will be restricted to a sub-set of lower-/middle-income countries with sufficient absorption capabilities, favourable governance structures and geographic locations; IPR in favour of international business and core economies.

Given the evidence for club convergence; non-linearities/thresholds in development process, there is limited scope in this scenario for EMEs and LDCs to support their development efforts with industrial policies; trade policy arrangements favour bi-modal development of global catching-up and specialisation structures; hence this scenario is characterized globally by convergence limited to a sub-set of EMEs and divergence in other parts of the developing world.

This scenario predicts in macro-economic terms prolonged economic stagnation in Europe (see WP1): this goes along with underutilization of technological potential; hysteretic effects on skills and R&D capacities; much reduced scale of Community programs; falling behind in ‘convergent technology’ race; reduced capacity to support development processes in Europe’s periphery and neighbourhood – which are more affected than other global EMEs (those are less burdened by debt crisis)

Europe loses further attractiveness for ‘global talent’ – net out-migration; EU MNCs tend to increase their global rather than regional activities – benefit from pro-business IPR and trade policy rules (WTO+); more global out-sourcing/off-shoring has labour market and distributional impacts.

B2 Eurozone break-up – US-China Accomodation scenario:
In this scenario the US and China represent Stackelberg leaders in the two regions which they dominate; there will be both conflictual and cooperative relationships in different policy areas between China and the US: w.r.t. global and regional trade policy arrangements, IPR systems, and R&D races; there will be differentiated developments of services and goods liberalisation and of regulatory frameworks in favour of respective economic interests of US and China in their respective spheres of influence.
Europe is more likely to tend towards a strong trans-atlantic alliance with the US as driving partner; this will affect internal European integration processes and relationships to its neighbourhood (to CIS, WA, MENA, Africa). US and China will play increased roles in Europe's neighbourhood region and its unstable 'Rim' region given their interests in securing energy and commodity supplies and also geo-political strategies.

Europe's 'innovation system' will become again segmented along national lines; EU R&D and educational programs collapse; this leads to loss of economies of scale and scope; loss of S&T staff to US and Asian centres of excellence; some countries and firms in Europe remain attractive as R&D locations (for US and transatlantic MNCs); some revival of national industrial and development strategies – these might succeed in a limited set of countries.

Europe will be a much diminished actor on the international scene; little impact on regulatory structures and international policy making bodies – will largely follow US lead; China and Asian economies challenge Europe's traditional industrial strengths – low level of protection for European IPR; Chinese investment in Europe is 'technology seeking'; this scenario is one with the most acute trade policy conflicts and conflict zones.

B3 Multi-speed Europe/Federal Europe – Regionalisation scenario:
In this scenario three main global areas of strong regional integration (Europe, North/Central America, SEEA) dominate: these regions drive regionalist trade and production integration; there will be different forms of institutional, political-economic (i.e. 'deep') integration in the 3 areas. Other regions develop neighbourhood relations, between bloc positions, or suffer from continued marginalisation in international trade, FDI and technology/knowledge flows.

For Europe the main challenges will be to decide on directions for further 'deep integration' in the areas of technology, industrial, labour market, and social policies; and on relationships to EU neighbourhood and partnership arrangements. 'Federal Europe' could be success or failure w.r.t. unbalanced intra-European developments, i.e. it might or might not solve intra-European structural imbalances and competitiveness problems.

Europe pursues more intensive R&D collaboration; new, more effective programs; danger of 'knowledge diversion' if too much inward looking; scope for sustained efforts in neighbourhood policy and on development policy with regard to Europe's periphery; differences between 'multi-speed' and 'Federal Europe' scenarios in terms of resources and scope for differentiated treatments (the former provides a continuum of access to EU; less of demarcation line between 'ins' and 'outs').
Improved position of Europe in energy supply/security; more weight in international policy-making/regulatory structures; but differentiated by regionalist entities; scope for inter-regionalist conflicts and conflict potential in Asian region.

B4 Towards Federal Europe – Multipolar Coordination scenario:

This scenario is a global development scenario: trade policy arrangements, IPR, aid programs in favour of more generalised catching-up; move towards multi-lateral arrangements to deal with global development issues (trade policy, aid, environmental)
Europe: would evolve a strong commitment to development agenda, preferential trade/IPR arrangements towards LDCs, in particular Africa , Middle East and Western Asia. Environmental/global warming agenda is discussed in detail in Chapter 6 of AUGUR Final Report.
Difficult issues in international relations to be resolved: how to move from a 'normative' development and environmental Agenda to a positive political economy of multipolar/multilateral bargaining with changed weights of DCs/EMEs/LDCs; reform of existing and setting up of new international governance structures; how to arrive at relatively unified EU position on the various agenda issues.

Europe has to resolve its own internal intra-country, inter-country, EU-level political economy problems to achieve an effective position in complex international bargaining environment; taking particular responsibility of a development and environmental agenda with regard to Europe's neighbourhood.

WP4 – Global development, demography and migration

Methodological Advances
One of the primary areas of focus for Work Package #4, "Development, Demography and Migration", has been an assessment of the potential problems caused by the projected ageing of the population in some major European countries. This phenomenon has often been discussed in alarmist terms, with commentators using, for example, such phrases as the 'demographic time-bomb'. It has widely been argued that an increasing 'burden' of dependency will inevitably result in unsustainable costs to society, necessitating such policy changes as increases in the age of retirement, reductions in social protection spending in such areas as social security benefits, and reforms in pension arrangements, such as the replacement of 'defined benefit' pay-as-you-go schemes with more market-oriented 'pre-funded' contributory schemes.

However, the research in this work package has been based on the assumption that a narrow focus on purely demographic measures of dependency can lead to an inaccurate evaluation of the potential costs of ageing. And thus, importantly, misleading policy conclusions can be drawn. In particular, by overlooking the dependency that arises out of unemployment and low labour force participation rates among the working-age population, analysts have often placed undue emphasis on the costs of an ageing population.

Hence, in order to overcome the shortcomings of conventional approaches, the research for this work package has modified standard dependency measures, which are constructed using purely demographic variables, in order to incorporate dependency costs associated with unemployment and withdrawal from economic activity. In doing so, this research has found that considerable scope exists for policy measures that could reduce economic dependency.

Thus, the research for this work package has distinguished purely demographic effects, such as ageing or a large 'youth bulge', from employment-related effects. It has done this through the development and use of the Economic Dependency Ratio (EDR) where:
EDR = (Unemployed + Inactive + Elderly + Young)/Employed

The novel aspect of the use of this ratio is that is can be decomposed into two sub-components, the Demographic Dependency Ratio (DDR) and the Working-Age Dependency Ratio (WADR). These are defined as follows:
DDR = (Elderly + Young)/Employed
WADR = (Unemployed + Inactive)/Employed

These two ratios allow a decomposition of the problem of dependency into 'demographic' effects and 'employment-related' effects. Since the denominator in both ratios is the number of employed persons, dependency is measured relative to the population that is *currently employed* and productive, rather than to 'potentially' productive groups, such as the working-age population at large or the economically 'active' population (which may or may not be employed).
Of course, these two ratios, the DDR and WADR, can be combined additively to form the overall Economic Dependency Ratio:
EDR = Demographic Dependency Ratio + Working-Age Dependency Ratio

This approach results in the added advantage that a graphical decomposition of the economic dependency ratio can be readily produced by generating a plot of each of the two sub-components of the ratio. Thus, the relative strength of the effects of the demographic and employment-related effects can closely be examined.

Policy-Oriented Results
In drawing out the major policy implications of demographic and employment-related trends, Work Package #4 has focused on the effect on the Economy Dependency Ratio of four of the combined European-Global Scenarios generated by the CAM model for the AUGUR Project.

By using the Economic Dependency Ratio, this research has been able to contribute more usefully to the debate on demographic trends, especially in Europe, by identifying employment-related solutions within the working-age population instead of relying exclusively on targeting the benefits of the elderly. This approach has also helped propose more progressive economic policies for Developing Countries in dealing with increases in young dependents and their growing need for employment.

The use of the CAM model's database has also allowed this research to examine gender differentials in employment rates so that disproportionate increases in female employment can be programmed in countries where such policies would be appropriate. Also, the CAM model has enabled researchers to track tends in the stock of net migrants between 2012 and 2030.

Scenarios for Europe

Economic Dependency
In the scenario 'Struggling On + Reduced Government', the Economic Dependency Ratio would rise in all European blocs—most severely in North Europe, West Europe and the UK—because ageing would intensify while employment would stagnate. But the results from the scenario 'EU Breakup + US-China Accommodation' would represent the 'The Worst-Case' Scenario for Europe because of a sharp rise in the Economic Dependency Ratio, especially in N. Europe, W. Europe and the UK, based on greater stagnation of employment than in the 'Struggling On + Reduced Government' scenario, which represents 'business-as-usual' trends.

It was also found that for both the scenario 'Multi-Speed Europe + Regional Globalisation' and the scenario 'Towards Federal Europe + Multipolar Collaboration', there would be a generally significant reduction in the Economic Dependency Ratio, most notably in South Europe and East Europe, based on a concerted government-led stimulus to employment. This policy implication is an important contribution of the research on this work package. It was also found that employment-stimulus policies would be beneficial under the global context of the 'Struggling On + Reduced Government' scenario as long as the Eurozone countries were allowed to utilize varying but pegged exchange rates (pegged to the Euro).

Migration

A major focus of Work Package #4 has been the effect of various combined Global-European scenarios on migration flows and stocks, particularly with regard to Europe. Drawing on the same four scenarios just described above, researchers in work package #4 have found that the projected results for the net stock of migrants are not as readily predictable as those for Economic Dependency. The two exceptions are that 1) the outcomes for net migration would be uniformly the worst for the scenario 'EU Breakup plus US-China Accommodation', and 2) the outcomes would be uniformly second-worst for the scenario 'Struggling On plus Reduced Government'.

The most interesting results relate, however, to the last two progressive scenarios. The scenario 'Multi-Speed Europe plus Global Regionalisation' seems to project the optimal results for the net stock of migrants for four of the five European blocs. The reason appears to be partly due to the determinants of migration flows assumed in the CAM model: 1) employment opportunities in the recipient countries and 2) the differential in levels of income per capita of countries (relative to the world average). Since the last scenario, 'Towards Federal Europe plus Multipolar Collaboration', assumes a substantial convergence of the incomes per capita in developing countries towards the levels of developed countries, such an effect could actually *slow down* net migration into Europe from elsewhere in the world.

Scenarios for Developing Countries

North Africa and West Asia

The research for work package #4 also examined trends in the Economic Dependency Ratio for Developing Countries. For example, researchers programmed an additional government-led employment stimulus for North Africa and West Asia within the context of the generally progressive scenario of 'Multi-Speed Europ**e +** Regional Globalisation'. Even in the underlying scenario, for example, **e**mployment would rise only modestly and the Economic Dependency Ratio would decline only modestly by 2030. Both North Africa and West Asia confront a serious problem of Economic Dependency (based on a rapidly growing youth population and a notable lack of productive employment).

As a result of programming an increase in government expenditures (linked to private investment) and depreciation of the real exchange rate in both blocs, the employment-to-working age population ratio would rise significantly in both cases. As a result, the Economic Dependency Ratio would decline dramatically, accompanied by an overall increase in labour productivity, maintenance of manageable fiscal positions and increases in the exports of manufactures and services

India and China

China and India face distinctly different demographic futures: China would experience a doubling of the share of its elderly by 2030 while India would experience some decline in its large share of youth but would still face a daunting problem of a large cohort of unemployed youth.

Thus, their projected development conditions would be quite different. China's Economic Dependency Ratio would be very low in 2030 (because of a high employment rate) while India's would be almost three times higher (because of a much lower employment rate).

Hence, the research in this work package experimented with programming employment-focused economic policies for India based on trying to achieve an overall increase in the employment-to-working-age population based on a disproportionate increase in female employment.

As a result of this programming, the female employment rate in India would rise by over 50%, significantly boosting the overall employment rate. Also, the country's Economic Dependency Ratio would fall dramatically, based on a more rapid rise in the Employed (especially female employed) in comparison to Economic Dependents. Also, India's labour productivity would end up increasing substantially, indicating that employment would not be expanded at the cost of falling productivity (and falling real wages).

The results for the policy-oriented scenarios for North Africa and West Asia, on the one hand, and for India and China, on the other hand, indicate that government-led employment-stimulus policies in developing countries can potentially have beneficial impacts both economically and demographically.

WP5 – Energy, primary resources and environmental challenges

The main results and foregrounds of work package 5 on "Energy, primary resources and environmental challenges" consist in both (i) methodological advances in the way scenarios to investigate the interplay between energy, environment and sustainable globalization and (ii) insights on short-term development options' long-standing implications for energy and environment.

Methodological advances

Short-term development choices (investing in a coal power plant or in wind turbines, building transport infrastructure, urban planning, etc) can have long-term consequences. For example, investing today in a coal power plant is likely to imply carbon emissions for several decades if the plant is used over its entire technical life. To decide among alternative development choices, accounting for the far future is thus necessary, despite the deep uncertainty on future socio-economic developments, on ultimate energy resources and on future technologies. These decisions constitute a challenge to decision-making processes, all the more as they often imply irreversibility. Such decisions need to be informed by scenarios exploring the whole space of uncertainty. The prevailing practices of global socio-economic scenarios projections are not fit for the purpose. In traditional scenario methods, groups of experts would work collaboratively to choose a common set of qualitative storylines, informed by experts' intuition regarding the most important driving forces leading to different socio-economic evolutions and technologies developments. Analysts would then use computer simulation models to develop quantitative projections based on these storylines. But this process may fail to yield storylines that focus on the most important driving forces for the

decision at stake, and avoid focusing on the less important drivers. Furthermore, since future socioeconomic and environmental changes are highly uncertain, policies need to be tested against a variety of scenarios that cover a large range of possible futures. It would indeed be dangerous to implement a policy that performs well in one given scenario but completely fails in another, for instance if the population is larger or technological change slower than expected. Although the traditional process creates coherent scenarios through the storylines, it does not guarantee that the scenario outcome will sufficiently cover the uncertainty spectrum.

To address those two limitations, we developped a method to build scenarios using a "backward" approach. Our methodology is based on (i) an identification of potential drivers of future technological and socio-economic evolutions, (ii) a modeling exercise to explore the uncertainty space and select scenarios, and (iii) an a posteriori confirmation of which drivers matter.

We then applied this methodology to build four archetypical scenarios showing the short-term development options' long-standing implications for energy and environment. Over the long term, one can imagine a large multi-model scenario database and a diversity of selection criteria that can be used to identify which scenarios are most relevant for a given category of decisions. A web-based tool could then be proposed to allow decision makers to select the few scenarios that they need to consider in their decision making process. Such a tool would benefit from the multiplicity of models available in the literature. It would also avoid the difficult selection of a few marker scenarios, which will inevitably oversimplify the reality and result in the discarding of a lot of useful information.

Main results

Through the scenarios developed, we showed that both climate change and energy security issues are long-term issues, for which the main challenges may arise after the 2030 horizon. However, the two coming decades are crucial for these issues since the directions taken over this short-/medium-term risk to create lock-ins of the economies in carbon and/or oil dependency. Indeed, inertias in the technical systems, the behaviors and the institutions make the transformations away from oil consumption and/or away from carbon intensive economies a slow process. If these transformations are not started early, during the coming two decades, it creates the risks that (i) economies are vulnerable to oil prices shocks that may happen when producers reach depletion constraints (possibly after 2030, as in our scenarios), (ii) it would be unfeasible or extremely costly to limit climate change to the 2°C target.

The first important conclusion is that climate change is an extreme case of market failure, because it is an externality at the global scale and develops over long-term horizon. In that case, in the absence of incentives to decarbonize the economy, markets would create a carbon lock-in, even when the depletion of fossil fuel resources is taken into account. Policies and global coordination efforts are therefore needed to create the incentives to avoid the carbon lock-in.

One important point here is that the two issues of climate change and energy security are actually linked. Indeed, climate policies, by putting a price on carbon, give the signal increasing the price of fossil fuels, including oil. Therefore they trigger technical change, structural change and changes in behaviors that improve energy efficiency and leads to substitutions away from fossil fuel, including oil. If policies are implemented early, they may be able to avoid the "carbon lock-in", as well as the "oil lock-in" of the economies. The improvement of the energy security can thus be seen as a co-benefit of climate policies.

The recent European roadmap for 2050 reaffirms the ambitious 2°C climate objective internally but does not mention background policy packages for helping developing countries to finance their transition to a low carbon society, which is one key condition to get an international agreement and save its international leadership. Indeed, the Durban Conference has acknowledged the failure of the international cap-and-trade paradigm embodied in the Kyoto Protocol, and one reason for this failure is that it does not provide a palatable deal for developing countries given the reluctance of developed countries to grant large compensatory transfers (by means of financial aid or generous emissions caps) to offset the adverse effects of a significant carbon price on their middle classes and industries.
The challenge, then, is to create incentives that significantly increase the scale of private investment in mitigation measures in developing countries without imposing a burden on the government budgets of industrialized countries which have been weakened by the financial crisis. Contributions from these budgets will still be needed to support adaptation measures in developing countries.

The context of the euro crisis opens the way for reforming the financial system to avoid repeated financial crises and to reorient a significant part of the world savings towards green investments. Innovative financing strategies need to be found in a period of financial turmoil and huge indebtedness, to support the transition towards a low carbon society. Europe could play a leading role in the development of climate finance if it aims at aligning development objectives with low carbon bifurcations, and if it is inserted in a global view of the climate-development issue.

WP6 – International governance and regional economic integration

In a world of continuously increasing interconnectedness over the past three decades, be it by trade, financial, or knowledge and information connections, the nature of global governance has been assumed in the AUGUR project to be a major driver of the world future. By global governance we mean the set of actors and systems of relationships contributing to the making and enforcement of the rules governing all the forms of international relations. Along time this system is bound to evolve according to the main challenges arising in international affairs and to the structure of national interests.

The project thus started identifying a periodisation of the various global governance structures that prevailed from the aftermath of World War II till the 2008 crisis. In that respect a major change occurred in the mid 1970s with the end of the Bretton Woods system of gold standard and fixed exchange rates. The period that followed was marked with the diffusion of a worldwide boost in liberalization of trade and financial flows. This spread of economic liberalism culminated with the fall of the Berlin wall and the demise of the communist bloc which had been a major component of the global governance structure that prevailed in the three decades that followed World War II. This phase of economic liberalism which saw the emergence of new international institutions (such as the World Trade Organization) and the rise of civil society organizations as new meaningful international actors came to be rapidly dominated by the liberalization of finance.

The decade that followed the 1997 Asian crisis, soon followed by the 2001 dot.com crisis, both tied with the globalization of finance, ended by what has been called a *financialisation* of the world economy, eg. by the prevailing role of financial criteria in all decision making regarding international trade, investment and financial flows. The global governance that

accompanied this phase, prior to 2008, was marked by a retreat of the power of the states and a prevailing role of international firms, and in the first place of financial firms. Conversely the role of international institutions (and especially of the kind of institutions inherited from the post World War II period) has significantly been eroded, while the rising influence of CSOs was not sufficient to check the rise in power of financial markets.

The 2008 financial crisis which rapidly turned out to be a major systemic crisis was likely to change deeply the global governance that had developed in the past three decades of economic liberalism. Indeed the massive bail out that most states in the developed economies undertook to escape total collapses led many observers to diagnostic a return of the states. It rapidly became obvious that the future was not at all so uniformly going back to a reduction in the power of multinationals and a return of the past system of nation states interacting through international institutions of the Bretton Woods type. Clearly the world economy had reached a level of interconnectedness where one could not simply come back to any previous form of global governance. The crisis was therefore bound to lead to some new global governance system.

It is on these premises that the AUGUR project had to retain a set of scenarios on global governance. The rapid turn to extend the G7 group to a G20 group of major nation states clearly showed that some power shifts had to be taken into account in the global governance system. But this adjustment in favour of some large emerging economies (namely the BRICS: Brazil, Russia, China, India, South Africa) was not the only driver of change. The G20 expressed a general will to contain the role of finance but came down to rather mild measures, postponing the domestication of finance initially aimed at. This inhibition could partly be explained by the will to avoid shocks in trade and financial flows when protectionist reactions were felt as a major risk of systemic crisis on the basis of the experience of the 1930s. This ghost explained the rapid reaction of the governments in the bailing out of too big to fail activities (be they financial institutions or manufacturing firms). Still these bails out do not imply a final denial of economic liberalism which had been dominant. The scope for renewed global governance thus remained wide open and our four assumptions of global governance tried to cover this broad spectrum.

Clearly a first assumption was to retain some continuation of “reduced government“ by nation states. A second assumption stated that some dominant economies, such as the US and China, could be tempted to accommodate the ruling of international relations to the best of their respective own interests, within some kind of implicit compromise. A third assumption postulates that some strengthening of regionalization processes came to avoid the kind of dual hegemony just mentioned. Finally a fourth assumption goes further and retains a more multilateral concern encompassing more or less all countries if only because some issues like the environment threats are directly global. Our project focusing more specifically on the place of Europe in this general governance we are led to associate the above global assumptions with more specific scenarios for Europe. Thus in a world of “reduced government” or of US China accommodation Europe could either “muddle through” in a business as usual manner… or break up. Conversely in a global context where regionalization processes would prevail, Europe can effectively either go straightforwardly further on the road towards a federal union or be led to device some multispeed scheme (with pegged exchange rates … and capital controls) to proceed in its regional trajectory. These specifications of global governance systems have to be done by domain, looking at trade and financial flows, eventually by sector be it agriculture, manufacturing or services. The role of

each of the four actors (namely states, markets, international institutions or civil society organizations) also has to be tracked.

Principal questions addressed

In the above setting of global and regional governance scenarios one has to specify the relative importance and role of each actor. The retreat of states, the rise of CSOs influence or the power of markets, not to mention the rise and fall of international institutions are all issues, which may differ from country to country. It may also vary from one domain to the other, let us say from the organization of trade flows to the monitoring of finance, but also of international exchanges in information and knowledge. In a world largely transformed by the liberalization process, the main challenges are linked with the functioning of markets: how can countries access markets, how unstable are the prizes on these markets? Interestingly enough, now and in the near future new challenges have been raised which are concerned by the potential negative externalities of the international transactions under view. These risks can be labeled as safety risks as they reflect the concerns channeled in a lot of controversies over the impacts of some process or product innovations. The challenges raised by the production and use of nuclear energy or of some biotechnologies (such as GMOs, genetically modified organisms) are clear cases in point.

Policy implications

Many policy issues are at stake. The control and regulation of markets is a first issue where policies will try to limit both security risks and safety risks. It stresses that markets are not genuine structures but rather organized ones and this regulation may involve at diverse levels the four actors under view. This stand goes beyond a strict opposition between states and markets and policy design has to address this construction of markets issue.

WP7 – Well being and living conditions

Economic growth will continue to influence well-being in the world. Low and middle income countries will experiment a convergence towards higher levels of income and this will provoke a similar convergence to the most developed countries in the standard of living and well being; to a different extent this process is prevailing in all the considered scenarios and, hence, independent on possible changes in world governance and economic policies.

According to the increase in the income per capita, poorer countries will experience a reduction in absolute poverty. For Africa and the poorest areas of the world this reduction will require a specific effort and it will be possible only trough increasing transfers from richer countries. In high income countries the slow growth, especially in the less positive scenarios, will maintain unemployment high and increase inequality. This may negatively affect the standard of living of a large part of their population and endanger the current high levels of health and education in the long term.

Although economic growth is an important factor, changes in political and economic governance will be equally relevant in the development of well being. A social "reorganization" of a large part of the world will be required to tackle unsatisfactory levels of employment and high in-country inequality. Moreover, middle income countries are entering a phase of development where social protection and collective services are needed to maintain a high pace of expansion and social cohesion: this is true for China, but also for other Asian and South American countries, which will experience an enlargement of social protection and the strengthening of well being domains.

In presence of a significant reduction of absolute poverty and according to the convergence process in income per capita, social protection and reduction of inequality will become a global issue which will bring interests of developing and developed countries closer together. Also other domains of well being, such as health and education, will no longer depend on available resources to produce the related services, but on equal and effective access of the population to public or private services.

Economic and social interdependence requires increasing cooperation at regional and global level in order to promote adequate answers to well being needs. Individual solutions and competitive approaches of countries would result in declining living conditions and "zero sum" games in employment and equality. In general this is true for economic growth, but also for well-being, which will always require more international regulation and institutions for employment, working conditions, basic social protection, shared standards in education and health assistance.

The definition of broad institutional framework for global well being will require national adjustments according to the available resources for well-being services and the social transformations needed for safeguarding and/or developing well-being levels. In particular, high income countries, which seem destined to a relative slower growth and significant ageing, social innovation and new forms of welfare should be identified to maintain equality and social cohesion.

The previous considerations imply the need for a huge and widespread effort in institution building of high and middle income countries; the latter countries, in particular, have to define and create their new social infrastructures and welfare systems.

In Europe well being will be strongly affected by the governance and the economic policies that will prevail in the next decades. Increasing disparities between countries and a reduction in social protection and well being will occur if European countries and European Union will be unable to reform their welfare state and make it consistent with economic growth.

The universalistic welfare system and a well being approach based on solidarity and public redistribution are at stake in the near future. Actually, structural imbalances enforce necessary changes; they will affect public budgets but also social cohesion and the EU democratic system. From this point of view, European welfare systems need radical reforms, which do not necessarily require additional resources, but rather a different allocation of the existing ones and managerial and organizational changes. These changes are possible not only in the most favorable scenarios, but in the pessimistic ones as well. The health system is an example: a high space there is for better coordination between the different health sectors and between health and care systems are relevant; it is also necessary to encourage self care, enhance prevention, and improve management of hospitals and data systems.

In other sectors of well being, such as some public services, there is no correlation between well being measurements and national levels of GDP. This implies that improvements in the production and delivery of these services are possible in most European areas. Education is a good example: achievements of the education systems at regional level are weakly correlated to the regional per capita GDP. Improvement of the quality of education through the renewal of methods and content of teaching and through the definition of basic standards in service provision around Europe would be possible.

The econometric exercise, based on a specific modelling of main well being domains in five European blocs and consistent with the economic projections of the CAM model, allowed a joint consideration of social along with financial sustainability issues; this theme is particularly relevant considering the economic and financial crisis faced by European countries. With no changes in the policy conducted at the national and European levels, most countries, and in particular those belonging to the southern and eastern blocs, will go into a process of deep fiscal consolidation that will seriously limit their possibility of getting the necessary resources to finance the present levels of social protection and welfare intervention in the short to medium term. This prolonged reduction in growth and public redistribution would produce significant and negative effects on all well being domains.

The conflict between budgetary policies and the need for economic growth and social inclusion, the potential conflict between policies stimulating the elderly participation in the labour market and the need of challenging youth unemployment during recession, as well as the obviously problematic relation between labour market flexibility and the erosion of the contributions to the welfare systems are only few of the many inconsistencies that European authorities are likely to face in the near future. Form this point of view, policies focused on single aspects and dimensions may prove to be inefficient. A holistic approach appears to be suitable but it requires a new "narrative" of social progress in addition to deeper knowledge on well being dimensions and their interrelation and a change in policy design and implementation mechanisms.

In any case, improvements of well being are possible in several fields, even in the prospect of a long period of slow growth, although it requires a strong political commitment and a great capacity for social innovation. It is worth noting, then, that rationalisation and social innovation in various domains of the welfare system will still be required in the most positive scenarios, because problems posed by an aging population or an inadequate education system do not disappear in the favourable scenarios. But they can be dealt with in a much more favourable context, with less conflict in the system and less social tensions.

WP8 – Political economy and politics

The aim of the workpackage was to specify the main political issues emerging and see how they develop and condition under the various scenarios.
From the point of view of the political scene, a few processes have been indicated as the most important for the future of policy making:

The current and future political situation is and will be affected by the global financial crisis. It has first a direct political cost as political leaders who were in charge lost power in the elections due to the dissatisfaction of the society with the state of economy. It also has an indirect long-lasting cost as it alienates the society from its political elites and rises support for radical (both left and right wing oriented) anti political establishment movements.

The role of the media in the political debates is also a driver of change on the political scene; More and more attention is paid to the attractiveness of the presented material and less and less space is left for serious in depth debates. Storytelling tends to dominate over the discussion of serious policy options in the usual media. Meanwhile the rising role of the internet represents a serious challenge for the traditional ways of communication between politicians and voters. Direct access to voters bypassing the traditional medias favours a wider spectrum of opinions all of which in times of economic crisis will feed the rise of antiestablishment movements.
The economic integration process also has impacts of its own on national politics. f Some issues are not discussed anymore at national levels , and more and more decisions are transferred from traditional, national political bodies (governments, parliaments) to the technocratic and international institutions like central banks, EU institutions etc. There are advantages in this process (decision are not made under pressure of current politics) but one has to realize that society can feel that democracy is weakened and that the most important decisions are taken in undemocratic bodies.

The development of national political scenes depends very much therefore on the global assumptions that one retains regarding regional and global economies.

d) Potential impact (including the socio-economic impact and the wider societal implications of the project so far) and the main dissemination activities and exploitation of results

For this part of the report, each WP leader was asked to assess the potential impact of the particular findings of the corresponding WP.

WP1 – Macro-model of world regions

Demonstration of a methodology for analysis of policy issues and policy coordination in the world as a whole and in each world region that takes full account of extensive historical data now available for the past four decades and allows consideration of all types of policy intervention and institutional change over medium and long term horizons

Using this methodology, scenarios for the period up to 2030 demonstrate the need for long-term interventions by government at national, regional and global levels to ensure sustainable and acceptable patterns of economic growth in the world as a whole and improve the distribution of benefits and well-being in each world region.

The scenarios provide an analysis of key issues facing Europe over the next two decades including problems of government budgets and debt management as well as social impacts of slow economic growth and potential loss of cohesion. Specific scenarios have been prepared to illustrate alternative directions for European institutions including movement towards Federal Europe on the one hand and a "multi-speed" system with increased flexibility to

compensate long-term differences in social institutions and economic performance of member states on the other.

There is considerable potential for use of the macro model in further research to examine long-term policy issues for Europe and other parts of the world.

Dissemination
Scenario hypotheses and outcomes have been written up in a chapter of the AUGUR full scientific report with a technical appendix describing the model. Historical data and software used to generate scenarios have been published with a user guide on the AUGUR web site.

Training has been provided to researchers from partner institutions in Europe and other parts of the world throughout the lifetime of the project, starting with a 3-week workshop in May 2010 and followed up by further short workshops and presentations over the period to June 2012.

Exploitation
Rearchers working for other AUGUR teams have developed their understanding of the methodology and modelling software by implementing their own modifications to model structure and scenario definitions in order to examine specific policy issues and write up conclusions in articles.
Development of the databank and macro model under the AUGUR program has provided a valuable background for improvements to the UN's global policy model (GPM) used by the UN Department of Economic and Social Affairs, the International Labour Organization and the UN Conference of Trade and Development (UNCTAD).

See the list of working papers put on the website which can be used as User guides.

WP2 – Financial markets and international regulation

The central argument in the critique of financial regulation concerns the failure to adapt regulatory tools to an environment in which systemic risk is regarded as the key issue in the attainment of financial stability. Current regulatory developments are dominated by increases in risk-weighted capital requirements – just the measure that failed to secure stability in the financial crisis. Indeed, as has been pointed out in this project, the emphasis on the adoption of best-practice risk modeling increase the homogeneity of response in the face of extreme events and thus *adds to* instability. Moreover, simply ramping up capital requirements severely curtails the lending ability of the banks at a time when the economies of Europe are seriously credit constrained. It is necessary to start from the character of systemic risk, relate the growth of systemic risk to the growth of bank balance sheets relative to the underlying real assets on which monetary assets are ultimately written – and then to devise powerful *but simple* measures to limit the growth of risk. Such measures may range from leverage collars aimed at non-core deposits (the ultimate source of the excess growth rate of balance sheets), or to legal measures akin to Glass-Steagall.
By and large the work in this work package has insisted on the importance to develop analyses of systemic risks beside the prudential regulation of individual banking institutions.
These issues have been discussed in particular at the Cambridge workshop 367 October 2011 as a general topic. A special debate focused on the macro regulation of finance in the European scenarios was held at the Vienna workshop 26-27 April 2012.

Also to be noticed a panel presented at the ASSA (Allied social sciences of America) meeting in January 2011 in Denver (Colorado US).

See also the working papers put on the website which addresses this major issue of systemic risk.

WP3 – Innovation and technology diffusion

The work package WP3 has especially insisted all along on the various patterns of trade and technology diffusion. It took a structuralist view of these trade flows. The literature on convergence clubs has been mobilized. Costs and prices are not the only determinants of trade flows. Organisation of international networks of exchanges are playing a role in the process.
This issue of trade structure and technology diffusion has been especially addressed at many workshops , from the one held in Vienna February 2010 which has been partly devoted to North south relationships to the workshop held in Roma 14-16 march 2012 where specific issues on EU trade with eastern or south countries were addressed.
See the list of working papers put on the website to take a overview of this analysis of the structure of trade and investment.

WP4 – Global development, demography and migration

One of the primary areas of focus for Work Package #4, "Development, Demography and Migration", has been an assessment of the potential problems caused by the projected ageing of the population in some major European countries. The approach has been guided by the assumption that a narrow focus on purely demographic measures of dependency can lead to an inaccurate evaluation of the potential costs of ageing. By overlooking the dependency that arises out of unemployment and low labour force participation rates among the working-age population, analysts have often placed undue emphasis on the costs of an ageing population.

Hence, the research for this work package has modified standard dependency measures in order to incorporate dependency costs associated with unemployment and withdrawal from economic activity. Considerable scope exists thus for policy measures that could reduce economic dependency.
Thus the research for this work package has distinguished purely demographic effects, such as ageing or a large 'youth bulge', from employment-related effects.
The novel aspect of the use of this ratio is that is can be decomposed into two sub-components, the Demographic Dependency Ratio (DDR) and the Working-Age Dependency Ratio (WADR).. follows:
Special attention was paid to these issues at our Rome workshop 14-16 March 2012.
See the working papers on the website which are dealing with this issue of dependency in bothe Europe and in emerging economies like China and India.

WP5 – Energy, primary resources and environmental challenges

The methodological advances in the way scenarios investigate the interplay between energy environment and sustainable globalization developed within the AUGUR project combine in an original way mitigation and adaptation behaviours. These results were presented in IPCC (Intergouvernmental Panel on Climate Change) workshops as a contribution to new socio-economic scenarios for climate change research . The results led to four peer reviewed publications that were presented in various conferences and posted on the website, altogether with unpublished working papers on the issue. .

The method and its implications results for the AUGUR scenarios were extensively discussed at our Brussels workshop November 2011 and at our Roma workshop 14-16 March 2012.

WP6 – Global governance and regional economic integration

The approach on global governance in the AUGUR project insisted in the first place on the importance of the internationalization trend and its impact on the governance structure. The past decades have shown a new interplay between the four actors setting the rules in international affairs, namely the states, the markets, the international institutions and the civil society organizations.
The crisis of 2008 has challenged the system that the liberalization trend had promoted with key roles left to the markets and especially to a globalized financial markets. Scenarios will hereafter be driven by the new systems that will be put in place. Scenarios thus gradually move from situations with limited solidarity between nations , largely due to a persistent retreat of the states, to system more open to cooperation be it at regional or global levels. The environmental challenge clearly push towards more cooperation between countries. A chapter in the final report presents the methodology and major implications of our approach of the global governance issue. It helps to characterize the various scenarios.
Various aspects of this approach have been successively exposed at the different workshops organized for the project. Global governance issues have been especially addressed at the workshop in Roma in 3-6 May 2011. The Arab spring added an opportunity to discuss the European regional governance and its relations with neighbouring countries in the South and the East .

Conversely background elements of this analysis have been exposed at international conferences (especially at the ASSA Allied Social Sciences of America yearly conference in Chicago January 2012 as well as at the Euromemo meeting in Poznam in September 2012) .
Finally specific issues contributing to the general assessments of global governance have led to publications in scientific journals, of which a special issue in the journal Foresight.
Not to forget that most of these background papers, at their pre publication stage have been posted on the website of the project.

WP7 – Well being and living conditions

The use and the impact of the study concern on one side the future research and on another side the political sphere.

The adopted approach to well being (based on measurable items and associating individual and social behaviours) demonstrated to be fertile. Even if data are still limited and national statistics do not consider adequately well being outcomes and drivers, comparisons of national trends and modelling European well being have been possible.

Scientific developments are potentially important in several directions interesting for EU countries.; Three of them are underlined hereafter:
a) enlarging the number of examined well being domains and inclusion of security, environment and social capital in order to provide a more comprehensive analysis at EU level;
b) conducting sub-national (regional) analyses, at least in countries where useful data are available, in order to investigate internal disparities and different impacts of welfare policies;
c) detailing interactions and feedbacks between well-being and economic growth, in order to better examine the contribution of well-being to economic growth. This interpretative model

can be easily used in different analytical contexts and its integration of quantitative and qualitative analyses permits immediate understanding of the policy implications.
The definition of a European econometric model capable of projecting main trends of well-being outcomes according to main demographic variables, GDP and public expenditure is an important and additional result of the study. The model provides interesting knowledge of the effects of changes in public expenditure on well-being; this will be a crucial item in the next years where many European countries will have to reduce public expenditures.

The results of well being analysis in AUGUR are also important for the political debate and the policy decision making. They contribute to a broader view of the socio-economic problems of the current era. First of all, the use of well-being indicators as a measurement of development changed the point of view on growth and obliged to focus on social aspects of our life. In this respect the study contribute to the debate on social innovation and economic adjustments in Europe from a less usual point of view and pointing out the value of social cohesion.

Secondly, the analysis provides policy makers with quantitative estimations of possible impacts of future policy on European standard of living. These results are important to assess the economic impact of current policy and the relationship between policy decisions and day by day life. Hence, several results and the econometric models (CAM and European one) are basic tools for policy decision making.

Thirdly, the analysis of the complex relationships between public expenditures, social organisations and institutions has identified a set of well-being drivers mutually related, but also individually utilizable to better answer to specific needs. As far as this is concerned, the WP7 considered several proposals debated in the literature concerning welfare state, labour market, public services and social policy in Europe and put them in a unique analytical framework. This exercise has given coherent and comprehensive results to feed policy debate.

Fourthly, the integration of the European and the global analyses provided a realistic picture of the future role of Europe in relation to social issues. The global changes and the consequent decrease in the economic power of the advanced countries are less problematic for our standards of living if cooperation among countries and international region will prevail. In addition, the development of welfare state in emerging countries may reduce cost competition and promote international social standards. In this respect, a new international market and a new field of international cooperation are opening for Europe; its social model and high levels of well-being are becoming a strategic asset.

WP8 – Political economy and politics

WP8 has analyzed the national political contexts likely to be associated with the various European scenarios. It led to underline the importance of the contemporary changes in political processes and to identify the trends that could follow from economic stagnation and other challenges such as climate threat. The importance of the media and the internet are clearly part of the factors of change. Conversely the increasing role of international institutions in the decision processes of national political affairs change the relationships between national political elites and citizens. A risk of alienation and of an increasing gap between the populations and political elites has been stressed. The importance of populist movements has been analysed in relation with the various scenarios.

The political class has to realize that there is a real threat of rising support for anti-establishment (both right and left oriented) parties, which can severely limit the fiscal policies required to face some of the structural changes on the agenda.

These issues have been centrally addressed in some AUGUR workshops.
In Warsaw December 8th 2011 , the increasing role of technocratic bodies with obvious advantages (lack of current political pressure, ability to focus technocratic issues) but also disadvantages like a growing distance between society and government have been discussed in relation with the various scenarios..
The future of populist movements in diverse European contexts were debated in the workshop held in roma in 14-16 March 2012.

e) Address of the project public website, if applicable as well as relevant contact details.

Address of project public website: www.augurproject.eu
Main contact point for the consortium: augurproject@gmail.com

Project logo

A·U·G·U·R
Challenges for Europe in the world, 2030

Poster of final conference

Picture of consortium members in Rome, 16 March 2012

List of participants and contact persons

Participant no.	*Participant Organization name*	*Participant Organisation Acronym*	*Country*	*Contact persons*
1	Centre National de la Recherche Scientifique Université Paris 13 – Centre d'Economie Paris Nord	CNRS-CEPN	FR	Pascal Petit, Jacques Mazier
2	The Chancellor, Masters and Scholars of The University of Cambridge	UCAM	UK	John Eatwell, Francis Cripps
3	School of Oriental and African Studies, University of London	SOAS	UK	Terry McKinley
4	ISMERI-EUROPA	ISMERI	IT	Enrico Wolleb
5	Kozminski University	KU	PL	Grzegorz Kolodko
6	Wiener Institut Fur Interntionale Wirtschaftsvergleiche	WIIW	AT	Michael Landesmann
7	Société de Mathématiques Appliquées et de Sciences Humaines	SMASH	FR	Jean-Charles Hourcade