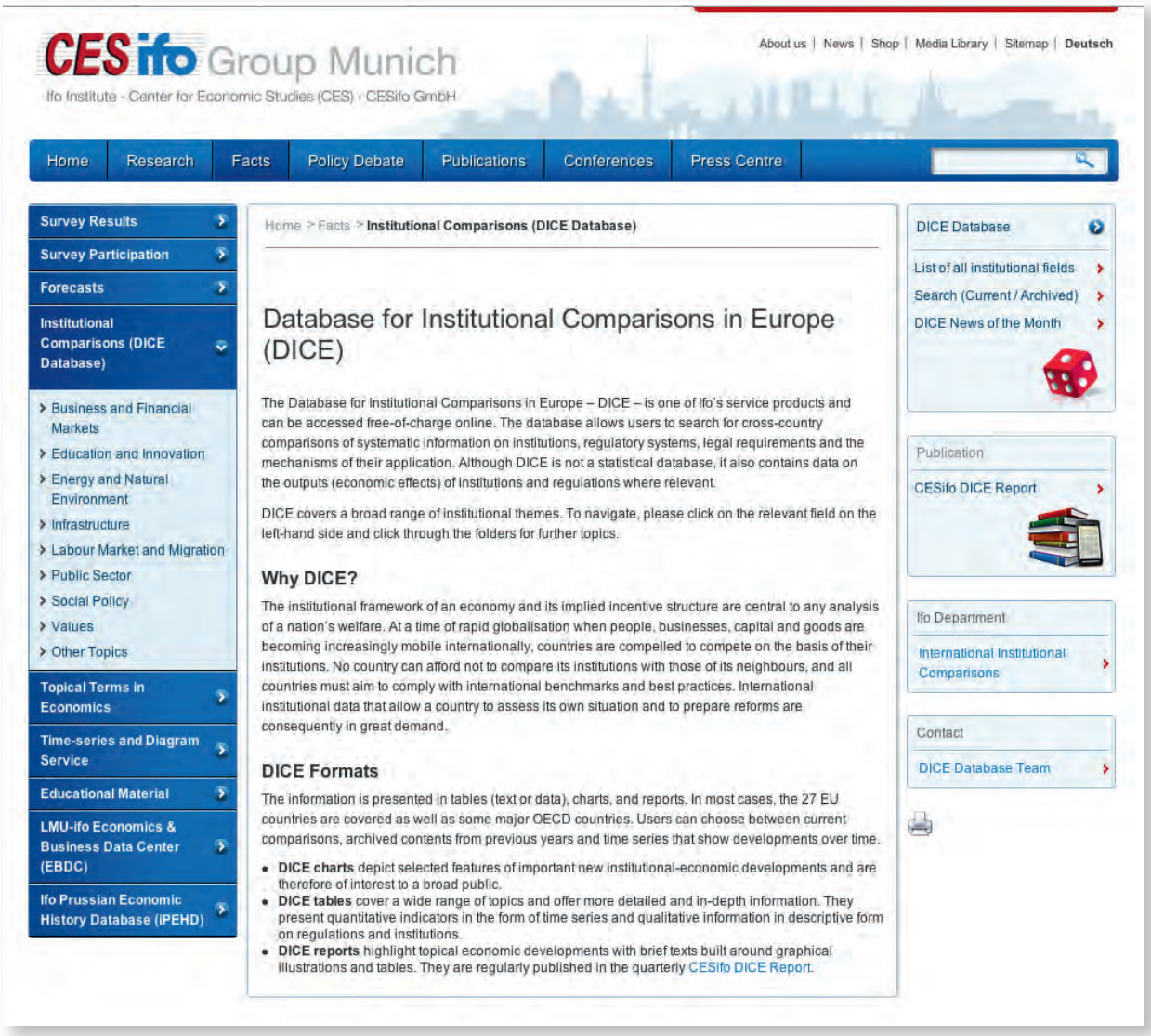
CESifo DICE REPORT

Journal for Institutional Comparisons

VOLUME 10, NO. 4 WINTER 2012

CESifo The international platform of Ludwig-Maximilians University's Center for Economic Studies and the Ifo Institute, Munich



CESifo DICE Report
ISSN 1612-0663 (print version)
ISSN 1613-6373 (electronic version)
A quarterly journal for institutional comparisons
Publisher and distributor: Ifo Institute
Poschingerstr. 5, D-81679 Munich, Germany
Telephone ++49 89 9224-0, Telefax ++49 89 9224-1462, e-mail ifo@ifo.de
Annual subscription rate: €50.00
Editors: Marcus Drometer, Silke Friedrich
Editor of this issue: Silke Friedrich (friedrich@ifo.de)
Copy editing: Lisa Giani Contini, Sabine Rumscheidt

DICE Database: www.cesifo-group.org/DICE

CESifo DICE Report

Volume 10, Number 4 Winter 2012

Forum

Securing Pensions for the Next Fifty Years

Research Reports

Reform Models

Database

News

Securing Pensions for the Next Fifty Years

Varieties of Pension Governance under Pressure: Funded Pensions in Western Europe

Bernhard Ebbinghaus*

Introduction

For over two decades, the financial sustainability of pay-as-you-go financed public pensions has been questioned, while the privatization of prefunded supplementary pensions has been advocated. The recent financial crisis, however, has challenged the merits of private (funded) pensions in view of the significant decline in the value of their assets. As a result, trust in the expected long-term returns of funded pensions has been shattered at a time when saving for retirement has become more important. The privatization of responsibility for old-age income and the shift towards more funded pensions thus raises important issues about developing better governance and regulation.

Drawing on the experiences of ten Western European countries with mature or expanding multi-pillar systems (Ebbinghaus 2011), the comparative analysis of the variety of supplementary pensions presented here will focus on the role of state and collective actors in regulating and governing private pensions (Ebbinghaus and Wiß 2011). Although the state seems to be retreating from former commitments to guarantee secure and adequate public pensions, the need for public regulation has increased rather than diminished. Moreover, social partners – employers and workers' representatives – play an important role in private (funded) pensions. This article begins by analysing the three different modes of governance in the area of private pension schemes. It will map the differences in the current weight of private (funded) pensions and discuss how they were affected by the financial market crash of 2008, as well as the long-term consequences for private pension governance and regulation.

*Mannheim Centre for European Social Research (MZES), University of Mannheim.

The stakeholders in private pension governance

The recent financial crisis raises some fundamental issues of private pension governance. Conflicts of interest over supplementary pensions occur due to the complex principal-agent relations between beneficiary and sponsor, and between sponsor and financial agent. Employees, for instance, rely on their employers who co-sponsor pension contributions, while both have to trust financial managers investing on their behalf. Problems arise due to asymmetric information between the agent and principal (McCarthy 2006). To control their agents, principals have an 'exit' option through market mechanisms or rely on 'voice' (participatory rights). We can distinguish three governance modes of supplementary pensions based on the sponsor-beneficiary relations (Ebbinghaus 2011; Ebbinghaus and Wiß 2011): collective negotiated social partner schemes, employer-sponsored occupational pensions and the individual's decision to save for retirement (see Table 1).

In the case of *collective schemes* employer and unions agree on jointly managed schemes for a sector, providing for broad coverage and risk pooling, while the voice of stakeholders (sponsors and beneficiaries) is indirectly represented by their organizations. The advantages of such schemes include more professional portfolio management, lower administrative costs due to economies of scale, and labour mobility within the nation-wide or sectoral scheme. Schemes self-administered by social partners assume an important second-tier income function in Finland (a partially funded scheme) and France (an unfunded scheme for private employees), as well as in Denmark, the Netherlands and Switzerland, while negotiated top-up benefits exist in Sweden and are gaining in importance in some sectors in Belgium, Germany and Italy.

Employer-sponsored plans can be financed by book reserves, by a trust fund external to the firm, or by a defined contribution (DC) contract with an insurance company. Traditionally firms offered defined benefits (DB) in order to bind qualified workers to the firm, thereby limiting labour mobility. Employers as sponsors mainly control these plans, while the employees and retirees only have a limited voice through minority representation (for instance, in UK trust funds). These employer schemes have higher administrative costs than collective plans, and pool risks less broadly. Employer-sponsored occupational pensions play an important role in the UK, although many have moved from DB to DC schemes in recent years. Employer-specific plans are also a preferred form for Dutch and Swiss larger firms, and some German firms provide such plans as voluntary fringe benefits (often with on the book reserves only).

Table 1

Collective, employer-sponsored and personal supplementary pensions

Collective occupational pension	Employer-sponsored occupational pension	Personal pension
Sector-wide (social partner negotiated): Netherlands, Denmark, Finland, Sweden, Switzerland, Belgium, France*, Germany, Italy	UK *(opt-out)*, Netherlands, Switzerland; Germany *(also book reserve*)*, Belgium, France	*Mandatory public pension:* Swedish Premium P., Danish Special Savings P.; UK *(opt-out)*, Germany *(voluntary, Riester)*

Note: Main systems underlined; * = unfunded.
Source: Ebbinghaus (2011); Ebbinghaus and Wiß (2011).

In the case of *individual decisions,* there may be a collective action problem for individuals: they may not have much of a voice vis-à-vis their investment fund; and may only be able to vote with their feet (exit) by switching to a different fund. Here responsibility remains solely with the individual, although the state as regulator may define particular obligations or tax incentives. One advantage of personal pensions, which are commonly DC schemes, is portability, at least within national borders. In addition to the two mandatory personal pensions in Denmark and Sweden, voluntary personal pensions have become very widespread in Germany since 2001 due to tax subsidies. Their popularity has also grown in the UK since 1986 when the government granted an opt-out option of the second state pension.

Varieties of pension fund capitalism

Europe's pension landscape varies in the importance of private funded pensions, depending on the gap eft by more or less generous public pensions (Ebbinghaus 2011). Pension fund capitalism, as revealed by the size of pension fund investment, has a major impact on financial markets and corporate governance. Based on the Varieties of Capitalism approach (Hall and Soskice 2001), we would expect there to be a strong relationship between the importance of financial markets in Liberal Market Economies (LMEs) and their reliance on funded private pensions, whereas in Coordinated Market Economies (CMEs) there is a larger reliance on patient capital and non-funded pensions (book reserves) by private sector firms. The variations in fund assets show the differences in the maturity of private pensions (see Table 2). The correlation between financial markets and funded pensions is very strong for liberal Britain, while pension fund assets in Germany's coordinated market-economy are still relatively small, although growing. Similarly, Belgium, France and Italy are laggards in pension fund asset growth. However, two CME countries, Switzerland and the Netherlands, outperform the UK in funded capitalism, channelling substantial investments through the Dutch collectively negotiated and the Swiss mandatory pension funds. Moreover, the Nordic CMEs (Denmark, Finland, and Sweden) also now have substantial funded pillars as part of both public and private pensions.

Among the more mature multi-pillar systems, the UK has a long tradition of pension fund trusts and voluntary personal pensions as alternatives to the state second pension. Indeed, both schemes cover over half of the UK population. Recent pension reforms (2007/08) have limited contracting-out and require employers to provide access via auto-enrolment in a supplementary pension, which will phase-in over five years as of October 2012. Dutch occupational pensions are mainly based on sector-wide agreements that can be extended by the ministry and which, together with a few larger company plans, cover almost the entire workforce. Swiss occupational pensions have been mandatory since 1985, but take different forms: some are administered by social partners, while others are administered as

multi-firm or single-firm DC plans (with bipartite representation).

Scandinavian countries have made substantial progress in funded pensions. Denmark was a laggard until the labour market pensions were developed as sector-wide agreements in the 1990s, parallel to a temporary, mandatory personal pension. In Sweden, there are four occupational schemes for public and private employees, providing negotiated funded top-up benefits for all employed persons. As part of the 1994 reform, a DC premium pension is part of mandatory pension contributions and individuals are given the choice between multiple investment funds (including union-run schemes). In Finland, partially funded occupational pensions are mandatory, co-administered by the social partners, and cover all private and public employees. They are currently the main source of retirement income. While Finland and Sweden have ended their basic pensions, Denmark has retained its scheme, but all three countries have seen an increase in (more or less privately) funded pensions in order to maintain living standards in retirement.

Finally, until recent cutbacks in public pensions, continental pension systems left much less space for funded pension systems to develop. In France, non-funded private pension schemes run by social partners dominated for a long time; and the development of voluntary funded pensions has only been introduced slowly over the last decade. Occupational and personal pensions have grown in Belgium since the mid-1990s as a result of shrinking public pensions. While many larger and few smaller German employers have provided occupational pensions as fringe benefits, voluntary *Riester* pensions have been introduced (and subsidized for low-income groups and families) since 2002. In Italy, former severance pay is now transferred automatically or voluntarily into various occupationally funded pensions, thus complementing a predominantly public pension system to date.

Funded pensions facing the current crisis

Funded pension schemes faced major problems during the financial market downturns of the early and late 2000s (Casey 2012; Ebbinghaus and Wiß 2011). In *funded* systems contributions are invested in capital markets for high long-term returns, albeit with some risks, which have been exposed by the last two crises. In DB schemes, the employer or social partners are responsible for covering pension liabilities in case of underfunding or adjusted defined benefits, while they may profit from contribution holidays in good times. In funded DC schemes, however, the

Table 2

Public and private pensions in Western Europe, 2007-2010

	Pension expenditure [a]		Private pensions [b]			
	Public	Private	All assets	Growth 2007–2010 [c]	Contributions	Benefits
Denmark	5.6	2.2	177.8	127.8	6.9	5.1
Netherlands	4.7	5.2	128.5	108.7	4.8	4.0
Switzerland	6.5	6.0	113.7	97.9	8.6	5.1
UK	5.4	4.5	88.7	93.8	3.1	3.3
Finland	*8.3	0.2	91.0	93.7	*10.2	*10.9
Sweden	*7.2	2.1	56.9	..	..	..
France	*12.6	0.3	8.5	..	0.6	0.4
Italy	14.5	1.4	5.3	98.1	0.7	..
Germany	10.7	0.8	5.2	108.0	0.5	0.2
Belgium	8.9	3.7	3.8	87.8	1.7	2.9

* Including mandatory private pensions (Finland: partially funded; Sweden includes mandatory Premium Pension; France: non-funded)
[a] % GDP, 2007
[b] % GDP, 2010 or earlier, includes insurance and autonomous pension funds but excludes on-the-book reserves (Germany: only Pensionskassen/fonds). Growth: cumulated returns from 2008 until 2010.
[c] Index (2007=100).
Source: OECD (2011b); OECD (2012a); own calculations.

financial market risks are completely individualized, meaning that lower than expected returns may lead to the postponement of work exit or lower retirement income. All Dutch and Swiss occupational pension plans are funded, the British, Danish and Swedish private sector pensions are fully-funded, and in Finland all occupational pensions are partially funded. Most new German personal and occupational pensions, Belgian occupational pensions, French voluntary pensions and Italian occupational pensions are funded, although Germany still has some older schemes with book reserves.

Defined benefit (DB) schemes tend to protect employees' interests better than defined contribution (DC) schemes; as they allow for the pooling of social risks across employees in a firm, across employers in a sector or even nation-wide. While individuals bear the financial risks in DC schemes and need the foresight to stick to a lifecycle portfolio investment strategy, DB schemes can balance risks by pooling and thus guaranteeing some predefined benefits. While the majority of current pensioners is still covered by DB schemes, new schemes or plans for new entrants are increasingly DC schemes in most countries. The Netherlands and Finland still stand out by virtue of providing DB schemes through occupational schemes with nearly full coverage.

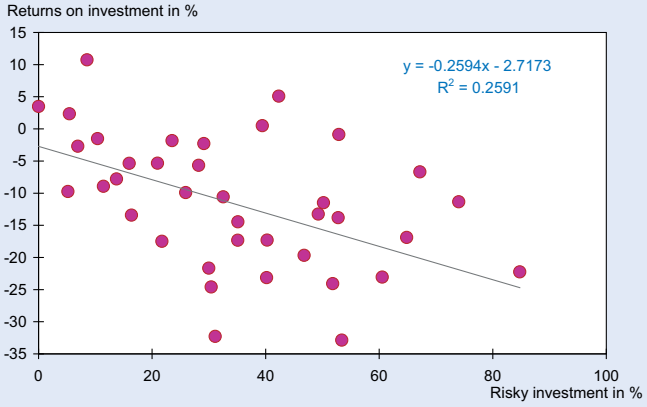
Following the 2008 financial crash (see Figure 1), most funded pensions suffered major losses on investments, while Denmark, Germany, and Italy fared much better. Prudent management can reduce the risk of losses, while regulation may impose quantitative restrictions to limit risky investments, or require a minimum rate of return to protect individuals from undue financial risks. The less strict, 'prudent person' rule, allowing greater investment flexibility and higher, but risky returns, is prevalent in the UK (and also the Netherlands), while the other countries considered in this article have more quantitative restrictions (Laboul and Yermo 2006, 508).

The recent financial market crisis led to major losses among many pension funds across the OECD. The financial crisis following the breakdown in September 2008 impacted pension funds immediately, although with some cross-national variations. Asset values declined by over 25 percent in the USA and Ireland, while most other European pension funds saw a nominal decline of over ten but less than 20 percent, with very few exceptions (OECD 2009). Certainly, most of these funds have recovered somewhat since 2008 (particularly in Denmark), but it will take several years for all of them to make up for the forgone growth (see growth index in Table 2). Moreover, the financial crash had various economic and financial repercussions that led to ad hoc intervention by governments, particularly in countries with sovereign debt problems (Casey 2012).

The differential impact is largely determined by the investment portfolio, and particularly risky stock market investments (equities, currencies, hedge funds, commodity trading) vis-à-vis more conservative investments (public bonds, non-risky loans, and domestic real estate). The countries with the largest losses have the highest percentage of equities in their portfolios (OECD 2009, 34; Pino and Yermo 2010). There is indeed a strong negative linear relationship (see Figure 1) between post-crash losses of pension funds and their overall share in equities (and private investments) shortly before the financial market crash. More risky investments, most notably in the United States and Ireland, but also in the United Kingdom and the Netherlands, lead to higher negative investment returns than in countries

Figure 1

RISKY INVESTMENT OF PENSION FUNDS IN 2007 AND POST-CRASH RETURNS IN 2008



Note: Risky investment: share of equities, mutual funds and private investments in % overall investment by pension funds; N = 38 (28 OECD, 10 non-OECD countries).

Source: OECD (2012a); OECD (2012b), statistical Annex.

like Switzerland and Germany with more prudent investment in bonds. Among the OECD countries, LMEs tend to rely much more on a growth-oriented, but more risky equity-based strategy, while CMEs (including Swiss funds) are more conservative in their investment, but were also much less severely struck during the crisis as a result, perhaps due to their smaller long-term returns.

Consequences of the financial crisis

The crisis highlights the problems of shifting responsibility to private players. The sudden losses and lower than expected returns affect employers or social partners as sponsors of DB schemes, as well as current and future pensioners relying on DC schemes. Even if pension funds have been partly recovering since 2008, the effects of the crisis will last by undermining long-term growth expectations and trust in funded pensions. In collective schemes, the social partners can function as mediators between employers and employees and can balance the interests of current and future pensioners. Via collective bargaining and involvement in the operation and management of pension funds, burdens can be shared between employers (higher contributions) and employees/pensioners (lower or frozen indexations, higher contributions and lower benefits).

The consequences for individuals depend on pension plan designs. Workers might possibly have to postpone retirement (exit work later), pay higher contributions or accept lower than expected benefits if long-term returns are low. Current retirees or those close to retirement are more severely hit by the current crisis if savings are still in risky investments. Therefore, nudging rules in DC plans should insure life-cycle investment strategies, that is, a shift towards more conservative investments as retirement approaches and a transfer to annuities instead of lump-sum pay-outs when reaching retirement. Pensioners covered by DB schemes are less directly affected by the financial crisis, but their benefits could decrease in real value when pension indexation is suspended as in the Netherlands. DB schemes place particular strains on their sponsors, the employer or social partners. Reinsurance against the bankruptcy of the sponsoring firm is needed; indeed, premiums have increased, for instance, in Germany, the UK, and Switzerland.

A further long-term impact of the last two financial crises has been the further acceleration of the shift from DB to DC benefits, from more buffered to individualized risk exposure. The crisis in the early 2000s propelled a shift from final-salary to average-career-salary DB schemes, while the recent crash of 2008 led to a paradigm shift from DB to DC schemes, or at least to cut-backs in promised defined benefits. The European Commission proposes the introduction of minimum return guarantees in DC schemes or new mixed DB/DC pension plans, as well as improved life-cycle portfolio management in order to reduce short-term volatility (European Commission 2010, 14).

To restore sustainability in DB schemes, employers (or the social partners) face a choice between raising contributions or reducing promised benefits in the long-run. The funding ratio of Dutch pension funds has fallen below 95 percent, ten percentage points below the required minimum funding, but the government extended the period for recovery from three to five years. The UK average funding ratio has dropped by around ten percent to 85 percent following the 2008 crash (Antolin and Stewart 2009, 128). Swiss funding ratio in the private sector also dropped to 97 percent in 2008, and pension indexation was suspended as a result, while contributions increased. An overall trend is a post-crash shift to less risky investments like bonds and loans, which, however, entails historically low returns, while more growth-oriented international diversification increases risks (Antolin and Stewart 2009).

Conclusion

Although we often speak of pension privatization, the regulation and governance of supplementary pensions varies tremendously. Whether occupational pensions are collectively negotiated, employer-provided or consist of individual schemes has major consequences for the overall scope of private pensions and benefits in retirement. The more funded pensions have grown in economic importance, the more an individual's retirement income will depend on long-term financial market performance. However, the financial risks depend largely on the scope and portfolio of asset investments. The main lessons from the two financial crises are the need for stricter rules regarding public supervision (e.g. more regular stress tests), investment restrictions and partly new benefit protection mechanisms. This indicates that

the role of private pension governance, including (state) regulation, is continuing to gain importance, despite the claims of privatization, representing a retreat on the part of the state. Furthermore, state regulation is often complemented by the governance and regulation of social partners.

The stronger inclusion of employee representatives in supplementary pensions may help to balance interests and risks between employers, financial institutions and beneficiaries. The state's retreat from public pension commitments has not only increased the need to fill the retirement income gap with privately-funded pensions, but has led to demands for better regulation of those pensions (see also Ebbinghaus and Whiteside 2011). Otherwise it may be questionable whether the funded pension route remains political sustainable, should it remain a rather risky business for people facing retirement.

References

Antolin P. P. and F. Stewart (2009), "Private Pensions and Policy Responses to the Financial and Economic Crisis", *OECD Financial Market Trends 2009* (1), 127–41.

Casey, B. (2012), "The Implications of the Economic Crisis for Pensions and Pension Policy in Europe", *Global Social Policy* 12 (3), 266–82.

Ebbinghaus, B., ed., (2011), *The Varieties of Pension Governance. Pension Privatization in Europe,* Oxford University Press, Oxford.

Ebbinghaus, B. and T. Wiß (2011), "Taming Pension Fund Capitalism in Europe: Collective and State Regulation in Times of Crisis", *Transfer* 17 (1), 15–28.

Ebbinghaus, B. and N. Whiteside (2012), "Shifting Responsibilities in Western European Pension Systems: What Future for Social Models?", *Global Social Policy* 12 (3), 266–82.

European Commission (2010), *Towards Adequate, Sustainable and Safe European Pension Systems,* Green Paper, COM(2010) 365 final, 7 July, Brussels.

Hall, P. A. and D. Soskice (2001), "An Introduction to Varieties of Capitalism", in P. A. Hall and D. Soskice, eds., *Varieties of Capitalism,* Oxford University Press, New York, 1–68.

Laboul A. and J. Yermo (2006), "Regulatory Principles and Institutions", in G. L. Clark, A. H. Munnell and J. M. Orzag, eds., *The Oxford Handbook of Pensions and Retirement Income,* Oxford University Press, Oxford, 501–20.

McCarthy, D. (2006), "Occupational Pension Scheme Design", in G. L. Clark, A. H. Munnell and J. M. Orzag, eds., *The Oxford Handbook of Pensions and Retirement Income,* Oxford University Press, Oxford, 543–61.

OECD (2009), *Pensions at a Glance* 2009, OECD Publishing, Paris.

OECD (2011a), *Private Pensions Outlook,* OECD Publishing, Paris.

OECD (2011b), Social Expenditure Database (SOCX).

OECD (2012a), Global Pensions Statistics, www.oecd.org/daf/pensions/gps.

OECD (2012b), *Pension Markets in Focus* no. 9, OECD Publishing, Paris.

Pino, A. and J. Yermo (2010), "The Impact of the 2007-2009 Crisis on Social Security and Private Pension Funds: A Threat to Their Financial Soundness?", *International Social Security Review* 63 (2), 5–30.

Policy Mixes in the Current European Pension Reform Process[1]

Axel H. Börsch-Supan*

This paper links the causes of current problems to the cures required to make typical pay-as-you-go financed pension programs in Continental Europe sustainable beyond the present financial crisis. There is no such thing as an "optimal pension reform", since current systems vary significantly in terms of the causes of future problems, and no single reform element suffices quantitatively to offset population aging. Country-specific policy mixes are the appropriate solution under these circumstances.

Introduction

Public pensions represent a substantial share of GDP. In 2011 Italy and France pensions were Europe's frontrunners, accounting for some 14 percent of GDP, while in Greece, Portugal and Austria, this share was about 12 percent. In terms of fiscal stability in the current debt crisis, pension systems are a scary example of how current programme design, the size of future entitlements and political credibility interact as either virtuous or vicious spirals. This article argues that it is no coincidence that those countries which spend the highest share of GDP on pension entitlements are also the countries currently under the most pressure to offer very high yields to sell their government bonds. Through this mechanism, high pension costs imply high costs of debt service, thereby worsening the fiscal balance and crowding out other spending.

Ironically, in spite of their size, some of the expensive pension programmes nevertheless fail to provide adequate support for certain population groups since they heavily target the middle-class median voter. Greeks aged 65 and over, for example, face a poverty rate of 22.7 percent, a rate that is almost double the OECD average.

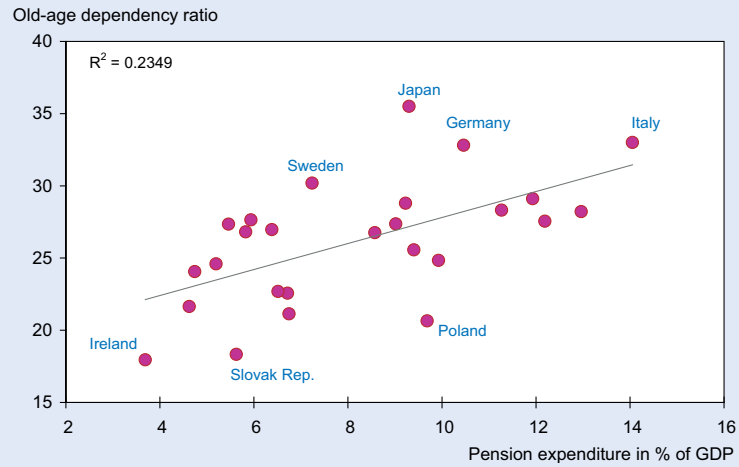
Causes for reform

It is common knowledge that population aging is the number one reason for aligning current entitlements with future fiscal capacity. This has been documented many times (e.g., Economic Policy Committee 2003). As a result, pension and entitlement reform is an ongoing process in virtually all European countries. It may come as more of a surprise, however, to learn how weakly the current demographic structure is linked to the current relative size of European public pension programs (see Figure 1).

This is mainly due to the large number of design differences between European pension systems. Some of these designs are self-stabilizing and thus prevent

Figure 1

Pension Expenditure by Old-Age Dependency, 2011



Source: OECD (2011a).

[1] An extended and more detailed version of this contribution has appeared as NBER Working Paper No. 18009 and will be chapter 10 of a book edited by Alberto Alesina and Francesco Giavazzi entitled "Fiscal Policy after the Financial Crisis", published by the University of Chicago Press.

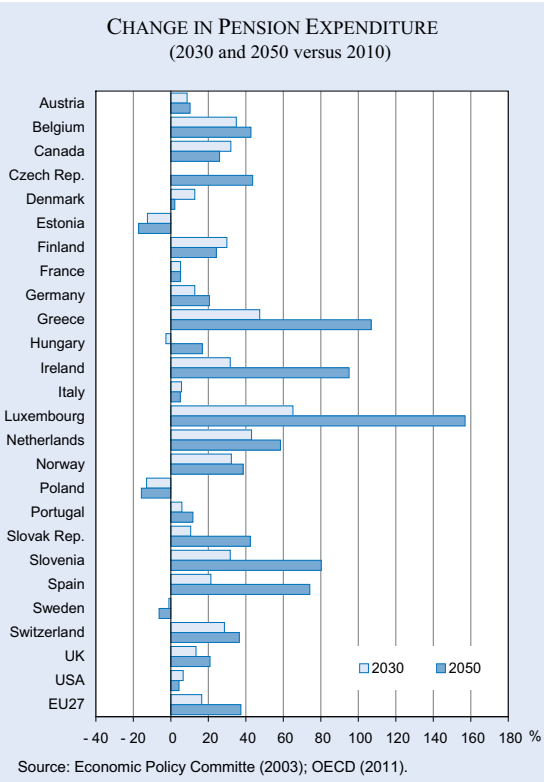
* Munich Center for the Economics of Aging (MEA) at the Max Planck Institute for Social Law and Social Policy.

high cost increases. This is the case, for example, with Estonia, Poland and Sweden. Other designs create strong negative incentive effects on labor supply and generate early retirement, which decreases economic capacity and thus threatens fiscal capacity and economic growth in general. This, in turn, increases the burden of population aging on pension expenditure. Figure 2 shows that while almost all European countries face increasing pension costs as a percentage of GDP, there are very large differences between countries. On average across the European Union, the cost share is set to increase by 16 percent by 2030 and by 37 percent by 2050. In Greece and Luxembourg, however, pension expenditure will more than double by 2050, while it is projected to decline in Estonia, Poland and Sweden.

The weak correlation between aging and projected pension costs, and the huge variation in cost increases point to many other reasons for reform in addition to population aging. Most of the reforms required are related to large incentives to retire early. At the same time, some countries fail to provide protection against old-age poverty.

Some entitlement programmes may be considered fair insurance because the expected benefits of the program equal the expected lifetime contributions.

Figure 2



Source: Economic Policy Committe (2003); OECD (2011).

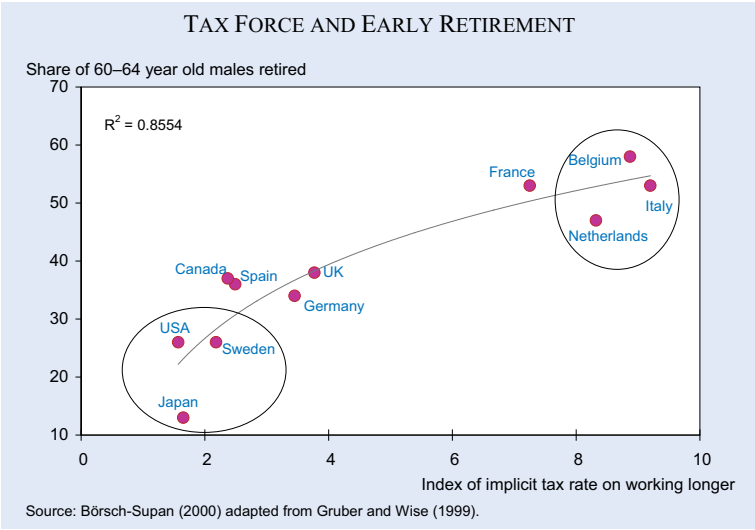
Therefore, according to traditional economic theory at least, one would not expect very large labor supply disincentive effects.[2] Examples of such programmes are most defined contribution pensions (including notional defined contribution systems) and most private health insurance programmes. Most programmes, however, have strong transfer components such as payroll-tax financed pension programs with flat benefits (in Great Britain, the Netherlands, Switzerland). Such payroll taxes are known to distort the labor supply of the younger generation (Blundell, Duncan and Meghir 1998). Since social insurance contributions constitute a large part of total labor compensation, demand for labor declines, leading to higher unemployment and lower economic growth as a result. Reducing the contribution burden is therefore not only important for the long-run stability and sustainability of the pension system itself, but for fiscal stability and economic performance at large.

There are two additional tax components in pension contributions. Since the implicit return from a mandatory pay-as-you-go system tends to be lower than the explicit return on the voluntary investment in a funded pension, there is an implicit tax in all pay-as-you-go systems, see Börsch-Supan and Reil-Held (2001). Moreover, most public pension systems are not actuarially neutral because they distort the older generation labor supply through early retirement incentives. This creates an implicit tax on working longer, measured, for example, by the Gruber-Wise group and the OECD (Gruber and Wise 1999; Blöndal and Scarpetta 1998). Figure 3 links an index of this implicit tax to the share of those men who are already retired at age 60-64. In countries with a large implicit tax on working longer (like Belgium, France, Italy, and the Netherlands), the share of retirees is much larger than in countries with a low implicit tax (like Sweden, the US and Japan).

The aggregate correlation in Figure 3 permits no causal interpretation. Supplemental analyses, however, have produced convincing evidence for causality (Börsch-Supan and Schnabel 1998; Börsch-Supan 2000; Gruber and Wise 2003). The secular decline in labor supply among individuals aged 50 years and older is not a "natural trend" tied to concurrent secular income growth. Instead, the decline happened exactly when the tax force on working longer increased; and was largely "engineered" by the

[2] See the implicit tax argument in pay-as-you-go systems below.

Figure 3



incentive effects that are intrinsic to some of the public pension systems, and particularly by the incomplete adjustment of benefits to retirement age. A particularly striking historical example of the exogenous policy change that can be exploited for formal micro-econometric evidence with a causal interpretation is the German pension reform in 1972; and its almost exact reversal with the 1992 reform. The combination of higher life expectancy with an earlier average retirement age since the 1960s has increased pension expenditure by almost 50 percent.

In addition, many European countries have increased the replacement rate of public pensions, especially in the 1970s and 1980s. Many countries also added a minimum pension, either as statutory basic or minimum pension, or effective through social assistance mechanisms.[3] As Figure 4 shows, this has kept poverty rates low in most European countries, at least relative to the OECD average and certainly vis-à-vis the United States.

There are, however, three striking exceptions where the old-age poverty rate exceeds 20 percent of individuals aged 65 and more: Greece, Spain, and Ireland. Ireland spends very little on pensions. Greece and Spain, however, both have above average pension replacement rates, but are nevertheless plagued by very high old-age poverty rates, mainly due to poor coverage. While pension systems and/or their associated social assistance systems in most countries distribute from the rich to the poor, these figures suggest a degree of perverse redistribution in Greece and Spain.

[3] E.g. in Germany: the tax-financed "*Grundsicherung im Alter*" which is not part of the German public pension system.

Curing the problems

Reform processes are underway in almost all European countries. Some countries reformed early in the 1980s like Sweden, while most countries started the process much later and some, like Greece, have not implemented reforms at all. Typically, we have experienced "reforms in installments". These reforms have combined "parametric" elements (introducing actuarial adjustments, changing the benefits indexation formula, increasing the retirement age) with "fundamental" elements (changing the financial mechanism by moving substantial parts of retirement income from public pensions to private savings). Table 1 presents a synopsis.

The multitude of reform elements in Europe is partly a result of initially different political preferences.

Figure 4

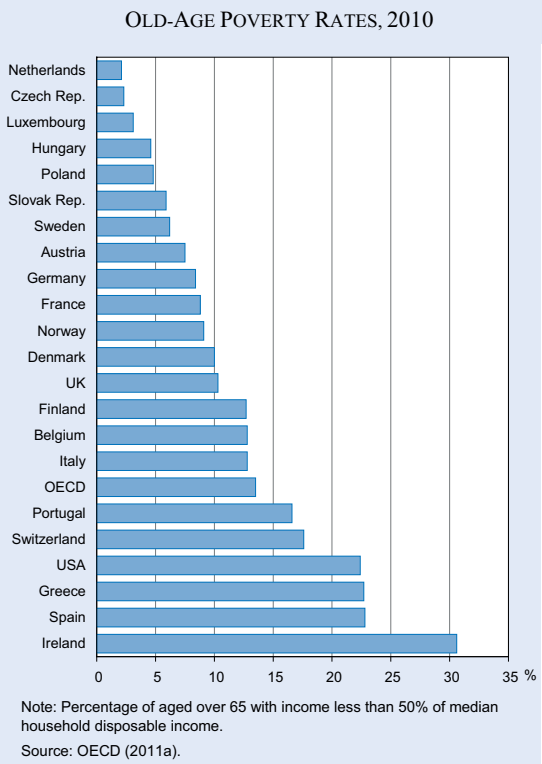


Table 1
Synopsis of pension reform elements in Europe, 1980-2010

	Retirement age	Link of benefits to contributions	Indexation	More Pre-funding
Austria	women → 65			
Germany	all → 67	point system	sustainability	Riester
France	all → 62	point system		
Italy		NDC	NDC	
Spain				
Greece		partially		
Denmark	all → 67			yes
Sweden	DI	NDC	NDC	yes
Norway		point system	life expectancy	yes
Finland	UI tunnel	scale factors		
Netherlands	EEA, DI			yes
UK	all → 68		price → wage	yes
USA	all → 67			yes

NDC = Notional Defined Contribution System
UI tunnel = Early retirement via Unemployment Insurance
EEA = Early Eligibility Age
DI = Disability Insurance

Source: The author.

It also reflects the fact that there is no single reform measure that can lead to a stable and sustainable system of old-age provision; and that a mix of several reform elements is required instead. If the goal is to restore fiscal sustainability, then reform will require an overhaul of the existing pay-as-you-go systems, as well as the re-introduction of private saving as a major source of future retirement income. Extreme policies are unlikely to work: the public pension system alone cannot provide a sufficient retirement income at reasonable tax and contribution rates, nor can private savings fully substitute for pay-as-you-go pensions.

Relying on public pay-as-you-go financed pensions alone is not possible because the resulting tax and contribution rates from maintaining current levels of generosity will damage economic growth due to the negative labor supply incentive effects described earlier. Further increases in the tax and contribution rates are particularly damaging in those EU countries that already have high total labor costs, and particularly to Germany, Austria, Denmark and Sweden.

Transiting pensions entirely to private saving does not constitute a viable policy option either. One crushing argument opposing such an option is that it is simply too late to adopt it. Saving requires time, and there is no longer enough time left for the baby boomers to accumulate sufficient funds to finance a full pension by 2030. Time and history is of the essence in pension reform. The baby boom/baby bust transition dictates the time schedule, making reforms that were possible 25 years ago – such as the complete transition to a fully funded system – impossible to envisage today.

There are other reasons for advocating a more subtle, but more complex multi-pillar system, rather than a pure pay-as-you-go or a pure fully funded system. An important reason is diversification. Pay-as-you-go systems carry large demographic and political risks, while fully funded systems carry large capital market risks. Since these risks are not perfectly correlated, diversification mitigates the risk of poor outcomes.

Hence, in order to achieve long-run fiscal balance, reforms typically need to feature two components: adapting the public system to demographic change under the restriction that taxes and contributions cannot increase much further, and strengthening private savings under the restriction that not much time is left until 2035.

Adapting pay-as-you-go public pension systems

Stabilizing tax and contribution rates implies expenditure cuts if and when demographic change simultaneously reduces the number of contributors to, and increases the number of beneficiaries from, the pay-as-you-go pension systems. Pension expenditure has two dimensions: the level of benefits (via the replacement rate) and the duration of benefits (via the retirement age). Expenditure cuts are easier to shoulder if they involve both dimensions.

Both dimensions are politically difficult. Fortunately, although the demographic change is dramatic, its magnitude is far from absorbing all available resources. The dependency ratio deteriorates at an annual rate of about 0.2–0.5 percent. This is much lower than the average long-run annual rate of productivity growth, which is about 1.5 to 2.5 percent for most European countries. Hence, population aging

absorbs between a seventh and a third of future productivity growth, leaving the bulk for real income growth. Pension benefits can therefore rise in real terms in spite of population aging, provided that the benefits growth rate remains below the growth rate of wages.

The extent to which benefit increases must be dampened depends on the speed and the extent of demographic change in each country relative to its productivity growth. France and Sweden, for example, will require less adaptation than Italy and Germany. Some countries have formalized this link between demographics and benefit level. Sweden and Italy have introduced notional defined contribution (NDC) systems that compute benefits on the basis of the accumulated contributions plus some fictitious interest, which depends on demographic essentials such as life expectancy, dependency ratio and wage growth. Since the labor force growth rate declines as a population ages, a NDC system features a declining replacement rate as a population ages. Moreover, longevity decreases the value of the annuity emanating from the accumulated notional wealth.

Germany has taken an apparently very different approach, preserving the defined benefit structure that has gained so much political acceptance in many countries.[4] The conventional benefit formula, which indexes benefits to wages/prices, is multiplied by the relative number of contributors to pensioners, the so-called sustainability factor. This augmented indexation formula will lead to decreases in pension benefit levels vis-à-vis the path of wages. Currently, gross benefits are about 50 percent of gross earnings. This corresponds to a net pension level of about 70 percent of net earnings. In 2035, when the population aging ceiling is reached, the gross pension level will be about 43 percent.

The other crucial dimension of pension expenditure is the duration of pension benefits, determined by the difference between the age at which pension benefits are taken up and life expectancy. The two main policy instruments that can be deployed to reduce the duration of benefits are increasing the statutory retirement age and reducing early retirement benefits. Both instruments are extremely unpopular throughout Europe.

In Germany, the 1992 reform succeeded in abolishing most early retirement pathways without actuarial adjustments. This law became effective in 1997, but there is a transition period until 2017. Denmark, Germany, France and the UK have enacted increases in the statutory normal retirement age (e.g. in Denmark and Germany the statutory normal retirement age has increased from 65 to 67 years, in the UK it has risen to 68 years, while in France it has edged upwards from 60 to 62 years). Most increases are slow and gradual. In Germany, the increase started in 2011 with monthly steps, which mean that a retirement age of 67 will be reached in 2029. This increase corresponds to two-thirds of the projected change in life expectancy. This approximately keeps the ratio of time spent in working life to time spent in retirement constant and thus neutralizes, from an expenditure point of view, the effect of longevity increases on pension expenditure.

In some countries, the statutory retirement age is not the primary determinant of actual retirement age, but the number of years worked. In Germany, 45 years of contributions will generate a full pension, even if these service years are worked before the age of 65. In some countries, the number of required contribution years is much lower, notably in France, Greece and Italy, and varies by profession (see the colorful Greek case described by Börsch-Supan and Tinios 2002). With increasing life expectancy, such mechanisms mean that individuals receive pension benefits for a long time, which is very costly. If one follows the above logic, the required number of service years should also be adapted to reflect longer life spans. This idea has proven particularly controversial in France and Italy.

Private saving and pre-funding

Reducing the first pillar of pay-as-you-go financed public pensions creates a gap in retirement income relative to the levels of income that workers have become accustomed to. There are only two mechanisms to fill the gap: working longer and saving more.[5] A reasonable approach is, of course, to exploit both mechanisms, despite the unpopularity particularly of the first mechanism described in the preceding subsection.

[4] Börsch-Supan and Wilke (2005) show that the German system almost perfectly mimics a NDC system.

[5] Higher fertility is only a long-run solution and does not help to offset the fiscal strains generated by the baby-boom generation. Higher migration would help, but net immigration numbers would have to be unrealistically large to offset the domestic aging process, see United Nations Population Division (2001).

The German pension reform 2001-2007 combines a higher retirement age (67 instead of 65) with subsidized private retirement savings, the so-called Riester pensions, at a rate of four percent of gross income from 2009 on. The result is an income level for retirees that is comparable to today's income level, in spite of the reduction in public pillar pensions according to the sustainability formula.

Increasing saving rates by four percent has been feasible in the past, but it naturally hurts consumption. This is the price for reforming too late. Germany started pre-funding about 15 years later than the Netherlands or Sweden. Given the short time period left until the baby boomers retire, for many countries the price will even be higher, and in some, such as Spain, more pre-funding may only be an option for later generations.

Targeting and redistribution

Cutting pay-as-you-go pensions to a sustainable share of GDP will particularly hurt those who have earned very little and whose saving capacity is also low. The reform-driven reduction of replacement rates will drive workers who have earned incomes only slightly above the poverty line into old-age poverty after retirement.

The dilemma between sustainability and old-age poverty can only be addressed by introducing policies targeted at those who are liable to suffer from old-age poverty. One instrument is basic and/or minimum pensions (e.g. Denmark and, effectively, Germany). Another instrument is a non-linear (concave from above) schedule linking benefits to contributions (e.g. via the PIA/AIME conversion in the US social security system). The latter creates an additional element of payroll tax with potentially high distortions for labor supply. In other countries such elements are non-existent or provide income below the poverty line (e.g. Greece and Ireland). Such countries need to redistribute more from rich to poor pensioners if they wish to prevent old-age poverty.

Conclusions

The major European pension systems (France, Germany, Italy, Spain) still have some way to go in order to become financially sustainable. This article has shown that this goal is achievable with a combination of reasonable policy steps. Italy, for example, has introduced a new entrants system that will stabilize pension expenditure if it is implemented consistently in the future. Sweden with its NDC system has no sustainability gap. Germany has substantially reduced its implicit pension debt through a set of politically accepted gradual steps: increasing retirement age, indexing benefits to the system dependency ratio, and introducing individual-accounts-type private pensions to fill the emerging pension gap.

The recent debt crisis makes pension reform even more urgent. It is no coincidence that Greece and Italy are currently under the highest pressure. These countries have the highest pension expenditure as a share of GDP in Europe. In Italy, this high pension expenditure is at least stable, but it will remain a fiscal challenge as it will not fall in the foreseeable future and its parameters are threatened by political risks. Pension expenditure is still increasing dramatically in Greece. Without pension reform to cut the high share of pension expenditure as a percentage of GDP, no fiscal consolidation appears possible.

There is no single "optimal pension policy" since the initial state (general welfare state design emerged through culture, history, and political preferences) and problems (demographic pressure, design flaws) differs so greatly between countries. Instead, the policy mix of reducing pay-as-you-go benefit levels, increasing the retirement age, introducing actuarial adjustments, and establishing occupational and individual funded pensions has to be different across countries. Moreover, restrictions differ from country to country and building up funded pensions takes time. The feasibility of a transition strategy depends on the time left until the "baby-boom bulge" enters retirement and on the current size of the pay-as-you-go pillars. The higher the current pay-as-you-go share, the harder any transition will prove in the years ahead.

Automatic stabilizers like the NDC systems in Sweden, Italy and Poland, and the indexation of pension benefits to the system dependency ratio in Germany, may help to put pension systems on a long-run fiscally sustainable path by sheltering them from day-to-day political opportunism. It may prove advisable to introduce similar automatic rules for the retirement age, such as a proportionality rule that keeps the ratio of time spent in retirement to time spent working constant. The sheltering effect, of course, can only go so far. In Germany, for example,

the sustainability factor in the benefit formula has been imposed via a "pension benefit guarantee", which rules out any nominal benefit reduction, and parts of the dynamic increase in the retirement age has been offset by the introduction of new duration-of-service-rules. By and large, however, pension reforms introducing automatic stabilizers have been more successful in achieving long-term fiscal balance than those without such mechanisms.

References

Blöndal, S. and S. Scarpetta (1998), "The Retirement Decision in OECD Countries", *OECD Economics Department Working Papers* no. 202.

Blundell, R., A. Duncan and C. Meghir (1998), "Estimating Labor Supply Responses Using Tax Reforms", *Econometrica* 66 (4), 827–62.

Börsch-Supan, A. (2000), "Incentive Effects of Social Security on Labor Force Participation: Evidence in Germany and Across Europe", *Journal of Public Economics 78*, 25–49.

Börsch-Supan, A. and A. Reil-Held (2001), "How Much is Transfer and How Much Insurance in a Pay-As-You-Go System? The German Case", *Scandinavian Journal of Economics 130* (3), 505–24
.

Börsch-Supan, A. and R. Schnabel (1998), "Social Security and Declining Labor-Force Participation in Germany", *American Economic Review* 88, 173–78.

Börsch-Supan, A. and P. Tinios (2002), "The Greek Pension System: Strategic Framework for Reform", in R. C. Bryant, N. C. Garganas and G. S. Tavlas, eds., *Greece's Economic Performance and Prospects,* Bank of Greece, 361–451.

Börsch-Supan, A. and C. B. Wilke (2005), "The German Public Pension System: How It Will Become an NDC System Look-Alike", in: R. Holzmann and E. Palmer, eds., *Pension Reform – Issues and Prospects for Non-Financial Defined Contribution (NDC) Schemes,* World Bank, Washington D.C., 573–610.

Economic Policy Committee (2003), "The Impact of Aging Populations on Public Finances: Overview of Analysis Carried Out at an EU Level and Proposals for a Future Work Programme", Document no. EPC/ECFIN/435/03-EN final, Brussels.

Gruber, J. and D. A. Wise, eds., (1999), *Social Security and Retirement Around the World,* University of Chicago Press, Chicago.

Gruber, J. and D. A. Wise, eds., (2003), *Incentive Effects of Public Pension Systems: Microeconometric Estimates,* University of Chicago Press, Chicago.

OECD (2011a), "Pensions at a Glance 2011", OECD Pensions Statistics (Database), OECD Publishing, Paris.

OECD (2011b), *Social Expenditure Database (SOCX),* www.oecd.org/els/social/expenditure (accessed November 2011).

United Nations Population Division (2001), *Replacement Migration: Is It a Solution to Declining and Ageing Populations?,* United Nations, New York.

The Future of Multi-Pillar Pension Systems

Lans Bovenberg* and
Casper van Ewijk**

Introduction

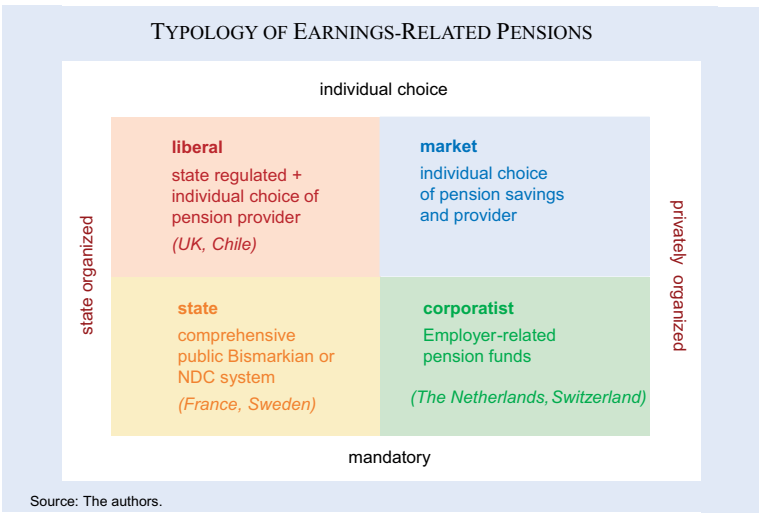
Pensions are organized in a wide variety of ways in Europe's different member states. This article discusses a typology of pension systems (see also Bovenberg, Van Ewijk and Westerhout 2012). We focus on earnings-related pensions because this is the part of the pension system that differs most across countries. After exploring this typology, the article discusses the challenges faced by pension systems as a result of aging and increased consumer heterogeneity. Despite featuring different pension systems, many countries have been forced to introduce similar reforms.

Alternative pension systems

We develop a typology of earnings-based pensions based on two dimensions (see Figure 1). The first dimension involves the governance of pensions. Does the state administer and control earnings-related pensions, or are these responsibilities left to the private sector via group insurance (occupational pension plans) or individual decisions (personal pension plans)? As purely public and private systems do not exist, this article refers to state-oriented and private-oriented systems. Indeed, there are various dimensions to government versus private control. For example, the government can mandate individuals to take out pension insurance from a specific insurance pool, which is administered privately (such as sectoral pension funds, for example). Alternatively, the state can provide longevity insurance, but contract out certain tasks (administration, investment) to private parties. This illustrates that the various tasks involved in earnings-related pension insurance (administration, investment, insurance, intergenerational and intra-generational risk sharing, marketing, and assisting individuals in complicated life-cycle financial planning) can be distributed in alternative ways across the government and the private sector.

The second dimension distinguished in our typology involves the scope for individual choice in pension insurance. We refer to choice-oriented and mandatory-oriented systems because the extent of choice is also multi-dimensional. Indeed, choice has more aspects than mandatory versus voluntary participation in pension insurance. Particularly during their working life, individuals may be able to select the level of contributions, the investment portfolio or the sensitivity of their accumulated pension rights to macroeconomic risks, the extent and type of survivor and other insurances (e.g., disability insurance), the insurance pool, the provider and their retirement age (i.e., the age at which pension income is received for the first time). On or during retirement, they may

Figure 1



Source: The authors.

* Tilburg University, Netspar.
** CPB, University of Amsterdam, Netspar.

choose the type of annuity (unit-linked, linked to price or wage, or lump-sum payments), additional insurances (e.g., health or care insurance), and the insurance company or the insurance pool. Finally, in addition to choices made by individuals, choices made by employers are relevant. For example, are employers free to select their own insurance pool and insurance company or pension fund for their workers?

The typology of earnings-related pensions in Figure 1 leads to four prototype models. The classical juxtaposition is that between a mandatory state system, on the one hand (in the lower left corner of Figure 1), and a market-based system with free choice of savings and insurance in private capital markets, on the other (in the upper right corner of Figure 1). The typology also distinguishes between two more hybrid systems: a corporatist system with mandatory participation in private pension funds (in the lower right corner of Figure 1) and a liberal system, which leaves scope for individual choice in publicly regulated systems (in the upper left corner of Figure 1). The Dutch and Swiss pension systems, where employer-provided earnings-related pensions play an important role, constitute examples of the corporatist system. The Chilean system, which features mandatory pension savings together with free individual choice between private pension funds and insurance companies, is an example of the liberal system. The pension reforms of the 'second state pension' in the UK, featuring automatic enrolment with the option of opting out, can also be viewed as another example of a liberal system.

These prototypes bear some resemblance to the classification of the welfare state by Esping-Anderson (1990), which distinguishes between the Scandinavian, Anglo-Saxon and Corporatist systems. The three prototypes of state, market and corporatist pensions correspond more or less to the Scandinavian, the Anglo-Saxon and the Corporatist models respectively. Our fourth prototype – the liberal system – relies on extensive government regulation, but leaves ample scope for individual choice and market competition.

The World Bank (Holzmann and Hinz 2005) distinguishes between three pillars in earnings-related contributory pensions. The first pillar is a publicly-managed and mandated pension plan. The second pillar involves mandatory, private pension plans. Voluntary private plans make up the third pillar. In addition, the World Bank identifies a basic pension (the so-called 'zero' pillar) aimed at poverty alleviation. The first dimension of our typology – state versus private systems – thus involves the distinction between the first public pillar, on the one hand, and the private second and third pillars, on the other hand. The second dimension – individual choice versus mandated systems – relates to the borderline between the mandatory first- and second pillars, on the one hand, and the voluntary third pillar, on the other hand. In our typology in Figure 1, the first pillar is the dominant form of pension provision in the state model, while the third pillar is dominant in the market model. With regard to the second pillar, our typology distinguishes between two alternatives. The first is the traditional corporatist model, whereby participation is mandatory and linked to the employer or industry through occupational pension plans controlled by corporations and possibly representatives of workers. The second is the liberal model, whereby the government determines the pension contract and enforces participation, but at the same time leaves the administration, investment and insurance to private-sector parties. The second model creates scope for individual choice and competition in the market for personal pension plans. These four prototypes are described in greater detail below.

State model

The classical state is associated with the traditional welfare state that provides social insurance for its citizens from cradle to grave. The pension system is controlled and administered by the state and is comprehensive and largely mandatory. The state organizes not only the basic pension aimed at poverty alleviation, but also earnings-related pensions for the middle class. Most households therefore do not need to save voluntarily for their retirement income. The functions of both life-cycle planning and intergenerational risk-sharing are conducted on their behalf by the government. Intergenerational risk-sharing sometimes relies on separate rules such as automatic balancing in non-financial defined contribution (NDC) systems (Holzmann, Palmer and Robalino 2012), but can also be integrated with the rest of public finances, including public-debt policy. Funding of future pension liabilities is taken care of through fiscal policy aimed at debt reduction or by building up some reserve funds within the government.

These state systems are typically mandatory, but may leave some scope for individual choice regarding retirement age, for instance. However, this scope is limited in order to avoid adverse selection in insurance and individual failures in life-cycle planning. This prototype encompasses both the classical Bismarckian systems (in Germany and France, for example) and the more modern NDC systems (in Sweden and Norway, for example).

Market model

Earnings-related pensions are in the market model the responsibility of the private sector through employer-provided plans or individual pension plans in the market model. Participation in pension savings is either voluntary, or may be part of the labor contract of individual employers. The state provides a basic flat social pension to avoid poverty in old age. The government also regulates the private sector. Solvency regulation ensures that the promises of pension funds and insurance companies are credible. Moreover, regulation helps to make financial markets more transparent for individual consumers. Individuals are not forced to participate in mandatory earnings-related plans; they can take their own portfolio decisions and are free to withdraw their retirement capital as a lump sum rather than an annuity. The government may encourage pension savings or annuitization by using subsidies and tax benefits.

In Esping-Anderson terminology, the Anglo Saxon welfare state conforms to the market model. With respect to pensions, however, the state in the main Anglo-Saxon countries – the UK and the US – plays an important role in providing earnings-related pensions. Moreover, beyond such public systems, these countries are starting to employ defaults to guide individual decisions and stimulate privately provided pensions to supplement their public systems. The planned reforms in the UK, for example, are moving the country further towards the liberal model.

Corporatist model

In the corporatist prototype, pension funds organize earnings-related pension insurance for workers in specific firms or sectors. Earnings-related pensions are considered part of the labor contract. Pensions are thus employment-related and provided by the employer. Pension funds are organized on an occupational or sectoral basis, for example, as collective defined contribution (DC) or as defined benefit (DB) systems, or as mutual insurance companies. As cooperatives, pension funds are typically governed by representatives of the employers and the unions, which play an important role in corporatist countries. Together with the basic pension provided by the state, the system is comprehensive and mandatory, leaving little scope for individual choice in terms of levels of saving or portfolio choices. Typical examples are the Dutch and Swiss pension systems. The government may support private pension funds by providing tax advantages and enforcing the mandatory pooling of individual firms and their workers in industry-wide pension funds.

Liberal model

Just like the corporatist solution, this prototype aims to synthesize the state model and the market model. However, rather than relying on employer-provided pensions negotiated between social partners, it combines state regulation with individual responsibility. The state both organizes the basic pension and controls earnings-related pensions, but also leaves room for private administration and insurance as well as individual choices. More specifically, the government can mandate earnings-related pensions by forcing workers to enroll in personal pension plans, while leaving them free to select their own investment and insurance companies. Individuals are thus not constrained by agreements between unions and employers. The Chilean system is an example of this model.

A more liberal version of this prototype model is to automatically enroll workers while giving them the discretion to opt out of earnings-related pension insurance. This model thus takes to heart the lessons of behavioral economics and can be characterized as 'libertarian paternalism' – as distinct from 'old paternalism' and the associated mandatory systems. An example is New Zealand's Kiwi Saver plan, which combines automatic enrolment with some degree of individual choice of contribution rate (within some range) including the option to take contribution holidays and withdraw capital before the retirement age under special circumstances. People can opt to save through mortgage repayment rather than a pension plan. Another interesting case is the UK, where the State Second Pension (S2P) allows for contracting out with an employer-based occupational pension.

From 2012 onwards, a new system of centrally administered personal accounts is being introduced, namely the so-called National Employment Savings Trust (NEST). Enrolment will be automatic for all employees who are not enrolled in a suitable occupational pension plan – but opting out or making additional contributions are both possible.

Common challenges to all models

Each of these pension systems face common challenges stemming from falling birth rates, rising life-expectancies and growing demand for pension systems tailored to meet individual needs. Rising life expectancy challenges both funded and PAYG systems; and at a given retirement age, it also increases the length of the retirement period that needs to be financed. A growing number of pension systems are explicitly shifting the costs of higher longevity to pension plan participants. Many European pension systems have reduced or completely eliminated the generous early retirement incentives introduced in the 1970s and the 1980s. Most pension systems now allow for a flexible choice of the retirement age with more or less actuarially fair adjustments. This applies to public, occupational and individual schemes alike. Moreover, several countries have tightened eligibility criteria for unemployment and disability schemes in order to prevent these schemes from being abused as early retirement programs. At the same time, pension schemes have improved labor-market incentives during an individual's working life by linking benefits more tightly to contributions over the period of his/her entire working life.

As regards fertility risk, PAYG schemes in particular seem to be vulnerable to lower fertility rates because they rely on the human capital of young people to finance the pensions of older generations. Indeed, in the face of lower fertility, funded pensions may replace part of the PAYG pensions as cohorts that raise less children rely more on financial capital than on investments in the human capital of children to safeguard their retirement incomes (Sinn 2000). However, just as global aging may reduce rates of returns on capital markets, funded schemes may also come under pressure as a result of lower fertility. Indeed, aging is likely to increase the return on human capital and reduce the return on financial savings. In response to the growing burden of aging, many countries have cut back the cost of pensions in an attempt to put a ceiling on pension contributions. In line with DC schemes, most of the burden of adjustment is thus placed on the benefit side by raising the retirement age, restricting eligibility for benefits in other ways, or reducing replacement rates. Some countries with large PAYG systems have limited the indexation of benefits in payment. This may facilitate a move towards a multi-pillar scheme, which includes not only a public PAYG scheme, but also occupational pension plans and personal pension schemes.

Pension systems do not just provide an income for the elderly, they also play an increasing role in the broader problem of financial life-cycle planning. Both during the contribution phase and during the payment phase pensions should contribute to the desired life-cycle profile of consumption. This concerns the level of savings, as well as their risk profile. As the capacity of corporate sponsors and taxpayers has become more limited in absorbing pension risks in the face of aging and increasing competition in commodity and labor markets, those who have accumulated pension claims become risk-bearing stakeholders and are thus confronted with greater risks. Accordingly, defined-benefit systems which suggest that pension benefits can be shielded from macroeconomic risks are being replaced by pension systems that let participants suffer the impact of such shocks. Pension schemes must therefore find optimal ways to allocate risk among their participants, to communicate this risk, and to help participants absorb it.

All pension systems face growing heterogeneity and greater demands from consumers. There is no easy way to get around the trade-off between choice and compulsion. Yet there may be scope for improvement. Firstly, mandatory pensions could become increasingly tailored to individual heterogeneity. This requires governments and pension funds to gather information on individual circumstances like household composition, career and housing status. Secondly, one could allow for more elements of choice within mandatory systems, for example, by adjusting contributions, the investment portfolio, the point of retirement and the type of annuity paid. Thirdly, literature on behavioral finance (Thaler and Sunstein 2008) suggests that there is scope for substantial improvement by guiding individual choice using defaults. In order to contain individual failures, experiments with defaults are increasingly popular in countries that traditionally treasure individual discretion. Defaults maintain the freedom of individu-

als to opt out and simultaneously address individual failures by assisting those who are not able or willing to choose themselves. To illustrate this point, the US introduced a pension law in 2006 that facilitates default enrolment in pension plans, automatic default escalation of pension contributions and default portfolios. Structured choice through defaults may result in some convergence of various pension systems. Defaults, in turn, may guide individual choice in individual schemes (which are dominant in the market and liberal models) while also allowing some degree of choice in collective schemes that previously did not allow any individual choice (these systems are dominant in the state and corporatist model).

Conclusions

This paper has documented the substantial international diversity in earnings-related pension systems. It has also discussed the challenges faced by pension systems. Despite featuring different pension systems, various countries have introduced similar reforms. In particular, pension systems accommodate more individual choice and structure the choice architecture more carefully through defaults, for example. More macroeconomic risks are transferred to pension rights and pension benefits instead of pension contributions in view of the limited ability of the sponsors of the pension schemes to absorb these shocks. Moreover, retirement ages have been raised and made more flexible, early retirement benefits have become more actuarially fair, and pension benefits are linked more closely to lifetime contributions.

Although different retirement systems respond similarly to common trends, they cannot be expected to evolve towards one unique 'optimal' system due to two reasons. First of all, there are fundamental trade-offs underlying the design of the pension system. Secondly, the institutional design of a particular position on the trade-off has no unique solution. The same functions can be performed by alternative institutions and deciding which institutions best fit a particular country depends on that country's specific circumstances and history.

References

Bovenberg, A. L., C. van Ewijk and E. Westerhout (2012), *The Future of Multi-Pillar Pensions,* Cambridge University Press, Cambridge.

Esping-Anderson, G. (1990), *The Three Worlds of Welfare Capitalism,* Princeton University Press, Princeton.

Holzmann, R. and R. Hinz (2005), *Old Age Income Support in the 21st Century: An International Perspective on Pension Systems and Reform,* World Bank, Washington D.C.

Holzmann, R., E. Palmer and D. Robalino (2012), *Nonfinancial Defined Contribution Pension Schemes in a Changing Pension World,* World Bank, Washington D.C.

Sinn, H.-W. (2000), "Why a Funded Pension System is Useful and Why it is Not Useful", *International Tax and Public Finance* 7, 389–410.

Thaler, R. H. and C. R. Sunstein (2008), "Nudge: Improving Decisions about Health, Wealth and Happiness", *Journal of Public Economics* 89, 2037–67.

Pensions and Income Inequality in Old Age

Kees Goudswaard*,
Olaf van Vliet*,
Jim Been* and
Koen Caminada*

Introduction

Over the past decades, a trend towards greater private pension provision has emerged in many industrialised countries. This trend is the result of pension reforms aimed at alleviating the pressure of ageing populations on public finances (OECD 2009; Orenstein 2011). In many countries pension ages have been raised and/or public pension benefits have been cut. Some of these countries are now relying more heavily on private pension contributions. The literature on pensions, as well as that on income inequality and poverty, pays remarkably little attention to the distributive effects of these pension reforms on the elderly. Public pension benefits are often flat rate and generally tend to reduce income inequality and poverty in old age. Private pensions, on the other hand, mainly redistribute across the life cycle and are unlikely to have a strong impact on income inequality among the elderly. Thus, shifts from the public sector to the private sector in pension provision will probably lead to higher levels of income inequality and poverty among elderly people (Arza 2008). This would imply a trade-off between alleviating the pressure on public finances on the one hand, and income inequality among the elderly on the other. The empirical literature in this field consists mainly of either cross-national studies at a given moment in time (Smeeding and Williamson 2001), or descriptive analyses for a single country (Milligan 2008). As a result, relatively little insight has been gained into how pension reforms have influenced income inequality and poverty among the elderly in advanced capitalist countries in recent decades. This article examines the relationship between developments in pension systems and the variation in income inequality and poverty among older people across European countries and over time.[1]

* Leiden University.

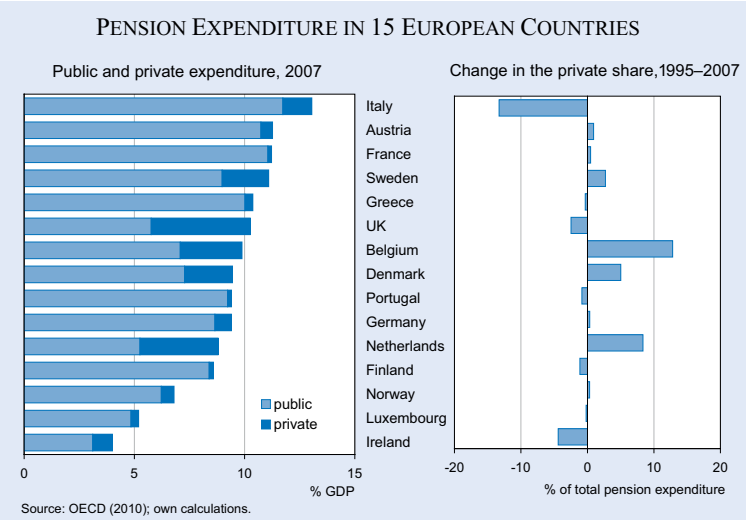
The distributional impact of public and private pensions

In many European countries, pension provision consists of a mix of public and private pension schemes. Pension reforms have resulted in relative shifts towards more private pension provision (OECD 2009; Orenstein 2011). To compare changes in the public/private mix of pension provision, we use data from the most recent release of the OECD Social Expenditure Database (OECD 2010). The left-hand panel of Figure 1 presents the composition of pension expenditure in 15 European countries in 2007.[2] The figure shows that pension expenditure consists mainly of expenditure on public pension schemes. However, the situation varies considerably between countries. In the United Kingdom and the Netherlands in particular, expenditure on private pensions is relatively high. The right-hand panel of Figure 1 presents changes in the share of private social expenditure as a percentage of total social pension expenditure between 1995 and 2007. In a number of countries the magnitude of the shift remains limited, but in other countries like Belgium, Denmark and the Netherlands, there have been substantial changes.

The relevant question here is how relative shifts in pension provision affect income distribution among older people. The main objective of pension schemes is to redistribute resources across an individual's life cycle. However, most public pension plans are also designed to redistribute income between individuals, namely from the rich to the poor. Public pension plans are generally based on income-related funding by taxes or contributions, while benefits are flat rate.

[1] See Van Vliet et al. (2012) for a more detailed analysis.
[2] Unfortunately, pension expenditure data is only available up to 2007.

Figure 1



This strongly benefits lower income groups and reduces income inequality among the elderly (Wang, Caminada and Goudswaard 2012). In most countries public pensions are seen as part of the safety net, generating large anti-poverty effects. The level of public pension benefits is such that a relatively small percentage of pensioners fall below the poverty line. Wu (2005) indicates that, without social old age and survivor programs, over half of the elderly would live in poverty.

Private pension plans (including occupational pensions), by contrast, are based on a link between contributions paid and benefits received and therefore are not expected to contain elements of (ex ante) income redistribution. They mainly reallocate income over the life cycle. A private pension insurance is actuarially fair as a rule. This means that each individual is provided with benefits whose actuarial value is equal to his/her contributions, given the chance of the insured event occurring. This is the case for individual private pension insurances that have a defined contribution character. However, private earnings-related pension schemes (in the second pillar) may not be actuarially fair and may contain elements of redistribution. This is often the case when (supplementary) private schemes are negotiated by social partners in collective labour contracts. These schemes are mandatory for (a group of) workers. Defined benefit pension schemes, for example, generally redistribute resources both within generations (for instance through redistributive elements such as thresholds or ceilings) and across generations (risk sharing). Tax advantages (to households or to employers) can also be used to stimulate the provision of private pensions. This is often the case with supplementary pension programmes, where contributions are tax exempt (Yoo and De Serres 2004). The tax advantages related to supplementary private pension plans are positively related to income levels in most countries, and thus favor the wealthy (Goudswaard and Caminada 2010).

In short, it seems plausible that private pension schemes will generate less income redistribution from the rich to the poor than public programmes. This is confirmed by empirical research. A number of cross-sectional studies indicate that income inequality among elderly people is lower in cases where larger shares of the elderly's income exist as public pension benefits (Brown and Prus 2004; Weller 2004; Fukawa 2006). The number of studies on the income effects of private pensions is considerably smaller, but for Canada Schirle (2009) found that a larger private share in the pension provision is associated with increasing income inequality among the elderly. Comparable effects have been found for poverty. Based on country-specific analyses over time, Oshio and Shimizutani (2005) and Milligan (2008) concluded that a larger public share in the pension provision is related to less poverty among elderly people. Hughes and Steward (2004) found that increases in the private share are associated with an increase in the poverty rate among elderly people. Hence, shifts from public sector to private pension provision can be expected to lead to higher levels of income inequality and poverty among the elderly.

Income inequality and poverty among older people

We use two indicators provided by Eurostat (2011) to analyse income inequality and poverty among older people across countries. Income inequality among the elderly is measured by the S80/S20 ratio of people aged 65 and over. This indicator is constructed by dividing the total equivalised disposable income of the top 20 percent incomes of elderly by the total equivalised disposable income of the bottom 20 percent incomes of people aged 65 and over. A higher value of this indicator implies a higher

Table 1

Trends in social outcomes among elderly people, 1995–2010

	Income inequality among the elderly (S80/S20)				Poverty among the elderly (PL 60)			
	1995	2007	2010	Change 1995-2010	1995	2007	2010	Change 1995-2010
Austria	4.0	3.2	3.6	-0.4	20	14.0	15.2	-4.8
Belgium	4.9	3.4	3.7	-1.2	25	23.0	19.4	-5.6
Denmark	-	2.7	3.6	-	-	17.7	17.7	-
Finland	3.0	2.9	3.1	0.1	12	21.6	18.3	6.3
France	4.8	4.0	4.5	-0.3	19	13.1	10.6	-8.4
Germany	4.9	4.2	3.8	-1.1	15	16.2	14.1	-0.9
Greece	7.6	4.8	4.1	-3.5	35	22.9	21.3	-13.7
Ireland	3.9	3.4	3.9	0.0	19	28.3	10.6	-8.4
Italy	4.6	4.7	4.2	-0.4	18	21.9	16.6	-1.4
Luxembourg	4.1	3.2	3.2	-0.9	12	7.2	5.9	-6.1
Netherlands	4.2	3.2	3.1	-1.1	8	9.5	5.9	-2.1
Norway	-	2.8	2.8	-	-	14.1	12.0	-
Portugal	6.6	6.0	5.0	-1.6	38	25.5	21.0	-17.0
Sweden	-	2.8	3.1	-	-	9.9	15.5	-
United Kingdom	4.9	4.4	4.3	-0.6	32	27.6	21.4	-10.6
Mean (all countries)	4.8	3.7	3.7	-1.1	21.1	18.2	15.0	-6.1
Mean (12 countries)	5.2	4.3	4.2	-1.0	23.0	21.0	16.4	-6.6

Note: Mean for 12 countries excluding Denmark, Norway and Sweden.
Source: Eurostat SILC-database (Eurostat 2011) and own calculations.

degree of inequality among the elderly. Poverty among the elderly is measured by the percentage of people aged 65 and over who live below the poverty line of 60 percent of median equivalised (disposable) income of the total population. This poverty line of 60 percent represents the agreed upon definition of poverty in the EU. A higher value of this indicator implies a higher rate of poverty among elderly. It is worth noting that this indicator is a relative poverty indication and can therefore be seen as a representation of income inequality for the lower part of the income distribution.

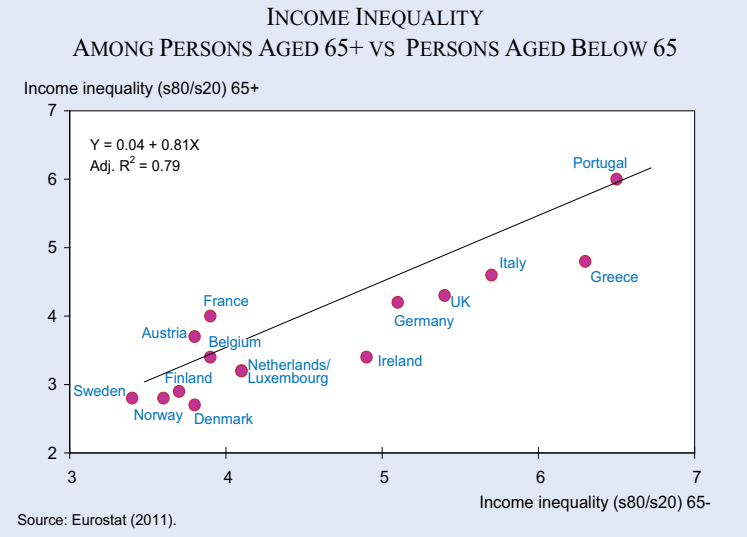
Table 1 shows a general trend towards less income inequality and less poverty among the elderly across countries in the period 1995–2007.[3] In 2007, average income inequality among the elderly (mean value of 12 countries) was almost 18 percent lower than in 1995, while inequality remained almost stable between 2007 and 2010. The downward trend over time is shown by the poverty rate among the elderly, which decreased by almost 29 percent on average between 1995 and 2010. If a different poverty line is applied (50 percent of equivalised median income instead of 60 percent) the result is almost the same, which implies that this trend is robust with respect to the poverty line. However, trends vary considerably between countries. Greece and Portugal, for example, have experienced a huge decline in poverty rates among the elderly over time. Finland and Sweden, on the other hand, have faced a relatively large increase in poverty levels.

Between 2007 and 2010 poverty rates for older people have fallen rapidly in most countries, which is remarkable because the economic crisis started in 2008. This can partly be explained by the poverty concept used (60 percent of median income): median incomes probably decreased during the crisis years, while pension incomes apparently remained relatively stable. However, several countries have implemented cuts in pension benefits since 2010. Consequently, poverty rates among the elderly may well have increased since 2010.

We proceed to analyse how income distribution among older people is related to income distribution among the working population. Figure 2 presents the income inequality among people aged 65 and above compared to income inequality among people aged below 65. It indicates that the levels of income inequality among working-age and older people are fairly closely related. Within a society, inequality

[3] These Eurostat data should be interpreted with caution because there is a disruption in the time series of inequality and poverty indicators presented in Table 1; see for details: Eurostat (2005).

Figure 2



tends to be fairly comparable for people aged below 65 and above 65. Furthermore, the figure shows that, in the majority of countries, income inequality among older people is smaller than income inequality among people below the age of 65.

Regression analyses

The data presented above suggest that there is no evidence that an increasing share of private pensions leads to higher income inequality and poverty among older people. In order to take our analysis beyond these descriptive statistics, we continue with panel data regression analyses on 15 European countries for the period 1995–2007.[4]

The results of estimation are presented in Table 2. The effects of public pension expenditure as a percentage of GDP on income inequality among the elderly are negative, but not significant (model 1 and 3). Model 4 indicates that public pension expenditure as a percentage of GDP is negatively and significantly related to poverty among the elderly. In line with our expectations based on the literature on this topic, this result suggests that higher social spending on public pensions is associated with lower poverty rates among the elderly. However, the results in Model 6 indicate that there is only weak evidence for this relationship. With respect to private pension expenditure as a percentage of GDP, the results do not indicate a positive effect of private pension expenditure on income inequality. In contrast, the negative coefficients suggest that private pension expenditure as a percentage of GDP is negatively related to income inequality among the elderly. Model 2 also indicates a negative coefficient for private pension expenditure as a percentage of total pension expenditure, but Models 3, 5 and 6 show a positive effect for the private share of pension provision, albeit not significant. This implies that higher spending on private pensions in general, and a shift from public to private pensions in particular, are not associated with higher levels of income inequality or poverty among older people. As for graying populations, the results indicate that the effect of ageing on income inequality and poverty among the elderly is limited. It seems that the percentage of the population aged 65 and over is negatively correlated with income inequality among the elderly, while no correlation can be observed between this variable and poverty among the elderly. In short, the most important finding of this analysis is that shifts in pension provision from public to private do not seem to entail higher levels of income inequality or poverty among people aged 65 and older. This conclusion is robust for other data sources and a broad range of alternative econometric specifications (Van Vliet et al. 2012).

Alternative explanations

A number of tentative explanations are conceivable for our main finding that shifts towards relatively more private pensions are not related to higher levels of income inequality among the elderly. Besides the public/private-mix, the institutional design of the mix is also relevant (Ebbinghaus and Neugschwender 2011). Several countries with large private pension sectors, such as Denmark and The Netherlands, have relatively generous basic pensions. This may counteract the impact of pension privatisation on poverty and inequality in a cross country analysis. Furthermore, the use of pension expenditure data at the macro-level implies some restrictions. Much

[4] The regressions contain country- and year-fixed effects, a Prais-Winsten correction for autocorrelation and panel-corrected standard errors.

Table 2

Panel data regressions of pension expenditure and income inequality among the elderly (65+)

	Income inequality (s80/s20)			Poverty (PL 60)		
	(1)	(2)	(3)	(4)	(5)	(6)
Public pension expenditure (% GDP)	-0.13 (0.12)		-0.19 (0.13)	-1.50* (0.83)		-0.29 (1.14)
Private pension expenditure (% GDP)	-0.45*** (0.17)		-0.87** (0.42)	-1.09 (0.82)		-5.23 (3.84)
Private share (% total pension expenditure)		-3.41** (1.52)	3.58 (4.77)		2.61 (11.96)	65.32 (56.73)
Population aged 65 and over (% total)	-0.22** (0.11)	-0.22* (0.12)	-0.34*** (0.13)	-0.54 (0.80)	-0.78 (0.76)	-0.02 (0.64)
GDP per capita (/1000)			-0.09*** (0.03)			0.81** (0.34)
Constant	8.96*** (2.14)	7.62*** (1.78)	13.74*** (2.92)	42.75*** (11.58)	30.42*** (11.49)	1.38 (16.85)
Observations	135	135	135	154	154	154
Adj. R-squared	0.84	0.84	0.85	0.79	0.78	0.80
Rho	0.41	0.42	0.36	0.63	0.66	0.63

OLS regressions; unstandardised coefficients; panel-corrected standard errors in parentheses; Prais-Winsten transformation (AR (1) disturbances).
* Significant at the .10 level; ** at the .05 level; *** at the .01 level.
Each regression also includes country and year dummies (not shown here).
Countries included: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, and the United Kingdom.
Source: Income inequality (Eurostat 2011); Pension expenditure (OECD Social Expenditure Database 2010).

information can be lost in classifying pension programmes into pillars.

Another explanation for our findings could be that increases in private pension expenditure probably mostly concern young retirees, aged between 65 and 70, and are not as applicable to older retirees who retired on the basis of older rules. Hence, it may be possible that inequality among young retirees has actually increased as a result of pension privatisation, but that this is not visible in the data on the total older population. However, additional descriptive analyses of data from Eurostat (not shown here) suggest that this is not the case. The levels of income inequality and poverty among people aged 75 and above are higher and have increased more than the income inequality and poverty levels among people aged 65 and older. One explanation for our findings is possibly that the coverage of private pension plans among younger retirees has increased in recent years, and especially the coverage among younger retirees with below average incomes. Further research should shed more light on this issue.

Conclusion

In many industrialised countries, public pension systems have been reformed in order to alleviate the pressure on public finances resulting from ageing populations. This has often led to shifts in pension provision from the public to the private sector. Since private pensions are probably less redistributive than public pensions, these shifts could lead to greater income inequality among retirees. Surprisingly, empirical research shows that shifts in pension provision from the public to the private sector do not seem to entail higher levels of income inequality or poverty among people aged 65 and older.

The policy implication of this finding seems to be that the pressure of pension expenditure on public finances can be alleviated without serious consequences for income inequality or poverty among elderly people. However, great caution is required when drawing such a policy implication. As suggested before, our results could be explained by increas-

es in the coverage of private supplementary pension schemes rather than by policy reforms. A higher coverage of private programmes also causes a shift from the public to the private sector, but will probably have a different distributional impact to cutting public pension benefits. Finally, it should be noted that our analysis does not include the years after 2007. This means that we cannot assess the income effects of the pension reforms triggered by the credit crisis at the beginning of the 21st century.

The results of this study do not suggest that pension reforms in European countries have led to more income inequality and higher poverty rates among the elderly, but additional research is needed to provide deeper insights into this question.

References

Arza, C. (2008), "Changing European Welfare: The New Distributional Principles of Pension Policy", in C. Arza and M. Kohli, eds., *Pension Reform in Europe: Politics, Policies and Outcomes,* Routledge, New York, 109–31.

Brown, R. L. and S. G. Prus (2004), "Social Transfers and Income Inequality in Old Age: A Multinational Perspective", *North American Actuarial Journal* 8 (4), 30–36.

Ebbinghaus B. and J. Neugschwender (2011), "The Public-Private Pension Mix and Old Age Income Inequality in Europe", in B. Ebbinghaus, eds., *The Variaties of Pension Governance: Pension Privatization in Europe,* Oxford University Press, Oxford, 384–422.

Eurostat (2005), "The Continuity of Indicators During the Transition Between ECHP and EU-SILC", *Working Paper and Studies,* Brussels.

Eurostat (2011), SILC-database, http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/introduction.

Fukawa, T. (2006), "Sustainable Structure of the Japanese Public Pension System Viewed from a Germany-Japan Comparison", *The Japanese Journal of Social Security Policy* 6 (1), 131–43.

Goudswaard, K. and K. Caminada (2010), "The Redistributive Effect of Public and Private Social Programmes: A Cross-country Empirical Analysis", *International Social Security Review* 63 (1), 1–19.

Hughes, G. and J. Stewart (2004), *Reforming Pensions in Europe: Evolution of Pension Financing and Sources of Retirement Income,* Edward Elgar, Cheltenham.

Milligan, K. (2008), "The Evolution of Elderly Poverty in Canada", *Canadian Public Policy* 34 (s1), 79–94.

OECD (2009), *Pensions at a Glance 2009: Retirement-Income Systems in OECD Countries,* OECD Publishing, Paris.

OECD (2010), Social Expenditure Database 1980-2007, http://www.oecd.org/document/9/0,3343,en_2649_34637_38141385_1_1_1_1,00.html.

Orenstein, M. A. (2011), "Pension Privatization in Crisis: Death or Rebirth of a Global Policy Trend?", *International Social Security Review* 64 (3), 65–80.

Oshio, T. and S. Shimizutani (2005), "The Impact of Public Pension Benefits on Income and Poverty of the Elderly in Japan", *The Japanese Journal of Social Security Policy* 4 (2), 54–66.

Schirle, T. (2009), "Income Inequality among Seniors in Canada: The Role of Women's Labour Market Experience", *CLSRN Working Paper* no. 10.

Smeeding, T. M. and J. Williamson (2001), "Income Maintenance in Old Age: What Can Be Learned from Cross-national Comparisons", *Luxembourg Income Study Working Paper* no. 263.

Van Vliet, O., J. Been, K. Caminada and K. Goudswaard (2012), "Pension Reform and Income Inequality among Older People in 15 European Countries", *International Journal of Social Welfare* 21 (4s1), 8–21.

Wang, C., K. Caminada and K. Goudswaard (2012), "The Redistributive Effect of Social Transfer Programs and Taxes: A Decomposition across Countries", *International Social Security Review* 65 (3), 27–48.

Weller, C. E. (2004), "The Future of Public Pensions in the OECD", *Cambridge Journal of Economics* 28 (4), 489–504.

Wu, K. (2005), "How Social Security Keeps Older Persons Out of Poverty across Developed Countries", *Luxembourg Income Study Working Paper* no. 410.

Yoo, K.-Y. and A. de Serres (2004), "Tax Treatment of Private Pension Savings in OECD Countries", *OECD Economic Studies* 39 (2), 73–110.

The Political Feasibility of Postponing Retirement

Vincenzo Galasso*

Retirement trends

Most developed countries have experienced a dramatic drop in the labor force participation of their middle-aged and elderly male workers over the last fifty years. The average retirement age for males, or the average age of transition to inactivity, since exits from the labor market do not necessarily coincide with formal retirement, has dropped in the OECD countries from 67.9 years in 1950 to 61.7 years in 1990.

Indeed, this phenomenon dates back to a far earlier period in time. In 1880 over 75 percent of US males over the age of 65 were active in the labor market. By 1990 less than 20 percent of US elderly males were part of the workforce, despite the contemporaneous, impressive gains in life expectancy. This trend is hardly unique to the US: France, Germany and the UK are just a few of the countries that display similar long run patterns (Costa 1998). Indeed, this phenomenon has become even stronger in the last few decades. In virtually all OECD countries, with the notable exceptions of Iceland and Japan, the average labor force participation of males aged between 60 and 64 has dropped by at least 25 percent. Two striking cases are the Netherlands, which saw a drop from 84.7 percent in 1960 to a mere 19.1 percent in 2000; and France, where the figure plunged from 68.7 percent in 1960 to just 17.8 percent in 2000. However, this phenomenon has also been particularly strong in Belgium, Finland and Italy. These trends have a clear impact on the retirement age. For instance, in 1950 French male workers tended to retire at the age of 66.1 years on average, while in 1995 this transition occurred at the age of 59.2 years. The average age of transition for Japanese workers, on the other hand, remained virtually unchanged from 66.7 years in 1950 to 66.5 years in 1995 (Blöndal and Scarpetta 1999). Moreover, the participation rate among elderly males (aged 65+ years) has even dropped in developing countries: from 67 percent to 52 percent in Mexico between 1970 and 1999, from 62 percent to 41 percent in Peru and from 68 percent to 39 percent in Turkey (Kopecky 2011).

These retirement trends are all the more striking since longevity has constantly increased during the last few decades, at a pace of almost three years every ten years. The increase in old age leisure achieved by retiring early has often been associated with the process of economic growth, which allowed individuals to enjoy higher income (and wealth) and thus more leisure, and with a reduction in the price of the leisure goods (Becker 1965; Costa 1998). In fact, several studies (Gustman and Steinmeier 2002; Coronado and Perozek 2003) have found evidence of a strong income effect in retirement decisions: unexpected positive shocks to wealth, such as the stock market boom of the nineties, have led to early retirement. In particular, elderly workers who held corporate equity immediately prior to the bull market of the 1990s retired an average of 7 months earlier than individuals with similar characteristics, but different portfolio holdings. Similar results are obtained for Switzerland (Bütler, Huguenin and Teppa 2005): credit constrained individuals tend to leave the work force earlier the higher their accumulated pension capital. Interestingly, this mechanism also seems to work in the opposite direction: a Dutch reform in the early 1990s, which reduced pension generosity and increased the actuarial fairness of the scheme, induced workers to postpone retirement (Euwals, Vuuren and Wolthoff 2006).

Retirement decisions are also largely driven by incentives, such as the level of the income guarantee provided by the pension system and the implicit tax on earnings (Feldstein 1974; Boskin and Hurd 1978). Indeed, the adoption of generous early retirement provisions in the social security systems of most industrialized countries between the late 1960s and the 1970s has been largely responsible for the dra-

* CEPRA, Università della Svizzera Italiana, and CEPR.

matic decrease in labor force participation among middle-aged male workers in recent decades. Two features of these early retirement provisions have been identified (Gruber and Wise 1999 and 2004; Blöndal and Scarpetta 1999), which display a strong correlation with the departure of elderly workers from the labor force: the early (and normal) retirement age and the tax burden, which is imposed on the labor income of those individuals who continue to work after reaching an early retirement age. In fact, in most OECD countries the conditional probability of male workers exiting the labor force (the hazard rate) peaks at the early (and at the normal) retirement age, suggesting that most individuals leave the labor market as soon as they are entitled to collect a pension benefit. The strong incentive is due to the existence of a large implicit tax imposed on continuing to work after early retirement age, to which individuals respond optimally by anticipating retirement.

Introduction of early retirement provisions

Despite their relevance for these labor market trends, less research has been devoted to identifying the determinants of the widespread adoption of these early retirement provisions. A few explanations, however, have emerged. Some authors (Gruber and Wise 1999) have hinted at the fact that such provisions have been adopted to accommodate a secular pattern of decreasing labor force participation. The introduction of early retirement schemes may instead have represented an instrument used in the late 1960s, when Europe experienced a period of tensions and strikes, to increase the share of production appropriated by the labor factor (Caballero and Hammour 1998).

Alternatively, the adoption of early retirement provisions might have been due to the emergence of a large group of redundant or unemployed elderly workers, who were not yet entitled to an old age pension. The introduction of formal early retirement provisions, the weakening of the eligibility criterion for disability pensions, whose eligibility was often made contingent to labor market conditions, and the institution of "unemployment pensions" to be awarded to unemployed elderly workers were indeed aimed at enabling this mass of redundant or unemployed elderly persons to withdraw from the labor market[1] on a pension transfer (Conde-Ruiz and Galasso 2003 and 2004). Indeed, data provided in 1986 by the Economic Commission for Europe at the United Nations on the institutional details of the first early retirement provisions in fifteen OECD countries support this argument. Almost everywhere in Europe in the 1970s and 1980s, i.e., during a period of industrial restructuring, generous early pathways from the labor market were offered to redundant or unemployed elderly workers, who were allowed to collect benefits under a wide array of welfare schemes, such as (i) special pensions to unemployed elderly workers (in Austria, Finland, and Germany); (ii) disability benefits awarded on the basis of labor market considerations (in Denmark, Germany, Netherlands, Norway, Spain, and Sweden), and (iii) special contracted pensions for redundant workers (in Austria, Belgium, France, and Germany). General early retirement provisions were also made available in Canada, Japan, and the USA; whereas Italy had already had a general early retirement provision in place since 1965, although most early exits from the labor market draw on the more generous disability benefits.

According to this argument (Conde-Ruiz and Galasso 2003 and 2004), political support in favor of early retirement hinged on two crucial conditions. Firstly, the emergence of a large group of redundant or unemployed elderly workers with an incomplete working history, who were not otherwise entitled to an old-age pension, but benefited from an early retirement pension transfer. Secondly, there exists an element of intra-generational redistribution in the early retirement provision generated by the utility from leisure. In fact, to the extent that leisure is similarly valued across ability types, but foregone labor income is lower for less productive types, lower income workers found it more convenient to retire early. This retirement behaviour gave rise to an endogenous group of low-educated workers with an incomplete working history, which guarantees future constituency for this provision. Indeed, the vast majority of the workers who, over the years, have taken advantage of these early retirement provisions are workers in low and intermediate educational groups (Blöndal and Scarpetta 1999). Moreover, early retirement has proven more common in manufacturing, where the number of retirees among males

[1] The proportion of men receiving disability or unemployment benefits at age 59, hence typically below early retirement age, was 21 percent in France, 22 percent in Belgium, 24 percent in Sweden, 27 percent in the Netherlands, 33 percent in the UK, and 37 percent in Germany, as opposed to only about 12 percent in Japan and the USA (Gruber and Wise 1999).

aged 55 to 64 exceeded the number of workers in every OECD country in 1995.

An interesting body of literature has also emerged along these lines that analyses the political determinants of early retirement (Fenge and Pestieau 2005; Casamatta, Cremer and Pestieau 2005; Cremer and Pestieau 2000; Cremer, Lozachemeur and Pestieau 2004). These works endogenize the political determination of some of the characteristic features of early retirement systems.

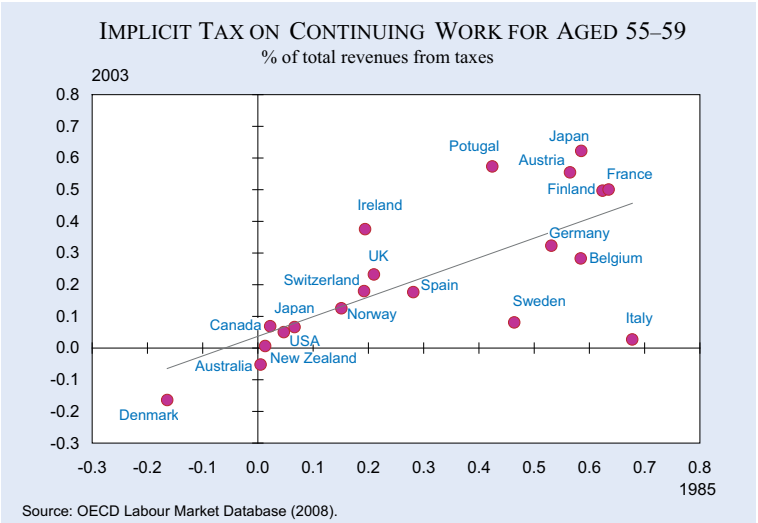
The cost of early retirement

According to a justification, which has proven very popular among politicians and the media, early retirement may have been introduced in periods of high youth unemployment in order to encourage elderly people to withdraw from the labor force, and thereby to provide more job opportunities for young workers. This argument – which has become known as the "lump of labor fallacy" – has been proven flawed both theoretically[2] and empirically (Boldrin et al. 1999; Gruber and Wise 2010). These studies found early retirement to have no (positive) effect on youth employment. Additionally, a positive, albeit small, correlation was established between the implicit tax of earning (which is known to induce early retirement) and youth unemployment. Hence, the fiscal burden produced by the incentives built into the early retirement provisions may actually hurt the job prospects of young people.

In the context of the technological progress and globalization that immediately followed the introduction of these provisions, workers with lower human capital, or with more technology-specific human capital, are even more induced to take advantage of these provisions, and to retire early (Ahituv and Zeira 2000). Coupled with the demographic dynamics of an aging population, these retirement trends have helped to increase the dependency ratio, and therefore, to exacerbate the financial imbalances of pay as you go (PAYG) social security systems. Due to early retirement, fewer workers are effectively available to finance the (generous) pensions of a higher number of retirees. Furthermore, calculations (Herbertsson and Orszag 2001) have shown that early retirement can be held responsible for a reduction of around five to seven percent in potential annual GDP in OECD countries, with even higher figures for EU countries.

As the costs of early retirement have become increasingly apparent, several scholars and international organizations like the European Union or the OECD have proposed raising the effective retirement age, or, analogously, increasing the activity rate among individuals aged above 55 years, as the crucial policy measure for controlling the rise in social security expenditure. Postponing the retirement age has thus become a common element in all social security reform proposals. Yet the actual implementation of these policy prescriptions has proven difficult. Figure 1 displays the incentive to retire early, as measured by the implicit tax on continuing to work for individuals aged 55 to 59, in OECD countries in 1985 and 2003. Different patterns emerge. The pension systems in Denmark and in a few other Anglo-Saxon countries, located on the lower left of Figure 1, have historically provided little incentive to retire early. In other countries, like Sweden, Italy and, to a lesser extent in Germany and Norway, incentives have recently been removed, with the implementation of pension reforms that have transformed the systems from defined benefits to notional defined contribu-

Figure 1



Source: OECD Labour Market Database (2008).

[2] Since the economy cannot be represented as a closed box with a fixed number of available jobs, the retirement by an elderly worker does not necessarily make room for a young worker, nor is needed for a young individual to find a job. Moreover, elderly and young workers need not to be close substitute due to differences in ability and productivity.

tion (NDC). In NDC schemes, pension benefits depend directly on lifetime contributions, and are actually linked to retirement age – thereby providing little incentive to retire early. However, these reforms, and analogous proposals, have always met with strong opposition from elderly workers, who are close to (early) retirement, and from the unions (Boeri et al. 2006). In the case of the 1995 Italian pension reform, political support was achieved by designing a long transition period in order to allow middle-aged workers to retire with the unreformed (more generous) systems.

The political feasibility of postponing retirement

Although early retirement has recently been identified as one of the main culprits, together with aging populations, of the financial imbalances that characterise many social security systems, postponing retirement – although widely endorsed by experts and policy-makers – is not the only possible solution. Alternatively, contribution rates could be (further) increased, or per-capita pension benefits reduced. These policy measures have different economic effects, as well as different sources of political support, as the cost of these reform measures varies across generations. The beauty of postponing retirement is that it makes it possible to maintain a sufficient level of old age consumption by combining a longer working career – and thus higher labor income – with relatively generous pension benefits, albeit at the cost of less old age leisure.

But will future voters be willing to support such a policy? The recent political-economic literature (Fenge and Pestieau 2005; Lacomba and Lagos 2007; Casamatta et al. 2005; Cremer and Pestieau 2000; Cremer et al. 2004; Conde-Ruiz and Galasso 2003 and 2004) on the introduction of early retirement provisions emphasizes the crucial role of policy persistency for the political success of these measures. This suggests that the introduction of early exit paths from the labor market were also welcomed by young workers who expected to retire early. An EC survey (European Commission 2004) indicates that current workers are effectively unwilling to postpone retirement.

Yet tomorrow's potential early retirees are today's young workers, and they may be facing a different economic scenario. Recent contributions (Galasso 2008; Conde-Ruiz, Galasso and Profeta 2013) suggest that postponing retirement may indeed become feasible in the future due to the political push of aging. In countries with large social security systems, like most developed economies, which also feature generous early retirement schemes, aging may induce a major negative income effect by reducing individuals' pension net wealth. In fact, the increase in the dependency ratio reduces pension profitability for all future generations, who hence obtain a worse deal from the social security system. Furthermore, if the reduction in the social security return takes the form of lower pension benefits, a substitution effect also arises, since the pecuniary incentive to retire decreases, which favours postponing retirement.

This mechanism rests on the existence of income effects in retirement decisions, which were already present in early contributions (Michel and Pestieau 1999; Sheshinski 1978; Lacomba and Lagos 2007). Recent empirical contributions consider the role played by income effects as derived from the consequences of higher exposure to market risks – in the US, older workers hold almost two thirds of their 401(k) balances in equities – in the decision to retire. For instance, did the recent decline in the stock market encourage older workers to postpone retirement? Indeed, participation rates among older workers have increased during the recessions of this decade (Munnell, Muldoon and Sass 2009; Munnell and Saas 2008). In particular, the collapse of the stock market might explain part of the two percentage point increase in the labor force participation rate of older workers (55–64) between early 2000 and 2002, (Eschtruth and Gemus 2002; Cahill, Giandrea and Quinn 2006), which constitutes an unprecedented effect during a recession, when labor force participation usually declines. Moreover, one out of five among the 50–70 year old respondents in an AARP survey, who had not yet retired, reported that they postponed retirement as a result of stock market losses (Munnel et al. 2009).

These phenomena have had only limited effects on the average retirement age to date, which has only increased slightly in most countries since the early 1990s. A more recent phenomenon with potential long lasting effects has, however, occurred in the labor markets of many European countries: the introduction and the massive use of temporary contracts[3]. These contracts are largely concentrated among the young (in 2006, respectively 52 percent, 36 percent and 32 percent of twenty-five year-old

Spanish, Italian and French workers had a temporary contract), and often do not provide the same pension rights as regular jobs. Furthermore, temporary contracts are typically associated with lower wages than permanent contracts.

The potential long-term effects on pension benefits – and thus on the future retirement behaviour – of this current phenomenon in the labor market on the younger generations is estimated to be fairly substantial. Unfortunately, in many countries, postponing retirement for future generations of workers may turn out to be politically feasible, but for the wrong reason: individuals who are now young will not have enough pension rights to retire (early) when they get older, and will need to work longer.

[3] According to OECD (2008) data, the share of temporary contracts among dependent workers increased from eight percent in 1980 to 14.4 percent in 2008 in the EU 15 countries, jumping from 4.7 percent (in 1985) to 13.9 percent in Italy, and from 15.5 percent (in 1987) to 29.3 percent in Spain.

References

Ahituv, A. and J. Zeira (2000), "Technical Progress and Early Retirement", *CEPR Discussion Paper* no. 2614.

Becker, G. S. (1965), "A Theory of the Allocation of Time", *The Economic Journal* 75, 493–517.

Boldrin, M., J. J. Dolado, J. F. Jimeno and F. Peracchi (1999), "The Future of Pension Systems in Europe. A Reappraisal", *Economic Policy* 29, 289–320.

Boeri, T., M. Castanheira, R. Faini and V. Galasso (2006), *Structural Reforms without Prejudices,* Oxford University Press, Oxford.

Blöndal, S. and S. Scarpetta (1999), "The Retirement Decision in OECD Countries", *OECD Economics Department Working Papers* no. 202.

Boskin, M. J. and M. D. Hurd (1978), "The Effect of Social Security on Early Retirement", *Journal of Public Economics* 10, 361–77.

Bütler, M., O. Huguenin and F. Teppa, (2005), "Why Forcing People to Save for Retirement May Backfire", *CESifo Working Paper* no. 1458.

Caballero, R. J. and M. L. Hammour (1998), "The Macroeconomics of Specificity", *Journal of Political Economy* 106, 724–67.

Cahill, K. E., M. Giandrea and J. Quinn (2006), "A Micro-level Analysis of Recent Increases in Labor Force Participation among Older Men", *BLS Working Paper* no. 400.

Casamatta, G., H. Cremer and P. Pestieau (2005), "Voting on Pensions with Endogenous Retirement Age", *International Tax and Public Finance* 12 (1), 7–28.

Conde-Ruiz, J. I. and V. Galasso (2003), "Early Retirement", *Review of Economic Dynamics* 6, 12-36.

Conde-Ruiz, J. I. and V. Galasso (2004), "The Macroeconomics of Early Retirement", *Journal of Public Economics* 88, 1849–69.

Conde-Ruiz, J. I., V. Galasso and P. Profeta (2013), "The Role of Income Effects in Early Retirement", *Journal of Public Economic Theory,* in press.

Coronado, J. L. and M. Perozek (2003), "Wealth Effects and the Consumption of Leisure: Retirement Decisions during the Stock Market Boom of the 1900s", *Finance and Economics Discussion Series* no. 2003–20.

Costa, D. L. (1998), *The Evolution of Retirement: An American Economic History, 1880–1990*, National Bureau of Economic Research Series on Long-Term Factors in Economic Development, University of Chicago Press, Chicago.

Cremer, H., J. Lozachemeur and P. Pestieau (2004), "Social Security, Retirement Age and Optimal Income Taxation", *Journal of Public Economics* 88 (11), 2259–81.

Cremer, H. and P. Pestieau (2000), "Reforming Our Pension System: Is it a Demographic, Financial or Political Problem?", *European Economic Review* 40, 974–83.

Eschtruth, A. and J. Gemus (2002), "Are Older Workers Responding to the Bear Market?", *Just the Facts on Retirement Issues* no. 5, Chestnut Hill, MA: Center for Retirement Research at Boston College.

European Commission (2004), "The Future of Pension Systems", *Special Eurobarometer* 161 / Wave 56.1, http://www.europa.eu.int/comm/public_opinion/archives/ebs/ebs_161_pensions.pdf.

Euwals, R., D. van Vuuren and R. Wolthoff (2006), "Early Retirement Behaviour in the Netherlands, Evidence from a Policy Reform", *CEPR Discussion Paper* no. 5596.

Feldstein, M. (1974), "Social Security, Induced Retirement, and Aggregate Capital Accumulation", *Journal of Political Economy* 82 (5), 905–26.

Fenge, R. and P. Pestieau (2005), *Social Security and Early Retirement,* MIT Press, Cambridge, Mass.

Galasso, V. (2008), "Postponing Retirement: The Political Effect of Aging", *Journal of Public Economics* 92, 2157–69.

Gruber, J. and D. Wise (1999), *Social Security and Retirement around the World,* University of Chicago Press, Chicago.

Gruber, J. and D. Wise (2004), *Social Security Programs and Retirement around the World: Micro Estimation,* University of Chicago Press, Chicago.

Gruber, J. and D. Wise (2010), *Social Security Programs and Retirement around the World: The Relationship to Youth Employment,* University of Chicago Press, Chicago.

Gustman, A. and T. Steinmeier (2002), "Retirement and the Stock Market Bubble", *NBER Working Paper Series* no. 9404.

Herbertsson, T. T. and J. M. Orszag (2001), "The Cost of Early Retirement in the OECD Countries", *IoES Working Paper Series* no. W01:02.

Kopecky, K. A. (2011), "The Trend in Retirement", *International Economic Review* 52 (2), 287–316.

Lacomba, J. A. and F. M. Lagos (2007), "Political Election on Legal Retirement Age", *Social Choice and Welfare* 29 (1), 1–17.

Michel, P. and P. Pestieau (1999), "Social Security and Early Retirement in an Overlapping-generations Growth Model", *CORE Discussion Paper* no. 9951.

Munnell, A. H., D. Muldoon and S. A. Sass (2009), "Recessions and Older Workers", *Issues in Brief* ib2009-9-2, Center for Retirement Research.

Munnell A. and S. A. Sass (2008), *Working Longer. The Solution to the Retirement Income Challenge,* Brooking Institution Press, Washington D.C.

OECD (2008), *Employment Outlook* 2008, OECD Publishing, Paris.

Sheshinski E. (1978), "A Model of Social Security and Retirement Decisions", *Journal of Public Economics* 10, 337–60.

The Impact of "Caring" Policies on Societal Issues

Mary McThomas* and
Roberto Gallardo**

Introduction

There has been much debate and concern over the limitations of modern liberal democracies in addressing issues of care. Modern liberalism and the resulting state structures tend to focus on individualism at the expense of the community, and privilege individual rights over networks of care and obligation. Resulting policies have reflected this focus, often with negative results. As a result, some scholars have argued that a care-based viewpoint should be included and used as the basis of policy formation. In our view it can also be used to evaluate existing policies. To this end, we have created a measure to assess how individual states in the USA fare in creating caring policies and to explore the impact of the presence (or lack of) such policies on several societal concerns.

The term "caring" policies is used to denote a political system that provides the necessary means to allow individuals to care for children and elderly parents, to access basic goods such as housing and healthcare, and to have a say in creating laws and policies through greater participation in political activities. Such a caring political system addresses basic human needs and acknowledges the resources required to care for others. In addition, through the encouragement of political participation, it ideally allows individuals a voice in the creation of policies as new needs arise.

Demand for care-taking and care-giving is increasing and will continue to grow. There has been a rise in the number of double-earner households leading to an increasing need to balance work and child care; and an increase in the number of people aged 65 years and over (12 percent between 1990 and 2007) leading to potential concerns regarding care for the elderly; and an increase in poverty (approximately 46.2 million people in the USA live below the poverty line as of 2010). In an effort to evaluate state policies with these concerns in mind, we have created a political caring index based on nine variables that were selected using Daniel Engster's (2004) Institutional Political Theory of Caring as our theoretical framework. We then use the resulting index to assess the impact of caring policies on five issues of societal concern.

Concerns of caregiving

State policies matter so much because they control public resources and regulations. A lack of subsidies and other incentives lead to an inability on the part of families to care for their own members, as well as to meet basic needs. Due to work schedules and other obligations, individuals are increasingly turning to "care-related" service industries to provide care for their family members. However, such unsubsidized services can considerably add to their monthly expenses. A growing number of people unable to afford such services are put at a disadvantage; as care for children and the elderly are no longer an option, but a necessity. There is consequently a need to recognize that the men and women who care for children and the elderly are facing an increasingly difficult task.

Hiring people to provide care is not without its costs both financially and emotionally. In addition to the strains placed on family members, there are concerns about the commodification of care for both the communities and the individual wage earners offering these services. Commercial services treat "care" as a market exchange instead of a relationship, which has the potential to weaken both familial and community networks. For example, McKnight (1995) claims that professional – as opposed to family or community provided – "care-related" services weaken the

* Mississippi State University.
**Southern Rural Development Center at Mississippi State University.

community and destroy the very fabric of society. This, in turn, causes families to collapse, schools to fail and violence to increase. While his predictions are rather dramatic, having care-friendly policies and incentives in place is critical, even if McKnight is only partially accurate. More specifically, policies are needed that enable individuals to provide for their own care and that of their family members, instead of relying on professional, paid services to supplant these care networks. It should be noted that not everyone wants to be the primary care-giver for his or her family members. Ideally, however, individuals should have the ability to fulfill this function if they so choose. There are many factors involved in these concerns. There are those in need of care whose needs may not be satisfied, as well as potential care-givers who do not have the time or money to provide the care needed by their family members (family by blood or choice). Finally, there are those who are willing to be employed in care-giving roles, but are being exploited due to the nature of the existing system. Any state policy concerned with these issues needs to address all such factors.

Research on care and care ethics

The ethics of care and its challenge to the individualistic approach of modern liberalism and rights-based theories of justice started with Carol Gilligan (1982). There has since been much research testing and utilizing the ideas of care ethics. While political institutions have received less attention, scholars have most notably applied care ethics to social institutions. There has been a proliferation of literature applying the ethic of care to schools (Cassidy and Bates 2005; Beck 1992; Noddings 1988; Courtney and Noblit 1994; Rogers 1994), hospitals and nursing homes (Dodson and Zincavage 2007; Bowden 1997), as well as to other forms of home-care employment (Holgate and Shea 2007; Hondagneu-Sotelo 2001).

Many of these authors discuss the exploitation that occurs within the field of care work, due to the fact that care is seen as feminine, private, invisible and therefore of little value (see for example Duffy 2005; Kittay 2001; Romero 2001; Arno, Levine and Memmott 1999; Karner 1998; Bubeck 1995; Folbre 1995). Yet care-receiving is a reality that is both necessary and central to the human experience at some stage in every person's life. Thus, under the current structure, care is unrecognized and undervalued, and yet remains a human necessity. As often happens with invisible labor that is seen as domestic in nature, care-giving is consigned to the already overwhelmed and underpaid segments of society (women, immigrants, non-whites). This situation has led some to call for state involvement in order to recognize care as work and treat care-giving like any other type of employment (Howes 2004; Kittay 2001; Glenn 2000). However, as Holgate and Shea (2007) point out, it is difficult to combine the complexities of care with the existing institutional framework of state and market. Evelyn Nakano Glenn (2000, 89) calls for a transformation in conceptions of "citizenship in the United States to make care central to rights and entitlements." However, this "transformation of caring must be linked to major changes in political-economic structures and relationships" (Ibid, 93). It is these political-economic structures that we attempt to evaluate as a way of assessing how well – and whether – states in the USA are providing caring institutional policies.

Daniel Engster (2004) acknowledges the lack of an institutional theory of care and attempted to fill the void. To this end, he incorporates care ethics into the framework of rights-based theories. He provides three main categories of core rights. The first category is development and dependency work such as paid family leave and subsidies for childcare. Engster's rationale for this category of core rights is to allow individual caregivers the ability to achieve their life goals despite their role as caregivers (2004, 131). In this way, Engster integrates the reality of caring obligations with the recognition of the importance of individual life plans.

The second category of core rights is traditional political and economic rights. Traditional political rights include, for example, civil liberties, freedom of speech and religion, and protection against arbitrary arrest and imprisonment. While the protection of basic rights may seem obvious, it must be included in an institutionalized political theory of care. Care ethics have been criticized for parochialism, focusing on private relations at the expense of political concerns. The inclusion of political rights brings the political back in and ensures that the individual is protected by the state and is granted access and voice. Economic rights offer protection from economic deprivation in order to allow for self-autonomy with the understanding that the basic needs of humans (e.g., food, housing, health care) must be met in order for individuals to act out their life plan. Without the guarantee of basic sustenance, the free-

dom to make choices means very little. Political and economic rights act in tandem to both protect and enable individual choices.

The third and final category of rights discussed by Engster is that of political participation. Political participation is differentiated from political rights because participation and access to the political agenda ensures that political rights will be protected and new rights will be considered. While political rights can be understood as a form of protection against the state, the right to political participation represents access to the state and the chance to have a voice in creating law and policy. We adopt Engster's three categories of core rights and use his underlying theoretical framework to create our political caring index, which is subsequently used to evaluate state policies.

Evaluating state policies

To evaluate caring policies in the USA, we utilized state-level data instead of examining policies at the national level. We chose to focus on state policies as states have the flexibility to craft individual programs that reflect the different cultures and needs of their particular population in a way that the larger national structure does not. Focusing on state-level data also allowed us to see variations in policies during a specific time period.

For the first category of core rights, development and dependency work, a score given to each state based on a parental leave policy analysis conducted by the National Partnership for Women and Families (Grant, Hatcher and Patel 2005) was used. The higher the score, the better parental leave programs the state has in place. The type of benefits analyzed include family leave, medical leave, parental leave, maternity leave, paternity leave, job-protected leave, paid leave benefits, paid family leave, paid medical leave, short-term disability insurance, temporary disability insurance, and at-home infant care (Grant et al. 2005). These policies are intended to be gender neutral in that they either do not specify a gender (e.g. parental leave), or they include both male and female genders (e.g. paternity *and* maternity leave). While social norms, gendered roles, and traditional practices may lead to more women taking advantage of these policies, they are available to both men and women. In addition, they allow for job security, which helps to mitigate the sacrifices often made by women when it comes to caring duties.

For the second main category of rights, political and economic rights, six variables were used. The first variable selected was the overall score per state based on a freedom index that analyzed state and local policies related to economic, social, and personal spheres (Sorens, Muedini and Ruger 2008). The laws and policies included in this freedom index range from fiscal policies to marriage and domestic partnership laws (Sorens et al. 2008). In our view this overall freedom variable best measures the second category of rights called for by Engster, as it includes various personal freedoms in addition to such basic political rights as freedom of speech and religion. The remaining five variables in this category are related to economic rights: the percentage of basic assistance as a total of TANF funds used[1], the percentage of children living in poverty, income distribution, the percentage of subsidized housing units, and the percentage of persons without health insurance.

In order to capture the right to economic sustenance, we included a welfare measure. Although welfare is a result of federal policy, states have a flexibility that leads to variations among them. The percentage of basic assistance as a total of federal and state funds used was calculated to measure the willingness of states to allocate funds to cash assistance. The higher the percentage of total funds used that a state spends on cash assistance, the higher the caring score. Secondly, the percentage of children living in poverty was included because we believe it is a good proxy for economic deprivation. We decided to include children in poverty instead of an overall poverty rate because children are generally more vulnerable to a lack of economic sustenance and require more care. Therefore, the higher the percentage of children in poverty, the lower the caring score. A measure of income inequality was also used to show income distribution across a population. This measure was adopted instead of median household income to minimize variances in the cost of living; as levels of income can be misleading when comparing states as the cost of living in each state varies. An income of USD 20,000 in New York City translates into a dif-

[1] TANF (Temporary Assistance to Needy Families) is a block grant given to states, which in turn decide how to use the funds. Funds can be used for childcare, transportation, work subsidies, education and training or basic assistance (includes cash payments, vouchers, or other forms designed to meet ongoing basic needs) among others.

ferent level of economic security (or lack thereof) than the same income in Oklahoma City.

The percentage of subsidized housing units was selected as an indirect measure of basic housing provisions. It is important to note that we are more interested in the availability of housing units than in the quality of publicly subsidized housing. Some may question whether subsidized housing counts as decent housing. However, it nonetheless provides a place for families to live who otherwise could not afford a home at all. Finally, and related to the basic provision of healthcare, we included the percentage of the population without health insurance. The higher the percentage of uninsured, the less likely people are able to care for themselves and others.

For the third category of core rights, namely political participation, two variables were selected: the percentage of citizens registered to vote and the voter turnout rate, both for the 2006-midterm elections. We selected the 2006-midterm election rather than the 2008 presidential elections for two reasons. Firstly, the voter turnout rate for the 2008 elections was unusually high; and secondly, the 2006-midterm elections involved voting for public officials that have a more direct impact on local community issues. This is important in terms of ease of access to one's political representatives and influence on the resulting local policies. Voting is certainly not the only form of political participation. However, as noted in one study, 68 percent of Americans felt that voting is the best strategy for addressing issues and being involved in their communities (National Conference on Citizenship 2007). We included both voter registration and voter turnout since each capture unique segments of political participation. Low-levels of voter turnout may reflect political alienation. A lower voter registration rate, on the other hand, may be a result of tedious registration and points to potentially changeable state policy. In other words, political participation can be thwarted by confusing or difficult procedures (purposefully constructed or not) in the registration process itself which is quite a different, but equally important, issue from that of the actual turnout for an election.

Impact on societal issues

Once the political caring index was constructed, we used it to test the impact of caring policies on productivity, the number of suicides, the divorce rate, the percentage of the population completing a high school degree, and violent crime rates. We wanted to look at levels of productivity as the loss of productivity is often cited as a reason not to allow or extend parental leave policies. In addition, while research has focused on the relationship between productivity and family benefits (e.g. Baughman, Holtz-Eakin and DiNardi 2003), we were unable to find studies that explored the relationship between productivity and a more comprehensive political caring system. The remaining societal issues were chosen to test whether less "caring" policies lead to negative social impacts as measured by suicide, divorce, levels of education and violent crime including murder, rape, robbery and aggravated assault.

The caring index explained 37 percent of the variance in worker productivity across states. States with more caring policies had higher rates of productivity. This finding shows a different result than that of Baughman et al. (2003), which found no significant relationship between offering family benefits and an increase in productivity. We believe the main reason for this difference is that the political caring index not only considered family benefits, but also other elements that together have an impact on the productivity of workers by helping them to deal with the multiple demands of work and family. For example, a study conducted by Ross Phillips (2004) found that 25 percent of workers with a child under the age of three, 40 percent of low-income workers, and half of working parents with incomes below the poverty level did not have paid leave. Our findings suggest that this lack of leave actually decreases productivity.

Perhaps the most interesting result, and the one that most strongly supports McKnight's (1995) argument, is the ability of the model to explain 67 percent of the variance in suicide rates. The different suicide rates in the various states can largely be explained by how "caring" their policies were. States with more caring policies had lower suicide rates. This finding supports McKnight's (1995) main argument that a "careless" state will lead to the destruction of its society and resulting social ills. A possible explanation for our result may be that the variables we used to construct the index can also be used as stress indicators related to suicide rates. For example, an individual's lack of healthcare, housing, economic independence, etc. may lead to despair, thus caring policies remove the reasons that may lead someone to resort to suicide.

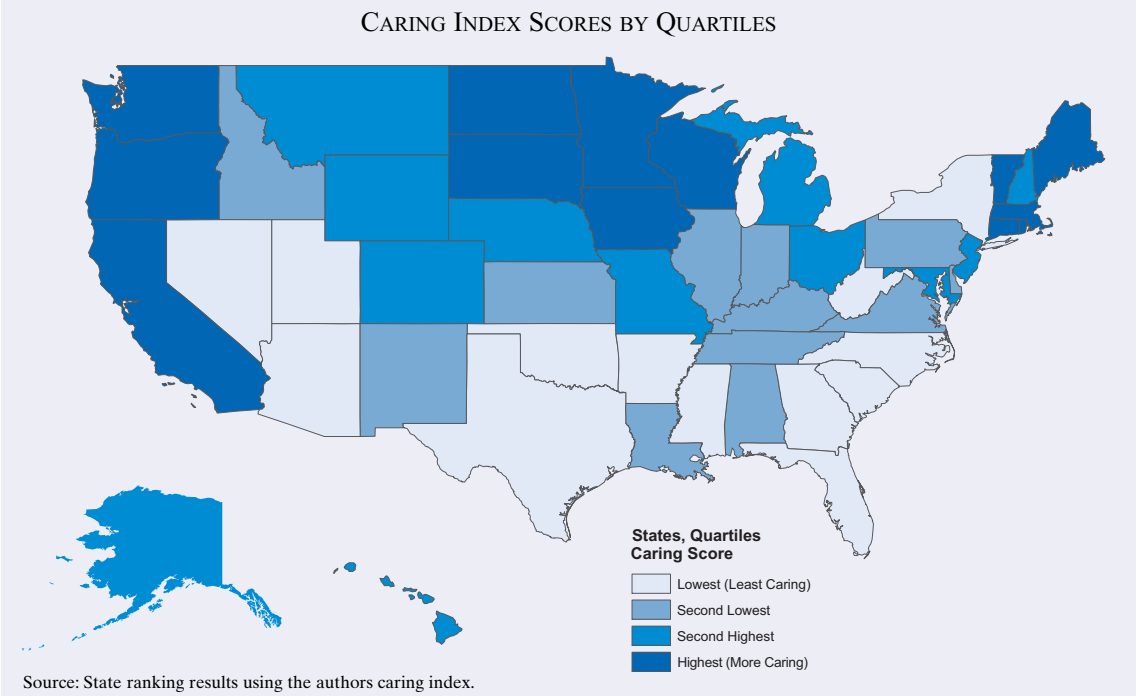
The model explained 37 percent of the variance in the divorce rates of those aged 15 and over. States with more caring policies had lower divorce rates. Once again, a caring political system seems to mitigate negative social issues. Presser (2005) found that spouses that work late shifts spend less quality time together and those that have the further compounding factor of having children are more likely to separate or divorce. Given these findings, politicians and policymakers wishing to address divorce rates and other "family values" may want to turn their attention to economic policy, instead of social morality, and consider focusing on how to design care-inducing policies.

Another interesting finding from this study was that the caring index model explained 84 percent of the variance in high school graduation rates among those aged 25 years or older. This finding suggests that the reason one state has more people graduating from high school than another state can be largely explained by whether that state has caring policies in place or not. This finding parallels previous research done by Bridgeland DiLulio and Morrison (2006). They found that 22 percent of students who dropped out from high school did so because they had to care for family members either because both parents were working or were otherwise unavailable. Similarly, research conducted by Israel, Beaulieu and Hartless (2001) found that a supportive family network affects high school students' educational achievement. This led them to conclude that policies should go beyond promoting educational achievement and extend to strengthening family and community social capital. In other words, the existence of a caring environment affects the educational achievement of children and caring policies can help to bolster the educational levels of a state's citizenry.

The final societal issue explored was the rate of violent crime, specifically murder, rape, robbery and aggravated assault. Those states with higher levels of care had lower crime rates. However, the caring index explained only 22 percent of the variance among states. Thus, there are other factors that can potentially better explain differences in rates of crime among states. That said, caring policies still had some impact. Future research should focus on better understanding the relationship between a caring political system and the rate of violent crimes. More importantly, using a framework based on care ethics may shed light on previously unknown ways to address this key societal issue.

Given the importance of these issues and the potential of state policies to help mitigate such social problems, we were curious to see the ranking of the states based on their levels of care; or which states were ranked the most caring states in the United States (Minnesota followed by Maine, Vermont, and Oregon), and which were the least caring states in the nation (Nevada followed by Texas and

Figure 1



Source: State ranking results using the authors caring index.

Mississippi). We divided the states into quartiles based on their caring score. Figure 1 depicts a map of the United States in which the color of the state reflects the quartile of the rankings into which each state fell.

Pockets of more caring states are located in the Northeast (Maine, Vermont, Rhode Island, Massachusetts, and Connecticut), the North Midwest (Minnesota, Wisconsin, North Dakota, Iowa, and South Dakota), and the Pacific (California, Oregon, and Washington).The majority of least caring states are located in the Southeast and Southwest. Furthermore, all states in the Southeast region have below average scores. This may not be surprising due to the region's historically weak safety net, which includes punitive and restrictive welfare systems and a legacy of racism with their corollary effects on welfare politics (Quadango 1994; Schram, Soss and Fording 2003; Soule and Zylan 1997).

The geographical pockets of caring states suggest the viral spread of policies among neighbors, or the potential impact of similar histories, traditions and cultures among neighboring states. Esping-Andersen (1990) explored this issue in greater depth, looking at how common historical backgrounds can be helpful to understand why states enact the policies that they do. Pierson (2000) similarly concludes that the recognition of historical processes is necessary to better understand the varied politics of social policy. Culture may also play a role in the spatial patterns observed. For example, Rice and Sumberg (1997) built a civic culture index based on the concept of Putnam, Leonardi and Nanetti (1993) of social capital to help explain regional differences. They found a clear link between how civic a state is and government performance, whereby states that are more civic tend to enact more liberal and innovative policies. States with a stronger civic culture are therefore more likely to enact caring policies. In fact, Engster's core rights speak for acknowledging and maintaining a more engaged and organized citizenry.

Elazar (1984) identified three different political cultures built on the migration patterns of distinct racial, ethnic, and religious groups: moralistic, individualistic, and traditionalistic cultures. A moralistic culture is more concerned with the public good than with private interest. Such a culture views government as a legitimate force for achieving the public good. In contrast, an individualistic culture believes that the public should rarely intervene in private matters, and that the state should be limited to keeping the marketplace working properly. Finally, a traditionalistic culture sees the sole role of government as that of maintaining the existing status quo, including social hierarchies. Based on Elazar's typology, moralistic states are better suited to be more "caring" followed by individualistic and lastly traditionalistic states. According to Elazar (1984), two states (Vermont and Maine) in the North Eastern, more caring "pocket" have a moralistic political culture; while the other three have an individualistic culture. All states in the more caring north Midwest and Pacific Northwest regions have a moralistic culture. On the other hand, ten out of the thirteen least caring states have a traditionalistic culture according to Elazar's typology. Six out of the thirteen states included in the most caring quartile ranked in the top ten states based on the civic culture index developed by Rice and Sumberg (1997) discussed above. Regardless of typology, however, there appears to be a relationship between political caring, political culture, welfare politics, historical backgrounds and civic culture.

Conclusion

Our attempt to create a caring index and evaluate the impact of caring policies on societal issues represents just one endeavor in a wide range of potential research designs that utilize a caring framework. Our index can complement other indices and provide another tool for understanding why states implement the policies they do. More importantly, this index sheds light on the positive or negative impact that particular policies have on the community as a whole, as well as on individuals. This study provides insights into which policies have the capability to significantly improve the caring policies of specific states. In turn, this can have an impact on such societal issues as educational achievement, crime, suicide rates and worker productivity. Furthermore, the index can be used as a tool to assess whether the current policies are working as planned or expected. Overall, we believe that analyzing policies and their effectiveness through the caring lens opens up a new area of research that can make a valuable contribution to knowledge in this field. Theories related to the ethic of care have changed the way we think about justice, individualism, policy design and effectiveness. If a political ethic of care is to be taken seriously, a way must be found to integrate it into public policy.

References

Arno, P., C. Levine and M. Memmott (1999), "The Economic Value of Informal Caregiving", *Health Affairs* 18 (2), 182–88.

Baughman, R., D. Holtz-Eakin and D. DiNardi (2003), "Productivity and Wage Effects of 'Family-Friendly' Fringe Benefits", *International Journal of Manpower* 24 (3), 247–59.

Beck, L. (1992), "Meeting the Challenge of the Future: The Place of a Caring Ethic in Educational Administration", *American Journal of Education* 100 (4), 454–96.

Bowden, P. (1997), *Caring: Gender-sensitive Ethics,* Routledge, London.

Bridgeland, J., J. DiIulio Jr. and K. Morrison (2006), The Silent Epidemic: Perspectives of High School Dropouts, http://www.civicenterprises.net/pdfs/thesilentepidemic3-06.pdf.

Bubeck, P. (1995), *Care, Gender and Justice,* Clarendon Press, Oxford.

Cassidy, W. and A. Bates (2005), "'Drop-outs and Push-outs': Finding Hope at a School that Actualizes the Ethic of Care", *American Journal of Education* 112 (1), 66–102.

Courtney, M. and G. Noblit (1994), "The Principal as Caregiver", in R. Prillamen, D. Eaker and D. Kendick, eds., *A Tapestry of Caring,* Ablex, Norwood, New Jersey.

Dodson, L. and R. Zincavage (2007), "'It's Like a Family': Caring Labor, Exploitation, and Race in Nursing Homes", *Gender and Society* 21 (6), 905–28.

Duffy, M. (2005), "Reproducing Labor Inequalities: Challenges for Feminists Conceptualizing Care at the Intersections of Gender, Race and Class", *Gender & Society* 19 (1), 66–82.

Elazar, D. (1984), *American Federalism: A View from the States,* Harper & Row, New York.

Engster, D. (2004), "Care Ethics and Natural Law Theory: Toward an Institutional Political Theory of Caring", *The Journal of Politics* 66 (1), 113–35.

Esping-Andersen, G. (1990), *The Three Worlds of Welfare Capitalism,* Princeton University Press, Princeton, New Jersey.

Folbre, N. (1995), "Holding Hands at Midnight: The Paradox of Caring Labor", *Feminist Economics* 1 (1), 73–92.

Gilligan, C. (1982), *In a Different Voice: Psychological Theory and Women's Development,* Harvard University Press, Cambridge, Massachusetts.

Glenn, E.-N. (2000), "Creating a Caring Society", *Contemporary Sociology* 29 (1), 84–94.

Grant, J., T. Hatcher and N. Patel (2005), Expecting Better: A State-by-State Analysis of Parental Leave Programs, http://www.nationalpartnership.org/site/DocServer/ParentalLeaveReportMay05.pdf (accessed 16 June 2009).

Holgate, B. and J. Shea (2007), "SEIU Confronts the Home Care Crisis in California", *New Politics* 11 (2).

Hondagneu-Sotelo, P. (2001), *Domestica: Immigrant Workers Cleaning and Caring in the Shadows of Affluence,* University of California Press, Berkeley.

Howes, C. (2004), *Upgrading California's Home Care Workforce: The Impact of Political Action and Unionization,* The State of California Labor, University of California Institute of Labor and Employment, Berkeley.

Israel, G., L. Beaulieu and G. Hartless (2001), "The Influence of Family and Community Social Capital on Educational Achievement", *Rural Sociology* 66 (1), 43–68.

Karner, T. (1998), "Professional Caring: Homecare Workers as Fictive Kin", *Journal of Aging Studies* 12 (1), 69–82.

Kittay, E.-F. (2001), "A Feminist Public Ethic of Care Meets the New Communitarian Family Policy", *Ethics* 111 (3), 523–47.

McKnight, J. (1995), *The Careless Society: Community and its Counterfeits,* Basic Book, New York.

National Conference on Citizenship (2007), 2007 America's Civic Health Index, http://www.ncoc.net/index.php.

Noddings, N. (1988), "An Ethic of Caring and Its Implications for Instructional Arrangements", *American Journal of Education* 96, 215–31.

Pierson, P. (2000), "Three Worlds of Welfare State Research", *Comparative Political Studies* 31 (6/7), 791–821.

Presser, H. (2005), *Working in a 24/7 Economy: Challenges for American Families,* Russell Sage Foundation, New York.

Putnam, R, R. Leonardi and R. Nanetti (1993), *Making Democracy Work: Civic Traditions in Modern Italy,* Princeton University Press, Princeton, New Jersey.

Quadango, J. (1994), *The Color of Welfare. How Racism Undermined the War on Poverty,* Oxford University Press, Cary, North Carolina.

Rice, T. and A. Sumberg (1997), "Civic Culture and Government Performance in the American States", *Publius* 27 (1), 99–114.

Rogers, D. (1994), "Conceptions of Caring in a Fourth-Grade Classroom", in R. Prillamen, D. Eaker and D. Kendrick, eds., *A Tapestry of Caring,* Ablex, Norwood, New Jersey.

Romero, M. (2001), "Unraveling Privilege: Workers' Children and the Hidden Costs of Paid Care", *Chicago-Kent Law Review* 76, 1651–72.

Ross Phillips, K. (2004), "Getting Time Off: Access to Leave Among Working Parents", *New Federalism: National Survey of America's Families* no. B-57, http://www.urban.org/publications/310977.html.

Schram, S., J. Soss and R. Fording (2003), *Race and the Politics of Welfare Reform,* University of Michigan Press, Ann Arbor, Michigan.

Sorens, J., F. Muedini and W. Ruger (2008), "State and Local Policies in 2006: A New Database", *State Politics and Policy Quarterly* 8 (3), 309–26.

Soule, S. and I. Zylan (1997), "Runaway Train? The Diffusion of State-Level Reform in ADC/AFDC Eligibility Requirements, 1950-1967", *American Journal of Sociology* 103 (3), 733–62.

Green Growth and Nuclear Energy

Holger Rogner*

This article outlines nuclear energy's potential contribution as part of a green energy portfolio, as well as its role in a green economy towards green growth.

Introduction

The issue

Since the 1986 Chernobyl accident, the sustainability of nuclear energy technologies and fuel cycles has understandably sparked intense debate at gatherings addressing climate change mitigation, sustainable development, and more recently, green economy and green growth. Topical disputes include: concerns about operational plant safety; the lack of a demonstrated solution to the disposal of high-level nuclear waste; doubtful economics; public acceptance; and the technology's potential contribution to nuclear weapons proliferation.

At the international level, energy and its role in sustainable development was first addressed at the ninth session of the Commission on Sustainable Development[1] in 2009 (CSD-9), where nuclear power was also intensely debated. The international community agreed to disagree on the role of nuclear power in sustainable development. CSD-9's final text observed that some countries view nuclear power as an important contributor to sustainable development while others do not, and summarized briefly the logic of each perspective (UN 2001). The community agreed that, "the choice of nuclear energy rests with countries" (UN 2001).

Ten years later, as the CSD process geared up for the Rio+20 Earth Summit in 2012, the notions of green economy and green growth were increasingly used to emphasize socio-economic development aspects (as the prime objective of developing countries), rather than environmental protection (the prime objective of industrialized countries).

Green economy and green growth

Green economy

A unique and universally accepted definition of the "green economy" has yet to be developed. The term itself underscores the significance of the economic and social dimensions of sustainability. The United Nations Environment Programme (UNEP) defines the green economy as one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP 2010). Specifically, a green economy is characterized by socially inclusive development (including aspects of quality of life beyond income), environmentally benign production and consumption patterns and the efficient use of natural resources.

Green growth

Green growth builds upon the green economy principle by adding the explicit objective of advancing economic growth and development towards the criteria defined for a green economy, in the sense that growth should reduce social inequity, mitigate climate change, and prevent environmental degradation and the unsustainable use of natural resources. It represents a fundamental adjustment to the classical growth paradigm by recognizing the environment as a factor in the production function. "Green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies" (OECD 2011).

Green growth and energy

"Green growth requires a green engine. Improving the environmental performance of energy transformation and consumption is a cornerstone of any attempt towards green growth" (OECD 2011). Typical criteria for green energy include, inter alia:

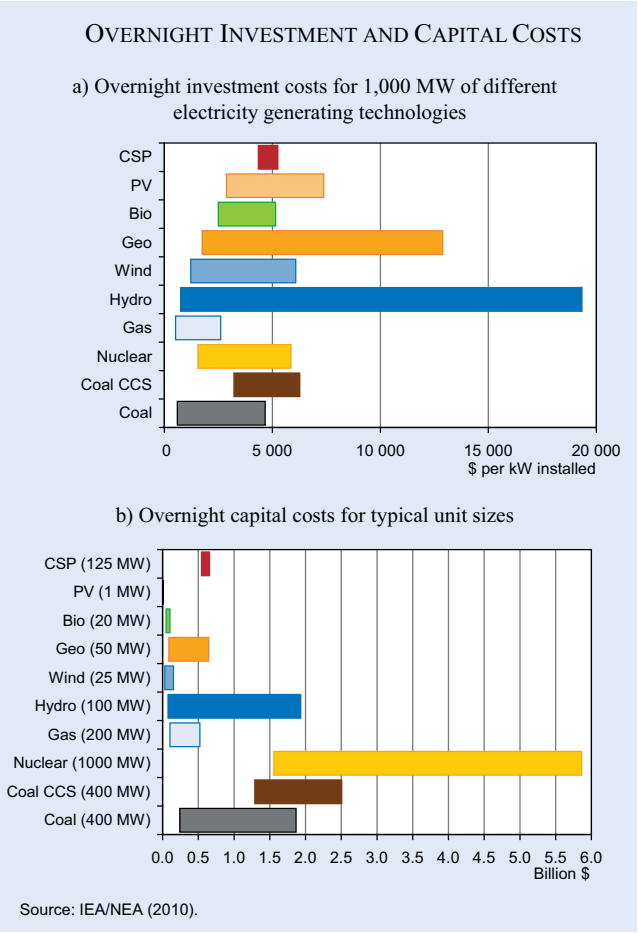
* IIASA Austria / KTH Sweden.

[1] The UN Commission on Sustainable Development (CSD) was established to oversee the implementation of Agenda 21, the principal outcome document and action plan of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, 1992.

- High security of energy supply
- Low local/regional air pollution
- Low greenhouse gas (GHG) emissions
- Low threat to biodiversity & human health/security
- Competitive generating costs
- Low material intensity (3R= reduce, reuse, recycle)
- Low resource depletion
- Low waste volumes
- Low noise/ visual pollution
- Low land requirements
- High innovation potential

According to these criteria, nuclear energy could well qualify as a green energy technology. However, many oppose nuclear energy because of its long-lived radioactive waste, the risk of severe accidents with long-term impacts, weapons proliferation concerns, and its lack of public acceptance. Table 1 summarizes the principal arguments that have been brought forward in past and on-going debates.

Figure 1



Economics

The economics of nuclear power are characterised by large up-front capital costs, but low and stable fuel and operating costs. The investment in a nuclear power plant can amount to several billion dollars (USD two – eight billion depending on its design, location, finance, etc.) for a typical 1,000 MW

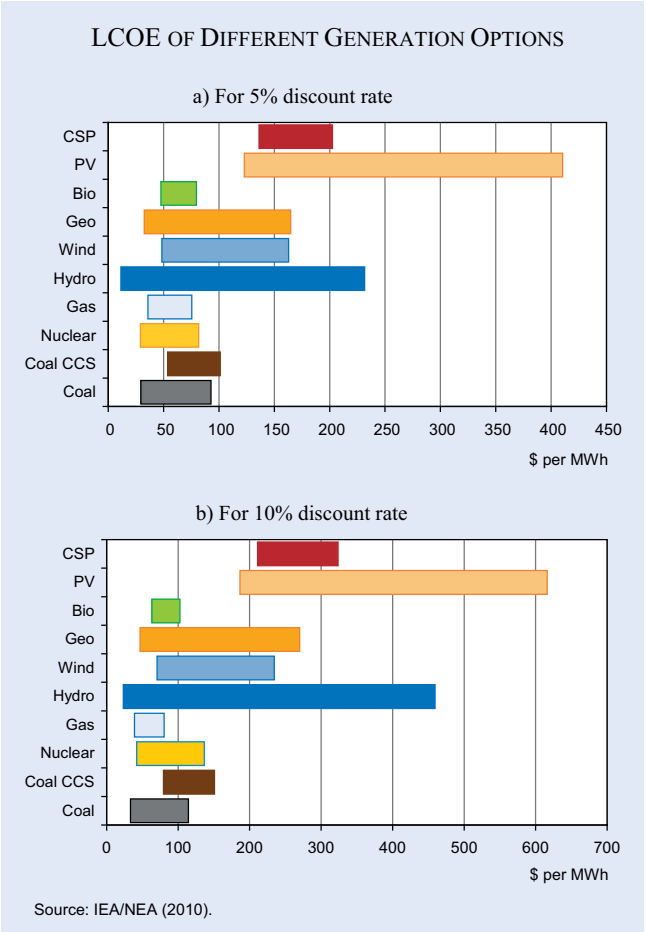
Table 1

Pros and cons of nuclear power as a technology to support green growth

Arguments against nuclear power	Arguments in favour of nuclear power
Nuclear power is unsafe and its risks are excessive – it can never be made safe enough	Nuclear power on a life cycle basis has an excellent safety record compared with the alternatives
Diverts attention from energy efficiency and renewables	Expands electricity supplies ("connecting the unconnected")
No solution for climate change mitigation, especially in the short run	Reduces harmful emissions, including greenhouse gases
Trans-boundary consequences and issues related to transport of spent fuel	Enhances energy security
Lacks economic basis – too expensive and always depends on subsidies	Competitive supplier of base-load electricity at stable and predictable generating cost
Nuclear weapons proliferation	Increases human and technological capital
High externalities	Ahead in internalising externalities
Uranium resources last only a few decades	Nuclear power decoupled from any resources constraints – no alternative uses for uranium
No long-term solution to high level nuclear waste	Wastes are manageable
Lacks public acceptance	Keeps options open for future generations

Source: The author.

Figure 2



Source: IEA/NEA (2010).

nuclear power plant, which accounts for some 60–75 percent of total generation costs.

Figure 1 summarizes the overnight investment cost (OC) data, i.e., without interest during construction (IDC), of the OECD study "Projected Costs of Generating Electricity – 2010 Update" (IEA/NEA 2010).

Figure 1a shows a large overlap and spread of specific investment costs for different energy supply technologies, typically explained by varying local conditions, technology designs, as well as regulatory and environmental constraints. The lower boundary represents the conditions in large developing countries such as China and India, while higher prices reflect particularly challenging site conditions in OECD countries.

On a per unit size, nuclear power investment exceeds that in its alternatives considerably. Smaller unit projects are easier to finance, especially for utilities with low capitalization. Small grid sizes in developing countries limit the integration of presently commercially available designs of 1,000 MW or more per unit. In the future, the commercialization of small and medium sized nuclear power plants of 100 to 600 MW per unit might ease financing and their integration into national power grids.

Long-run marginal generating costs accounting for OC, interest during construction (IDC), fuel, operating and maintenance costs, as well as waste management and decommissioning costs are often used to rank investment alternatives. Figure 2 shows the ranges of the levelized costs of electricity (LCOE) generation for real discount rates of five and ten percent per year.[2]

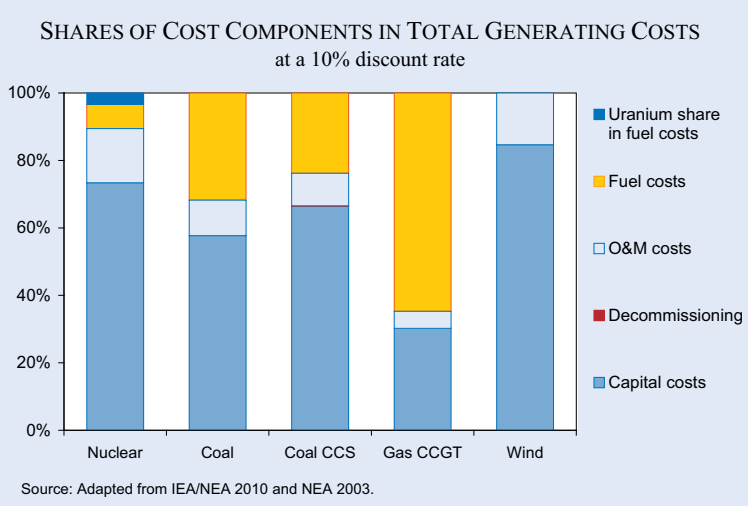
The LCOE range for nuclear power coincides with that of most competing technologies. Furthermore, any greenhouse gas emission policy, e.g., carbon taxes or emissions caps, further improves the competitiveness of nuclear power. Nuclear power offers stable and predictable generating costs. Uranium accounts for about five percent[3] of nuclear generating costs (Figure 3), and unlike coal and natural gas fired electricity generation, a doubling of resource prices hardly affects the total generating costs of nuclear power (Rogner 2010). The decommissioning costs in Figure 3 are not discernible either because they are very low in actual terms (as in the case of wind), or are incurred so far in the future (e.g., 80 or more years for nuclear power) that discounting makes them quasi invisible.

Energy security

Nuclear energy enhances energy security. Its low fuel volumes allow for easy stock-piling, i.e., the on-site storage of uranium for the entire life time of the plant. Long-refuelling cycles of 18 to 24 months plus the practice of on-site storage of fuel elements for one refuelling event provides sufficient time to seek alternate suppliers in case the original supplier defaults on contractual arrangements.

[2] The OECD study uses harmonized technology performance assumptions and boundaries, as well as clearly specified fuel prices, decommissioning and waste management costs for the LCOE calculations.
[3] The full nuclear fuel cycle costs include enrichment, fuel element fabrication and spent fuel management (in addition to the uranium costs).

Figure 3



Uranium reserves and resources are abundant and available. Figure 4 shows the recent development of identified uranium resources and the geographical distribution for 2011. Present uranium resources are sufficient to fuel existing reactors for more than 90 years, and if all conventional uranium occurrences are considered, for almost 200 years. The reprocessing of spent fuel and the recycling of unspent uranium and plutonium doubles the reach of each category (see next section on 'Making nuclear energy even more compatible with green growth'). Fast breeder reactor technology can further increase uranium utilization 50-fold or even more.

In addition to conventional uranium occurrences, enormous low and lowest concentration (unconventional) occurrences also exist. Phosphates, carbonite, non-ferrous ores, lignite and black schists contain an estimated 17 million tonnes uranium (tU). Low concentration occurrences are widespread in many rocks and in seawater. The total mass of uranium in seawater is enormous and amounts to about 4,500 million tU.

Nuclear operating safety

The essence of nuclear operating safety is the protection of the population, workforce and the environment from ionized radiation. Operating safety is thus the highest priority for nuclear power plant design and operation. As a result, the radiation from normal operation of nuclear power plants are insignificant compared with the average radiation exposure from natural and other anthropogenic sources (UNSCEAR 2010).

Nuclear power and fuel cycle facilities contribute an estimated two µSv per person per year to the average global radiation exposure of 2,420 µSv per year – between 1,000 and 13,000 µSv depending on location (UNSCEAR 2010; WHO 2012). Diagnostic medical examinations (X-rays) contribute some 400 µSv per year.

In the event of a severe nuclear accident, however, surface radioactive concentrations in the plant vicinity can be high and can last for years or decades. In areas further away, agricultural production and fishing may need to be temporarily suspended. However, non-radiation impacts can be significantly larger than radiation impacts. For example, the severest consequences of the Chernobyl accident were social in nature and are not directly radiation related (Gerasimova 2008). Most of the 335,000 evacuees from villages around Chernobyl

Figure 4

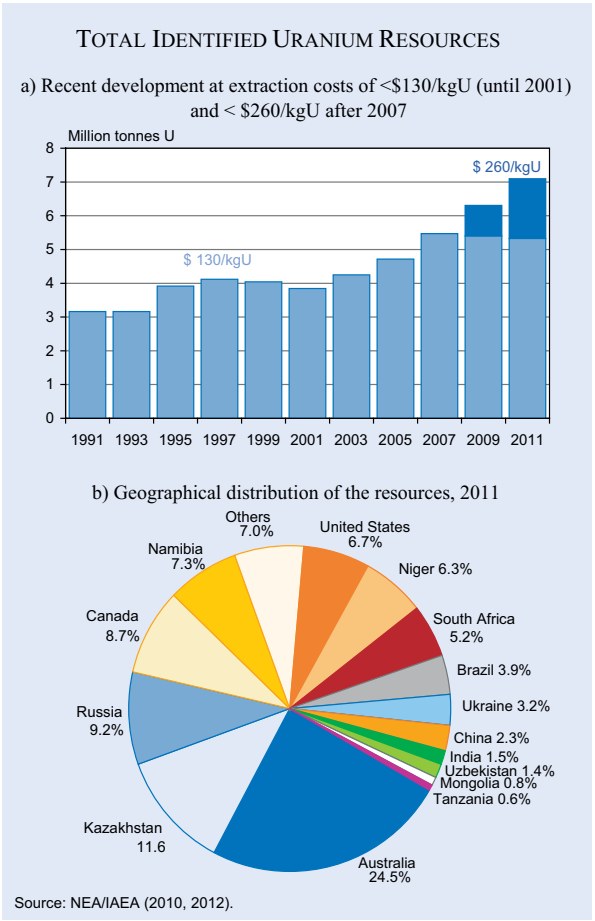


Table 2

Total life cycle material requirements for selected materials

	Iron kg per GWh	Copper kg per GWh	Bauxite kg per GWh	Concrete m^3 per GWh
Hard coal	2,700	8	30	22.8
Lignite	2,314	8	19	na
Gas combined cycle	1,239	1	2	3.9
Nuclear (PWR)	457	6	27	17.2
Wood CHP	934	4	18	na
PV 5 kW poly	4,969	281	2,189	
Wind 1.5 MW at 5.5 m/s	2,066	52	35	99.3
Wind 1.5 MW at 4.5 m/s	4,471	75	51	na
Hydro 3 MW	2,700	8	30	na

Source: Peterson, Zhao and Petroski (2005); Voss (2009).

did not return to their original homes and suffered from depression and stress related difficulties (Simmons 2012).

The Three Mile Island accident resulted in the release of minute amounts of radioactive gases with inconsequential health and environmental impacts (UNSCEAR 2011). In contrast, the Chernobyl and Fukushima Daiichi accidents released large amounts radioactive materials with significant social, economic and environmental consequences. However, there have been no radiation related fatalities in the Fukushima Daiichi accident (UNSCEAR 2012). The latest analyses estimate the long-term fatalities associated with the Chernobyl accident at cumulative 4,000 to 10,000 late life cancer deaths.[4] More fatalities per year are recorded in other industries like, mining, coal, oil and hydro power (Burgherr, Eckle and Hirschberg 2011).

Nuclear energy and the environment

Resource utilization

The rational use of resources is closely related to the 3R (reduce, reuse, recycle) principles. An important aspect of resource utilization is the high energy density of uranium relative to fossil fuels. High density means low resources and waste volumes. Resource utilization can be maximized (and volumes of high level radioactive waste minimized) through the reprocessing of spent nuclear fuel – a first step towards a 3R compatible resource utilization strategy. Unlike the once through fuel cycle (OTC) where all of the spent fuel is eventually disposed of in a geological repository, the reprocessing fuel cycle (RFC) extracts the plutonium generated during operation and unused uranium from the spent fuel. The reprocessed fissile material is recycled into new fuel, which reduces fresh uranium requirements. RFC reduces the volume of high level radioactive waste (HLW) requiring geological disposal drastically (i.e., by > 90 percent) compared to the OTC and improves the rate of resource utilization by a factor of two to over 60 depending on the reactor technologies involved (see next section).

Materials requirement

Power plant construction is material intensive and the evaluation of construction material inputs is central to the lifecycle assessments of nuclear and other non-fossil energy systems. Table 2 shows the total life cycle requirements for selected materials. The material quantities per technology are location dependent, especially for concrete requirements. Except for natural gas combined cycle plants, nuclear power has the lowest material intensity.

Interaction with the environment

Greenhouse gas emissions

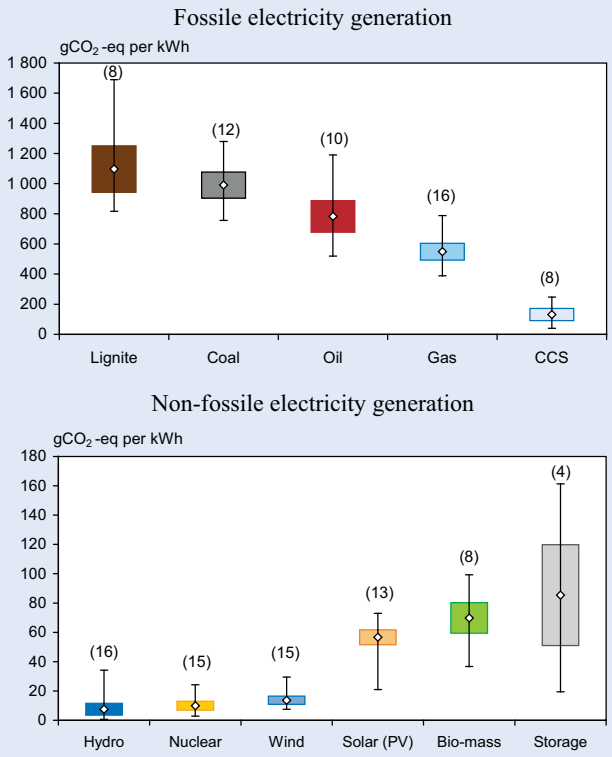
The full technology chain for nuclear energy includes uranium mining (open pit or underground), milling, conversion, enrichment (diffusion or centrifuge),

[4] Today, uncertainty remains about future mortalities due to the long latency periods for many cancers; however cancer deaths in Chernobyl affected regions are expected to be similar to non-Chernobyl controls (Simmons 2012).

fuel fabrication, power plant construction and operation, reprocessing, conditioning of spent fuel, interim storage of radioactive waste, and construction of the final repositories. On a life cycle basis, the nuclear chain emits between 2.8 and 24g CO_2-equivalent/kWh (Weisser 2007). The bulk of greenhouse gas emissions arise from plant construction (emissions from cement and material production and component manufacturing). Figure 5 shows that nuclear power, together with hydropower and wind based electricity, is one of the lowest emitters of GHGs in terms of g CO_2-eq. per unit of electricity generated on a life cycle basis (IPCC 2007, 2011)

Figure 5

LIFE CYCLE GHG EMISSIONS OF DIFFERENT ELECTRICITY GENERATION OPTIONS



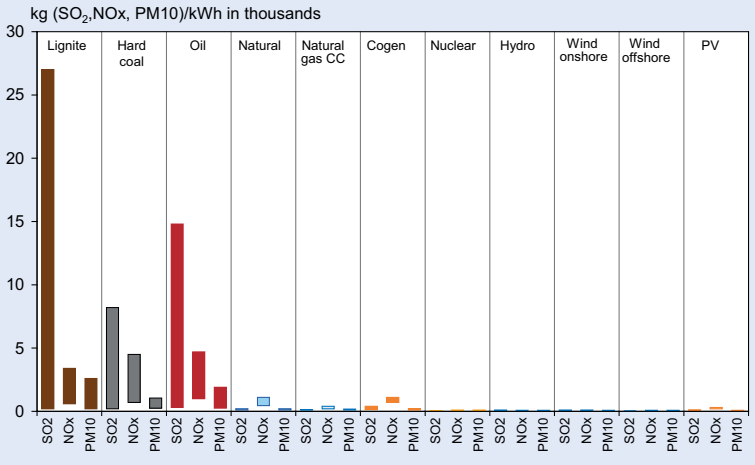
Source: Weisser (2007).

Other pollutant emissions

Nuclear power plants can also avoid emissions of other non-GHG air pollutants associated with negative health and environmental impacts on local and regional scales. Nuclear power plants (as well as renewable technologies) emit virtually no air pollutants like nitrogen oxides (NO_x), sulphur dioxide (SO_2) or particulate (PM10) emissions during operation (Figure 6). By contrast, fossil-based power plants are major contributors to air pollution, and result in local poor air quality, haze, limited visibility and reduced sunlight. The World Health Organization (WHO) has estimated that air pollution causes approximately two million premature deaths worldwide each year (WHO 2008).

Figure 6

AIR POLLUTANTS FROM SELECTED ENERGY CHAINS



Source: Adapted from NEA (2007).

Solid waste

All electricity generation technologies generate waste – fuel and material extraction, fuel preparation, equipment manufacturing, plant construction, plant operation and decommissioning in one way or another generate by-products and wastes. These wastes can vary widely for different electricity chains in terms of volumes per kWh, toxicity and longevity.

The nuclear chain produces waste of varying levels of radiotoxicity. Low (LLW) and intermediate level wastes (ILW) account for some 97–98 percent of the total volume, but only approximately eight percent of total radioactivity. LLW and ILW arise mainly from routine facility maintenance and operations, as well as fuel cycle activities and range from just above nature's background level to

slightly elevated levels. Disposal of LLW and ILW has been practiced safely for decades in many countries using engineered surface facilities, shallow and intermediate depth facilities (IAEA 2009a).

It is the high level waste (HLW) that is the topic of debate. HLW is either spent nuclear fuel or separated waste from reprocessing spent fuel. Globally, nuclear power plants combined produce approximately 10,000 m^3 HLW per year. This would cover the size of a soccer field to a depth of 1.5 meters (Commonwealth of Australia 2006). HLW accounts for two to three percent of total nuclear radioactive waste, but presents particular challenges due to its radiotoxicity and longevity (IAEA 2004).

Although to date no repository accepting civilian nuclear HLW is in operation, the nuclear industry has practiced the safe temporary surface storage of spent fuel for more than half a century. Over the last two decades, however, major advances towards the first operating disposal facility have been accomplished. Sweden and Finland have the most advanced spent fuel management programmes with sites selected with full participation of the surrounding communities. Other countries (e.g. France, Canada) have set out timetables for developing geological disposal facilities.

It should be noted that long-lived toxicity is not unique to radioactive waste; other forms of hazardous waste, such as mercury, will retain their toxicity forever and will thus require indefinite isolation. Although small in comparisons to its total waste, PV cell manufacturing generates some amounts of toxic and hazardous wastes with necessary confinement of thousands of years (ENEF 2010).

Internalizing external costs

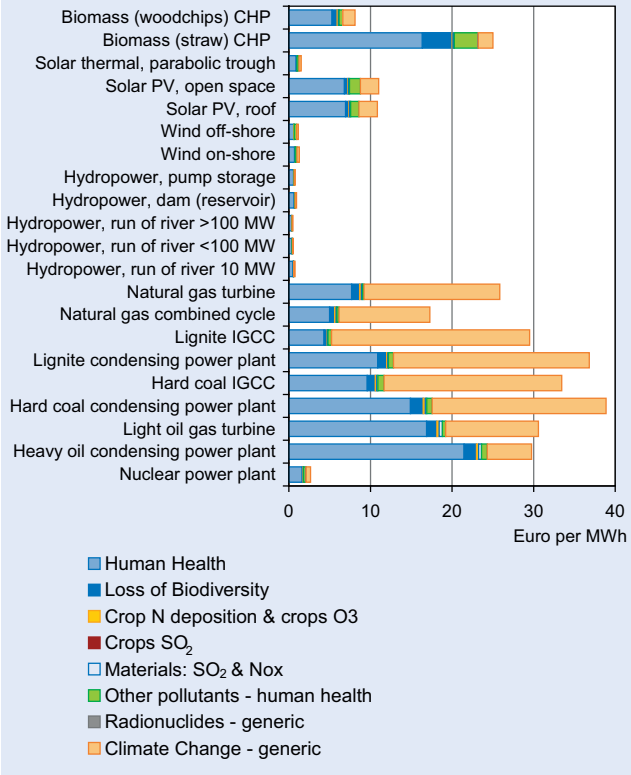
Externalities arise when an economic agent enjoys benefits or imposes costs without having to make a payment for doing so. The adverse health and environmental damages (hidden costs) caused by fossil sourced electricity generation or damage costs by severe nuclear accidents and that are not compensated by the producer are negative externalities. Factoring external costs into the market price of electricity ("internalization") would necessarily result in higher prices (imposing a carbon tax per tonne of CO_2 emitted as a proxy for damages caused by climate change would, for example, reduce the attractiveness of fossil-fuelled generating technologies). It would send correct pricing signals to the market place, thus changing the merit order of investment and operating decisions, as well as reducing demand and emissions with subsequent lower externalities.

Several studies have attempted to quantify externalities, most of which focus on electricity generation (EU 2003; NRC 2009; Ricci 2010). The latest systematic analysis of external costs of various electricity supply technologies and their associated chains is available from European Commission's CASES[5] project (Markandya, Bigano and Porchia 2011). The CASES project estimated monetized externalities due to: (1) climate change; (2) human health impacts, biodiversity loss, crops, and materials of familiar air pollutants; (3) health impacts of heavy metals; and (4) health impacts of radionuclides.

[5] Cost Assessment for Sustainable Energy System (CASES).

Figure 7

AVERAGE EXTERNAL COSTS FOR THE EUROPEAN UNION (EU27)



Source: EU CASES Project (Markandya et al. 2011).

Figure 7 shows the estimated average monetized external costs (on a life-cycle basis) in the EU over the period 2005–2010 for a range of electricity generation technologies.

Human health impacts due to classic air pollutant emissions and the adverse consequences from greenhouse gas emissions dominate the external costs across all technologies. Through safety and environmental regulations, the nuclear industry is ahead in internalizing costs and thus compares well with its alternatives.

Making nuclear energy even more compatible with green growth

The future development of new generation nuclear energy systems is influenced by economics, safety, proliferation resistance and environmental protection, including improved resource utilization and reduced waste generation (while drastically shortening the time span until radiation levels reach natural background levels).

Increased safety

Enhancing by design the defence-in-depth of future nuclear reactors through a combination of active and passive safety systems mitigates the risk of severe accidents by at least an order of magnitude as compared to existing designs. The ultimate target is to limit relocation or evacuation measures to within the plant perimeter in the case of a severe accident.

Addressing 3R principles in long-term reactor and fuel cycle strategies

Currently, nuclear reactors use some 67,000 tU annually and generate some 11,000 t of heavy metal as spent fuel. It is the six percent of non-uranium constituents that constitutes HLW and requires long-term isolation from the biosphere. HLW accounts for over 90 percent of the radiotoxicity of spent fuel. It also needs cooling because fission products generate a significant amount of heat during the initial several hundred years. Short-term risks are due to the mobility of spent fuel in the geosphere and the possibility of it entering the biosphere, while the long-term hazard of spent fuel and HLW is the longevity of actinides (IAEA 2004).

Great progress has been made in terms of understanding and delineating suitable underground repositories. These engineered or natural barriers provide for the isolation and containment of radioactive waste, allowing time for radioactive decay such that any eventual release of radioactivity back to the surface environment will be comparable to releases from natural rock formations and insignificant to adverse effects on health and the environment (NEA 2008). However, the total confinement of radiotoxic materials in human-made structures beyond 10,000 years cannot be guaranteed (IAEA 2004). Reducing or eliminating long lived radionuclides, therefore, has been an area of intensive R&D, especially as waste management remains one of the biggest challenges to public acceptance.

Reprocessing spent fuel is a first step towards a 3R waste management strategy. Unlike once through fuel cycles (OTC), where all spent fuel is eventually disposed of in a geological repository, the reprocessing fuel cycle (RFC) extracts plutonium and unused uranium from spent fuel. RFC reduces the volume of HLW requiring geological disposal drastically by > 90 percent compared to OTC[6]. 99.9 percent of the uranium and plutonium is recovered. The HLW then contains only fission products and minor actinides, including a very minor fraction of the unrecovered major actinides. When plutonium and uranium are removed, the radiotoxicity falls below that of natural uranium ore within approximately 9,000 years (Figure 8).

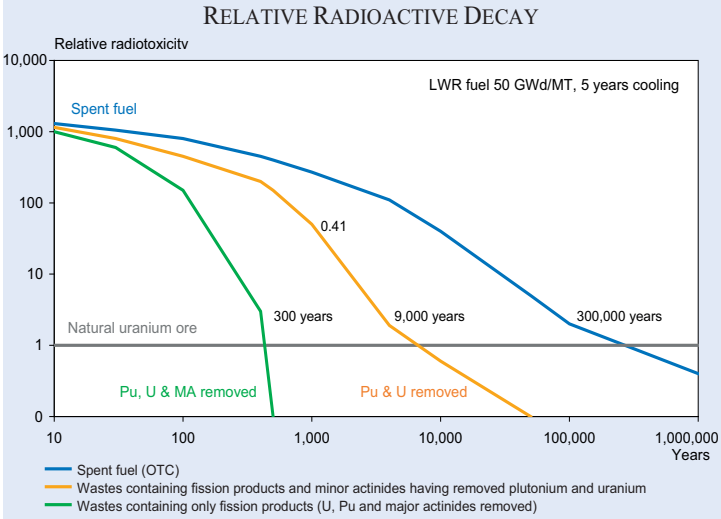
Recovered uranium and plutonium can be fabricated into new reactor fuel (e.g., mixed oxide fuel (MOX) – fuel consisting of recycled uranium and plutonium, as well as of fresh uranium) for use in conventional light water reactors. As a co-benefit, the 3R waste management strategy would reduce fresh uranium requirements, further reducing mining and its associated impacts. The use of MOX fuel in thermal reactors doubles increases the uranium utilization efficiency by a factor of two (IAEA 2009b).

Compared with OTC, reprocessing in combination with advanced breeder technology and closed

[6] Reprocessing increases the amounts of low level wastes (LLW) and intermediate level wastes (ILW). LLW and ILW have been stored safely for more than half a century in many countries around the world. Usually LLW is packaged in steel drums and stored in near surface facilities. ILW is typically packaged for disposal by encapsulation in highly-engineered steel or concrete containers and deposited in intermediate depth facilities such as abandoned mines or intentionally excavated facilities.

nuclear fuel cycles (CNFC) would boost overall resource utilization by a factor of 60–70 with corresponding reductions in HLW generation (and disposal requirements). The fast breeder reactor (FBR) generates more fissile material by converting the non-fissile isotope U238 of natural uranium into fissile plutonium, which can be reprocessed to make more fuel. Non-fissile U238 is 140 times more abundant than fissionable isotope U235, effectively decoupling FBRs from fuel resource constraints.

Figure 8



Source: Royal Society (2011).

Nuclear waste management and safeguards would be further simplified if fissile material and actinides could not only be removed from spent fuel (as in CNFC), but also destroyed through 'partition and transmutation' (P&T) technologies (Royal Society 2011), i.e., by separating the long lived elements plutonium, uranium, minor actinides and long-lived fission products from the spent fuel (partitioning) and converting (transmutation) them into shorter-lived or stable and harmless isotopes. In essence, partitioning is an extension to other radionuclides of the current reprocessing techniques, a kind of 'super reprocessing' or individual isotopic separation.

Transmutation is the conversion of one chemical element or isotope to another. Natural transmutation occurs when radioactive elements decay over a period of time, transforming into eventually stable elements. Artificial transmutation involves irradiating actinides in nuclear reactors with fast neutrons, which decreases their intrinsic radiotoxicity by a factor of 100–1,000 (IAEA 2004). The radiotoxicity of the remaining waste then declines substantially over only a few hundred years (Figure 8), almost allaying concerns about radioactive leaching into the biosphere. P&T is at a very early stage of development and not expected to be deployable on an industrial scale for several decades.

Nevertheless, even with integrated P&T, some radioactive isotopes will always accompany the bulk of the fission products. Whichever strategy is followed, a repository for radioactive waste will need to be established, whether through direct disposal, reprocessing or P&T (Widder 2010; IAEA 2009a).

Concluding remarks

Energy is an essential component of green growth – there is no growth without energy, green or otherwise. Energy in the context of green growth must satisfy several criteria including but not limited to: the efficient use of natural resources, affordability, access, the prevention of environmental degradation, low health impacts and high energy security. Although nuclear energy appears to be largely compatible with most criteria for green energy, perceptions differ widely concerning its benefits and risks for green growth.

Nuclear power can be competitive in some markets and existing nuclear plants are often the lowest cost base-load generators on the grid. Its long-run marginal competiveness depends on investors' time horizons and risk averseness. Liberalized markets characterized by short-run shareholder value maximization are less likely to adopt a technology with high upfront capital costs and long amortization periods than in markets where investors take a longer-term perspective; where energy security concerns allow for an insurance premium; where investors value predictable and stable generating costs; or where nuclear energy's climate and environmental benefits are visible to investors.

[7] Development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN 1987).

Nuclear power expands the supply options for present and future generations and is consistent with the Brundtland definition of sustainable development[7]. Future generations should have the right to decide for themselves about the suitability of the technology to meet their needs. From a resource perspective, nuclear power holds the potential to decouple itself from long-term resource limitations. On a life cycle basis, nuclear power has low externalities, lower than those of fossil fuel chains, and comparable with the electricity chains of many renewables.

Today's technology is not tomorrow's. As with all technologies, innovation and R&D in the nuclear field will lead to progressively higher safety margins and improved economics in new reactors. However, absolute safety is a myth – accidents will happen, which is one profound lesson learned from the Fukushima Daiichi accident. While the social, psychological and economic damages of the accidents are enormous, not a single person has died from radiation caused by the Fukushima Daiichi plant and long-term radiation-related health effects from the accident will not be statistically notable.

If the Chernobyl accident is any indication, the Fukushima Daiichi accident will certainly lead to the further strengthening of stringent safety measures and regulatory schemes. It can also be expected that probabilistic safety assessments will increasingly be complemented by beyond-design based deterministic approaches.

When judging nuclear power on its green growth merits, one should be aware that there is no technology without risks and interaction with the environment. Fossil fuel chains cause tens of thousands of deaths every year and contribute to climate change. While wind, solar and nuclear energy have quasi no interaction with the environment at the point of electricity generation, there are emissions and wastes associated with material extraction, manufacturing and construction and, in the case of nuclear, with the front and back-end of the fuel cycle. It is therefore imperative to compare all options on a level playing field. Some societies may well view the risks as excessive and shy away from nuclear energy. Other societies will continue to adopt or expand its use as an integral part of their national green growth strategies.

References

Burgherr, P., P. Eckle and S. Hirschberg (2011), *Final Report on Severe Accident Risk including Key Indicators,* SECURE Deliverable no. 5.7.2a, Security of Energy Considering its Uncertainty, Risk and Economic Considerations (SECURE), Brussels.

ENEF (2010), *Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis,* Part 1: Strengths & Weaknesses, Document by the Working Group Opportunities, Subgroup on Competitiveness of Nuclear Power, European Nuclear Energy Forum, Luxembourg.

EU (2003), *External Costs – Research Results on Socio-Environmental Damages Due to Electricity and Transport,* EUR 20198, Brussels.

Gerasimova, N. (2008), "Long Term Consequences of the Chernobyl Catastrophe and Remediation Programs in the Russian Federation", proceedings of the *International Conference on Chernobyl: Looking Back to Go Forward* organized by the International Atomic Energy Agency, Vienna.

Commonwealth of Australia (2006), "Australia's Uranium ¬ Greenhouse Friendly Fuel for an Energy Hungry World. A Case Study into the Strategic Importance of Australia's Uranium Resources for the Inquiry into Developing Australia's Non-Fossil Fuel Energy Industry", House of Representatives, Standing Committee on Industry and Resources, Canberra.

IAEA (2004), "Implications of Partitioning and Transmutation in Radioactive Waste Management", *Technical Reports Series* no. 435, International Atomic Energy Agency, Vienna.

IAEA (2009a), "Classification of Radioactive Waste – General Safety Guide", *IAEA Safety Standards Series* no. GSG-1, International Atomic Energy Agency, Vienna.

IAEA (2009b), *Status and Trends of Nuclear Technologies*, Report of the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO), International Atomic Energy Agency, Vienna.

IEA/NEA (2010), *Projected Costs of Generating Electricity 2010,* OECD Publishing, Paris.

IPCC (2007), *Climate Change 2007: Mitigation, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge and New York.

IPCC (2011), *Special Report on Renewable Energy Systems and Climate Change*, IPCC Working Group III - Climate Mitigation, Cambridge University Press, Cambridge and New York.

Markandya A., A. Bigano and R. Porchia, eds. (2011), *The Social Cost of Electricity: Scenarios and Policy Implications - Private and External Costs Assessment, Policy Implication and Scenarios for the EU and Selected Non-EU Countries*, Edward Elgar Publishing, Cheltenham. Associated data files available on the CASES project web-site: http://www.feem-project.net/cases/downloads_presentation.php.

NEA (2003), *Nuclear Energy Today, Nuclear Development*, OECD Publishing, Paris.

NEA (2007), *Risks and Benefits of Nuclear Energy, Nuclear Development*, OECD Publishing, Paris.

NEA (2008), *Nuclear Energy Outlook 2008*, OECD Publishing, Paris.

NEA/IAEA (2010), *Uranium 2009: Resources, Production and Demand*, Joint Report prepared by the OECD Nuclear Energy Agency and the International Atomic Energy Agency, OECD Publishing, Paris.

NEA/IAEA (2012), *Uranium 2011: Resources, Production and Demand*, Joint Report prepared by the OECD Nuclear Energy Agency and the International Atomic Energy Agency, OECD Publishing, Paris.

NRC (2009), *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*, National Academy of Sciences, Washington, D.C.

OECD (2011), *Towards Green Growth*, OECD Publishing, Paris.

Peterson, P. F., H. Zhao and R. Petroski (2005), *Metal and Concrete Inputs for Several Nuclear Power Plants*, Report UCBTH-05-001, University of California, Berkeley.

Rogner, H.-H. (2010), "Nuclear Power and Sustainable Development", *Journal of International Affairs* 64 (1), 137–63.

Ricci, A. (2010), *Policy Use of the NEEDS Report*, Final integrated report Deliverable no 5.3 – RS In New Energy Externalities Developments for Sustainability (NEEDS).

Royal Society (2011), *Fuel Cycle Stewardship in a Nuclear Renaissance*, The Royal Society Science Policy Centre Report 10/11, London.

Simmons, P. (2012), "The 25th Anniversary of the Chernobyl Accident", *Business, Economics and Public Policy Working Papers* no 2012-1, University of New England, Armidale.

UN (1987), *Report of the World Commission on Environment and Development: Our Common Future,* Transmitted to the General Assembly as an Annex to Document A/42/427, New York.

UN (2001), *Report on the Ninth Session (5 May 2000 and 16–27 April 2001)*, Economic and Social Council Official Records, 2001, Commission on Sustainable Development, New York.

UNEP (2010), *Green Economy: Developing Countries Success Stories*, United Nations Environmental Programme, Economics and Trade Branch, Geneva.

UNSCEAR (2010), "Sources and Effects of Ionizing Radiation", *UNSCEAR 2008 Report* (1), United Nations, New York, http://www.unscear.org/unscear/en/publications/2008_1.html (accessed 7 October 2010).

UNSCEAR (2011), "Sources and Effects of Ionized Radiation", *UNSCEAR 2008 Report* (2), Annexes C, D and E, United Nations, New York.

UNSCEAR (2012), UNSCEAR Assessment of the Fukushima-Daiichi Accident, Background Information for Journalists, 23 May 2012, http://www.unis.unvienna.org/pdf/2012/UNSCEAR_Backgrounder.pdf (accessed 29 October 2012).

Voss, A. (2009), "Life Cycle Analysis for Different Energy Sources", paper presented at the Symposium *Energy 2050*, Stockholm, October.

Weisser, D. (2007) "A Guide to Life-Cycle Greenhouse Gas (GHG) Emissions from Electric Supply Technologies", *Energy* 32 (9), 1543–59.

WHO (2008), Air Quality and Health, Fact Sheet No. 313, Geneva, http://www.who.int/mediacentre/factsheets/fs313/en/index.html.

WHO (2012), *Preliminary Dose Estimation from the Nuclear Accident after the 2011 Great East Japan Earthquake and Tsunami,* Geneva, http://www.who.int/ionizing_radiation/pub_meet/fukushima_dose_assessment/en/index.html (accessed 2 August 2012).

Widder, S. (2010), "Benefits and Concerns of a Closed Nuclear Fuel Cycle", *Journal of Renewable and Sustainable Energy* 2 (6).

Emissions Trading and Energy Policy – Worldwide Trends and Current Problems

Niklas Lüder Barre*,
Marc Gronwald** and
Jana Lippelt**

The reduction in global greenhouse gas emissions, and especially CO_2 emissions, required to fight climate change has been a top priority on the political agenda for some time. The introduction of a global emissions trading system is still considered to be the most effective way of reducing global CO_2 emissions. Such a system effectively limits the emission of CO_2 and also ensures that the reduction of CO_2 emissions is cost-effective. Ultimately, it is also much easier to implement politically than alternative measures like the direct taxation of CO_2 emissions. The most influential system of this type is currently the European Emission Trading System (EU ETS), which accounts for around 50 percent of CO_2 emissions in Europe.

Since the power sector is the most important sector in the EU ETS – a good 40 percent of emissions covered by this system come from this sector – climate policy is also simultaneously energy policy. This implies that any direction set in terms of climate policy has a significant influence over the fuel sources – fossil, nuclear energy and renewable energy – used to generate energy. On the other hand, however, it also means that measures that taken with a view to increasing supply security or the economic efficiency of power generation are also to be constantly considered from a climate policy perspective.

There is certainly a long way to go on the road to a worldwide emission trading system. It is encouraging, however, to see that a growing number of countries and/or regions are introducing or contemplating the introduction of this type of system. At the same time, it is nevertheless clear that there is still room for improvement as far as the smooth functioning of the EU ETS is concerned. This article summarises worldwide trends and examines the current problems with the EU ETS.

Figure 1 clearly illustrates that there are currently several independent trading systems in Europe, North America, New Zealand and Japan.[1] These systems differ in terms of their size and design, but all share the universal goal of reducing CO_2 emissions.

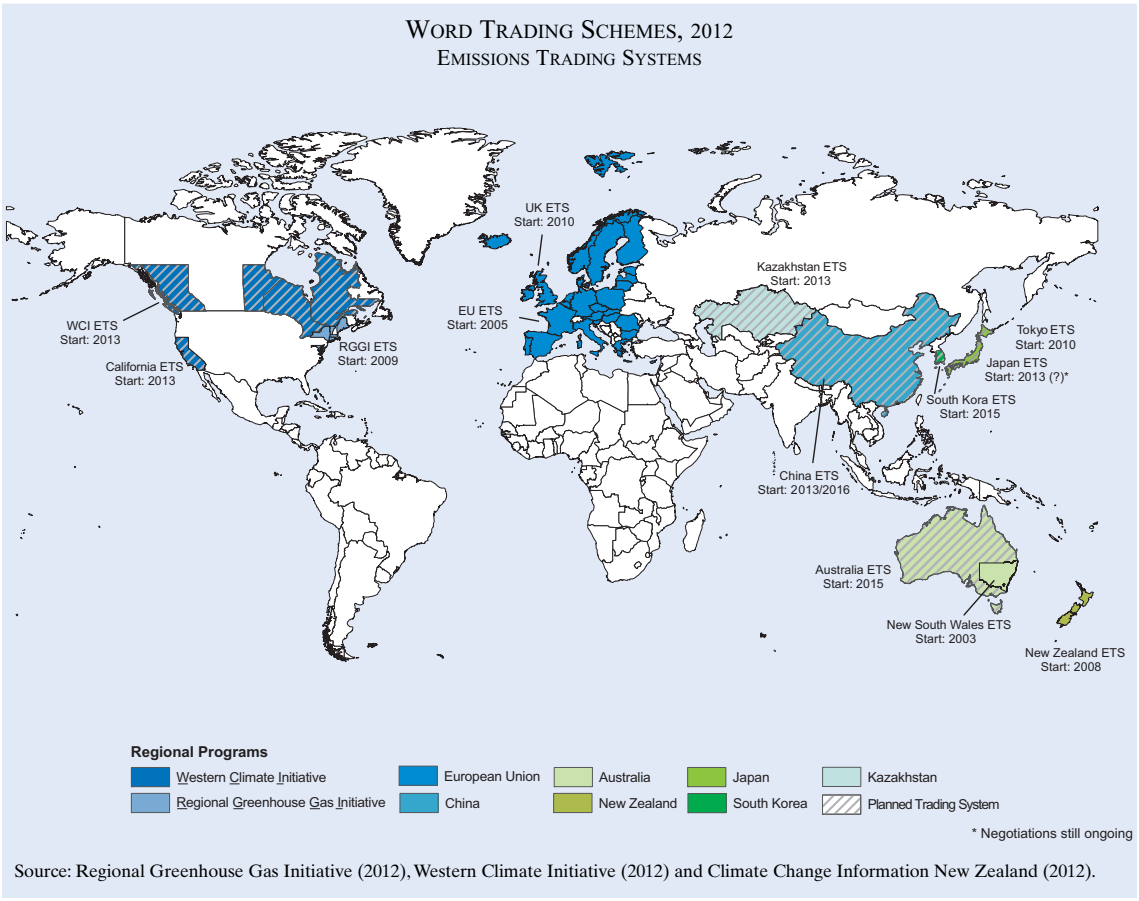
The EU ETS is by far the biggest active emissions trading system. It was founded in 2005 and covers Iceland, Liechtenstein and Norway in addition to the 27 EU states. In the USA efforts are currently concentrated on a regional level with the Regional Greenhouse Gas Initiative (RGGI), which took effect as of 2009. RGGI is a union of eight states from the North East of the USA, which have set up a common emissions trading system. Other regions that already have legally binding systems include New Zealand (NZ ETS), Australia (NSW Greenhouse Gas Reduction Scheme), Japan (Tokyo and Suitama) and the UK (CRC Energy Efficiency Scheme; covers organisations that are not part of the EU ETS).

The introduction of further systems is either in the pipeline or about to take place in various locations across the world. The Western Climate Initiative (WCI), which consists of California and four Canadian provinces, is planning to introduce a trading system in 2013. An internal system is also soon to be launched in California. Pilot projects will also be set up next year in seven provinces of China, which should be expanded to form a national system by 2016. National trading systems are planned for 2015 in both Australia and South Korea. Other countries like Mexico and Brazil, for example, are also cur-

* Maastricht University.
** Ifo Institute.

[1] The authors would like to thank Peter Heindl for his assistance with drafting this overview. Further information on this topic is also available in CESifo-DICE-Database for Institutional Comparisons in Europe.

Figure 1



Source: Regional Greenhouse Gas Initiative (2012), Western Climate Initiative (2012) and Climate Change Information New Zealand (2012).

rently attempting to create the institutional and legal framework conditions required to set up trading systems. At the end of August it was announced that the EU ETS will link up to the Australian trading system as of 2015.[2] It has been specifically agreed that only certificates from the EU ETS can be transferred to Australia initially. As of 2018 this link should be completed and a transfer should be possible in both directions.

Links between emission trading systems are fundamentally positive, since they make it possible to exploit the cheap CO_2 emission reduction measures that exist in the various regions of the world more effectively, and thus to increase cost efficiency – see for example Edenhofer, Flachsland and Marschinski (2007). Moreover, in a recent investigation Grüll and Taschini (2012) show that the systems to be linked up must be sufficiently similar to enable full exploitation of this potential. Constraints in this respect could take the form of restrictions on the number of certificates that can be transferred from one system to another. This kind of constraint can be introduced so that measures to reduce CO_2 emission are not only implemented abroad, but that incentives are also created to make similar efforts domestically. A further constraint on complete price convergence between two linked systems can be the introduction of price floors and ceilings, which can be introduced to reduce uncertainty regarding fluctuations in certificate prices, for example.

Such links can only be seen as constructive in terms of creating a worldwide emissions trading system. In this respect the largest existing trading system at present, namely the EU ETS, can be seen as a model. This is precisely why the current condition of the system gives cause for concern as it seems in a position to lastingly erode confidence in emissions trading as a policy instrument. The focus at the moment is on the excessively low price of certificates, which has been hovering for some time at around EUR seven per ton CO_2. In the past this price reached EUR 30 per ton. One of the main reasons cited for the drop in prices is the current over-supply of certificates due to the lasting economic and financial crisis, which has led to a considerable decline in economic perfor-

[2] See European Commission (2012).

mance and thus of CO_2 emissions. Another reason is the announcements made by the European Commission regarding its initiation of further measures to improve energy efficiency, and counter the over-allocation of certificates in Eastern Europe.[3]

Today's low prices are generally considered as an insufficient incentive for climate-friendly investments, and have therefore led to calls from many quarters for corrective measures. These measures specifically include plans by the European Commission to withhold a share of certificates in the forthcoming year in order to increase the current price, and to bring these certificates back into the market at a later point in time.[4] However, this temporary intervention is seen by some as inadequate and there are calls for lasting changes like a boosting of the EU's climate targets from 20 to 30 percent or the permanent liquidation of a part of the excess certificates.[5] It would also be theoretically conceivable to introduce lower price limits for certificates, although this is not yet under discussion at a policy level.[6] Moreover, these discussions seem to be taking place without taking into consideration the fundamental long-term consequences of the various options. In the end, it is imperative not to erode confidence in emissions trading as an instrument – especially since this is a market created by policy. However, interventions such as the introduction of a lower price limit are also under critical discussion from a scientific point of view. This kind of intervention implies that the trading system can no longer be described as a pure emissions trading system, but must be understood as a hybrid system consisting of a mix of emission trading and a tax on CO_2 emissions. According to Grüll und Taschini (2011) a price floor would be easy to introduce in principle and would lower investment uncertainty. The regulatory authority is nevertheless faced with the difficult task of deciding on the number of certificates that must be removed from the market in order to ensure compliance with the lower price limit. A further measure for reducing pricing uncertainty often discussed in literature on this topic is the introduction of price ceilings, which, combined with a price floor, would then form a price collar. For obvious reasons this is currently not under political discussion, but it nevertheless remains worth mentioning since the environmental goal will not necessarily be achieved by this kind of system. These comments should illustrate that there is a need to take action to lead European emissions trading out of its current crisis on the one hand, but that this calls for well-informed decision-making.

The problem of the present over-supply of certificates mentioned above could have potential repercussions on the discussion of the interaction between emissions trading and other energy policy instruments, like the promotion of renewable energy with the help of feed-in tariffs, or the phase-out of nuclear energy that Germany is aiming to achieve. The Scientific Advisory Committee to the Federal Ministry of Economics and Labour (BMWA 2004) pointed out that, citing the example of the promotion of renewable energy in Germany, the expansion of renewable energy has no impact on CO_2 emissions in Europe, since the energy sector is subject to emissions trading and emissions are established by this system. This argument is often cited in the context of the debate over the energy turnaround in Germany and is currently taken up by RWI (2012). In principle, this argument can also be applied to the phase-out of nuclear energy.

Moreover, the extent of the current over-supply of certificates is considerable: for the period from 2008–2012 it is currently estimated at up to 1.5 billion certificates, which corresponds to around 75 percent of the upper ceiling for emissions for 2013, see DEHSt (2012) and KfW/ZEW (2012). Forecasts by the Öko-Institut (2012) and estimates by market experts (Fenwick 2012) suggest that this over-supply is not set to fall by 2020. Should these forecasts prove true, this would mean that the reduction in CO_2 emissions through the EU ETS is not binding. In this case, the interaction of emissions trading and other energy policy measures would have to be reassessed. Trends in the over-supply of certificates should therefore be observed and taken into consideration in the shaping of energy policy measures related to the energy policy turnaround.

[3] For a detailed overview of the current situation in the EU ETS see KfW/ZEW (2012), Öko-Institut (2012) or UBA (2012).
[4] This measure is described as the "set-aside" of certificates, see European Commission (2011).
[5] See DEHSt (2012), Öko-Institut (2012) or UBA (2012). A summary of the viewpoints of emission trading analysts can be found in Fenwick (2012).
[6] The introduction of a unilateral lower price limit is currently under discussion in the UK, while Australia has abandoned its planned introduction of a lower price limit for the time being due to its alliance with the EU ETS.

References

BMWA (2004), *Zur Förderung erneuerbarer Energien,* Gutachten des Wissenschaftlichen Beirats beim Bundesministerium für Wirtschaft und Arbeit, Dokumentation nr. 534, Berlin.

Climate Change Information New Zealand (2012), International Examples of Emission Trading, http://www.climatechange.govt.nz/emissions-trading-scheme/about/international-examples.html.

DEHSt (2012), "Emissionshandel in Deutschland: Ein Update aus der Deutschen Emissionshandelsstelle vor dem Beginn der dritten Handelsperiode", presentation of Christoph Kühleis at the *Berliner Energietage*, May, http://www.berliner-energietage.de/fileadmin/user_upload/2012/Tagungsmaterial/1.13_Christoph_Kuehleis_-_Emissionshandel_in_Deutschland_-_Ein_Update_aus_der_Deutschen_Emissionshandelsstelle_vor_dem_Beginn_der_dritten_Handelsperiode.pdf.

Edenhofer, O., C. Flachsland and R. Marschinski (2007), *Towards a Global CO_2 Market: An Economic Analysis*, Potsdam Institute for Climate Impact Research, Potsdam.

European Commission (2011), Climate Change: Commission Sets out Roadmap for Building a Competitive Low-carbon Europe by 2050, http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/272.

European Commission (2012), Australia and European Commission Agree on Pathway towards Fully Linking Emissions Trading Schemes, http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/916&format=HTML&aged=0&language=EN&guiLanguage=en.

Fenwick, S. (2012), Will a 'Set-aside' Save the EU Carbon Markets?, http://www.risk.net/energy-risk/feature/2196465/eu-carbon-markets.

Grüll, G. and L. Taschini (2011), "Cap-and-Trade Properties under Different Hybrid Scheme Designs", *Journal of Environmental Economics and Management* 61, 107–18.

Grüll, G. and L. Taschini (2012), "Linking Emission Trading Schemes: A Short Note", Economics of Energy and Environmental Policy 1 (3), 115–22.

KfW/ZEW (2012), "Anreizwirkung des EU-Emissionshandels auf Unternehmen gering – Klimapolitische Regulierung wenig relevant für Standortentscheidungen", *CO_2 Barometer 2012*, Frankfurt am Main.

Öko-Institut (2012), *Strenghtening the European Union Emissions Trading Scheme and Raising Climate Ambition,* Berlin.

Regional Greenhouse Gas Initiative (2012), State Statues and Regulations, http://www.rggi.org/design/regulations.

RWI (2012), *Marktwirtschaftliche Energiewende: Ein Wettbewerbsrahmen für die Stromversorgung mit alternativen Technologien,* Essen.

UBA (2012), "Wahl zwischen Stillstand und Aufbruch – Warum die EU ihr Klimaziel 2020 jetzt erhöhen muss", *Positionspapier des Umweltbundesamtes*, Dessau-Roßlau.

Western Climate Initiative (2012), Partner Climate Action Plans, http://www.westernclimateinitiative.org/climate-action-plans.

Reform of Higher Education Finance and Access to College in Russia[1]

Michael Kaganovich*

The combination of high achievement in all measures of educational attainment with laggard levels of labor productivity is a peculiar legacy of post-Soviet Russia, which has driven the reform of its higher education system. The unique feature of this education system is the strong presence of private funding options within the *public* college-prep and tertiary institutions. This phenomenon is consistent with the evolution of many social services in Russia, which feature a striking combination of preserved centralized budgeting and control with a complete departure from the principles of social guarantees. This article examines the implications of the mixed (two-track) higher education admission and financing system for the distribution of educational attainment in Russia. Furthermore, it discusses alternative policies of allocating higher education subsidies from the standpoints of accessibility and efficiency.

A unique feature of the transition economies setting them apart in the menu of growth scenarios is that their indicators in education categories were out of proportion to their per capita GDPs. Namely, standard measures of educational attainment in most transition economies were, at least initially, as high as in the world's wealthiest countries; yet in terms of per capita GDP a typical transition economy belonged in the category of middle income developing countries. A snapshot of such comparisons is given by Table 1, which, in addition to measures of educational attainment, also contains the indicators of public funding of education and income inequality. It is therefore clear that government policies affecting human capital accumulation are among the most significant (albeit less attention-grabbing) aspects of transition from a centralized command system toward markets.

It is worth noting that income inequality characteristics along with measures of public funding of education are essential determinants of the distribution of access to education of the current younger generation (Carneiro and Heckman 2002). The data in Table 1 confirms the general fact that many transition economies are characterized by a stronger degree of inequality, especially when it comes to poverty measures, than developed countries (with the exception of the US).

One of the most striking changes in the provision of education in Russia is the development of a peculiar mixed system of access to higher education.[2] It is characterized by an unusually strong presence of private funding options within *public* secondary and tertiary institutions. This system features a two-track admission: one form of admission is tuition-free and based solely on merit, while the other track has lower academic requirements for admission, but charges students the full amount of tuition. While tuition differentials are not uncommon in many higher education systems (for example, in-state vs. out-of-state, as well as merit and need-based differentials in the US and the substantially higher tuition fee paid by foreign students in some European countries), the stark features of the Russian system are its extreme level of price discrimination (full sticker price vs. a free ride) and its exclusive merit basis, which as I will argue is quite distinct from favoring ability and is heavily biased against low income students. One should add that this regressive feature of the Russian college financing system is exacerbated by the undeveloped educational credit market, as well as by the corruption of college staff as far as the

[1] I gratefully acknowledge the funding provided by the National Council for Eurasian and East European Research (NCEEER), under the authority of Title VIII grant from the US Department of State, which supported the work that contributed to this paper. Neither NCEEER nor the US Government is responsible for the views expressed herein.
* Indiana University, Bloomington.

[2] Remarkably, similar mixed access systems have developed, with no apparent coordination, in some other Soviet successor states. Elements of such a system were also present in the 1990s in some transition economies of Eastern Europe.

Table 1

International comparisons for 2002

	Russia	Turkey	Malaysia	Estonia	Poland	Germany	Japan	USA
GDP per capita (USD)	2,405	2,638	3,905	4,792	4,894	24,051	31,407	36,006
Gini index of income distribution	45.6	40.0 [a)]	49.2	37.2	31.6 [b)]	28.3	24.9 [c)]	40.8
Income share (%) of population's poorest 10%	1.8	2.3 [a)]	1.7	1.9	2.9 [b)]	3.2	4.8 [c)]	1.9
Ratio of income shares: richest 20% to poorest 20%	10.5	7.7 [a)]	12.4	7.2	5.8 [b)]	4.3	3.4 [c)]	8.4
Public expenditure on education as % of GDP	3.1	3.7	7.9	7.4	5.4	4.6	3.6	5.6
UNDP education index	0.95	0.80	0.83	0.98	0.96	0.95	0.94	0.97
Adult literacy rate (%)	99.6	86.5	88.7	99.8	99.7	99.0	85.0	94.0
Secondary net enrollment ratio (%)	92 [d)]	76 [d)]	69	87	91 [e)]	88	100	85
Tertiary gross enrollment ratio (%)	70	25	27	64	60	48 [f)]	49	81

Note: all measurements of income inequality in this table are for the year 2000, unless stated otherwise:
[a)]1997 figure, [b)]1999 figure, [c)]1993 figure, [d)]gross ratio, [e)] 2001 figure, [f)]1998/99 estimate.

Source: United Nations Development Programme (2004) and UNESCO Institute of Statistics (2004).

evaluation of college entrance examinations is concerned.

To gain an understanding of the full effect of a system of funding of tertiary education on the distribution of access to it, one must consider it along with the preceding basic stages of education, primary and secondary, where a student's pre-college human capital attainment is determined by his/her ability, as well as parental and school inputs, whether they be public or private. The main focus of my argument is on the problems of access to higher education stemming from the interaction of public and private funding at both the tertiary and the pre-college stage, where parental resources are even more essential than for financing college. Indeed, even when access to college is provided on a "need-blind" basis (for example, in many US universities admission is merit-based, while tuition is subsidized based on need) a young individual's overall opportunity to acquire higher education will depend on the availability of resources at earlier stages. I will therefore examine the trade-off between a student's innate ability and the availability of private resources for pre-college and college stages of education, given the fact that the interaction of public and private funding is omnipresent in Russia's current education system. At the college level, this is manifested by the aforementioned two-track admission system in public colleges. At the primary and secondary levels it is given by the widespread practice of providing optional additional education services to students in public schools for extra private fees, and also by the highly differentiated quality of public schools whereby the access to higher quality is strongly correlated with families' economic and social status. The problem of access to higher education arising in such a mixed system is the main subject of this article.

I will argue that Russia's two-track admission system to higher education leads to a polarization in the distribution of human capital. Its positive effect, which results from the crowd-in of private inputs, is an increased funding base for colleges and therefore sustained high rate of tertiary attainment, albeit at the expense of the quality of higher education outside a small subset of elite colleges. However, the same factors lead to deterioration of human capital levels and social mobility for the rest, for whom the opportunity to go beyond secondary education is substantially curtailed. Furthermore, the educational opportunity in such a system is much more heavily biased toward higher income families than is the case in developed countries in the West, where full or partial tuition subsidies are widespread.

Russia's education landscape: some facts and figures

Developments in education finance and access to education in post-Soviet Russia represent a striking combination of preserving the elements of the inherited centralized structure of management and budgeting with the total departure from the principles of basic social guarantees. A surprising continued near-complete dominance of public institutions at all levels of education is combined with unfettered availability of private opportunities within this system (other social services, such as healthcare are characterized by a similar mix). While private services offered by these institutions respond to demand, their public counterparts still feature centralized planning methods.

The analysis in this article is based on the following set of facts characterizing Russia's education system and its socio-economic indicators in the early 2000s.

Incomes

The following are 2001 figures from a study by Aleksandrova, Ovcharova and Shishkin (2003):

- Average monthly per capita income: 3,000 rubles, or around USD 120 at the contemporary exchange rate. This is twice the official contemporary poverty level.
- Share of population below poverty line: about 1/3, including ten percent lacking sufficient nutrition.
- Share of aggregate personal income spent on food items: over 50 percent. For the bottom two quintiles of the population by income such share exceeded 60 percent.
- Gini coefficient for incomes in 2001: 39.6 percent, rising from 28.9 percent in 1992. Share of aggregate personal income in 2000 received by the top income quintile: 47.6 percent (rising from 30.7 percent in 1991); the share received by the next two quintiles: 36 percent; the share received by the bottom income quintile: six percent (falling from 11.9 percent in 1991).

Primary and secondary education

The system is structured as in the Soviet past and resembles a classic German model. Education is provided uniformly in primary through an equivalent of junior high school (currently grades 1 through 9). The number of students exiting the junior high system in 2001 was about 2,180 thousand (Russia in Figures 2005, 2011). After this stage the pool splits in two directions: pre-college high schools, and the technical education track, which also provides secondary education. About 1,346 thousand students graduated from high schools in 2000. The technical track is represented firstly by secondary technical schools (PTU, in Russian abbreviation), from which about 763,000 students graduated in 2000, and also by "secondary-special" technical schools that provide junior college degrees and can be accessed either right after completing the junior high stage or upon obtaining a secondary school diploma. A total of 579,000 students graduated from technical schools of the latter type in 2000. About 1,292,000 students were admitted to colleges in 2001 (throughout this article the term 'college' is used to label institutions providing bachelor/master level degrees; as these are the only institutions classified as higher education institutions in Russia). The number of students admitted to colleges steadily and rapidly grew since its 1992 level of 521,000 to reach a peak of 1,682,000 in 2007. Its subsequent descent has been due to the demographic trend.

The state and municipal funding of the public education system as a whole shrank steadily throughout the 1990s. As a share of GDP it fell from 3.6 percent in 1991–92 to 3.1 percent in 2000. Moreover, funding in 1999 equaled around 49 percent of its 1991 level in consistent prices (Aleksandrova et al. 2003). Furthermore, the public funding of primary through secondary education is characterized by strong inter-regional and urban-rural inequities and social stratification of general public education. According to Jacobson (2002), budgetary funding per student in 2000 (even after purchasing power parity adjustment for education services) for the Moscow region ('oblast') without Moscow was less than half of that for Moscow metropolis proper; the figures for neighboring regions ranged from a half to less than a third of the metropolitan Moscow level. There was a similar degree of budgetary inequity within other metropolitan areas, where a subset of elite "special" schools was funded directly and preferentially by the city budget, while the rest were funded by lower level municipalities.

All of this has resulted in increasing polarization between the elite high quality segment of public schools and the severely under-funded regular public schools and has led to the development of the widespread system using an increasing share of sup-

plementary private parental resources in primary and secondary public schools. Aleksandrova et al. (2003) report the share of such private expenditure in budgets of primary and secondary *public* schools in 1998 at 21 percent. They estimate such private funding in 2001 at 0.6 percent of GDP, i.e., about 20 percent of government funding of education *at all levels* (which was 3.1 percent of GDP in 2001). The ability of families to provide supplemental funding is obviously unevenly distributed across income groups. The degree of disparity, however, is striking. In 2000, the share of the first and second top income quintiles of the population in aggregate private family expenditure at all levels of education, including kindergarten, was 48.5 and 25.7 percent respectively. The respective shares for the fourth and fifth quintiles were 7.6 and 3.7 percent.

In addition to private spending within public schools, many families spent substantial amounts on private preparation to college entrance exams, such as preparatory courses and private tutoring. According to Roshchina and Drugov (2003), such monthly per student expenditure in Moscow region in 2001 was almost uniformly distributed between 500 and 2,000 rubles among over half of all students applying to colleges. In other regions the figure was concentrated at around 500 rubles. The figures are substantial when compared to per capita income.

Higher Education: Admission and Funding

Russian higher education is still predominantly public. Although the number of private colleges has skyrocketed, their share in the total college student population had not exceeded 15 percent and they (colleges, as well as, logically, the students) were for the most part of inferior quality. However, as discussed above, the public higher education system has developed a two-track admission system where some students, best scoring on secondary school graduation and college admission tests, get a tuition-free ride, while others are admitted on a commercial basis: with lower academic requirements for admission, but full payment of tuition. Table 2 presents the dynamics of the breakdown between the tracks, where students in public colleges who are not marked as paying full tuition cost, pay none at all.

The trend in the share of students paying tuition (in full, there is no middle ground) increased steadily, but based on estimates of the ability to pay, it is expected to stabilize below 50 percent of all college students. Unsurprisingly, this share is unevenly distributed across the fields of study: according to a 1998–2000 study it approached 50 percent in economic, managerial and legal studies, while staying below ten percent in engineering and natural sciences (Roshchina 2003).

Table 2

Numbers of students in Russia's higher education system (at the start of school year, in thousands)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total number of college students	2,791	2,965	3,248	3,598	4,073	4,742	5,427	5,947	6,456	6,884	7,065	7,310	7,461	7,513	7,419
Students in public colleges, total	2,655	2,802	3,046	3,347	3,728	4,271	4,797	5,229	5,596	5,860	5,985	6,133	6,208	6,215	6,136
Students in public colleges paying full tuition	229	326	474	729	1,021	1,469	1,955	2,309	2,622	2,858	2,983	3,144	3,277	3,356	3,372
As a % of all college students	8.2	11	14.6	20.2	25.1	31	36	39	40.6	41.5	42	43	44	44.7	45.5
Students in private colleges	136	163	202	251	345	471	630	719	860	1,024	1,079	1,177	1,253	1,298	1,283
As a % of all college students	4.9	5.5	6.2	7	8.5	9.9	11.6	12.1	13.3	14.9	15.3	16.1	16.8	17.3	17.3

Source: Russia in Figures (2005, 2011).

The ratio between the aggregate amounts of funding from public and private sources is also telling: according to Aleksandrova et al. (2003), the aggregate tuition paid to colleges by students in 2000 was estimated at 24.7 billion rubles while the total state funding was 19.5 billion rubles. This is consistent with the estimates in Klyachko (2002) that while state funding per student admitted on the tuition-free track was USD 300 to USD 350 in 2000/01, the average tuition on the commercial track was about USD 600, or nearly a half of per capita income in 2001.

Like the situation in primary and secondary public education, budgetary funding of higher education has been characterized by significant regional inequality. This is illustrated by Jacobson (2002) who compares the numbers of college students whose tuition was funded by federal budget per 1,000 residents by geographic regions of Russia in 1999/2000. In Moscow this ratio was 51.6 and in St. Petersburg it was 44.2, while the figures in all areas outside the Central and North-Western regions (containing the respective cities) ranged from 9.7 to 17.5, and the ratio for Russia overall was 18.3. These figures *per se* do not prove a geographical inequality of access since the two largest "university" cities with their 135 public colleges (out of Russia's 590) have historically attracted students from all over the country. However, studies reveal a significant decline in the shares of "out of town" students in Moscow and St. Petersburg colleges, partly due to the increased cost of transportation and living. Roshchina (2003) indicates that Moscow, the pre-eminent college city, is also the most closed to out-of-town students. Given that the Moscow metropolitan area is also characterized by the highest level of per capita income and, as mentioned earlier, the highest funding level of pre-college public education (by very wide margins in both cases), these facts alone provide significant evidence of inequities in access to college. Moreover, this suggests that the higher-income segments of the country's population tend to have disproportionately greater access to publicly subsidized higher education.

The implications of the two-track system for college access

The discussion below is based on the theoretical analysis of higher education provision in a model of college admission decisions, as well as educational decisions by students and their families by Kaganovich (in press) whose assumptions are informed by the realities of Russia's education system, as well as the income distribution outlined above.

A fundamental feature of the higher education system at hand is that, while the colleges face limited government funding in the form of a specified supply of budgeted seats that come with a fixed tuition rate paid by the government, the colleges are allowed to admit additional students via their "commercial" track whereby the latter can be charged full tuition fees.[3] The colleges have an incentive to make such admissions even when their decisions are driven solely by the goal of maximizing the quality of the education that they provide, since commercial admission allows them to increase per student educational expenditure. In this case, the limit on commercial admission is imposed by the need to maintain adequate educational standards. The colleges must then set admission standards on each of the tracks to optimize the quality of their student body, as well as the tuition revenues needed to ensure adequate quality of instruction.

When students differ in their innate abilities, their access to college is determined by the interplay of the ability factor and parental private resources.[4] Students endowed with high abilities can gain admission without supplemental (privately financed) pre-college preparation. Their moderately capable counterparts, however, will require such funds to get into college, the more so the lower the student's ability. Thus under the two-track admission system, college is inaccessible to all but the most able students from low income families. The families of moderately able students who can afford some supplemental education funding have two potential options: they can either devote sufficient resources to prepare a student enough to gain the "budgeted" admission and then enjoy a free ride in college, or prepare him/her to qualify for the commercial track and incur subse-

[3] This situation whereby all commercially admitted students are indiscriminately charged the maximum tuition fee (while others are charged no fee at all) highlights the crucial distinction between the US college financial aid system, which results in close to perfect differentiation of students by their ability to pay, and the Russian system analyzed here.

[4] While the understanding that educational attainment depends on both students' abilities and parental characteristics is standard in the literature on the economics of education, until recently it overlooked the role of endogenous interactions between decisions made at the different stages of education, as they are affected by these heterogeneous endowments. Such analysis involves modeling education as a multi-stage process, which is the subject matter of a growing body of recent literature (Su 2004; Cuhna and Heckman 2007; Gilpin and Kaganovich 2012).

quent additional expenditure on tuition. It is clear that, controlling for family income, the first of these options is more cost-effective for adequately able students, therefore the second option defines the ability-income trade-off for access to college for middle-class families.

Thus the pool of students gaining college access can be partitioned into three subsets: highly able students whose access to college does not require financial support from their families, the next ability tier of students whose families can provide funding for pre-college preparation sufficient for them to gain a tuition-free college education (this implies a trade-off whereby the families of relatively modest means are only able to provide college access to children of relatively high ability), and the lowest ability tier whose college admission will require more resources, both for pre-college preparation and college tuition.

The above analysis of the composition of the admission pools in the two tracks shows that the two-track college admission system under investigation allocates public educational resources both inefficiently and unequally. Indeed, it features the most limited access to college for students from low income families. Thus public education funds are underprovided to a group with a relatively higher human capital potential where those funds would be the most productive. Another inefficient characteristic of the two-track admission system exhibited at the other end of income distribution is the crowding out of private educational resources available to middle and upper income students by the public funds to which they have disproportionate access. This is discussed in greater detail in the next section.

Comparison of public subsidy policies and their effects on access to college

The observations above raise questions about the appropriate direction of policy change in the system of the admission to and funding of higher education that would lead to improvements in allocative efficiency, as well as greater overall access to college education. It is worth noting that superior aggregate efficiency, and especially the provision of equal access, are the characteristics that are typically referred to as justifications for the public funding of education in the first place. One policy direction that is often believed beneficial (and is in line with the mainstream practice in Western Europe) is the expansion of tuition-free admission via increased government funding, which in this model would be expressed by increasing the size of the budgeted college track. This can be referred to as "policy *E*". An alternative approach that distinguishes the form of public subsidy of higher education prevalent in the US, henceforth labeled here as "policy *A*", is based on the principle of means-tested federal or state financial aid, whereby government funded or sponsored tuition subsidy is allocated to academically qualified students (at least in theory), but only if they meet a financial need criterion, rather than being purely based on academic merit.[5]

The actual approaches to reforming higher education funding on the agenda in Russia include elements of both types of policy. A government voucher policy experiment that was run in several universities between 2002 and 2005 was supposed to allow full or partial funding by the government of a student's tuition by means of an education voucher whose value would depend on his/her performance on a newly instituted system of standardized state exams for college admission and field of study (Klyachko 2002; Shishkin 2004). The expectation, however, was that the number of fully-funded students would increase. Indeed, the recent "*Law on Higher and Postgraduate Education*" in Russia specifically stipulated that the number of students studying at the expense of the federal budget should not decrease as a result of the proposed new policies. Although this approach assumed that a standardized examination system would improve access to education for the socially disadvantaged, no specific mechanism connecting the fact or extent of state funding to student's ability to pay was articulated. Indeed, as discussed above, family income is a major factor in students' preparation to college admission exams in most countries. An understanding that this factor can be a substitute for a student's innate ability appears to be behind a recent tendency in top undergraduate programs in the US to de-emphasize the role of standardized test scores (such as SAT or ACT) in their admission decisions.

[5] This government education policy should obviously be distinguished from the price discrimination by colleges based on ability to pay along with other factors. The latter important phenomenon in the industrial organization of education has received attention following Rothschild and White (1995) and Winston (1999). Unlike the tuition policies of colleges motivated by their own objectives, the government sponsored financial aid programs have a declared aim to provide more equitable access to education. The actual implications of such policies are a matter of controversy; this analysis aims to contribute to this discourse.

The aforementioned policy alternatives *A* and *E* can be defined in terms of an allocation rule for a marginal increment of the government's aggregate higher education funding.

Policy *E:* an increment of government funding of higher education is spent on the expansion of the tuition-free admission of top performing students.

Policy *A:* the government funding increment is allocated based on the combination of financial need and academic merit. In other words, only students from low-income families whose pre-college test results fall just short of the tuition-free admission standard, in addition to those meeting this threshold, receive the funding. The admission threshold remains unchanged for students whose families cannot demonstrate financial need, i.e., those deemed unable to afford tuition on the commercial track.

Analysis of the above policy alternatives in Kaganovich (in press) leads to the following results. A marginal increase in tuition-free admission according to policy *E* will lead to increased commercial admission (consistent with the factual co-movement of the two variables provided in Table 2) because the addition of tuition-free seats reduces competition on this track and hence lowers preparation requirements for it. This can be shown to reduce the marginal drop in the average quality of students associated with expanding commercial admission, and thereby to raise colleges' incentives to increase commercial admissions. This also implies that the additional public funding provided by the policy will crowd out private resources devoted by families to college preparation.

The incremental government funding dedicated to admitting additional, deserving low-income students according to policy *A* can be shown to shrink the number of middle class students admitted to the tuition-free track and to expand the admission of low-income students to a greater degree. Thus this policy, as opposed to policy *E*, redistributes the public funding of college tuition, as well as that of education access progressively, i.e., in favor of low-income students. Such redistribution also contributes to allocative efficiency because the ability cut-off for tuition-free admission is higher for students from low income families, who can only succeed by relying on their innate abilities and publicly funded pre-tertiary education.

The above also suggests that a policy change that keeps the aggregate tuition subsidy unchanged, but reallocates a part of it to be distributed based on the combination of merit and need (rather than purely on merit as defined in terms of performance in pre-college tests) will not only expand college access for able low-income students, but will also increase the efficiency of education funding: it will raise overall student preparation and "crowd in" private investment in education, while leaving the level of public funding unchanged.

Concluding comments

This analysis highlights two features of the higher education system in transition in Russia: (i) the higher education attainment has undergone an impressive expansion, although at the expense of an overall decline in quality; (ii) the two-track admission system strongly favors students from well-off families who have better access to quality pre-college education; namely, the incidence of public subsidy of higher education critically depends on the distribution of the available quality of education at earlier levels across income groups.

In reality, the fall in quality is naturally not uniform across Russia's colleges; instead, there is an expanding differentiation of standards between the small elite subset of programs and the rest. While quality differentiation seems like a natural price to pay for the expansion, and the increase in the number of students going to college can in itself be viewed as a welcome phenomenon, the points made above indicate important problems. Namely, the analysis demonstrates that the two-track system exacerbates the trade-off between the expansion of the higher education system and its quality by inefficiently channeling public resources, shutting out able low-income students who lack the resources to prepare adequately, while crowding out the private education expenditure of families who can afford it. The increasingly preferential treatment of an elite subset of colleges with "more than equal" public funding adds an important dimension to the above analysis of the distribution of student access to public education.

The main flaw in the evolution of Russia's education system, according to this article's analysis, is the expanding quality gap in pre-tertiary education,

which is due to insufficient and unequal public funding, and is exacerbated by the explicit advantages for students who are able to complement public funding with private resources in pre-college education. Indeed, such students are winning twice: thanks to their access to higher-quality pre-college education they are more likely to be admitted to better colleges and will be better prepared to study there; furthermore, they are more likely to get on the tuition-free track where their studies will be subsidized by the government. It is apparent that reallocation of some government funding from non-need based college subsidy toward a more equitable provision of public primary and secondary education would not only mitigate a rapidly growing polarization of society, but would also result in a net gain in terms of the quality of education of the labor force.

It is worth noting that while the current developments in Russia's education system may represent an extreme special case, this case is highly relevant for understanding the problems arising in the world's major "mainstream" education systems. Indeed, it highlights issues of the interaction between public and private resources that is present in all systems and plays an important role in their outcomes.

References

Aleksandrova, A., L. Ovcharova and S. Shishkin (2003), *Dohody Naselenia i Dostupnost' Sotsial'nyh Uslug (Population's Income and Accessibility of Social Services)*, Independent Institute for Social Policy, Urban Economics Foundation, Moscow.

Carneiro, P. and J. J. Heckman (2002), "The Evidence on Credit Constraints in Post-Secondary Education", *The Economic Journal* 112, 705–34.

Cunha, F. and J. J. Heckman (2007), "The Technology of Skill Formation", *American Economic Review* 97 (2), 31–47.

Gilpin, G. and M. Kaganovich (2012), "The Quantity and Quality of Teachers: Dynamics of the Trade-off", *Journal of Public Economics* 96, 417–29.

Jacobson, L. I., ed (2002), *Mezhbudzhetnye otnoshenia v rossiiskom obrazovanii (Budgetary Relations in Russian Education),* State University-Higher School of Economics, Moscow.

Kaganovich, M. (2013), "Higher Education Reform and Access to College in Russia", in: *The Oxford Handbook of the Russian Economy,* Oxford University Press, in press.

Klyachko, T. L., ed. (2002), *Modernizatsia Rossiiskogo Obrazovania (Modernization of Education in Russia),* State University-Higher School of Economics, Moscow.

Roshchina, J. M. (2003), "Neravenstvo dostupa k obrazovaniu: chto my znaem ob etom?" (Unequal Access to Education: What do We Know About It?), in S. Shishkin, ed., *Problemy Dostupnosti Vyshego Obrazovania (Accessibility of Higher Education)*, IISP Working Papers Series no. WP3/2003/01, Moscow.

Roshchina, J. M. and M. A. Drugov (2003), "Social'nye Determinanty Neravenstva Dostupa k Vysshemu Obrazovaniu v Sovremennoi Rossii" (Social Determinants of Unequal Access to Higher Education in Contemporary Russia), in S. Shishkin, ed., *Problemy Dostupnosti Vyshego Obrazovania (Accessibility of Higher Education), IISP Working Papers Serie*s no. WP3/2003/01, Moscow.

Russia in Figures (Rossiiskii Statisticheskii Iezegodnik) 2005, Rosstat (Russian Federation Federal State Statistics Service), http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/publishing/catalog/statisticCollections/doc_1135087342078.

Russia in Figures (Rossiiskii Statisticheskii Iezegodnik) 2011, Rosstat (Russian Federation Federal State Statistics Service), http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/publishing/catalog/statisticCollections/doc_1135087342078.

Rothschild, M. and L. J. White (1995), "The Analytics of Pricing in Higher Education and Other Services in Which Customers are Inputs", *Journal of Political Economy* 103, 573–86.

Shishkin, S. V. ed. (2004), *Vysshee Obrazovanie v Rossii: Pravila i Real'nost (Higher Education in Russia: Rules and Reality)*, Independent Institute for Social Policy, Moscow.

Su, X. (2004), "The Allocation of Public Funds in a Hierarchical Educational System", *Journal of Economic Dynamics and Control* 28, 2485–510.

UNESCO Institute of Statistics (2004), www.uis.unesco.org.

United Nations Development Programme (2004), *Human Development Report 2004,* New York.

Winston, G. C. (1999), "Subsidies, Hierarchy and Peers: The Awkward Economics of Higher Education," *Journal of Economic Perspectives* 13 (1), 13–36.

The Gorbachev Anti-Alcohol Campaign and Russia's Mortality Crisis

Christina Gathmann*and
Marijke Welisch*

Introduction

Following the demise of the Soviet Union, Russia experienced a 40 percent surge in deaths between 1990 and 1994. The average life expectancy for men declined by 6.6 years from 64.2 years to 57.6 years as a result. The magnitude of this surge in deaths – coupled with the Soviet Union's international prominence – has prompted observers to term this demographic catastrophe as the "Russian Mortality Crisis."

What caused this dramatic rise in mortality? Many people attribute the Russian mortality crisis to the political and economic turmoil that followed the breakup of the Soviet Union and the economic and political reforms that began in 1991. In Bhattacharya, Gathmann and Miller (2012), we propose an alternative explanation for the observed pattern, namely the demise of the supposedly successful 1985–1988 Gorbachev Anti-Alcohol Campaign.

The campaign efficiently implemented a broad set of measures to reduce alcohol supply and fight excessive alcohol consumption. Although the campaign officially ended in late 1988, it took some time for production to adjust accordingly; and prices remained above pre-campaign levels even after the campaign's official end. Some researchers (Nemtsov 2000, for example) suggest that the campaign's *de facto* end was as late as 1991 and thus coincided with the breakup of the Soviet Union and the beginning of Russia's economic and political transition.

* Heidelberg University.

We find that alcohol consumption declined substantially during the campaign years and resulted in fewer alcohol-related deaths between 1985 and 1988. Our findings also show that a significant share of deaths during the mortality crisis were due to the campaign coming to an end, suggesting that Russia's transition to capitalism and democracy was not as deadly as often suggested.

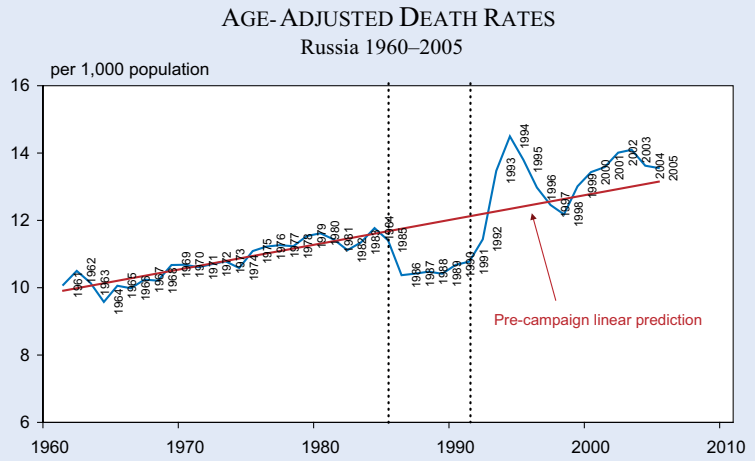
The mortality crisis in Russia

Between 1990 and 1994, crude death rates in Russia soared by 40 percent, rising from 11 to nearly 15.5 per thousand. By 2009 standards, the decline in male life expectancy at birth to only 57.6 years puts Russian men on a par with their counterparts in Bangladesh, and means that male longevity in Russia is even lower than in less-developed countries such as Haiti or North Korea.

Most explanations for this development are more or less directly linked to economic and political transition in Russia during that period. Specific transition-related explanations include the decline in economic output and employment (Cornia and Paniccia 2000; Brainerd 2001), rapid privatization (Stuckler, King and McKee 2009; Stuckler, King and McKee 2012), physiological and psychological stress (Shapiro 1995; Bobak and Marmot 1996; Kennedy, Kawachi and Brainerd 1998; Leon and Shkolnikov 1998; Gavrilova et al. 2001), reductions in the relative price of vodka (Treisman 2010), and the deterioration of the medical care system (Ellman 1994).

Between 1990 and 1993 alcohol consumption increased dramatically, accompanied by a high number of alcohol-related deaths (with the causes of death linked both directly (alcohol poisoning and violent deaths) or indirectly (heart attacks and strokes) to alcohol consumption). Working class men, the demographic group that drinks the most in Russia, saw a particularly sharp increase in their mortality rate. Recent estimates suggest that alcohol abuse is responsible for over half of all deaths in Russian cities among the 15–54 year old age group (Leon et al. 2007; Zaridze et al. 2009).

Figure 1



Note: Pre-campaign linear trend estimated using ordinary least squares regression of mortality per 1,000 population on pre-campaign year.

Source: Human Mortality Database (2011).

Our research explores a different explanation for the mortality crisis, namely the demise of the supposedly successful Anti-Alcohol Campaign launched by Mikhail Gorbachev in 1985. The basic logic of our approach is shown in Figure 1. Russian death rates, which increased linearly between 1960 and 1984, plummeted abruptly with the start of the campaign in 1985, remained below the campaign trend throughout the latter 1980s, rose again rapidly during the early 1990s to a temporary peak in 1994, and then largely reverted back to Russia's long-run trend.

The crisis could therefore be the combined result of a lagged 'catch-up' mortality (with relatively weak marginal survivors saved by the campaign dying at higher rates) and a reversion to the long-run trend. The lagged effect of alcohol consumption on mortality is consistent with findings in medical literature on the delayed effects of alcoholism on both liver cirrhosis and heart disease (see, for instance, Holder and Parker 1992 and Laonigro et al. 2009).

Alcohol consumption in Russia and the Gorbachev Anti-Alcohol Campaign

The Soviet Union – and Russia in particular – historically ranks among the world's heaviest drinking countries. Immediately prior to the anti-alcohol campaign, annual consumption of pure alcohol in the Soviet Union exceeded 14 liters per capita – compared to 8 liters in the United States and 13 liters in Germany (Nemtsov 2000; World Health Organization 2011). This figure is roughly equivalent to adult males consuming about half a liter of vodka every two days (Ryan 1995). In addition to the quantity consumed, the type of alcoholic beverages consumed and drinking patterns also have a large impact on mortality. A disproportionate amount of consumption in Russia is hard liquor and can be characterized as 'binge drinking' (defined as three or more alcoholic drinks within 1 to 2 hours). Alcohol abuse and binge drinking are linked not only to accidents and violent deaths, but more importantly in quantitative terms, they represent key risk factors for heart attacks and cardiovascular disease (McKee and Britton 1998; McKee, Shkolnikov and Leon 2001; Rehm et al. 2009; Tolstrup et al. 2006).

By the early 1980s, alcohol abuse was widely recognized as a major cause of death, absenteeism and low labor productivity in the Soviet Union. Although difficult to estimate, observers suggest that alcohol's cost to the Soviet economy during the 1980s totaled about 10 percent of national income (Treml 1987; Segal 1990; Tarschys 1993; White 1996). In response, the Politburo and the Central Committee led by Secretary General Mikhail Gorbachev passed a resolution entitled "Measures to Overcome Drunkenness and Alcoholism" in May of 1985. The directives passed by the Central Committee and the Presidium of the Supreme Soviet as a result of the resolution ushered in the country's most stringent anti-alcohol policies since the 1919–1925 prohibition. Consisting of seven broad measures, the main goal of the Gorbachev Anti-Alcohol Campaign was to raise the effective price of drinking whilst subsidizing substitute activities.

State production of alcohol was drastically reduced (the government was the sole legal producer and distributor of alcohol in the Soviet Union at that time), prices for alcoholic beverages were increased and restrictions were placed on alcohol sales. Between June 1985 and May 1986 alone, state production of vodka and hard liquor declined by 30–40 percent (Segal 1990) and cognac production fell by 44 percent (White 1996). In 1985, the price of vodka, liqueurs, and cognac rose by 25 percent (McKee

1999), and prices were increased by another 25 percent in 1986 (White 1996).

Liquor stores were not allowed to sell vodka or wine before two pm on business days, restaurants were no longer permitted to sell hard liquor, and the official drinking age rose from 18 to 21. Sales near factories, educational institutions, hospitals, and airports were prohibited, and many stores selling alcohol were shut down. In addition, high fines were introduced for public drunkenness and other alcohol-related offenses. Fines for workplace intoxication, for instance, were one to two times the mean weekly wage, and home production of alcohol, as well as the possession of homebrew equipment, was punishable by large fines or imprisonment.

Action was also taken to reduce demand for alcohol – leisure facilities (such as sports clubs and parks) were heavily subsidized and promoted, media campaigns and health education programs were launched together with bans on glamorous media depictions of drinking. To encourage sober lifestyles, a national temperance society was launched and 428,000 branches with a total of 14 million members were created within three years. Lastly, treatment of alcoholism was also improved substantially.

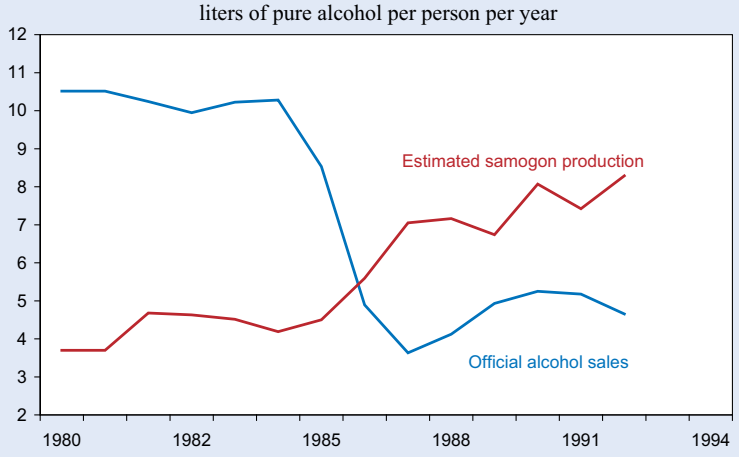
Overall, these campaign measures led to a decline in state alcohol sales of over 50 percent between 1984 and 1988 (White 1996). Official figures overstate the decline in alcohol consumption, however, because they do not capture the home-brewing response to the campaign. Russians have a long-standing tradition of producing *samogon* (literally, "distillate made by oneself," a generic term for illegal alcoholic beverages made from sugar, corn, beets, potatoes, and other ingredients) – and did so more vigorously during the campaign when access to legal alcohol was restricted.

As comprehensive estimates of oblast-year *samogon* production are not available, we extend the work of Nemtsov (2000) to generate estimates of this figure for the 1980s and early 1990s. Nemtsov (2000) used an indirect technique to infer total alcohol consumption based on forensic records from oblast forensic bureaus. Since these autopsy records were not made public during the Soviet era, manipulation for external political purposes is unlikely to be of concern. Both the Soviet Union and the Russian Federation mandate autopsies for all violent and accidental deaths, as well as deaths with unclear causes. These mandatory autopsies systematically document blood alcohol content (albeit in a non-random sample of Russians). Nemtsov (2000) used these records to estimate the association between blood alcohol concentrations and total alcohol consumption, and to recover implied *samogon* consumption (see Bhattacharya et al. 2012 for details).

Figure 2

OFFICIAL ALCOHOL SALES AND INDIRECT ESTIMATES OF SAMOGON PRODUCTION

liters of pure alcohol per person per year



Source: Data on official alcohol sales were obtained from annual statistical yearbooks compiled by Goskomstat and Rosstat through East View Information Services, the Hoover Institution's print archives and supplementary sources (see Appendices in Bhattacharya et al. (2012) for details). Estimates of illegal alcohol production were obtained by extending the work of Nemtsov (2000).

Figure 2 shows that the campaign had exerted a considerable influence on alcohol consumption during campaign years and the effects still lingered even after the Soviet Central Committee officially ended the campaign in October 1988 (in part because it was very unpopular, but also because the loss of revenue from alcohol sales was substantial). Alcohol prices remained above pre-campaign levels, alcohol production took time to adjust and several restrictions on alcohol sales remained in place (White 1996). Overall, total alcohol consumption rates did not return to pre-campaign levels until the early 1990s.

Impact of the campaign

We begin by establishing the association between the Gorbachev Anti-Alcohol Campaign and Russian mortality during the latter 1980s. Due to the absence of any previous adequate sub-national records, compiling such data means digitizing and harmonizing archival Russian data sources to create a new panel data set of Russian oblasts, administrative regions in Russia, spanning the years 1970–2000. Crucial variables for the estimation are crude death rates and alcohol poisoning death rates by gender, as well as sales of pure alcohol (in liters) and the estimated production of *samogon* (as described above).

Our estimation approach then flexibly traces out oblast-level changes in alcohol consumption and mortality during campaign years and the lagged effects of the campaign's end on Russian mortality. Because the campaign was highly multifaceted and adequate data on its individual components are largely unavailable, we use pre-campaign alcohol consumption interacted with year dummies as a summary measure of campaign intensity (assuming areas with greater pre-campaign alcohol consumption to be disproportionately affected – following Bleakley (2007), Qian (2008), Miller and Urdinola (2010), and Nunn and Qian (2011), for example).

We find that one additional liter consumed per person per year prior to the campaign is associated with a 28–69 percent decline in per-capita alcohol consumption during campaign years. We also show that harder-drinking oblasts experienced disproportionately larger declines in mortality during the late 1980s. Overall, our estimates suggest that the campaign is associated with about 400,000 fewer deaths per year, a reduction of 24 percent relative to the pre-campaign crude death rate.

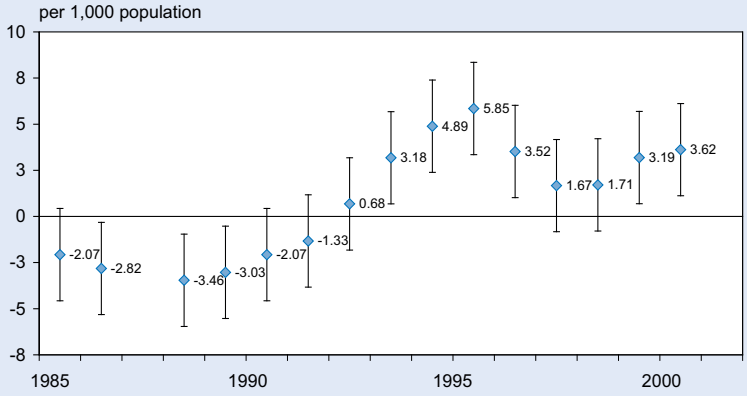
We then extend our framework to study the link between the end of the Anti-Alcohol Campaign and Russia's transition-era mortality crisis. As people resumed their pre-campaign drinking behavior, the ensuing rise in death rates was due to a combination of a reversion to the long-run mortality trend and catch-up mortality as relatively weak marginal survivors saved by the campaign died at higher rates in later years. Figure 3 shows that harder-drinking oblasts prior to the campaign not only experienced larger mortality declines during the late 1980s, but also saw disproportionate increases in deaths during the 1990s.

We also examine changes in three groups of cause-specific death rates with differential relatedness to alcohol consumption. Those most closely related to alcohol are alcohol poisonings and accidents/violent deaths. A large body of medical literature also suggests that alcohol consumption is a leading risk factor for cardiovascular diseases like heart attacks and strokes (Chenet et. al. 1998; Britton and McKee 2000; Corrao et. al. 2000; McKee et al. 2001; Ramstedt 2009). Causes more indirectly linked to alcohol are respiratory diseases and digestive diseases. Finally, cancer deaths are most weakly related to alcohol (and occur only after a long period of time).

We find that causes of death more closely related to alcohol consumption (circulatory disease, accidents and violence, and alcohol poisoning) increased to a

Figure 3

CRUDE DEATH RATE CHANGES IMPLIED BY THE ANTI-ALCOHOL CAMPAIGN



Notes: Campaign effects on crude death rate per 1,000 population plotted with 95% confidence intervals (scaled by median pre-campaign alcohol consumption to show implied change in crude death rate). All oblast-year samples are restricted to years prior to 2000 (1970, 1978, 1980, 1985, 1986, and 1988–2000).

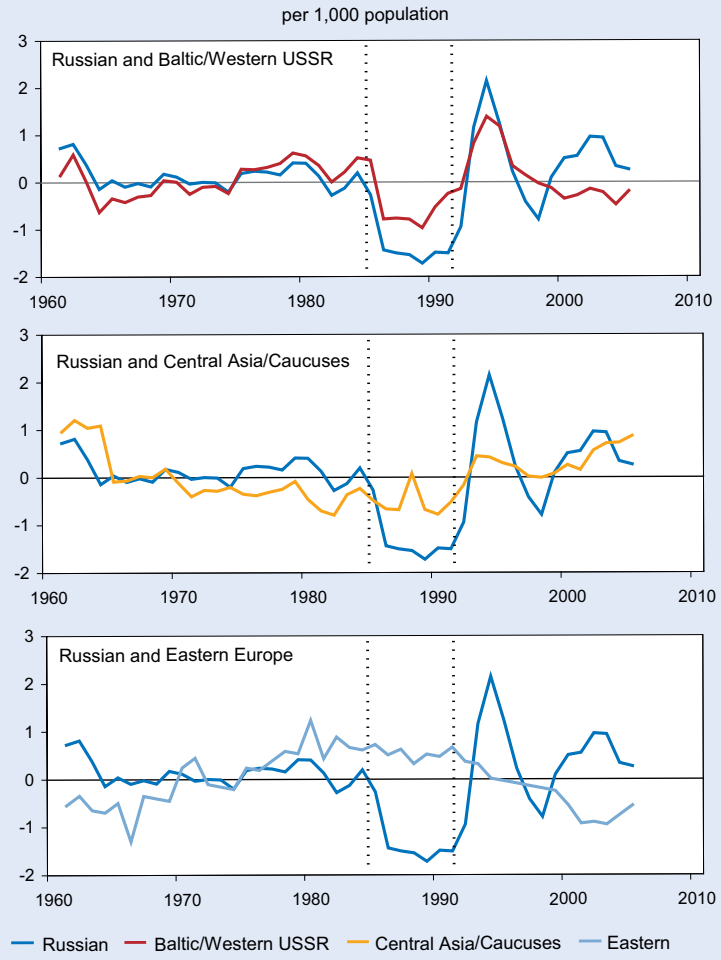
Source: Data on death rates and official alcohol sales were obtained from annual statistical yearbooks compiled by Goskomstat and Rosstat through East View Information Services, the Hoover Institution's print archives and supplementary sources (see Appendices in Bhattacharya et al. (2012) for details on data sources); estimates of total alcohol consumption using official alcohol sales supplemented by estimates of illegal alcohol production by extending the work of Nemtsov (2000).

relatively greater extent in harder-drinking oblasts during the 1990s and in proportion to intensity of the Gorbachev Anti-Alcohol Campaign. Consistent with known gender differences in alcohol consumption, the number of deaths from alcohol poisonings rises much more for men than for women. The most quantitatively important increases occur among cardiovascular disease deaths and accidents/violence. Predicted respiratory and digestive disease death rates rise to lower levels (consistent with their weaker relationship to alcohol consumption), and the trajectory of predicted cancer deaths is essentially flat throughout the 1990s.

Importantly, these relationships are robust to – and in some cases are effectively strengthened by – controlling for local economic conditions during the transition period (GDP per capita, the employment rate, and employment in private manufacturing – a measure of privatization). All in all, our estimates explain a large share of the Russian mortality crisis.

Figure 4

DE-TRENDED CRUDE DEATH RATES IN FORMER SOVIET AND NON-SOVIET STATES, 1960–2005



Source: Russian mortality data available from The Human Mortality Database (2011); other USSR mortality data from http://www.demoscope.ru; non-USSR mortality data from World Development Indicators (World Bank 2010).

Other former Soviet states also experienced the campaign, and the campaign's impact should vary systematically with ethnic/religious composition (with larger campaign-year reductions and larger transition-year increases in countries with lower concentrations of Muslims). Given Islam's prohibition of intoxicants, we exploit variation in the concentration of Muslims across the former Soviet Union. The underlying logic is that former Soviet states with relatively more Muslims should experience smaller absolute declines in deaths during the campaign and smaller increases in mortality during transition years. Non-Soviet Eastern European countries, on the other hand, had no anti-alcohol campaign – and therefore should display different temporal patterns of mortality despite experiencing similar political and economic transitions.

Figure 4 shows crude death rate comparisons between Russia and three groups of countries: former Soviet states with a small share of Muslims (Latvia, Lithuania, Estonia, Ukraine, Belarus, and Moldova), former Soviet states with a larger share of Muslims (Armenia, Azerbaijan, Georgia, Uzbekistan, Kazakhstan, Kyrgyzstan, and Turkmenistan), and non-Soviet Eastern European countries (the Czech Republic, the Slovak Republic, Hungary, and Poland). Each panel shows de-trended crude death rate means for one of these country groups (and Russia for comparison), plotting residuals obtained by regressing country-year crude death rates on a linear year variable (Demoscope Weekly 2009; World Bank 2010). Former Soviet states with low Muslim concentrations (top panel) exhibit both crude death rate decreases during the latter 1980s

and death rate increases during the early 1990s that are similar to those in Russia. Former Soviet states with higher Muslim concentrations (middle panel), by contrast, experienced significantly lower campaign year reductions and transition year-increases. Finally, death rates over time in non-Soviet Eastern European countries (lower panel) appear unrelated to those in Russia. These patterns of mortality during the 1980s and 1990s across former Soviet States and Eastern European countries are consistent with our oblast-level findings for Russia.

Conclusion

The evidence shows an important, but under-recognized link between the Gorbachev Anti-Alcohol Campaign and Russia's mortality crisis. Intervening on a variety of margins, the campaign simultaneously raised the cost of drinking and subsidized substitute activities. Alcohol consumption declined markedly, and Russia's crude death rate fell by an average of 24 percent per year, implying roughly 1.61 million fewer deaths during the latter 1980s. However, the campaign's unpopularity and public finance impact led to its repeal shortly before the collapse of the Soviet Union. The Russian death rate subsequently climbed rapidly – and the increase associated with the campaign's end explains a large share of Russia's Mortality Crisis (roughly 2.15 million deaths). Former Soviet States and the rest of Eastern Europe also experienced similar temporal patterns of mortality commensurate with their exposure to the Anti-Alcohol Campaign.

A key implication of these findings is that Russia's transition to capitalism and democracy was not as lethal as commonly suggested (Stuckler et al. 2009). However, our findings also do not necessarily imply that alcohol prohibition raises welfare (in Russia or elsewhere), even if it saves lives. Health is only one component of welfare, so health-improving restrictions on individual choices can cause harm as well as do good.

References

Bhattacharya, J., C. Gathmann and G. Miller (2012), "The Gorbachev Anti-Alcohol Campaign and Russia's Mortality Crisis", *American Economic Journal: Applied Economics,* in press.

Bleakley, H. (2007), "Disease and Development: Evidence from Hookworm Eradication in the American South", *Quarterly Journal of Economics* 122, 73–117.

Bobak, M. and M. Marmot (1996), "East-West Mortality Divide and its Potential Explanations: Proposed Research Agenda", *British Medical Journal,* 312–421.

Brainerd, E. (2001), "Economic Reform and Mortality in the Former Soviet Union: A Study of the Suicide Epidemic in the 1990s", *European Economic Review* 45, 1007–19.

Britton, A. and M. McKee (2000), "The Relation between Alcohol and Cardiovascular Disease in Eastern Europe: Explaining the Paradox", *Journal of Epidemiology and Community Health* 54, 328–32.

Chenet, L., M. McKee, D. Leon, V. Shkolnikov and S. Vassin (1998), "Alcohol and Cardiovascular Mortality in Moscow: New Evidence of a Causal Association", *Journal of Epidemiology and Community Health* 52, 772–74.

Cornia, G. and R. Paniccià, (2000), "The Transition Mortality Crisis: Evidence, Interpretation and Policy Responses", in: G. Cornia and R. Paniccià, eds., *The Mortality Crisis in Transitional Economies,* Oxford University Press, Oxford.

Corrao, G., L. Rubbiati, V. Bagnardi, A. Zambon and K. Poikolainen (2000), "Alcohol and Coronary Heart Disease: A Meta-Analysis", *Addiction* 95 (10), 1505–23.

Demoscope Weekly 2009, "Mortality in Russia through the Prism of Privatization", 15 February.

Ellman, M. (1994), "The Increase in Death and Disease under 'Katastroika'", *Cambridge Journal of Economics* 18 (4), 329–55.

Gavrilova, N. S., G. N. Evdokushkina, V. G. Semyonova and L. A. Gavrilov, "Economic Crises, Stress and Mortality in Russia", paper presented at The Population Association of America 2001, Annual Meeting.

Holder, H. and R. Parker (1992), "Effect of Alcoholism Treatment on Cirrhosis Mortality: A 20-year Multivariate Time-series Analysis", *British Journal of Addiction* 87, 1263–74.

Human Mortality Database (2011), University of California, Berkeley (USA) and Max Planck Institute for Demographic Research (Germany), www.mortality.org or www.humanmortality.de (accessed 30 October 2012).

Kennedy, B., I. Kawachi and E. Brainerd (1998), "The Role of Social Capital in the Russian Mortality Crisis", *World Development* 26 (11), 2029–43.

Laonigro, I., M. Correale, M. Di Biase and E. Altomare (2009), "Alcohol Abuse and Heart Failure", *European Journal of Heart Failure* 11, 453–62.

Leon, D. and V. Shkolnikov (1998), "Social Stress and the Russian Mortality Crisis", *Journal of the American Medical Association* 279, 790–91.

Leon D., L. Saburova, S. Tomkins, E. Andreev, N. Kiryanov, M. McKee, V. Shkolnikov (2007), "Hazardous Alcohol Drinking and Premature Mortality in Russia: A Population Based Case-Control Study", *The Lancet* 369, 2001–09.

McKee, M. and A. Britton (1998), "The Positive Relationships between Alcohol and Heart Disease in Eastern Europe: Potential Physiological Mechanisms", *Journal of the Royal Society of Medicine* 91, 402–07.

McKee, M. (1999), "Alcohol in Russia", *Alcohol and Alcoholism* 34, 824–29.

McKee, M., V. Shkolnikov and D. Leon (2001), "Alcohol is Implicated in the Fluctuations in Cardiovascular Disease in Russia since the 1980s", *Annals of Epidemiology* 11, 1–6.

Miller G. and P. B. Urdinola (2010), "Cyclicality, Mortality, and the Value of Time: The Case of Coffee Price Fluctuations and Child Survival in Colombia", *Journal of Political Economy* 118, 113–55.

Nemtsov, A. V. (2000), "Estimates of Total Alcohol Consumption in Russia, 1980-1994", *Drug and Alcohol Dependence* 58, 133–42.

Nunn, N. and N. Qian (2011), "The Potato's Contribution to Population and Urbanization: Evidence from a Historical Experiment", *Quarterly Journal of Economics* 126, 593–650.

Qian, N. (2008), "Missing Women and the Price of Tea in China: The Effect of Sex-Specific Earnings on Sex Imbalance", *Quarterly Journal of Economics* 123, 1251–85.

Ramstedt, M. (2009), "Fluctuations in Male Ischaemic Heart Disease Mortality in Russia 1959-1998: Assessing the Importance of Alcohol", *Drug and Alcohol Review* 28, 390–95.

Rehm, J., C. Mathers, S. Popova, M. Thavorncharoensap, Y. Teerawattananon and J. Patra (2009), "Global Burden of Disease and Injury and Economic Cost Attributable to Alcohol Use and Alcohol-Use Disorders", *The Lancet* 373, 2223–33.

Ryan, M. (1995), "Alcoholism and Rising Mortality in the Russian Federation", *British Medical Journal* 310 (6980), 646–49.

Shapiro, J. (1995), "The Russian Mortality Crisis and Its Causes", in A. Aslund, eds., *Russian Economic Reform in Jeopardy?,* Pinter Publishers, London.

Segal, B. (1990), *The Drunken Society – Alcohol Abuse and Alcoholism in the Soviet Union,* Hippocrene Books, New York.

Stuckler, D., L. King and M. McKee (2009), "Mass Privatisation and the Post-Communist Mortality Crisis: A Cross-National Analysis", *The Lancet* 373, 399–407.

Stuckler, D., L. King and M. McKee (2012), "The Disappearing Health Effects of Rapid Privatization: A Case of Statistical Obscurantism?", *Social Science and Medicine* 75, 23–31.

Tarschys, D. (1993), "The Success of a Failure: Gorbachev's Alcohol Policy, 1985-88", *Europe-Asia Studies* 45 (1), 7–25.

Tolstrup J., M. K. Jensen, A. Tjonneland, K. Overvad, K. J. Mukamal and M. Gronbaek (2006), "Prospective Study of Alcohol Drinking Patterns and Coronary Heart Disease in Women and Men", *British Medical Journal* 332, 1244–48.

Treisman, D. (2010), "Death and Prices: The Political Economy of Russia's Alcohol Crisis", Economics of Transition 18 (2), 281–331.
Treml, V. (1987) "Drinking and Alcohol Abuse in the USSR in the 1980s" in H. Herlemann, eds., *Quality of Life in the Soviet Union,* Westview Press, Boulder, CO.

White, S. (1996), *Russia Goes Dry: Alcohol, State and Society,* Cambridge University Press, Cambridge.

World Health Organization (2011), Country Profiles, http://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/deu.pdf (accessed 30 October 2012).

World Bank (2010), World Development Indicators, http://data.worldbank.org/data-catalog/world-development-indicators (accessed 30 October 2012).

Zaridze, D., P. Brennan, J. Boreham, A. Boroda, R. Karpov, A. Lazarev, I. Konobeevskaya, I. Igitov, T. Terechova, P. Boffetta and R. Peto (2009), "Alcohol and Cause-Specific Mortality in Russia: A Retrospective Case-Control Study of 48,557 Adult Deaths", *The Lancet* 373, 2201–14.

Government Influence on Selected Aspects of Management

The turmoil in financial markets during the recent crisis caused financial market institutions like banks, insurance companies and pension funds to incur losses, pushing many to the brink of insolvency and forcing a few to declare bankruptcy. Depositors, insurance policy holders and other investors risked losing their financial claims against these institutions. In the wake of the crisis, schemes to protect these groups and guarantee their claims were crucial to rebuilding trust in financial market institutions and stabilising the financial system as a whole.

Deposit insurance schemes, for example, which guarantee that depositors receive at least part of their claims against a bank in the case of its default, were extended in response to the financial crisis in order to prevent bank runs. The establishment of transparency and disclosure regulations to protect investors also became a key issue for policymakers.

A crucial question concerning those guarantee and protection schemes is whether they are administrated and operated by the government or by the private sector only. Mixed forms of organisation in which both sectors are involved also exist in some countries. Table 1 classifies the organisation of guarantee and protection schemes into five categories depending on the government's role in the composition of the board of the agencies operating the respective schemes (Schich and Kim 2011). The highest level of government involvement occurs when the government actually operates the scheme directly. In less extreme cases public officials are only members of the board or have a say in the appointment of board members. At the lowest level of government involvement only private member institutions appoint board directors.

The first column of Table 1 summarises the role of governments in the board composition of the agencies that operate deposit insurance schemes. Among the 18 countries listed, only six have appointed boards for deposit guarantee schemes without any public involvement. This practice seems to be prevalent in central European countries. At the other end of the scale, Ireland, the Netherlands and Sweden are the only countries in which the government directly operates the deposit insurance scheme.

Another measure of government involvement in deposit guarantee schemes can be drawn from survey data. The national public authorities of the different countries reported whether their deposit insurance fund is managed solely by the private sector, jointly by private and public officials, or solely by the public sector (Schich and Kim 2011). As shown by the first measure of government involvement, the survey data supports the view that the entirely private organisation of deposit insurance schemes is only common in central European countries, whereas officials from Ireland, the Netherlands, Sweden, UK, Canada and the US report that such schemes are publicly organised.

The second column shows the role played by governments in the board composition of those agencies that are concerned with investor protection. Investor protection mainly focuses on financial regulatory measures like disclosure rules and transparency requirements. It is supposed to oblige financial institutions to offer appropriate financial products and services, and to enable investors to make informed choices (Schich and Kim 2011). Table 1 shows that investor protection is only directly controlled by the government in the Netherlands and Sweden. All other countries have implemented either a mixed or a private process for appointing the board members of investor protection agencies.

In view of the lengthy duration of life insurance contracts, it is of the utmost importance to policy holders that their interests are protected, especially if the insurance company should default. In the countries for which data is available, the number of life insurance policy holder protection schemes headed by purely private boards and by boards appointed by government involvement is roughly equal. The government does not run life insurance holder protection schemes directly in any of the countries surveyed.

Another protection scheme in Table 1 deals with non-life insurance contracts. Among the countries analysed, only Ireland has opted for a directly government-run organisation. The last column outlines government involvement in a pension guarantee scheme for seven OECD-countries. Canada is the

only country where this scheme is entirely run by the government. At the other end of the scale, Germany, Japan, and Sweden appoint board members for pension guarantee schemes on a purely private basis.

On balance, both the government and the private sector are involved in the board composition of agencies running deposit and pension guarantee schemes in most of the countries surveyed. The same holds for agencies aiming to protect investors and insurance policy holders. Guarantee and protection schemes are rarely directly run by the government.

B.A.

Reference

Schich, S. and B.-H. Kim. (2011), "Guarantee Arrangements for Financial Promises: How Widely Should the Safety Net be Cast?", *OECD Journal: Financial Market Trends* 2011 (1).

Table 1

Government influence on selected management aspects

	Deposit guarantee	Investor protection	Life insurance policyholder protection	Non-life insurance policyholder protection	Pension guarantee
Austria	▲ – Private	▲			
Belgium	□ – Mixed	□			
Denmark	□ – Mixed	○		●	
Finland	▲ – Private	▲			
France	▲ – Private	▲	▲	□	
Germany	▲ – Mixed	□	▲		▲
Ireland	■ – Public	□		■	
Italy	▲ – Private	▲			
Netherlands	■ – Public	■			
Poland	□ – Mixed	□	□		
Spain	□ – Mixed	▲	□	□	
Sweden	■ – Public	■			▲
United Kingdom	● – Public	●	●	●	●
Norway	□ – Private	□		●	
Switzerland	▲ – Private				○
Canada	□ – Public	▲	▲	▲	■
Japan	● – Mixed	▲	○	○	▲
United States	□ – Public	●	▲	▲	□

Note: The text in the column for deposit insurance indicates the assessment made in the World Bank financial structure database regarding the management of the guarantee arrangement. The symbols provide a simple assessment of government influence in the composition of the Board of the agency operating the guarantee assessment.

■ – Government (including central bank) directly operates the arrangement.
□ – Public officials are part of the board and/or government-owned institutions administer arrangement.
● – Board members appointed i) from non-member and member institutions and ii) the government.
○ – Board members appointed i) from member institutions and ii) by the government (including central bank).
▲ – Board members of agency in charge of guarantee arrangement appointed by (private) member institutions.

Source: Schich and Kim (2011, 230).

E-Government Development Index

The provision of public services is one of the main tasks of national administrations. The development of new communication technologies and the emerging importance of the internet is obliging national authorities to provide a growing number of services online. This, in turn, means that citizens require the infrastructure and the skills to take advantage of the electronic services on offer.

To measure the development of national e-government capacities, the United Nations has generated the United Nations e-government development index (EGDI). The EGDI is a composite indicator that consists of three indices (online service index, telecommunication index and human capital index) that are equally weighted. In view of the steady growth in technological capabilities and the fact that the UN aims to reflect these developments in their indices, the EGDI is not fully comparable to prior indices reported by the organisation.

The three indices that make up the EGDI cover a broad range of topics that are relevant for e-government (Figure 1):

- The *online service index* measures a government's capability and willingness to provide services and communicate with its citizens electronically.
- The *telecommunication infrastructure index* measures the existing infrastructure that is required for citizens to participate in e-government.
- The *human capital index* is used to measure citizens' ability to use e-government services.

Online service index: This measures four stages of the online availability of national authorities. The higher stages have a greater impact on the index.

The first stage, emerging information service, measures if the government's website provides information to citizens in a user-friendly way, and if it provides links to ministries and other branches of government. As far as this service element is concerned, none of the countries observed have a value below 75 percent, meaning that at least 75 percent of the categories monitored at this stage are rated positively.

The second stage, the enhanced information service, basically tests whether a government s website enables one-way or simple two-way communication between authorities and citizens. In this case there is a far wider spread in the values scored by countries, which range from between 57 percent of fulfilment in Bulgaria and 95 percent in the United Kingdom.

The third stage, transactional services, measures the extent to which two-way communication between national administration and citizens is possible; including the possibility of handling a wide range of public services online, as well as requesting and receiving inputs on government policies. While the Czech Republic scores just 25 percent, Korea achieves a value of 92 percent at this stage.

The fourth stage, connected services, measures the government's ability to be proactive in web 2.0 applications, and whether the government provides a wide range of tailor-made e-services for different segments of citizens. The scores at this last stage range between 26 percent in Bulgaria and 88 percent in the Netherlands.

Telecommunication infrastructure index: This index consists of the estimated number of internet users, the number of main fixed telephone lines, the number of mobile subscribers, the number of fixed internet subscriptions and the number of fixed broadband facilities, each per 100 inhabitants. Whilst the online service index describes the digital presence and capability of governments, the telecommunication infrastructure index measures the respective national telecommunication infrastructure's ability to enable citizens to participate in all forms of e-government.

Human capital index: The human capital index is a compound of the literacy rate and a combined primary, secondary and tertiary gross enrolment ratio. Due to the high levels in enrolment and literacy in the countries observed, this index varies less than the others.

The EGDI is a result of the indices described above and shows that only two of the observed countries have a value beneath 0.60, namely the Republic of Macedonia (0.5587) and Turkey (0.5281), while Korea (0.9283), the Netherlands (0.9125), and the United Kingdom (0.8960) have the highest index value.

Overall, more countries have a higher value for the online service component than for the telecommuni-

cation infrastructure component; and except for five countries, the value for the human capital component is higher than that of the other components. The fact that the human capital component shows a lower variation in measured values than the other components means that it tends to level out differences in the EGDI value between the countries.

A more detailed table with further information is presented in the DICE Database under the category Public Sector / Public Governance and Law / Transparency.

D. L.

Reference

United Nations (2012), *E-Government Survey 2012. E-Government for the People,* New York.

Table 1

United Nations e-government development index (EGDI), 2012

	Rank	Index value	Online service component	Stage I	Stage II	Stage III	Stage IV	Total	Telecomm. infrastructure component	Human capital component
				Relative weight of stages						
				7%	24%	30%	39%	100%		
Austria	21	0.7840	0.7451	100	71	67	54	65	0.6977	0.9091
Belgium	24	0.7718	0.6471	100	64	65	38	57	0.7420	0.9264
Bulgaria	60	0.6132	0.4902	100	57	40	26	43	0.5006	0.8486
Cyprus	45	0.6508	0.5621	100	62	46	35	49	0.5153	0.8751
Czech Republic	46	0.6491	0.5425	100	60	25	48	47	0.5151	0.8898
Denmark	4	0.8889	0.8562	100	86	77	62	75	0.8615	0.9489
Estonia	20	0.7987	0.8235	100	69	65	74	72	0.6642	0.9085
Finland	9	0.8505	0.8824	100	90	75	67	77	0.7225	0.9467
France	6	0.8635	0.8758	100	79	85	65	77	0.7902	0.9244
Germany	17	0.8079	0.7516	92	67	56	68	66	0.7750	0.8971
Greece	37	0.6872	0.5752	100	60	40	43	50	0.5531	0.9332
Hungary	31	0.7201	0.6863	100	69	54	52	60	0.5677	0.9065
Ireland	34	0.7149	0.5359	75	62	44	35	47	0.6553	0.9535
Italy	32	0.7190	0.5752	92	57	48	41	50	0.6697	0.9120
Latvia	42	0.6604	0.5882	100	67	35	46	51	0.5051	0.8879
Lithuania	29	0.7333	0.6993	83	67	54	59	61	0.5765	0.9240
Luxembourg	19	0.8014	0.6993	100	69	62	49	61	0.8644	0.8404
Malta	35	0.7131	0.6144	100	62	48	45	54	0.7192	0.8057
Netherlands	2	0.9125	0.9608	100	88	71	88	84	0.8342	0.9425
Poland	47	0.6441	0.5359	100	67	42	29	47	0.4921	0.9044
Portugal	33	0.7165	0.6536	100	74	42	51	57	0.6028	0.8931
Romania	62	0.6060	0.5163	100	64	29	36	45	0.4232	0.8783
Slovakia	53	0.6292	0.5033	92	60	27	39	44	0.5147	0.8696
Slovenia	25	0.7492	0.6667	100	71	56	45	58	0.6509	0.9300
Spain	23	0.7770	0.7582	92	67	71	58	66	0.6318	0.9409
Sweden	7	0.8599	0.8431	92	90	71	62	74	0.8225	0.9141
United Kingdom	3	0.8960	0.9739	100	95	79	81	85	0.8135	0.9007
Croatia	30	0.7328	0.6405	100	76	44	45	56	0.6965	0.8615
Iceland	22	0.7835	0.5425	92	69	38	33	47	0.8772	0.9310
Macedonia	70	0.5587	0.4510	100	57	23	30	39	0.4135	0.8115
Montenegro	57	0.6218	0.5098	92	64	31	35	45	0.5375	0.8182
Serbia	51	0.6312	0.5752	100	64	38	42	50	0.4701	0.8484
Norway	8	0.8593	0.8562	100	71	79	70	75	0.7870	0.9347
Switzerland	15	0.8134	0.6732	100	88	46	43	59	0.8782	0.8888
Turkey	80	0.5281	0.4641	100	62	23	30	41	0.3478	0.7726
Australia	12	0.8390	0.8627	100	74	79	70	75	0.6543	1.0000
Canada	11	0.8430	0.8889	100	83	81	68	78	0.7163	0.9238
Japan	18	0.8019	0.8627	100	79	75	70	75	0.6460	0.8969
Korea	1	0.9283	1.0000	100	79	92	87	87	0.8356	0.9494
New Zealand	13	0.8381	0.7843	100	79	69	57	69	0.7318	0.9982
United States	5	0.8687	1.0000	100	90	88	83	87	0.6860	0.9202

Source: United Nations (2012, 126–133).

Pension Reforms: 67 – or Higher – is Becoming the New 65

Working longer as people live longer improves the financial sustainability of pension systems and it ensures a fairer distribution of the costs of ageing across generations (OECD 2012). How are countries adjusting to this challenge? The latest OECD Pension Outlook (2012) analyses pension reform measures in OECD countries since the beginning of the crisis in September 2007. Although highly controversially debated, the most obvious changes are increases in pension age. Looking at the pensionable age under long-term rules "67 – or higher – is becoming the new 65" concludes the latest outlook (OECD 2012, 26). Indeed, as can be seen in Figure 1, most OECD countries have already increased pensionable ages, or plan to do so in the near future. By 2050, one third of the OECD countries will have increased their pensionable age to at least 67. Moreover, in five countries, both men and women are expected to retire at 68 (Czech Republic, Ireland and United Kingdom) or at 69 (Denmark and Italy).

On the other hand, there are only a few countries left with pension ages below 65, and this is mostly the case for females. In France, for example, the deciding factor is generally the number of years of contribution, rather than the pensionable age (62 from 2017 on). For people with an incomplete contribution history, the pension age for a full rate pension will be 67 from 2022 onwards.

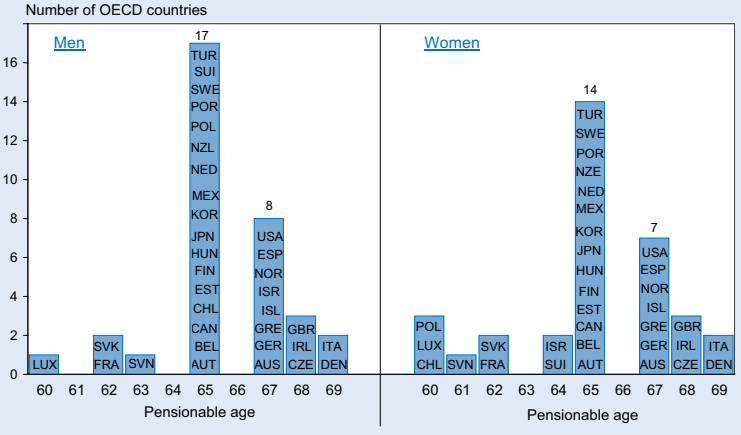
However, other less visible measures to encourage people to work longer, such as tighter conditions for early retirement, linking pensionable age to life expectancy or greater rewards for continuing after the normal pension age, were also implemented in 14 countries (Table 1). Australia and France, for example, have improved incentives for people to continue working after the normal pension age. Sweden provides an in-work tax credit to individuals aged 65+ at a higher level than for under the 65s. Both Sweden and Portugal have exempted older workers from employee social security contributions. The conditions for receiving early pensions have been tightened in Austria, the Czech Republic, France, Greece, Hungary, Italy, Denmark and Spain. Finland has tightened the conditions for the part-time pension and unemployment pathways into retirement, and Poland plans to remove early-retirement privileges for large groups of workers. France and Ireland have taken steps within public-sector pension arrangements to encourage people to work longer (Table 1).

However, bearing in mind the historical perspective, future increases in the pensionable age look far less impressive: in 1950, the average pension age in OECD countries was 64.5 for men and just over 63 for women. Then, over four decades, the average pensionable age fell to 62.5 for men and 61.1 for women. The average pension age is not expected to return to the same level as in 1950 until 2030 (for men) and 2020 (for women) (OECD 2012).

Moreover, whilst the pensionable age fell by two years in the decades following 1950, between 1958 and 2010, life expectancy after retirement grew by 4.3 years for men and by 5.7 years for women (OECD average). Looking forward, life expectancy is expected to continue to rise, and thus to outstrip increases in pension ages. Despite many OECD countries having already legislated for phased increases in the pension age (Figure 1 and Table 1), by 2050, on average, men are expected to enjoy 20 years in retirement, and women are projected to live for 23.7 years after leaving work.

Figure 1

Pensionable Age Under Long-Term Rules, by Sex



Source: OECD (2012).

Given current pension reform measures, it is therefore likely that the pension age will be able to keep pace with improvements in life expectancy in just a few countries (OECD 2012): the Czech Republic, Greece, Hungary, Italy, Korea and Turkey. In Austria, Estonia, the Slovak Republic and the United Kingdom, pension age increases exceed the projected growth in life expectancy for women, but not for men.

S.R.

Reference

OECD (2012), *OECD Pensions Outlook* 2012, OECD Publishing, Paris.

Table 1

Details of pension-reform measures – work incentives[1]

Austria	Access to early retirement tightened: higher minimum age, stricter rules on "substituted insurance periods" (*Ersatzzeiten*), abolition of buying retrospective insurance (for periods in full-time education) and 4.2% actuarial decrement to be applied for early retirement on this basis from 2014.
Belgium	Increase in employer contn to early-retirement benefits (April 2010).
Czech Republic	Pension age 63 ↑ 65 for men, 59-63 ↑ 62-65 for women depending on number of children from 2028; requirement for full benefit 20 ↑ 35 yrs by 2019.
Denmark	Voluntary early retirement scheme (eferlon) scaled back: increase in eligibility age 60 ↑ 64 during 2014–23 reducing pay-out period 5 ↓ 3 yrs; during 2012, choice between early retirement benefits and a tax-free lump sum at eligibility age of DKK 143,300.
Estonia	Pension age 63 ↑ 65 for men, 60.5 ↑ 65 for women 2017–2026.
Finland	Possibility of putting pension on hold while working (max. 2 years) extended to earnings related pensions from private sector. Currently, temporary legislation covering 2010–2014 (Jan. 2010). Eligibility age for part-time pensions increased to 60 for cohort 1953+ and the old-age pension after part-time pension slightly decreased. Eligibility age for unemployment pathway to pensions increased for cohort 1955+ to 60.
France	Minimum pension age (subject to contn conditions) 60 ↑ 62 by 2017; age for full rate pension 65 ↑ 67 (Nov. 2011); increment for late retirement 3-4% ↑ 5% from 2009; employers must have an action plan for employing workers aged 50+ by Jan. 2010 or face penalty social security contns. Actuarial reduction for early retirement from July 2008.
Germany	Increase in normal pension age 65 ↑ 67 for cohort 1964+.
Greece	Pension age linked to life expectancy from 2020; minimum age 60 for early retirement from 2011; contn yrs for full benefit 37 ↑ 40 yrs by 2015. Actuarial reduction of 6% per year of early retirement (July 2010).
Hungary	Pension age 62 ↑ 65 in 2012-17; tighter conditions for early retirement.
Ireland	Pension age 65 ↑ 66 from 2014 and ↑ 67 from 2021 and ↑ 68 from 2028. Pension decrement for early retirement of public-sector workers.
Italy	Pension age for women 60 ↑ 65 to match that of men; pension age for both sexes 65 ↑ 67 by 2021; pension age for women working in the public sector 61 ↑ 65 in 2012. Early retirement through seniority pensions (based on contribution yrs) limited.
Netherlands	Pension age 65 ↑ 66 from 2020 and 67 from 2025 before parliament.
Poland	Restrictions on occupations that can retire early, cutting eligible numbers by 80%, and then eliminating the scheme (Jan. 2009).
Portugal	Lower social security contn rate for workers aged 65+. (Sept. 2009).
Slovenia	Proposal to increase normal pension age 63 ↑ 65 men, 61 ↑ 63 women 2021–2024; eligibility for early retirement on full pension 40 ↑ 43 yrs men, 37.25 ↑ 41 yrs women was rejected by referendum in June 2011.
Spain	Normal pension age 65 ↑ 67 between 2013 and 2027 but full benefit at 65 with 38.5 yrs contn; sustainability adjustment after 2027; early pension age 61 ↑ 63 (but 61 in times of economic crisis); contn for full benefit 35 ↑ 37 yrs; contn for early retirement 30 ↑ 33 yrs.
Sweden	In-work tax credit introduced in 2007: higher level for over 65s. Credit for older workers enhanced in 2008 and 2009. In 2011, maximum credit for under 65s of SEK 21 249 (at average municipal tax rate) compared with SEK 30 000 for over 65s. Employee payroll taxes and abolished for over 65s in 2008-9; employer taxes (except for 10.21% pension contn for cohorts 1938+) also abolished. Note that full social security contribution is 31.42% for cohorts 1938+.
United Kingdom	Bring forward pension age increase 65 ↑ 66 to 2020, 6 yrs earlier than planned (Oct. 2010) and 66 ↑ 67 to 2026–28, 10 yrs earlier than planned (Nov. 2011).
Norway	Flexible retirement age 62–75 with adjustments to benefit levels.
Turkey	Pension age 60 ↑ 65 for men and 58 ↑ 65 for women by 2048.
Australia	Pension age for public scheme 65 ↑ 67 2017–23; earliest access age for private schemes 55 ↑ 60 by 2025; tax penalty on access to private pensions before age 60. Work bonus: concession in the income test that enables public pensioners to earn up to AUD 6 500 a year (single) and AUD 13,000 (couples). This is in addition to the income test free area of AUD 3,744 in the year 2010.
Contn = contribution; yrs = years.	

[1] For a detailed summary by primary objective (Coverage, Adequacy, Financial and Fiscal Sustainability, Administrative Efficiency, Diversification / Security and Other Aspects see: DICE Database / Social Policy / Pension / System Characteristics, *"Pension-Reform Measures September 2007 – February 2012"*.

Source: OECD (2012).

Financing of Political Parties: Disclosure Requirements and Competent Body

The United Nations Convention Against Corruption states in Article 7 on the Public Sector that: "*Each State Party shall […] consider taking appropriate legislative and administrative measures […] to enhance transparency in the funding of candidatures for elected public office and, where applicable, the funding of political parties*" (United Nations Office on Drugs and Crime 2004, Art. 7.3). There is obviously a connection between parties' financial transparency and potential corruption. One crucial way to enhance transparency is to provide disclosure requirements for donations, and thereby detect eventual conflicts of interests. Another interrelated aspect is the body responsible for the administration and enforcement of such regulations as it determines the effectiveness of existing rules.

Disclosure requirements for donors are particularly relevant when high amounts are donated, as the donor may be suspected of having some influence over the receiving party or candidate in such cases. Regulation might therefore require disclosure in cases where donations exceed some threshold value. This can be justified as being in the electorate's interest, as knowledge of such money flows makes it easier to detect conflicts of interest. In the case of minor donations, however, it can be argued that an individual's or entity's right not to reveal his or her identity outweighs this consideration.

The table shows that most European countries have disclosure requirements for donors to contribution-receiving political parties. These requirements apply either to all contributions or those above a certain threshold value. In Germany, for instance, donors must be identified if their contribution is larger than EUR 500, and disclosed if their donation exceeds EUR 10,000 in one year. In Italy contributions of over EUR 50,000 for parties and over EUR 20,000 for candidates in one year must be disclosed. In Cyprus, Malta, Sweden and Switzerland, on the other hand, there are no disclosure requirements at all.

It is intriguing that, despite existing regulation concerning parties' finances, there is no regulatory system in place to examine the financial reports made in some cases. Yet the complete absence of, or existence of only a weak body for administration and enforcement will presumably do little to promote adherence to the rules. If a regulatory body exists, an auditing agency, a court, an electoral management body or a government ministry are often responsible for supervision. However, in the case of ministries, these bodies might not be independent enough to guarantee a credible examination. An independent regulatory institution may be more desirable instead. Indeed, in some cases there is an institution specially created for this purpose, as for example in France, Italy, Portugal, the United Kingdom or Norway. Those European countries that lack a regulation system include Denmark, Malta and Sweden.

Finally, while disclosure requirements and regulation authorities are important per se, they must be considered together with further regulations and their actual enforcement when seeking a link to transparency or potential corruption in the overall public sector. Looking, for example, at the Transparency International Corruption Perception Index, which tries to measure perceived public sector corruption, it is striking that Sweden, which has no disclosure requirements and no regulation system, ranks fourth worldwide with 9.3 points (Transparency International 2011). A higher score is associated with lower corruption and 10 points represent the best score. Italy, on the other hand, scores poorly with only 3.9 points, despite possessing disclosure requirements and a regulatory body specially created for the purpose of supervision.

D.K.

References

IDEA (2012), Political Finance Database, http://www.idea.int/political-finance/reporting-oversight-sanctions.cfm

Transparency International (2011), Corruption Perceptions Index 2011, http://cpi.transparency.org/cpi2011/results/ (accessed 19 September 2012).

United Nations Office on Drugs and Crime (2004), United Nations Convention Against Corruption, http://www.unodc.org/documents/treaties/UNCAC/Publications/Convention/08-50026_E.pdf. (accessed 19 September 2012).

Table 1

Financing of political parties: disclosure requirements and competent body

	Body responsible for administration and enforcement of regulations for the financing of political parties	Disclosure requirements for donors to political parties that receive contributions
Austria	Ministry of Finance.	Contributions over EUR 7,260.
Belgium	Control commissions.	Contributions over EUR 125.
Bulgaria	National Audit Office and the Sofia City Prosecutor's Office.	All contributions received.
Cyprus	Auditor General; Ministry of the Interior.	No disclosure requirements.
Czech Republic	Chamber of Deputies; Tax Authorities.	All contributions received.
Denmark	No regulation system.	Contributions over DKK 20,000.
Estonia	Police prefecture.	All contributions received.
Finland	Ministry of Justice; National Audit Office.	Contributions over EUR 1,500.
France	Court; Institution for this purpose; Police; Tax Authorities.	All contributions received.
Germany	President of the Bundestag.	Donors must be identified if contributions exceed EUR 500, and disclosed if donations exceed EUR 10,000 per year.
Hungary	State Audit Office.	Contributions over HUF 500,000 or HUF 100,000 in the case of foreign contributions per year.
Ireland	Standards in Public Office Commission, the Gardai (police).	Contributions over EUR 5,078.95 for parties and over EUR 634,87 for candidates.
Italy	Auditing Agency; Institution for this purpose.	Contributions over EUR 50,000 for parties and over EUR 20,000 for candidates per year.
Latvia	The Corruption Prevention and Combating Bureau.	All contributions received.
Lithuania	Court; Electoral Management Body; other state authorities.	All contributions received.
Malta	No regulation system.	No disclosure requirements.
Netherlands	Ministry of the Interior.	Contributions from parties other than a natural person exceeding EUR 4.537,80. If the donor objects to disclosure, only the category of donor's organization must be disclosed.
Poland	Electoral Management Body.	Contributions exceeding one minimum wage.
Portugal	Constitutional Court; Electoral Management Body; Institution for this purpose.	All contributions received.
Romania	Court of Audit; Electoral Management Body.	Contributions exceeding 10 minimum gross salaries per year.
Slovakia	National council and Ministry of Finance.	Membership fees over SKK 25,000 per year. Contributions over EUR 331 for presidential candidates.
Spain	Court of Audit.	All contributions received.
Sweden	No regulation system.	No disclosure requirements.
United Kingdom	Courts; Institution for this purpose; Police.	All contributions received.
Norway	Institution for this purpose.	Contributions over NOK 30,000 per year.
Switzerland	No regulation system.	No disclosure requirements.
Australia	Electoral Management Body.	Contributions over AUD 11,500 (in 2010/2011).
Canada	Electoral Management Body.	Contributions over CAD 200.
Japan	Electoral Management Body; Minister for Internal Affairs and Communications.	Contributions over JPY 50,000.
New Zealand	Electoral Management Body; Police.	Contributions over NZD 1,500 for candidates or NZD 15,000 for parties; NZD 1,500 if donation to a party comes from an overseas person.
United States	Department of Justice; Electoral Management Body.	Contributions over USD 200 in an election cycle; identification of all PACs and party committees that give contributions.

Source: IDEA (2012).

New at DICE Database

Recent entries to the DICE Database

In the last quarter of 2012 the DICE Database received around 130 entries, consisting partly of updates of existing content and partly of new topics. The institutional themes of "Energy" and "Labour Market" are being restructured to enhance usability.

The new or updated topics include:

- Development of wages, minimum wage and wage differences
- Energy consumption and regulations in the energy sector
- Women's representation in national parliaments
- Progress in the implementation of Basel III
- Quality of and investment in infrastructure
- Freedom of press
- Entrepreneurship

Forthcoming Conferences

CESifo Area Conference on Macro, Money and International Finance

22–23 February 2013, in Munich

The purpose of this event is to bring together CESifo members who are working in the areas of macroeconomics and money to present and discuss their ongoing research, and to stimulate interaction and co-operation between them. All CESifo research network members are invited to submit their papers, which may deal with any topic in Macro, Money, and International Finance. This conference is open to CESifo Network Members only.

Scientific organiser: Paul De Grauwe

3rd Workshop on Labour Markets and Social Policy

1–2 March 2013, in Dresden

The two-day workshop is addressed to junior researchers to present their new research results in the fields of labour market and social policy research. The workshop is intended to foster the networking of junior researchers. Both, theoretical as well as empirical work is welcome. This year´s workshop focuses on the influence of individual characteristics and institutional set ups on individual labour market outcomes.

Scientific organisers: Alexander Kemnitz, Michael Kloß and Wolfgang Nagl

CESifo Area Conference on Applied Microeconomics 2013

08–9 March 2013, in Munich

The purpose of the conference is to bring together CESifo members to present and discuss their ongoing research, and to stimulate interaction and co-operation between them. All CESifo research network members are invited to submit their papers, which may deal with any topic within the broad domain of Applied Microeconomics (industrial organisation, experimental and behavioural economics, market regulation, banking and finance, auctions).

Scientific organiser: Christian Gollier

CESifo Area Conference on Public Sector Economics 2013

11–13 April 2013, in Munich

This annual area conference is intended to give an overview of the current research undertaken by members of the Public Sector Economics area of the network and to stimulate interaction and co-operation between area members. All CESifo research network members are invited to submit their papers which may deal with any topic in Public Economics.

Scientific organiser: Rick Van der Ploeg

CESifo–Delphi Conference 2013 – "The Economics of Firm Exporting"

26–27 April 2013, in Munich

CESifo and the Department of International and European Economic Studies (DIEES) of the Athens University of Economics and Business (AUEB) invite the submission of papers or extended abstracts (300-500 words) on the question of "The Economics of Firm Exporting" for the CESifo–Delphi Conference 2013.

Scientific organisers: Peter Egger, Margarita Katsimi

New Books on Institutions

The Handbook of the Political Economy of Financial Crises
Edited by Martin H. Wolfson and Gerald A. Epstein, Oxford University Press, 2013

Institutions and Comparative Economic Development
Edited by Masahiko Aoki, Timur Kuran and Gérard Roland,
Palgrave Macmillan, 2012.

DICE

Database for Institutional Comparisons in Europe

www.cesifo-group.org/DICE

The DICE database was created to stimulate the political and academic discussion on institutional and economic policy reforms. For this purpose, DICE provides country-comparative information on institutions, regulations and the conduct of economic policy.

To date, the following main topics are covered: Business and Financial Markets, Education and Innovation, Energy and Natural Environment, Infrastructure, Labour Market and Migration, Public Sector, Social Policy, Values and Other Topics.

The information of the database comes mainly in the form of tables – with countries as the first column – but DICE contains also several graphs and short reports. In most tables, all 27 EU and some important non-EU countries are covered.

DICE consists primarily of information which is – in principle – also available elsewhere but often not easily attainable. We provide a very convenient access for the user, the presentation is systematic and the main focus is truly on institutions, regulations and economic policy conduct. Some tables are based on empirical institutional research by Ifo and CESifo colleagues as well as the DICE staff.

DICE is a free-access database.

Critical remarks and recommendations are always welcome.
Please address them to

poutvaara@ifo.de
or
DICE@ifo.de