INTRODUCTION

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Indicators of fiscal sustainability are necessary to signal trends towards excessive deficit and debt levels or fiscal developments requiring unsustainable tax increases. They are necessary to guide the policy debate and the reform process in a changing economic and demographic context. They may enable policymakers to gradually adjust expenditure programmes to demographic developments avoiding sudden and socially costly changes. They can help governments to gain public consent for structural reforms.

Economists have long debated the definition of fiscal sustainability and the factors affecting it. Public debt has long been at the core of the debate. What are the limits to debt growth? Who bears the burden of public debt? What are the effects of debt on capital accumulation and growth? In recent decades, the expansion of the public sector and population ageing have drawn attention to the need to evaluate the role played by implicit government liabilities in the assessment of fiscal sustainability. This has given prominence to the future deficit path implied by current policies and has shifted the focus of analysis to the intertemporal budget constraint. New methodologies, like generational accounting, have been developed to link sustainability considerations to the concept of intergenerational fairness. At the same time, national and international institutions have devoted major resources to sustainability analysis. In most developed countries both projections of age-related expenditure and indicators of fiscal sustainability (such as tax gaps, debt-to-GDP ratios and generational accounts) are now widely available.

However, while the intuition is clear (a sustainable policy must ultimately avoid bankruptcy), the analytical and operational definition of sustainability is not straightforward. For instance, what is the maximum sustainable debt ratio? Sustainability indicators have several problematic aspects. First, they are often based on expenditure projections and assumptions concerning revenues that are consistent with current legislation but may not be socially and economically sustainable. In particular, is a sizeable decline in the amount of the average pension sustainable? Is a relatively high tax-to-GDP ratio sustainable? Second, demographic change is only one of the many factors affecting public finances. Social developments, environmental problems and technological development can also have a large impact. Indicators usually combine analysis of demographic trends, productivity, labour market developments and fiscal policy, but the interactions between these factors are sometimes only mechanical.

Moreover, standard analyses do not ordinarily take into account the composition of the fiscal adjustment: to the extent that a sustainable fiscal balance is to be achieved, lower deficits are equivalent to structural reforms. But the economic impact of higher tax rates and of an increase of the retirement age can be very different. The former correction can trigger sustainability problems. This suggests that standard fiscal indicators are only a starting point in the policy assessment.

The use of sustainability indicators in the policy debate may also prove problematic. Most studies are carried out by governments and public economic institutes, as they are better equipped to cope with the problems of data availability and the cost of fiscal projection models, but the fact that the same institutions are responsible for both policies and projections can give rise to conflicts of interest. Cross-country studies have greatly contributed to enhancing the quality and comparability of projections, but certain questions concerning the transparency and homogeneity of

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projections remain open. Finally, in spite of the extensive reports and studies, the general public's knowledge of the issue is frequently very limited. What is, then, the best way to incorporate long-term sustainability analysis into the policy debate?

The 2000 workshop addressed fiscal sustainability from four points of view: conceptual and definitional issues (with six papers reviewing the literature on fiscal sustainability and examining different definitions and methodologies); long-term budgetary projections (with six papers evaluating current policies in terms of public expenditure, revenue, deficit and debt dynamics); generational accounting (with five papers assessing sustainability by considering the implications of fiscal policy for different generations); and policy issues and links with the Stability and Growth Pact (with five papers examining policies to restore sustainability and the role of EU fiscal rules).

There are several reasons for devoting a second workshop to the issue of fiscal sustainability. First, over the past decade fiscal sustainability has remained at the centre of the theoretical and policy debate, which has been enriched by the advance of new methodologies for assessing fiscal sustainability. Many more studies assess sustainability at the national level. Long-term budgetary projections and fiscal sustainability assessment have become a standard feature of the EU fiscal framework. Nowadays, health and long-term care represent the main areas of concern alongside pensions, but their projections are more uncertain than those of pensions. Environmental issues are now recognised as a potential source of fiscal imbalances. Finally, many countries have introduced regular reporting of long-term budgetary trends.

The papers presented at the Workshop were divided among four sessions, which are mirrored by the sections of this volume. Section 1 examines the new methodologies for assessing fiscal sustainability, Section 2 considers the fiscal policy implications of sustainability assessment, Section 3 examines health care and long-term care, and Section 4 deals with environmental issues and sustainability reporting in the policy debate.

1 New methodologies for assessing fiscal sustainability

The papers in Section 1 discuss both refinements of the standard methodologies and new tools to assess fiscal sustainability. The first three papers adopt, respectively, stochastic simulations methods, stationarity and cointegration analysis, and debt-sustainability stress testing to assess fiscal sustainability of specific countries and/or the EU as a whole. The next two papers focus on public sector liabilities and pension expenditure, the first looking at their recording in public accounts, the second examining long-term forecasts. The last paper evaluates primary balances as a signalling device for fiscal sustainability. The innovations proposed in these papers are methodologically relevant and important to support the decisions of policymakers.

Bandiera, Budina and van Wijnbergen evaluate how to apply fiscal sustainability analysis to countries that largely rely on the production of oil. In these countries the uncertainty intrinsic in long-term projections is intensified by the volatility of commodity prices. The simulations in the paper are based on the case of Azerbaijan. Uncertainty is accounted for via stress tests and stochastic simulations. The paper shows that the temporary nature of oil and gas revenues raises issues of intergenerational fairness and that the volatility of revenues, if translated into highly volatile spending levels, and that of the real exchange rate can have negative consequences for economic growth. The authors argue that oil-producing countries should adopt a permanent income approach to the decision on how much to spend out of oil revenues and introduce an oil stabilisation fund in order to avoid excessive increases in public expenditure.

Afonso and Rault assess the sustainability of public finances in the EU-15 over the period 1970-2006 using stationarity and cointegration analysis. In particular, they investigate if the stock of real government debt follows a stationary process or if there is cointegration between government revenue and government expenditure as a percentage of GDP. Even if the EU lacks a single fiscal policy, a panel sustainability analysis of public finances is relevant in a context of EU countries seeking to pursue common and sound fiscal policy behaviour within the Stability and Growth Pact framework. Possible cross-country dependence can be envisaged in the run-up to Economic and Monetary Union or, for example, via integrated financial markets. The results of panel data tests lead the authors to conclude that the solvency condition is satisfied for the EU-15 countries. Moreover, the results show that general government expenditure and revenue ratios are integrated of order one.

Frank and Ley propose methodological refinements of the fiscal sustainability analysis framework essentially based on debt-sustainability stress tests. They look at debt-dynamics under the assumption of large changes in one variable at a time (interest rates, exchange rates or growth) while keeping all the others constant. Building on the probabilistic scenario analysis proposed by Celasun, Debrun and Ostry, they innovate in some respects; in particular, they: i) identify structural breaks over the sample period used to estimate the covariance matrix of the shocks to the debt ratios, ii) drop the assumption of normality of the shocks by modelling their respective empirical distributions directly via bootstrapping techniques, and iii) focus on the required primary balances consistent with sustainable fiscal policy instead of using fiscal reaction functions. This enables them to overcome existing data constraints and provides a framework in which current policy can be evaluated against a fiscal sustainability measure.

Gokhale examines government budget accounting issues in the United States in view of two reform projects currently underway at the Federal Accounting Standards Advisory Board. These projects involve an assessment of the moment in time when social programme benefits should be “recognized” and reported as federal liabilities. They also envisage inclusion of all projected expenditures and revenues under “current laws” in reporting on the entire federal government’s financial condition. Gokhale concludes that such extended reporting requires an integrated analysis of current operational costs, the current net asset position and the future implications of current policies to inform fiscal policy management. He recommends reporting total future actuarial net costs and the temporal sequence of their accumulation.

Gil, López-García, Onrubia, Paxtot and Souto develop a static micro-simulation model to project Spanish contributory pension expenditure for the period 2004-50. The model accounts for pensioners’ heterogeneity in terms of categories of pension, social security regimes and gender. In particular, differentiating between males and females allow the authors to improve the expenditure projections in so far as they capture the gaps associated with both the participation rate and the pension benefit. The model provides an estimate of total pension expenditure, which is projected to increase from an initial level of 8 per cent of GDP to 15 per cent in 2045. The increase is mainly determined by old-age pensions. Surprisingly, the projections show higher growth in the number of contributory pensions accruing to men than to women.

Herrera and Salman investigate whether primary fiscal balances represent a signalling device in a context in which private investors are uncertain about the government’s commitment to honour its obligations. Their estimates, based on data from Argentina, Brazil and Turkey, find evidence supporting this hypothesis. In particular, they show that sovereign spreads correlate directly with the debt ratio and inversely with the primary balance. However, this relationship is non-monotonic and is conditioned on a threshold debt level. In fact, improving the primary balance turns out to be especially valuable when the debt level has exceeded a certain threshold, or when interest rates are high, because in those circumstances the committed but non-fully credible government can show that it is willing to forgo the benefits of additional public spending in order to meet its future debt obligations.

Bouthevillain agrees with the main message of the paper by Gokhale and provides additional clarifications and arguments in favour of its recommendations. She remarks that concern over the issue of sustainability, difficulties in measuring it and the need to communicate to policymakers in an informative manner with the aid of relevant indicators are common on both sides of the Atlantic. In Europe, the benchmark calculations are those by the European Commission's Ageing Working Group. In particular, the S2 indicator is very similar to the tax gap used in Gokhale's analysis. Bouthevillain praises the paper by Gil *et al.* for providing detailed information and very interesting results on the Spanish social security system. The paper is considered especially pertinent for its assessment of past or planned reforms and their impact on budgetary imbalances. Bouthevillain highlights the importance of these analyses for the policy debate. In this respect, similar work has recently been done in France to assess the possible impact of new reforms intended to make the pension system more sustainable.

Brender discusses the first three papers. He observes that the analysis of fiscal sustainability requires a clear definition of sustainability and suggests that "being able to pursue the current policies into the (very) long run" might be one. He notes that the fiscal sustainability tool suggested by Bandiera *et al.* makes it possible to examine the impact of proposed policy modifications on macroeconomic variables and to evaluate alternative policy scenarios. He also points out the limitations of the tool, in particular the absence of interaction between the outcome of the analysis and fiscal policy. Endogenising the fiscal reaction function would make the behaviour of the agents in the model more rational. Brender deems very important the technical improvements to the sustainability tool proposed by Frank and Ley. The tool permits close examination of the projection risk and more accurate sustainability analysis. Concerning the paper by Afonso and Rault, Brender suggests the authors complete it by providing a description of the error-correction process in the model and information on the size of the adjustments needed to insure cointegration and on the characteristics of the countries that adopted sustainable policies compared with those that needed policy changes. This additional information would provide the reader with better guidance on how to interpret the behaviour of policy-makers during the sample period.

Rezk considers the paper by Herrera and Salman a rigorous and valuable empirical contribution to the analysis of emerging economies and to the literature on the role of primary balances as signalling devices: compared with the previous literature, it analyses whether fiscal variables alone explain sovereign spreads' behaviour or whether instead the actual signalling devices consist in the commitment to undertake reforms and economic and political stability, together with standard fiscal variables.

2 Sustainability assessment and policy implications

The eight papers in Session 2 provide a quantitative appraisal of long-term fiscal imbalances in various countries, most of them members of the EU and the euro area, and discuss what policy implications can be drawn from the sustainability assessment. The first two papers measure long-term fiscal imbalances in a static framework, assuming unchanged behaviour of economic agents and no policy actions in the coming years. The fiscal indicators employed in this type of analysis are well established in the literature and widely used in the official sustainability assessments. The next four papers examine potential extensions to the reference partial equilibrium framework. In particular, they account for the endogenous response of economic agents, economic growth and intergenerational equity and draw policy conclusions concerning the required fiscal consolidation effort and its timing and composition. The last two papers provide country-specific sustainability assessments of Italy and Japan, which both display significant population ageing. The papers also examine potential reforms to restore balance.

The paper by Carone, Costello, Diez Guardia, Eckefeldt and Mourre has a twofold goal: to measure the budgetary impact of ageing on the EU member states and assess their long-term fiscal sustainability. The authors' calculations draw on the macroeconomic assumptions developed jointly by the Working Group on Ageing of the Economic Policy Committee and the European Commission. Age-related expenditure is projected up to 2050 in a no-policy-change scenario. The fiscal impact of ageing is expected to be substantial in almost all member states, with the effects accelerating from 2010. In the second part of the paper, current fiscal positions and the projected cost of ageing are used to assess long-term fiscal sustainability. The sustainability gap, defined as the required fiscal adjustment to set public finances on a sustainable path, is computed for each country. For the whole EU the gap is estimated at 2.5 per cent of GDP. The situation varies greatly across countries, owing to the diversity and degree of maturity of public pension arrangements and the effects of the pension reforms enacted so far. As to policy conclusions, the paper highlights the need for retirement behaviour consistent with future increases in life expectancy and for more efficient health care and long-term care provision.

Balassone, Cunha, Langenus, Manzke, Pavot, Prammer and Tommasino examine the Ageing Working Group projections of age-related expenditures and assess long-term fiscal sustainability for euro-area countries by employing several indicators. The main results of this analysis are in line with the conclusions of the European Commission. Further, the paper focuses on three countries – Germany, France and Belgium – and carries out a generational accounting exercise to assess the ability of different budgetary strategies to restore fiscal sustainability, taking intergenerational equity into account. The main finding of this analysis confirms the need for a significant degree of pre-funding of the costs of ageing. An "early" adjustment strategy, implying significant government surpluses in the coming years, generally leads to flatter time profiles of the total lifetime burden than a "gradual" fiscal adjustment and thus may be considered more equitable.

The assessment of long-term fiscal sustainability via tax gap analysis or generational accounting usually ignores the feedback effects of changes in taxes and public expenditure on the response of economic agents (notably their labour supply and saving decisions) and ultimately on economic growth. In these approaches tax increases and spending cuts are equivalent means of achieving fiscal consolidation. In order to account for feedback effects, Cournède and Gonand construct a stylised dynamic general-equilibrium model with overlapping generations, calibrated on euro-area data, and simulate four alternative scenarios of fiscal consolidation. The fiscal authority can consolidate the public finances by either increasing taxes or cutting ageing-related expenditure, with or without raising the mandatory retirement age. The analysis confirms that, compared with spending restraints, tax increases are a more costly way to achieve fiscal sustainability. Moreover, combining expenditure restraint with appropriate structural reforms (such as raising the retirement age) significantly increases the benefits of fiscal consolidation, with a higher retirement age boosting labour supply and spending cuts stimulating household saving.

Beetsma and Oksanen explore the links between the future costs of population ageing, the revised Stability and Growth Pact and fiscal sustainability. While the latter can, in principle, be achieved through different combinations of spending and revenue policies, the authors choose to focus on those that treat subsequent generations equally. They develop the concept of actuarial neutrality: generations that are identical in terms of demography and retirement age should face the same tax rate for the same level of benefits. A partial equilibrium model is then calibrated on EU data to study the impact of actuarially neutral consolidation strategies and to discuss their implications for the Stability and Growth Pact. The calibration results suggest that adhering to the actuarial neutrality principle requires the average EU government to run substantial surpluses for at least two future generations. Consequently, the Stability and Growth Pact's current medium term objectives do not seem sufficiently ambitious.

The paper by Creel and Saraceno links the issue of fiscal sustainability to the growth-enhancing role of fiscal policy. In the context of the Barro endogenous growth model, the authors investigate fiscal sustainability and the determinants of economic growth in the presence of productive public spending which, in contrast with the standard literature, is assumed to be not entirely tax-financed. The model also features households maximising utility over a finite horizon. Provided that public spending is not too high and taxes are adjusted appropriately, public spending – even if not fully tax-financed – is shown to improve growth without hurting fiscal sustainability. The calibration of the model with data from France, the United Kingdom and the United States shows that the stock of public capital in these countries is below the optimal level.

Kleen and Pettersson highlight the important role played by endogenous labour supply in models assessing long-run fiscal sustainability. In particular, they suggest that endogenous labour response to structural reforms should always be taken into account as it can significantly affect fiscal sustainability results. The paper focuses on Sweden, which, based on standard analyses, exhibits a slightly unsustainable fiscal policy in the long run. Using the accounting model developed by the Swedish National Institute of Economic Research, the authors model a shift in the policy mix in which the reduction of taxes on labour income is financed by reduced household transfers. Such a reform; by providing incentives to increase labour supply, leads in turn the public finances to achieve sustainability in the long run.

Rizza and Tommasino present generational accounting estimates for Italy, a country with high life expectancy, a low fertility rate, high public debt and a large share of social expenditure targeted to the elderly. They show that after the remarkable reduction in the intergenerational imbalances in the nineties, current fiscal policies are neither financially sustainable nor fair to future generations. The paper considers alternative indicators, which all point to the need for policy measures to improve the balance between the active and non-active population. They also discuss various policy options that could potentially restore sustainability while also improving intergenerational justice.

In the last paper of the session, Oshika describes Japan's current fiscal position and recent actions taken toward fiscal consolidation and also discusses long-term fiscal projections and various issues concerning fiscal sustainability. The paper applies the European Commission's sustainability assessment methodology to the Japanese public finances. Its findings confirm the existence of risks stemming from the ageing of the population, the high level of public debt, the expected growth of social security benefits and the possibility of an increase of interest expenditure in the future. Oshika's analysis suggests the need to estimate implicit liabilities more accurately and to report them in public accounts.

Baylor argues that the main contribution of the paper by Carone *et al.* lies in its specific country results and its assessment of actual and potential progress. He suggests that providing a comparison with other sustainability studies could be of value for an international audience. Baylor praises Balassone *et al.* for explicitly calculating total lifetime generational accounts for all cohorts born between 1970 and 2050 as this is a more complete approach than simply accounting for differences in future taxes paid and in-kind transfers received. He points out that the allocation strategy of non-age-related government consumption and capital spending might not be satisfactory for the public policy debate. He also suggests that the authors should replace the concept of "intergenerational equity" with that of "intergenerational balance", as the former inevitably involves some sort of value judgement, while the latter relates more closely to the type of calculations they perform. As to the paper by Cournède and Gonand, Baylor agrees with the authors' decision to account for endogenous labour supply when assessing fiscal imbalance, which in the euro area primarily stems from public pensions. However, he notes that when the retirement age is made an exogenous policy parameter, any insight as to the impact of a specific policy on retirement behaviour is lost.

Madhusudhan praises Rizza and Tommasino and Oshika for providing interesting and updated sustainability analyses of Italy and Japan respectively, with a view to both fiscal sustainability and intergenerational fairness. She shares Rizza and Tommasino's view that there is no simple solution to attaining fairness in the intergenerational distribution of the net tax burden, and that trade-offs need to be recognized explicitly. She also notes the problems associated with long-range predictions due to uncertainty and sensitivity to assumptions and, in this regard, highlights the importance of analysing alternative measures, especially in the Italian case. Finally, Madhusudhan recommends that the analysis in both papers be extended to consider linkages between changes in the real economy and changes in the financial markets; between the domestic and the global economy; and between national economic policies and international macroeconomic and financial developments.

In reviewing the paper by Kleen and Pettersson, Part acknowledges the importance of accounting for an endogenous labour supply when investigating the impact of structural reforms on fiscal sustainability. He notes, however, that the results should not be misinterpreted, in that a high tax burden creates additional room for budgetary manoeuvre: the key policy challenge would be to cut social transfers by an amount equal to the tax revenues forgone. In the paper by Creel and Saraceno, Part highlights the key role played by the definition of the public spending threshold, where the marginal costs of taxation exceed the marginal benefits of public spending. Given a fairly high spending level in many European countries, this model appears to be applicable only to a limited degree. Since the authors rule out the possibility of a hump-shaped impact of public spending on growth, the issue of efficiency and effectiveness does not play a major role in the paper. Furthermore, Part recommends accounting for issues of time consistency of fiscal policy as well. In the model of actuarial debt neutrality developed by Beetsma and Oksanen, Part identifies a definition of intergenerational equity by fixing total debt given an unchanged retirement age. In Part's view, the results of the paper can be interpreted as an unsustainable fiscal starting point. While remarking that the results of these analysis tend to be very sensitive to interest changes, Part points out that the key issue in this definition of intergenerational equity is whether total pension benefits accrued over a lifetime are sustainable from the outset.

3 Health care and long-term care

Section 3 deals with the economic, budgetary and social consequences of ageing populations, focusing mainly on health care and long-term-care spending. The first two papers investigate the determinants of health care expenditure, and the third discusses current issues in health care financing in central and eastern Europe. The fourth and fifth papers discusses health and long-term care spending projections in specific countries. The sixth paper provides an estimation of contingent liabilities in Colombia. The last paper discusses the growth effects of alternative fiscal adjustment strategies aimed at ensuring debt sustainability, particularly in the face of the pressures of population ageing.

The paper by Przywara and Costello notes that the dynamics of public expenditure on health care is determined not only by changes in the age structure but also by a set of interrelated demand and supply factors, which are often exogenous to policy decisions. Therefore, reliable projections should account for such non-demographic factors. The authors first describe the projection methodology employed by the European Commission and the Ageing Working Group and present the main results, They then discuss possible methodological improvements. In particular, they suggest that a better understanding of the interactions between public and private spending on health could improve the projections. Moreover, some efforts should be devoted to the analysis of supply side factors and to enhancing the comparability of the input data collected from national authorities. It would also be useful to attach probabilities to the shocks introduced in each scenario. Finally, linking the projection results to the institutional setting of each country would enhance the policy relevance of the exercise.

Follette and Sheiner focus on the determinants of the historical and prospective growth in health care spending in the United States . Income and ageing had a large role in the past, and the rise in health insurance coverage had a dramatic effect on spending for health care of the elderly. The authors examine the implications for consumption of non-health goods and services of ever-increasing expenditure on health care and argue that per capita expenditure persistently outpacing per capita income would not lead to the crowd-outing of non-health consumption. They study the distribution of health spending by income quintile and age group over the next seventy-five years, projecting current spending and financing patterns and assuming a given excess growth of spending over income, and find unprecedented levels of private health spending by the lowest quintiles. Finally, Follette and Sheiner assess the implications for the federal budget of two alternatives that may capture the endogenous response by government in the past and they examine two scenarios where government support is reduced, which is inconsistent with past experience but consistent with proposals to scale back entitlement growth in the face of budget pressures.

Mihaljek focuses on health care financing issues in Central and Eastern Europe from the public finance and macroeconomic perspectives, given that there are defective financial incentives to health-care providers and an unsustainable structure of health-care financing. There are several similarities among the countries in question: their health care systems are ineffective, the current manner of financing the sector will become increasingly unsustainable, and reform options need to be examined immediately to prevent the systems' financial collapse. Whereas most recent health care financing reforms have focused on cost containment, resulting in a shift of a growing portion of health care costs onto households and in uncoordinated efforts among sectors, Mihaljek recommends financing a larger share of health care expenditure out of general tax revenues. Replacement of flat fees with fee-for-service payments based on a points system, accompanied by suitable monitoring and auditing of the bills submitted by primary care providers and a reform of the system of co-payments, would be desirable to keep costs from escalating. Finally, Mihaljek stresses the importance of the authorities' ability to manage the political economy aspects for the success of health care reform.

The paper by Aprile is about the impact of ageing on health and long term care and contains a description of the recent projections of medium/long term trends in Italy for the expenditure in the health sector. After identifying different groups of expenditure drivers, Aprile concentrates on the possible effects of a shift of the age consumption profile generated by a change in health status. The evidence of a positive correlation between longer lives and healthier statuses has two major implications First, maintaining the age consumption profile unchanged in the forecast is a conservative assumption, which tends to overestimate the effects of ageing on health and long term care expenditures. Second, analysis has concentrated on health improvements caused by interaction with changes in life expectancy, disregarding those stemming from non-demographic factors and developing two theoretical approaches: the “death-related costs” and the “dynamic equilibrium” approaches. Pointing out some problems in implementing the latter in forecasting models, Aprile proposes a methodological solution to project the age consumption profile.

Lagergren observes that simplistic calculations based on the assumption that future needs of care will be proportional to the number of old persons per age group may lead to misleading projections of long-term care expenditure by failing to take into account the health developments of the elderly. He then illustrates a calculation model for the projections of future costs of long-term care in Sweden, capturing the distribution of old people per age, gender and marital status, the health developments in different sub-groups and the provision of different services in relation to care needs. The calculations show that the results are highly sensitive to the assumptions made about the health development of older persons; the expected increase in costs for the period 2000-30 falls by two thirds. Consequently, Lagergren stresses the importance of policy measures directed at improving the health of the elderly.

The paper by Clavijo and Torrente analyzes the structure of the health care system in Colombia and seeks to ascertain the magnitude of the fiscal deficit it generates. After explaining its complicated mechanism of compensations and “cross-subsidies”, they give an estimation of the financial costs implied by arriving at universal coverage from the current measure of 86 per cent. Finally, based on these results, Clavijo and Torrente compute the net present value of the fiscal deficit likely to be generated over the period 2007-50. The baseline scenario shows an estimated net present value of public liabilities of about 110 per cent of GDP (in 2007 terms), which is of a similar magnitude to the pension system liability established after recent “parametric reforms” of the pay-as-you-go system. However, the authors stress that health care represents a uniquely challenging fiscal case in that its expenditure side cannot be easily bounded and, on the income side, estimates of contingent fiscal obligations are likely to force governments to continue increasing tax revenues through different means.

Botman and Kumar analyse the growth effects of alternative fiscal adjustment strategies to maintain debt sustainability, particularly in the face of ageing pressures. Using the IMF’s Global Fiscal Model, they consider the effects of fiscal adjustment by itself and when pursued in combination with tax, labour and product market reforms. The model also explores the international spill-over effects of demographic pressures and the benefits of cooperative fiscal adjustments. The authors find that that the debt is unsustainable under current policies both in the euro area and in the United States. If trading partners are also ageing, there are negative spill-over effects through financial and trade channels. A fiscal adjustment that combines both revenue and expenditure measures and makes it possible to achieve primary surpluses over the next decade is the only feasible and relatively efficient way to maintain debt sustainability. The short-term contractionary consequences of the adjustment can be reduced if there is international cooperation in structural reforms. Achieving the objectives set out in the Lisbon Agenda in Germany and the euro area is likely to overcome the adverse short-term effects on real GDP of the fiscal response. Finally, Botman and Kumar argue that there is a synergy between fiscal adjustment and the pursuit of the Lisbon objectives.

In the discussion of the first two papers, Braz points out that whenever a simplified approach is used to project health care expenditure some crucial country-specific features are inevitably missed. Hence, calculations based on national models, as is the case for pension expenditure projections, could represent a big step forward in the next round of the projections of the Ageing Working Group, provided that they are fully transparent and carefully assessed through a strict process of peer-reviewing. She then remarks that health expenditure is very difficult to project and that even a careful analysis of past developments is a complicated task. As a consequence, results are very sensitive to the assumptions. In this context, the construction of alternative scenarios is advisable. The projections of health expenditure for a group of countries, although very useful in the policy debate, may become less accurate as some simplifying assumptions are necessarily introduced for the sake of comparability or because of data availability problems. Finally, Braz underlies that policy challenges should be viewed in terms of general welfare and not only on the basis of budgetary considerations.

Francese discusses the papers by Mihalijek, Aprile and Lagergren. These studies focus on the measurement of the expenditure pressures stemming form population ageing and on the measures that can be implemented to cope with these pressures. They differ with respect to the countries (Central and Eastern Europe, Italy and Sweden respectively) and the items considered (health care, health and long-term care, and long-term care respectively). After drawing attention to some specific aspects of each paper, she remarks that expenditure projections are not only strongly influenced by population ageing but also by other economic and socio-demographic developments, such as changes in labour market behaviour (notably female participation), marriage and divorce rates, household composition, provision of informal care and migration flows. The likely impact of such changes and the need to avoid unwelcome distributive outcomes point to the need to broaden the standard analysis and to integrate health and long term care with other socio-economic policy programmes.

Schratzenstaller comments on the papers by Przywara and Costello and by Botman and Kumar. Referring to the first paper, she stresses that the estimate of contingent liabilities crucially depend on the assumptions about the factors influencing the revenues and expenditures of health care systems. This raises the question of how reliable are the projections and how sensitive the results to the underlying assumptions. As to the policy implications, it is important whether the social security/health care system is tax-financed or contribution-based. A tax-financed system is less sensitive to the size of the informal sector and does not have negative feedback effects on formal employment. Regarding the paper by Botman and Kumar, Schratzenstaller recognizes that the IMF Global Fiscal Model describes the structure of public expenditures and revenues in great detail and takes account of the interdependence between countries via goods and capital markets; however, the assumption of perfect capital mobility appears to be quite strong and may lead to an overestimation of international interdependencies and of the benefits of international cooperation. Finally, concerning international cooperation, she notes that populations age at different rates, so the pressure to implement fiscal adjustments and to join coordinated action may differ across countries.

4 Environmental issues and sustainability reporting in the policy debate

Session 4 examines the fiscal impact of environmental factors and the role of fiscal sustainability analysis in the policy debate. The first and the second papers consider the effects of extreme weather conditions and the impact of measures to reduce greenhouse gases. The next four papers examine sustainability analysis and reporting in four large European countries. Long-term expenditure projections are available for all these countries. In some of them they are presented in a comprehensive sustainability report aimed at increasing the awareness of policymakers and the public. The last paper focuses on sustainability analysis for the G-7 countries and on the choice of the timing of fiscal adjustments.

Heipertz and Nickel examine the fiscal dimension of climate change. They collect evidence concerning six of the most extreme weather events that have occurred since 1990 in the United States and the European Union. They note that the fiscal impact of these natural disasters has been relatively small in proportion to GDP. Nevertheless, they point to the need to reconsider the role of public and private insurance in the face of climate change. Public disaster insurance could potentially overcome market failures that might impede private insurance, but it should be designed carefully to overcome moral hazard effects. The likelihood that governments will be forced to cope with an increasing number of severe weather events underlines the need to reach and maintain sound public finance positions.

Stenborg and Honkatukia evaluate the impact on the Finnish economy of the measures that could be implemented to curb the emission of greenhouse gases. They use two general equilibrium models of the Finnish economy. They estimate that a large reduction of the emissions would cause a decline of GDP in the short term and significant employment problems. In the long run the impact on employment would be smaller, depending on the flexibility of the labour market. The size of energy-intensive industries would diminish as a consequence of abatement policies. The estimates highlight the importance of permit prices and CDM (Clean Development Mechanism) prices.

Biraschi, Codogno, Giammusso, Nenna and Pradelli describe the commonly-agreed European methodology that the Italian government adopts in official documents to assess fiscal sustainability and discuss some critical aspects of this approach. They extend the standard assessment of fiscal sustainability to cover alternative assumptions concerning migration flows, life expectancy, female labour market participation and productivity growth. The impact of changes in the assumptions about migration flows depends on the structure by age and gender of immigrants, which affects the impact of immigration on health care, education and social transfers. The sustainability of the Italian public finances appears to be robust under different demographic and macroeconomic scenarios. Labour productivity gains and the improvement of the primary balance in the near term are crucial to achieving fiscal sustainability in the long term.

Kastrop and Velleueṛ examine the German experience with sustainability reporting. They consider its background and rationale in the context of the ageing of the German population. They give an overview of the first comprehensive report on the effects of demographic change published by the Federal Ministry of Finance in 2005, point to the lessons learned from this first exercise and highlight the changes introduced in the preparation of the second sustainability report, which is based on updated projections. Kastrop and Velleueṛ evaluate how sustainability reporting can be relevant for the policy debate and illustrate the findings of a recent study using insights gained by behavioural economics. They also address the issue of uncertainty in the projections and conclude by examining how to deal with long-term risks in the formulation of medium-term budgetary targets.

Eich assesses the experience of the Treasury of the United Kingdom with the publication of the Long-term public finance report. He examines the reasons for launching the report in 2002, its structure and its evolution over time. For example, he shows how generational accounting was initially introduced in the report and was later excluded, both for lack of comparable studies in other countries and for its limited policy relevance, since it assesses the degree of generational fairness by looking only at future cohorts. Eich argues that the regular publication of the report has kept long-term fiscal issues alive in the policy debate and has allowed government to develop a better understanding of future trends. The report has provided a rigorous framework for policymakers to think about long-term economic issues. In particular, the report and the underlying analysis proved very useful for the design of pension reforms and the 2007 Comprehensive Spending Review. According to Eich, it is important that the analysis not get too complex and sophisticated, to ensure that policy makers are able to make use of the report.

Doménech and Melguizo note that medium and long-term projections of pension expenditure are crucial to anticipate the futures challenges of the public sector. However, in many cases these projections are not well known and understood by the public. This may explain the imbalance between the consensus reached within the academic community on the need for social security reforms and the limitations of the debate on these reforms within the general public. The paper suggests a set of indicators about the future performance of the Spanish public pension system and a suitable method of representing the uncertainty of future developments. The indicators should improve communication with the public and prevent future criticisms about the accuracy of the forecast. Doménech and Melguizo argue that simple, transparent, credible, public and periodically updated indicators would support governments in the reforms needed to strengthen the pension system.

Hauner, Leigh and Skaarup use two standard indicators (the debt target primary gap and the intertemporal primary gap) to assess the evolution of fiscal sustainability for each of the G-7 countries and evaluate the contribution of policy initiatives. They also compare the macroeconomic effects of earlier versus later adjustment using the IMF's Global Fiscal Model. They find that ensuring long-run fiscal sustainability requires a large-scale fiscal adjustment in all G-7 countries. Without any fiscal adjustment, debt dynamics would be explosive in all seven countries. There are significant growth benefits in putting public finances on a sustainable footing in the near term; postponement would increase the size of the adjustment. Hauner, Leigh and Skaarup point to the importance of obtaining a consistent set of cross-country estimates for future age-related spending pressures, which would raise the quality of cross country analysis.

Lindh discusses the papers by Heipertz and Nickel and Stenborg and Honkatukia. He agrees with Heipertz and Nickel that the long-run effects of climate change on public budgets are potentially very important; in many countries they could aggravate those stemming from demographic developments, giving rise to a "double sustainability problem". However, he notices that the uncertainty about the impact of climate changes is very great. He quotes a Swedish government report asserting that in the case of Sweden negative effects might be offset by positive ones. He also points to the difficulty of drawing inferences from past extreme weather events in a context of global warming in which the impact on public finances could increase in non-linear pattern. Lindh concludes his discussion of the paper by Heipertz and Nickel by observing that countries with sound public finance positions will be in a better position to cope with extreme weather conditions. Lindh underscores the interesting results of the paper by Stenborg and Honkatukia, in particular the risk that increased taxation on greenhouse emission can increase structural unemployment in Finland because of wage rigidities. However, he notes that it would be useful to have a more extensive analysis of wage rigidities.

In commenting on the papers by Eich, Biraschi *et al.* and Kastrop and Velleuer, Pench highlights the different normative backgrounds of sustainability analysis in the United Kingdom, Germany and Italy (the national framework in the first country and the European fiscal framework in Germany and Italy) and the different problems each country faces in order to ensure fiscal sustainability. He points to some critical issues, such as the risk that the projected decline of the benefit ratio in the British and Italian pension systems might not be politically sustainable. In the case of Italy, Pench notes that sustainability requires achieving and maintaining high primary surpluses, which in the past proved problematic. In the case of the United Kingdom, he questions the top-down approach which assumes that the future evolution of revenue and spending is subject to constraints stemming from national fiscal rules.

Tannenwald comments on the papers by Doménech and Melguizo and by Hauner *et al.* He notes that both papers provide policymakers with a clear picture of the main factors affecting future fiscal sustainability and provide insights into the policy levers that could be used to mitigate the impact of demographic changes. Both papers stress the uncertainty inherent in forecasting future fiscal imbalances. Tannenwald agrees with Doménech and Melguizo that the analysis of fiscal sustainability should be made accessible to policymakers and praises the effort of Hauner *et al.* to offer internationally comparable figures. He argues that providing high-quality, clearly communicated analysis to policymakers should be a top priority for economists. Economists should make an effort to write at a level understandable to someone with no training in economics and to answer the questions that the policymakers face.