

Public Investment and Discounting in European Union Member States¹

By
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Part 1: Budgetary Management of Public Investment

1. Introduction

The formal procedures of public expenditure management vary widely within the European Union. They depend especially on the relative status of institutions. In most member states, operations are delegated to spending ministries or other spending units which have considerable freedom (within tough overall budget constraints) to decide how they meet their objectives; but there are wide variations in the degree of delegation and the incentives for efficiency. Public enterprises, similarly, are seen in some countries as an arm of the public sector and in others as essentially commercial bodies. Some member states have federal structures. Nearly all have complex procedures for funding local municipalities or counties. They differ in their relationships between government and Parliament. They also differ in technical procedures such as budgetary timescales, and methods of accounting for expenditure.

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Furthermore no state's procedures stand still. On the contrary, the reform of public administration has been a major feature of most member states in recent years, and remains so. Many of these reforms affect responsibilities and incentive structures for capital investment.

Thus, no single operational template for the budgetary management of public investment can be lifted from EU experience.

There are, however, principles which member states would accept as good practice, and which can be tailored to the circumstances of individual Central and Eastern European countries (CEECs).

The following sections are based on several sources. These include: published work² by the OECD, the Asian Development Bank, the IMF, the World Bank, and the European Commission; many useful comments by experts on an earlier draft;³ advice from officials and other experts in France, Sweden and the Netherlands; and the author's direct experience of the UK and other countries. Use has also been made of government publications of the United States,⁴ which are written for a very different institutional setting but which deal thoroughly with the same principles and the same challenges.

The rest of Part I:

- defines "budgetary management of public investment";
- discusses the present handling in EU member states and CEECs of three key issues: the distinction between capital and current expenditure; multi-year budgeting and long-term commitments; and the role of the Ministry of Finance;
- describes how budgetary management of public investment in EU member states has evolved over time;
- discusses sources of good practice;
- concludes with a summary of main points.

2. Definition of Budgetary Management of Public Investment

"Budgetary management" has no unique definition. However many EU member states would use the term budgetary management of capital investment in a broad sense, as in this paper, to include most or all of the activities listed in Table 1.

The institutions contributing to these activities in all EU member states include the Ministry of Finance, spending ministries and other spending units, the

Table 1. Stages of Budgetary Management of Public Investment

Timing	Activity
Pre-commitment	Strategic objectives/strategic planning/detailed objectives
	Option appraisal
	Financing
	Budgetary allocation
Post-commitment	Procurement
	Project management
	Budget monitoring and control
Post-completion	Asset management
	Performance measurement
After any stage	<i>Ex post</i> evaluation

Prime Minister or Senior Ministers collectively, Parliament, and the Supreme Audit Institution.

CEECs developing budgetary processes would benefit from defining exactly what they wish to mean by terms such as budgeting, planning, control, programming, or whatever concepts of this kind they find useful. Clear definitions can greatly help to clarify discussion and development of budgetary procedures. Also needed is a definition of the roles of each institution in each activity.

A useful distinction can be drawn between the three principle objectives of budgetary management, which are planning (which is done before the expenditure), control (which is applied during and after the expenditure), and operational management. Some activities in Table 1 are planning; some are control; some (such as procurement) entail planning, control and operational management.⁵

These activities raise very many complex practical issues. Those discussed in the following two sections are chosen either because they are frequent points of difference between CEECs and EU member states, or because they illustrate how perceptions and practice have changed over time with the EU and more generally within OECD Member countries.

3. Three Key Issues

This section discusses three issues where, within EU member states, broad principles are well established and not generally controversial. They are however issues on which CEECs often diverge substantially from practice within the EU.

3.1. *The Distinction between Capital and Current Expenditure*

Capital and current expenditures should, for some purposes, be considered separately. For some purposes they should be considered together:

- budgeting and decision-making processes for capital and current spending must be considered together;
- capital spending within the budget, once it is set, must be clearly identified separately;
- investment proposals should be subject to processes for appraisal (of the capital and all the associated operating costs);
- strong procedures should be in place for capital asset procurement and for project management, and for subsequent monitoring and management of capital assets.

It is normal in EU member states for the section in the Ministry of Finance which is familiar with a spending unit's activities to deal with both capital and current spending. *Thus, the Ministry of Finance handles the budgeting of capital and current expenditure for each spending unit as an integrated expenditure programme.*

Budgets, when set, have capital and current components, usually with only limited freedom (if any) to vire between them. However, development of capital investment plans is seen as an issue for the internal management of spending units. Specific Ministry of Finance approval may be needed for some large capital projects, but this will be granted or withheld on the basis of analysis of the proposal as a whole, including all the current expenditure which would be needed to make use of the asset.

The annual government budget for all public spending is typically broken down into several hundred headings for approval by the Parliament. Each heading is usually wholly capital spending or wholly current spending. Indeed parliaments often require capital expenditures to be specifically identified in the budget documentation. However, presentation and debate in Parliament and in public focuses on the expenditure programmes as a whole.⁶

Capital and current expenditure are, however, distinguished in the *accounts* of spending units and in *reporting* expenditure.

In some member states, as described below, there are developments which are beginning to draw a sharper distinction between capital and current public spending. These include accrual accounting; "private financing" for public service projects; and in some cases stronger links between capital and the level of public

debt. However none of these developments challenge the principle of integrated *planning* of capital and current expenditure.

In most CEECs, the preparation of capital and current budgets are essentially separate procedures, carried out by different departments in the Ministry of Finance or, in some cases, by different ministries (*e.g.* the Ministry of Finance for current budgets, Ministry of Economy for capital budgets).

One reason for this separation is the special treatment and status given to capital expenditures, as part of the national development plans, in the former Soviet Union, and the powerful institutional status given to the GOSPLAN (and to some of the line ministries) relative to the Ministry of Finance, which was regarded essentially as a ministry of accounting. Another reason appears to be the extensive use in CEECs, especially in the early stages of transition, of overseas financing for capital projects. Under pressure from the World Bank, many transition countries developed Public Investment Plans (PIPs), which had some of the characteristics of the old Soviet planning system and retained many of the old institutional structures.⁷

There are serious disadvantages in separating the planning and budgeting of capital and current spending. Only if both are considered together can the relevant officials in the Ministry of Finance and in the spending units take a comprehensive view of each expenditure programme as a whole, including the best balance between capital and current. This is important in particular for EU funds, and for World Bank funds, which finance both capital and current spending (and are also set within a medium-term framework). Preparation for these grants and co-financing elements through the budget requires an integrated approach.

Yet another reason for avoiding the separate planning of capital is the political danger of over investment, because capital is often seen as inherently virtuous, or politically rewarding, especially if it can be approved separately from its associated current spending. Separate planning also duplicates work, using scarce administrative resources. It contributes to communication problems or political tensions between ministries or ministers. It discourages integrated forward planning within spending units. Even the logic of the boundary between capital and current expenditure is, in the public services, very fuzzy. International conventions are used to define capital for the purposes of national accounts, and these are essential for international comparisons. However, the boundaries are inevitably arbitrary. For example, teachers' salaries might, for some purposes, be better described as capital than as current, and any military expenditure might be described as either capital or current.

3.2. Multi-year Budgeting and Long-term Commitments

The usual pattern in EU member states is an annual budget negotiation,⁸ leading to a budget for the following year which is approved by Parliament, with budgets which are formally agreed for, say, two further years, but which are, in practice, open to some revision in the next annual negotiation. Many CEECs are moving to a pattern of this kind.

A problem found in some CEECs is that of handling legal commitments to payments for capital projects which extend beyond the year for which expenditure is legally budgeted. This will often apply to the payment of contractors, and over even longer periods to the repayment of debt.

These issues are not seen as significant problems in EU member states. When considering a capital project for approval, the spending unit is expected to consider all the future expenditure commitments which it would imply.⁹ Some of these commitments would be legally binding. Many others, such as the costs of maintaining, operating, and administering the asset throughout its life, might not be long-term legal commitments, but would be no less necessary for the efficient use of the asset, and no less costly. It is assumed that the spending unit will not commit itself to future expenditures which are so high that project capital costs or essential operating costs cannot be efficiently covered by future budgets.

A related issue is the need for some line ministries to have long-term investment strategies, where the sequencing of investments – in transport networks, for example – is optimised subject to budgetary constraints.

Several conditions are needed for long-term commitments of expenditure, or serious work on long-term infrastructure planning:

- confidence that budgets in the medium- to long-term will not be very severely less than expected;
- strong discipline in budget setting, to ensure that capital project approvals do not create more commitments than future budgets can reasonably be expected to support;
- confidence that project costs can be forecast reasonably reliably. In practice, all countries, whatever their stage of development, sometimes have projects which go seriously over budget. This risk can be greatly reduced, if never quite eliminated, by well specified contracts, which define clearly what is being procured, are not subsequently changed, and allow only very limited scope for negotiating price increases; and by good project management by the procuring body.

This confidence in budget allocations (based on well researched macro-economic forecasts), discipline in budget setting, and expertise in contracting and project control take time to develop. However, these conditions should by now have been sufficiently achieved in most CEECs to allow multi-year contracts and serious long-term infrastructure planning.

3.3. *The Role of the Ministry of Finance*

The Ministry of Finance in EU member states is expected to have very strong control over the budgetary process. Its ability to influence budget allocations, and explicitly approve or refuse to accept some expenditures, gives the ministry considerable authority. This depends upon the ministry having a high level of competence and upon its judgements being normally, even if not quite always, supported by the Prime Minister.

This “power of the purse” enables the ministry to issue guidance, instructions and regulations on budgetary management which line ministries follow, in the knowledge that if they do not their budgets will be threatened – and that they may also be in trouble from the state audit institution.

It is important that CEECs include in their budget law the authority for the Ministry of Finance to issue such guidance. This exists at present in only very few CEECs.

However, the Ministry of Finance must beware of collecting too much information, or involving itself in decisions which are better made by line ministries or other bodies. As noted below in the discussion of “decentralisation”, the Ministry of Finance in EU member states is generally involved directly in only a very small minority of investment decisions, and the trend is towards even less involvement.

Ministries of Finance in CEECs face not only the tasks of corresponding ministries in EU member states, but also a leading role in developing over time the many new structures and procedures needed for a mixed economy. A check list would include, for example, drafting new legislation to allow for integration of current and capital budgeting, proposing transfers of staff, drafting new budget reporting forms, modernising accounting and classification systems, writing guidance manuals on investment appraisal, promoting efficient procurement and efficient asset management, and developing training courses for itself and line ministries.

4. The Evolution of Capital Budgetary Management

Although the detailed procedures of capital budgetary management vary widely, many issues have evolved in similar ways in most EU member states. It is helpful if those developing new systems in transition economies are aware of this history. It carries interesting lessons.

The discussion below covers seven issues. Some are specific to capital; others relate to budgeting in general but have direct implications for capital. The first two have evolved slowly over some 20 or 30 years. The others are more recent, but became major developments in many countries in the 1980s or 1990s. These latter reforms have been largely driven by the increasing pressure on government budgets, imposed by public opinion and through developments such as the Maastricht Treaty. The seven issues are:

1. “scientific” budget allocation: optimism followed by realism;
2. “scientific” project appraisal: optimism followed by realism;
3. decentralisation;
4. objectives, performance measurement and incentives;
5. accrual accounting and budgeting;
6. Public/Private Partnerships;
7. golden rules, balanced budgets and limits on borrowing.

4.1. “Scientific” Budget Allocation: Optimism followed by Realism

In the 1960s and 1970s, it was widely believed that government budget allocation could be largely reduced to a “scientific” process, by systems such as PPBS (planned programming and budgeting system) or ZBB (zero-based budgeting). This belief turned out not to be true, for three main reasons. One was that for most public policies, finding the best way forward depends not only on analysis but very largely on pragmatism, political intuition and windows of political opportunity. Second was the unmanageable information demands, which were analogous to those required to run a centrally controlled economy. Third, was the implied power structure within government, as a system controlled in great detail from the centre.

During the 1980s and 1990s, developments of expenditure management systems have been more narrowly focused, and policy initiatives have been

concentrated on areas which happen, at the time, to be of highest priority, rather than seen as a continuing, comprehensive plan.

4.2. “Scientific” Project Appraisal: Optimism followed by Realism

Changes in attitudes to project appraisal have been broadly similar to those of higher level planning and budgeting. In the 1960s and early 1970s, great hopes were placed on techniques such as cost-benefit analysis (CBA) (in which non-marketed outputs are explicitly valued in monetary terms) as a way of deciding scientifically the optimal level and distribution of investment. Experience showed that for most areas of public investment this was unrealistic. Even in those areas where there is useful scope for such scientific analysis (notably transport, where time and injury risks can be valued), there are usually some major impacts, on the environment for example, which cannot be valued. In the great majority of areas of public policy, such as law and order, defence, employment, regional, industrial, education, health, or public administration, it is rarely possible for outputs to be explicitly valued.

The 1980s and 1990s have seen important advances in CBA, for example in the valuation of safety and environmental impacts. However, most numerical analysis of public sector investments in EU member states is confined to cost-effectiveness analysis (the comparison of the input costs to the economy of producing similar outputs by different means), or sometimes only to financial analysis (comparing the effects of alternative options on cash flows).

There is also increasing use of numerical techniques which do not require explicit monetary valuations. These techniques, described by the Directorate-General of Budget in the European Commission and generally by government officials as multi-criteria analysis (MCA), need to be handled with care, but if well used they can help.

Capital investment approval is a uniquely effective point at which to require a clear justification of expenditure. It is a point at which the proposer of the investment can be faced with a strong incentive to demonstrate good value, by making this a condition of approval. It is also the last point at which a proposal can be cancelled, delayed, or heavily modified without a high cost. It may, therefore, seem surprising, given the concern over the past decade with public service efficiency, that no EU member state has promoted a major initiative on investment appraisal.¹⁰

The reason for this is that the road to reform in EU member states is seen in terms of structures and incentives rather than analysis. It is assumed that if

spending units face the right incentives – to produce more socially valuable outputs with fewer inputs – this will persuade them to examine their activities more closely and to apply and further develop good analysis.

Within EU member states, Ministries of Finance take differing positions in the provision of guidance on investment appraisal. The UK Treasury (Ministry of Finance) produces a technical guide for the whole of central government; and the main spending ministries also produce guides, which are consistent with the Treasury guide, but tailored to their circumstances. In other EU member states, investment appraisal techniques are usually determined by the major spending units.

There are differences of view within and between EU member states on some technical aspects of appraisal methodology. However, investment appraisal is seen in EU member states as a mainly economic analysis of the national costs and benefits which might be generated by the investment, or by alternative options. Alternative options may include alternative locations, size, design, or timing of a new or renovated prison or hospital or defence establishment, and – especially – the alternative of not undertaking the investment.¹¹ The appraisal will typically include all costs, including the costs of using the asset throughout its lifetime. It will preferably include sensitivity analysis where costs or benefits are uncertain. It will also consider items such as legislative impact or environmental impact, and any impacts on other sectors. Political preferences will be added at the time of decision.

The most important requirements are:

- well-informed and open-minded consideration of alternative options, against well-defined policy objectives;
- taking proper account of opportunity costs (so that the use of labour, for example, is normally seen as a cost, not a benefit); and
- consideration of factors which cannot be explicitly valued in money terms as well as those which can.

This contrasts with what CEECs often understand by appraisal, which is an *engineering* analysis of an already well defined proposal. The capacity of CEECs to undertake engineering analysis is often quite strong; whereas their capacity for *micro-economic* analysis, to question initial proposals, is usually weak except, in some countries, in one or two of the most progressive ministries.

4.3. Decentralisation

EU member states vary in their degree of central involvement in specific investment projects.

In France, the most centralised EU member state, every legal commitment, capital or current, is authorised by a Financial Controller who is located in a spending ministry, but reports to the Budget Directorate of the Ministry of Finance. However, this is a check on legality, and essentially an ex ante audit rather than a planning function. The procedures for capital project selection are complex, involving regional plans and contracts between the state and the regions. France is, however, following the general trend to decentralisation. A Law of Decentralisation was passed as long ago as 1982, specifying the present three levels of regional or local government and their roles.

In Sweden, which has perhaps with Finland, the most decentralised EU public service, the Ministry of Finance is not involved in any specific expenditures. More typically, as in the UK, the Ministry of Finance approves some investment proposals – in particular those which are very large or unusual.

The Ministry of Finance in an EU member state is, in any case, not generally involved directly in more than a very small proportion of investment project approvals.

Most EU member states, while maintaining tight control over aggregate spending, are delegating more managerial freedom to spending units. Clearer specifications are being required of what spending units are expected to deliver. Spending managers' rewards (such as bonuses, re-appointment and promotion) are being related more closely to their measured performance.

One measure of decentralisation is the number of separate public expenditure votes approved by Parliament. Italy, for example, has reduced the number from 6 000 to about 800. (The UK has an unusually small number of separate votes, with only about 160.) Indeed, the degree of decentralisation may be largely determined by the Parliament. If the Parliament continues to demand a great deal of detailed information this will restrain decentralisation and devolution of authority to spending ministries. This will nearly always be damaging to the public interest. It is more effective for the Parliament to demand on a regular basis only the information it can handle on a regular basis, and to confine more detailed enquiries to specific investigations.

Another measure of decentralisation is the extent to which budgets are flexible, both within the year and between years. There is an increasing trend to allowing some limited carry over of unspent budgetary allocations into the next year, but practice varies widely between countries. This is one of many issues where each country needs to tailor its conventions to its own best interests.

However, such issues need to be kept under continuous review, and generally the main responsibility for controlling the debate and clarifying the arguments lies with the Ministry of Finance.

Another aspect of decentralisation, which every country finds difficult to manage, is that of devolution to the sub-national budgets of districts or municipalities, or in federal states, to sub-national governments with constitutional rights. The conventions relating different levels of government are often extraordinarily complex.

It is an important judgement for each CEEC country to decide how far it should follow the trend to greater delegation. Spending units should have freedom to decide how best to spend their budgets, because they know more than central ministries about their programmes, and because without this freedom they will have no incentive to develop their knowledge and budgeting skills. However, there are serious dangers in going too far, too fast towards “contractual” relationships between the centre and spending units.

4.4. Objectives, Performance Measurement and Incentives

Clear objectives are essential for effective planning. With decentralisation and delegation, objectives need to be translated into performance targets, against which managers can be held accountable. The increase in delegation (and in contracting out, including contracting out the provision of capital projects) has, therefore, led in many countries to an increased interest in performance goals, performance targets and performance measurement.

The construction of effective performance targets is in practice surprisingly difficult. The difficulties have over the years become more widely recognised, and some institutions have, with considerable effort, developed satisfactory frameworks for some applications. The difficulties, and the current situation, are well described in Chapter 15 of the OECD’s “Managing Public Expenditure”. This includes a discussion of the potential confusions between performance orientation, performance indicators and performance budgeting; the need for clarity about the concepts of input, output, outcome, impact and process; and the concept of a hierarchy of performance criteria and indicators, measuring compliance, efficiency and effectiveness.

The “science” of performance indicators has developed acronyms to describe what qualities they need. One popular one is CREAM, standing for Clear (precise and unambiguous); Relevant (appropriate to the objective at hand); Economic

(available at reasonable cost); Adequate (providing, by itself or in combination with others, a sufficient basis for assessing performance); and Monitorable (amenable to independent scrutiny). Another acronym, which adds important further qualities, is SMART, standing for Specific, Measurable, Agreed, Realistic and Timely.

Many EU member states have experience in this field which can be useful to CEECs.

4.5. Accrual Accounting and Budgeting

Experimental or permanent adoption in some areas of central government of accrual accounting, instead of only cash accounting, is now widespread in the EU. (In accrual accounting, costs are counted when the activity takes place, or as a capital asset is consumed. Capital is then charged as depreciation, instead of the cash spending on building the asset.) Among OECD Member countries, New Zealand is often quoted as an interesting case study.¹² In the EU, the introduction of accrual accounting and budgeting is well advanced in the UK and major steps are being taken in other EU member states especially the Netherlands.

Accrual accounting in some contexts is important, and in many contexts has advantages. However, it continues to present major challenges to many developed administrations and is not easy to introduce.¹³ Since cash accounting is less complex and easier to deal with, transitional economies should concentrate on developing a soundly based and reliable cash accounting system before considering accrual accounting concepts. Indeed, it is difficult to see how a transitional economy could develop a reliable accrual accounting system without first having developed a robust cash accounting system.

Ministries of Finance in CEECs need, however, to be familiar with the principles and the broad arguments for and against the use of accrual accounts. Some donor organisations are in favour of accrual accounting; and some national accounts data is required on an accrual basis under the *acquis*. There are also some activities, for example commercial activities, where accrual accounting is as relevant in the public sector as in the private sector.

4.6. Public/Private Partnerships

Public/Private Partnerships (PPPs) are another evolving area where the EU probably has few useful lessons to offer, yet, to the development of public investment policy in transitional economies.

Where an activity can be taken out of public control into a competitive or regulated private sector commercial environment, this is often the best approach, whether in a transitional or developed economy. There is also an important role for contracting out to the private sector the management and delivery of some public services. There is also often good potential for public and private sector co-operation in, for example, urban building developments which provide facilities for both sectors. However, the benefits of private financing for assets which are to remain under government control are less clear cut.

At a political level PPPs of this kind are very often seen as a way of avoiding budget constraints. However, “private” capital imposes as much future liability as “public” capital. There is little sense, and some danger, in a government using private finance as a device to evade its own financial controls.

Nonetheless, if the contract is well designed, private financing of this kind can provide better value for money than conventional public procurement, and several countries, in Europe and elsewhere, have over many years entered into such contracts, with mixed success. In recent years, the policy has probably developed furthest in the UK, for procurement from the private sector of a wide-range of capital intensive public services.¹⁴ However, this has entailed major institutional, cultural and in some areas, legal changes and could not have been efficiently achieved without a strongly established public planning and procurement base.

Transitional countries are probably best advised to concentrate on developing conventional public capital planning and procurement procedures, and the handling of established sources of external finance from the EU and elsewhere.

The most thorough EU study of PPPs for capital assets is probably that chaired by the then Transport Commissioner Neil Kinnock in 1997, in the context of Trans-European Transport Networks. That report is listed in the bibliography.

4.7. Golden Rules, Balanced Budgets and Limits on Borrowing

Some EU member states have or are developing explicit links between the level of net public investment with the level of public debt. The convention that increases in the stock of public debt should not exceed increases in the stock of net public investment is described as the “golden rule”.

There has also been increasing interest in recent years in conventions limiting the budget balance, and limiting the total level of public debt. These developments have been driven partly by the Maastricht conditions, which put limits on

budget deficits and the total level of debt as conditions for membership of the Monetary Union.

The golden rule and budget balance are specified in the German Constitution. However, a law was passed in 1967 – at a time when public investment was still widely seen as an instrument for controlling unemployment – allowing exceptions for federal and state governments where more public investment is considered justified by macro-economic conditions. This exception has been applied many times. The Netherlands applied the golden rule between 1927 and 1958. The new UK Government introduced a rigorous policy in 1997, under which the budget is balanced over the economic cycle, with no exceptions, and a target is set for the level of government debt.

Control of public debt is at least as important in transitional as in developed economies. However, the first priority is to develop reliable measures of public assets and, especially, liabilities. Information on capital assets and liabilities needs to be monitored, and some countries may find it helpful to establish some form of golden rule. However, this is a matter of national preference. The only requirements of the EU in this area are those laid down in the Maastricht Treaty.

5. Sources of Good Practice

Useful guidance covering most of the activities listed in Table 1 has been published by international organisations, in guidance covering public expenditure budgetary management as a whole.

Especially useful are the review articles in the OECD (SIGMA) report “Budgeting and Policy-making” of 1996. The presentation of Part 2 of that report (which precedes papers on France, Germany, Denmark and the US) suggests that good practice includes:

- minimising conflicts which need to be resolved personally by the Prime Minister (so that budgetary negotiation is settled mostly by civil servants);
- a firm presumption, supported by ministers collectively, against mid-year budget changes;
- re-examination of compromises of previous negotiations; and
- replacement of checks on compliance with management of performance efficiency.

The presentation also observes that, from the EU member state papers, “one concern is obvious: to strengthen the capacity for (and use of) evaluation and forward analysis of public investment projects.”

The Asian Development Bank published in April 1999 a comprehensive reference book on managing government expenditure in developing and transitional economies, to which OECD/SIGMA contributed. This includes a chapter on “The programming of public investment and the management of external assistance”. An OECD version of this reference book, targeted towards CEECs, was published in early 2001.¹⁵

Also published in 1998 was the World Bank’s “Public Expenditure Management Handbook”. This is a substantial guide addressed to transitional and developing countries. It stresses the three main objectives of budgetary management – control, efficient allocation, and efficient operational management. It describes these as “three levels of budgetary outcomes – aggregate fiscal discipline, strategic prioritisation, and operational performance”.

Effective application of the fairly complex principles set out in these guides requires a good understanding of how best to adapt them to national circumstances. Effective application also depends upon sustained commitment to the development of budgetary management by senior officials.

6. Summary of Main Points

1. Principles of “good practice” in public sector budgetary management, including capital budget management, are well set-out in international documents, notably the Asian Development Bank Reference Book on Managing Government Expenditure.
2. There are wide differences between EU member states in the ways in which the principles are applied, because each country has its distinctive set of institutions and effective sources of authority. There is, therefore, no single template which can be transferred from one country to another. However, EU member states generally share a common view with the international institutions of the principles of good practice.
3. Most EU member states, like many other countries, are in a period of rapid development of public expenditure management, in ways which give more freedom to spending units for capital investment and other decision-making, in exchange for stronger accountability for outputs.

There are many points on which Ministries of Finance in CEECs may wish to compare their procedures with those of EU member states. However three stand out as fundamental:

- *Integration of capital and current budgetary allocation:* Capital and current budget allocation are often handled in CEECs by different officials in the Ministry of Finance, or even by different ministries. This is not the case in EU member states.
- *Distribution of responsibility between the Ministry of Finance and spending units:* The systems in most CEECs are centralised, with a much stronger emphasis on input (expenditure) data than output data. This contrasts increasingly with the situation in most EU member states, where the emphasis is more on delegation of authority and specification and measurement of outputs, as well as the planning and control of inputs.
- *Appraisal of specific investment proposals:* The Ministry of Finance, supported by the government, needs to require that before a proposal is approved, the spending unit considers all the impacts on the national interest, throughout its lifetime and regardless of the sources of external or internal financing; and that it examines alternative ways of achieving the objectives. In CEECs “appraisal” is often confined to the engineering assessment of a single option.

Part 2: Discounting and the Cost of Capital in the Public Sector

1. Introduction

In every developed country, the technique of discounting is used in the public and private sectors, to compare costs and benefits which are expected to occur at different times.

The technique divides future costs or benefits by a factor $(1+r)^n$, where n is the number of years after a *reference date* (or baseline date), and r is the *discount rate*. The value of the cost or benefit, after division by this factor, is described as its *present value*. If all the relevant costs and benefits are discounted to the reference date, the total of all their present values is described as the *net present value* (NPV) of the activity being examined.

The calculation may use a specified discount rate. For example, a private sector firm may choose a discount rate equal to its estimate of the cost of capital appropriate to the particular kind of cost or benefit. Sometimes no discount rate is specified, but a calculation made of the discount rate at which the NPV is zero. This rate is described as an *internal rate of return* (IRR).

In the private sector, discounting is often applied to appraisals of investments to develop new or expanded markets, or to investments to improve cost-effec-

tiveness. Costs include the capital and operating costs. The benefits are the associated financial cost savings and/or extra revenues to the firm. In the public sector, discounting is applied in these and in other ways, as described below.

2. How Discounting is Used in the Public Sector

A discount rate, or a cost of capital, is used in the public sector in several types of analysis.

2.1. Cost-effectiveness Analysis

One difference between the public sector and the private sector is that many of the final outputs of the public sector – such as defence, law and order, school education, or support for those unable to support themselves – have no well-defined market value. Although governments estimate values for some of these outputs, most outputs are not valued.

It follows that most applications of discounting in the public sector are comparing different ways of providing the same, or a very similar service. Analysis of this kind is described as cost-effectiveness analysis. Cost-effectiveness analysis in the public sector mainly compares changes in expenditure in the early years of a project or programme with changes in expenditure in later years.

In a commercial organisation, public or private, cost-effectiveness analysis is a subset of commercial appraisal.

2.2. Commercial Appraisal

Commercial appraisal examines the effect of a proposed project or programme on the expenditures and revenues of a commercial body. Sometimes these are cost-effectiveness appraisals. Sometimes they are comparing costs with projected increases in sales revenues.

Public enterprises undertake commercial appraisals of costs against sales revenues. However, not all public enterprises are in a competitive market. If an enterprise has a strong monopoly – for the supply of water or fuel, for example – then changes in revenues from its sales are not a measure of social benefit. There are good arguments for prices generally to be set at a level which recovers the costs, but the ability of a monopoly to raise prices to recover the cost of an investment does not mean that the investment is necessarily worthwhile. Even where the objectives are at least partly to create a new or expanded market – as with a new

metro line for example – it is rare for commercial profitability to be the only, or even the main criterion for approval of the project.

Thus commercial appraisal of costs against sales revenues is less common in the public sector than in the private sector. Even where it is applied, it is usually only as part of a decision making process which takes a broader view of social priorities.

2.3. Cost-benefit Analysis

The term cost-benefit analysis (CBA) is usually applied to analysis in which substantial use is made of monetary valuations of non-marketed impacts. In transport, where CBA is widely used, this may include the valuation of people's leisure and working time and the valuation of risk of death or injury. Valuations are also applied to a slowly widening range of impacts in other fields, such as environmental policy and law and order.

Most CBAs are comparing the capital and operating expenditures of a proposed investment with monetary values of non-marketed impacts.

2.4. Costing of Public Sector Outputs

Public sector activities often need to be costed in a way which costs capital as the sum of a depreciation charge and a cost of capital or "interest" charge.

This may apply to public service capital where services (such as say the provision of passports, or of patent rights) are provided on the basis that users pay for them, with little or no subsidy from the general taxpayer. However, there is a good case for many public services being costed in this way, so that their full costs are known to government, Parliament and the public. Some countries cost all public expenditure programmes in this way.

Public enterprises usually cost their activities in this way. They need to. If they do not, no one knows the true level of subsidy, if any, which is being provided to the enterprise.

2.5. Comparing Sources of Finance

Sometimes, in some countries, comparisons are made between public and private financing of a public service asset. It is recognised that private financing incurs some extra costs, but that private financing may sometimes allow a better incentive structure in design, build and operation, and so produce net savings.

This is a complex area, but is included here because it well illustrates some conceptual and practical aspects of discounting.

2.6. Public Expenditure Analysis

Analyses are often made of the direct public expenditure implications of a proposed project or programme. This differs from a cost-effectiveness analysis or a commercial appraisal. For example, it is likely to exclude any opportunity costs, such as the use of existing assets, which do not directly create cash expenditures,¹⁶ and for some measures, such as measures to improve the collection of taxes, it will include receipts or expenditures which are “transfers” and would not be given the same weight in a cost-effectiveness analysis.

Often analyses of this kind are made to help with budget management, in which case there may be no need for discounting. But sometimes the government may be interested in the net present value of the direct impact of the proposal on government finances.

3. Price Changes Over Time

In quantifying costs and benefits in future years, care is needed in handling both general inflation and changes in the prices of specific goods and services relative to the general price level.

3.1. Changes in the General Price Level (General Inflation)

Future costs and benefits can be valued in nominal terms (or cash terms, or current prices), or in real terms. If the general price level is expected to change, real and nominal values in future years will differ. If the general price level in 2005 is expected to be 20% higher than it is in 2000, then in 2005, €120 in cash terms will be equivalent to €100 in real terms, in the money value of year 2000.¹⁷

If the numbers to be discounted are in real terms, they should be discounted at a real discount rate. If the numbers to be discounted are in nominal terms, they should be discounted at a nominal discount rate. If inflation is positive and constant, the nominal rate will be higher, by an amount equal to the rate of inflation.¹⁸

Carrying out analysis in real terms makes all the undiscounted costs and benefits over time directly comparable, because they are all valued at the same money value. It allows a discount rate to be specified which is independent of inflation, and which thus needs to be revised only infrequently. Analysis in real terms also often avoids the need to forecast general inflation.

However general inflation has to be forecast if some of the numbers are specified in nominal terms. This might apply for example to some rental contracts, or possibly to some receipts, such as tolls. In the private sector it may apply to financing costs such as payments on bank debt or on bonds.

It is, in practice, usual in the public sector in most countries to carry out analysis in real terms. In the private sector, analysis is more often carried out in nominal terms.

The rest of this paper is written on the assumption that public sector discounting is carried out in real terms, with a real discount rate applied to numbers to numbers which are also specified in, or converted to real terms.

3.2. Changes in Relative Prices

More confusing than general inflation, but less often important, are changes in relative prices.

Sometimes the forecast inputs of a project or programme may be specified in terms of physical quantities – such as numbers of staff, or area of floor space. When these inputs are converted to monetary values “in real terms”, the valuation should reflect any expected future changes in relative prices. Thus, for example, the unit cost of staff is likely to increase with economic growth. So too, in cost-benefit analysis, is the valuation of future costs or benefits such as personal risk or environmental impacts. This special case is discussed later.

4. The Economics of Public Sector Discounting

4.1. The Welfare Economics Approach

The welfare economics literature is mostly concerned with cost-benefit analysis, and hence with the problem that, whereas public expenditure is diverting resources from the rest of the economy, non-marketed impacts are not. In practice cost-benefit analysis, although very important in transport and increasingly used in other fields, is much less often used than cost-effectiveness analysis.

The welfare economics literature usually approaches public sector discounting in terms of *social time preference and opportunity cost*.

It conventionally derives a social time preference rate on the basis of two factors:

- As people's incomes increase, the extra utility which they enjoy from an extra Euro declines.
- People care slightly less about the marginal utility of future populations than they do about the marginal utility of the present generation. This effect is sometimes described as "pure time preference".

The welfare economics approach to *opportunity cost* is usually to define it in theory as the discounted present value of the stream of consumption which would have been created by the money spent on the public sector project, if this money had instead been left in the rest of the economy (for example by slightly lower tax rates). As explained in Appendix A, its approach to opportunity cost usually excludes a thorough analysis of risk.

This approach implies in theory a procedure in which the discount rate is set equal to time preference, but the "opportunity cost" is handled by applying a shadow price to public investment.¹⁹ In practice, the approach often defines instead a "social opportunity cost" rate of return, derived from private sector returns and usually assumed to be higher than social time preference. This differs from the financial economics approach described below, in that this rate does not depend upon the public sector activity.

The welfare economics literature does not generally address issues of pricing relative to the private sector.

4.2. The Financial Economics Approach

The financial economics literature is mainly confined to the private sector. However, when experts in this field advise on public sector discounting they usually propose that public sector costs and benefits should be discounted at the same rate as would be used by a competitive private sector body for similar costs or benefits.

This discount rate, or cost of capital, is usually derived in this approach by means of the Capital Asset Pricing Model (CAPM), as explained in Appendix A. The financial economics approach does not recognise the separate concept of social time preference, on the grounds that, in this financial economics framework, any such preferences are revealed by the market.

This approach, like the welfare economics approach, excludes a thorough analysis of risk in public sector activities. It also incorporates a view of capital markets which differs from the views generally held by experts in public sector economics.

4.3. An Integrated Approach

Discussion of public sector discounting needs to distinguish between the following three concepts:²⁰

- *Social time preference*: This is the conventional welfare economics concept of time preference. It quantifies the extent to which people prefer national benefits to be enjoyed sooner rather than later. It depends mainly on the rate of growth of people's incomes, and on how much the nation cares about the marginal utility (or welfare, or happiness, or satisfaction) of future generations.
- *The cost of capital*: This is the financial economics concept of the cost of capital, except that it includes a specific analysis of variability risk in publicly financed activities, which does not fully accept the conventional financial economics assumptions about perfectly efficient capital markets. It is the rate at which public capital should be costed, to price it efficiently (and fairly) relative to pricing in the private sector. It measures the opportunity cost of locking up capital in public sector assets. It depends upon: (1) the government borrowing rate; (2) the level of taxation of returns to capital; and (3) (to a very small extent) upon "systematic risk", as explained below.
- *The shadow price of public expenditure*: This measures the cost of using public expenditure, over and above its direct monetary value. It includes the welfare economics concept of opportunity cost of diverting resources from the rest of the economy. It may also arise from the distortionary effects of taxation. It applies equally to all public expenditures or receipts.

In practice, it seems likely that in many countries the *cost of capital* and the *time preference* rate are close enough to be set equal to the same number. This number will be greater than the interest rate on government borrowing.

The *shadow price of public expenditure* is less important, because, as noted in the following section, it does not affect most applications of public sector appraisal or evaluation. It does affect cost-benefit analysis, but in practice, in most countries, its effect is handled case-by-case by budgetary rationing, rather than by formally quantifying a shadow price.

4.4. Examples of Applications of Time Preference and of a Cost of Capital

Appendix A outlines the approaches to discounting adopted in several countries. One of these countries (New Zealand) has adopted the conventional financial economics approach. The others have adopted pragmatic approaches, influenced by various aspects of the welfare economics approach.

The applications outlined above pose differing theoretical problems of discounting or costing, as follows:

- *Cost-effectiveness analysis* compares similar kinds expenditure at different times. The discount rate for cost-effectiveness analysis should therefore be a measure of the nation's time preference. Any shadow price or opportunity cost of public expenditure would apply as much to later expenditure as to earlier expenditure. It is therefore irrelevant to the analysis.²¹
- *Commercial appraisal* of costs against sales revenues is generally designed to assess whether the public sector body is covering its costs by its charges. This implies the use of a cost of capital as a discount rate. (It is common for arguments also to be made for increasing the rate for these appraisals to help offset optimistic bias, or to restrain public expenditure.)
- *Cost-benefit analysis* (CBA) includes money values of non-marked impacts. For discounting, it should apply a time preference rate. Values of non-marketed impacts are usually derived in terms of people's willingness to pay for these impacts. They are thus valued as consumption benefits, which are not diverting resources from the rest of the economy. Any shadow price of public expenditure will, therefore, not apply to the monetary values of non-marketed benefits. This reduces their value relative to public expenditure. The *costing of public sector outputs* requires a cost of capital. The *comparison of different sources of finance*, if carried out rigorously, requires both a cost of capital and a time preference rate. *Public expenditure analysis* is normally concerned with impacts on public sector budgets. If these need to be discounted, the appropriate rate is a time preference rate.

These requirements are summarised in Table 2.

5.1. Estimation of Social Time Preference

5.1.1. General Principles

Social time preference is usually defined in terms of time preference for consumption, although it is usually applied to public expenditure, or taxation, or income. It is normally assumed that all these time preference rates are the same.

As noted above, it is conventional to derive this time preference rate on the basis of the following two factors.

1. As people's incomes increase, the extra utility which they enjoy from an extra Euro declines.

Table 2. Requirements for Discounting

Type of analysis	Instruments required			Notes
	Time preference rate	Cost of capital	Shadow price of public expenditure	
Cost-effectiveness analysis	Yes			Cost of capital and shadow price not relevant, because they apply equally to all costs and cost savings.
Commercial appraisal of costs against sales revenues		Yes		
Cost-benefit analysis	Yes		Yes	Often the shadow price is only applied implicitly, by public expenditure rationing.
Costing of public sector outputs, for comparison with private sector prices		Yes		
Comparison of different sources of finance	Yes	Yes		In some cases cost of capital may need to be estimated case by case.
Public expenditure analysis	Possibly			Discounting may not be needed.

2. People care slightly less about the marginal utility of future populations than they do about the marginal utility of the present generation. This effect is sometimes described as “pure time preference”.

There is also a case for including in a national time preference rate a small adjustment for variability risk, because the costs and benefits being discounted often vary systematically with national income.

These components are considered in turn below.

5.1.2. *The Effect of Increasing Income on the Marginal Utility of Income*

To quantify the effect of increasing income, it is usually assumed that, over the range of income of interest, people's elasticity of marginal utility of income is constant.²² This elasticity, for an individual or household, is given by

$$-b = YU''/U' \dots \dots \dots (1)$$

where:

Y is income; and

U' and U'' are the first and second derivatives of utility with respect to income.

Empirical evidence on the value of b is inconclusive, but values in the range of 1 to 1.5 are defensible and consistent with common experience (such as, for example, a widespread belief that taxation should take a higher percentage of high incomes than of low incomes).²³

5.1.3. Pure Time Preference

The magnitude of pure time preference is largely a political judgement. Some people believe that small changes in welfare should be given the same weight, whether they apply to today's population or to even the very distant future. Most people appear to be slightly less concerned about small changes in the welfare of future populations. There is a good case for also including in this number an allowance for the small general risk of a man made or natural catastrophe which would destroy much of the population, or of the physical assets then in place.

Estimates of pure time preference often lie in the range of 1-2% per year.

Systematic variability risk is not an issue of time preference. However as matter of practical convenience, if some adjustment is needed for this variability, and if it is fairly constant across much of public expenditure, then it is convenient to include it in the government "time preference rate". The valuation of this factor is discussed below, under "Valuation of the cost of capital", with the conclusion that it is extremely small.

5.1.4. Calculation of the Time Preference Rate

Following from the previous three sections, if the expected rate of growth of per capita income over the next 10 to 20 years is expected to be g% per year, upper and lower limits for social time preference might be taken as:

Upper limit: (1.5g+2.0+0.1)%

Lower limit: (1.0g+1.0+0.1)%

5.2. Estimation of the Cost of Capital

5.2.1. General Principles

The public sector cost of capital is here defined as the rate which needs to be applied to public sector capital in order to price it efficiently, relative to the cost of capital in the private sector.

It is uncontentious that this is equal to the risk free interest rate, which is usually taken as the cost of government borrowing,²⁴ plus a factor equal to any difference between the amount of taxation paid by private sector producers and that paid on government borrowing, plus a factor equal to the impact of systematic variability risk in the costs of public sector activities.

5.2.2. The Risk Free Rate

For public sector applications, the relevant risk-free rate is the cost of government borrowing (in real terms) over the relevant time period. In practice, it will nearly always be sufficient to take some average project lifetime – say 10 or 15 years – and to make a judgement about what the real interest rate for this term is likely to be, on average, for the next several years.

5.2.3. Taxation

It is often difficult to estimate the levels of tax paid on interest payments made by the government. It is also difficult to estimate the levels of tax paid by private sector companies on their profits. In both cases the tax rates are known, but an accurate estimate of the impact of allowances is likely to require substantial research.

In practice, in this context, tax paid on government interest payments is often ignored. Research in the UK suggested that the tax paid by private sector companies on marginal returns to capital amounted to between 1 and 2 percentage points in the 1980s, and about 1 percentage point in the 1990s.

5.2.4. Systematic Risk

The financial economics literature places great emphasis on “systematic risk” – that is variability which shareholders cannot diversify because it is correlated with variability in the equity market as a whole.²⁵ The analogous risk in the public sector is variability (in quantities which are being discounted) which is

correlated with national income. A fixed benefit, independent of income, is more valuable than one which has the same expected value, but which is higher when incomes are high and lower when incomes are low. In practice, many public expenditure costs do vary systematically with wages, and hence with national income.

The percentage by which the certainty-equivalent of a future cost or benefit, C , is reduced below its expected value is given by

$$100\delta C/C = 100b\rho\sigma_c\sigma_y \dots\dots\dots (2)$$

where:

b is as defined in equation (1) above;

ρ is the correlation coefficient of C and per capita income, Y ; and

σ_c and σ_y are the proportional standard deviations of C and Y .

For a cost or benefit which varies in exact proportion to Y (which might be a reasonable assumption for wages, for example), $\rho=1$, and $\sigma_c=\sigma_y$.

The magnitude of σ_y can be estimated empirically, for an economy with a long and fairly stable history, by comparing outturn values of GDP with the value which would have been expected say 10 or 15 years beforehand. For the UK economy, this gives a standard deviation of about 10% over 15 years, and slightly less over 10 years. For other stable economies, it might be reasonable to expect similar variability.

Taking values of $b=1.5$, $\rho=1$, and $\sigma_c=\sigma_y=0.1$ reduces the certainty-equivalent of C by approximately $100 \times 1.5 \times 1 \times 0.1 \times 0.1 = 1.5\%$. This is equivalent, if discounted over 10 to 15 years, to an increase in the discount rate of about 0.1 percentage points.

This effect therefore appears to be quantitatively unimportant. However, it needs to be addressed. It may possibly be quantitatively significant in some extreme cases. It is in any case an important issue in any discussion with economists who approach discounting from the financial economics perspective.

5.2.5. *Calculation of the Cost of Capital*

If the risk free rate is $R_f\%$, and the effective tax rate paid by the private sector is T percentage points, then the cost of capital is $(R_f+T+0.1)$.

5.3. Estimation of a Shadow Price of Public Expenditure

As noted, the conventional welfare economics approach defines the opportunity cost of public expenditure as in theory the present value (using the social time

preference rate) of the stream of consumption which the expenditure would have created, if it had not been diverted from the rest of the economy. This opens the way to elaborate calculations, with alternative assumptions about, for example, whether the expenditure is financed by taxation or borrowing. However, it is doubtful that calculations of this kind have ever been applied in practice.

In practice, most governments accept that public expenditure is rationed, in the sense that not all the spending which appears to pass the test of a cost-benefit analysis is undertaken. This reflects both the economic and the political costs of increasing taxation. Where a government feels that an explicit number for these effects would be useful, it is generally set on largely subjective grounds, rather than on the basis of detailed quantitative analysis. A figure such as 30% is not untypical (*i.e.* public expenditures and revenues are costed as if each €1 was in fact €1.30).

Such a number will affect only cost-benefit analysis and a few other situations, such as the appraisal of measures to improve the collection of taxes.

6. Other Arguments Applied to Public Sector Discount Rates

6.1. Optimistic Bias Risk

It is common for estimates of project costs, timescales and benefits to be optimistic. It is fairly common in the private sector for required *ex ante* rates of return to be increased as one way of offsetting this. Some government officials also argue for a high public sector discount rate for this reason.

However, there are two good arguments, as follows, for not adjusting a public sector discount rate on this account:

1. Discounting in the public sector is most often applied to cost-effectiveness analysis. In cost-effectiveness analysis, increasing the discount rate is as likely to increase optimistic bias as to offset it. A higher discount rate reduces the present value of the costs in particular operating and maintenance costs. This would reinforce the common failure in public sector appraisal of giving too little attention to these costs.
2. Even for commercial appraisals of costs against sales revenues, a higher discount rate is a very crude way of off-setting risk. It is discouraged in finance textbooks. It reduces incentives to examine risks carefully. It increases incentives on those making proposals to bias their projections of cost and benefits.

In the public sector, the most that can be said is that optimistic bias provides a weak case for applying a higher discount rate to commercial appraisals than to cost-effectiveness appraisals – if other forms of discipline are weak.

It is better for optimistic bias to be handled in other ways.

6.2. Public Expenditure Rationing

Officials in Finance Ministries sometimes argue for a high discount rate as a way of reducing pressures for public expenditure. There are good reasons for rejecting this argument:

- Discounting in the public sector is most often applied to cost-effectiveness analysis. In cost-effectiveness analysis, increasing the discount rate will tend, in the long-run, to *increase* pressures on public expenditure, because it gives too little weight to future expenditure savings. The discount rate should not be increased unless there is good reason to believe that it will be easier to increase rates of taxation in future years.
- Even if such a premium is applied only to commercial appraisals of costs against sales revenues, public enterprises are likely in practice to find ways to adjust their projections of costs and benefits.²⁶

6.3. Private Sector Returns on Assets

The conventional financial economics approach is concerned with the cost of capital, and hence with the private sector's marginal return on assets. The conventional welfare economics approach is also concerned with this marginal return – albeit averaged across the economy as a whole.

Data is also sometimes available on the *average* return on assets achieved by the private sector. This will be based on company accounts, which are usually expressed mainly in historic costs, and conversion of this data into real terms is an uncertain process. However, there is good reason to believe that the average returns achieved by private sector firms are higher than the marginal returns.²⁷ In some countries, private sector average returns on assets are taken into account in deriving a public sector discount rate.

There is no good technical case for this. The discount rate, in the public sector as in the private sector, applies to marginal expenditure.

There is a weak case for requiring public enterprises to earn an average return on their assets higher than their cost of capital, but this implies some monopoly

exploitation by the state. It would also be administratively confusing to apply two numbers to one organisation.

6.4. External Benefits

Public sector organisations with an interest in long-term investments – such as forestry, or the building of dams or power stations or other long-lived assets, or environmental investment - often search for arguments to justify a specially low discount rate for their activity. These may include, for example, arguments about spin-off benefits from technology, employment creation, saving imports, or environmental benefits.

These arguments are sometimes politically successful. However, they rarely have technical merit. Where they do, it is very rare for them to be technically relevant to the discount rate. Generally Finance Ministries oppose such arguments.

7. Special Cases of Discounting

7.1. “Utility” Impacts

In cost-benefit analysis some costs and benefits – such as personal risk, or of some environmental impacts, or possibly of leisure time – have an impact on personal utility which is almost or completely independent of personal income.

This can be handled by ascribing increasing monetary values to these effects through time, and then discounting them at the standard discount rate. However, it may sometimes be simpler to value these effects in all years at today's valuation, and then discount them at the pure time preference rate as derived above, of perhaps 1 or 2%.

7.2. The Very Long-term and the Extremely Long-term

It may be unreasonable to assume that the figures used for projecting over the next few decades per capita economic growth, or other variables, will continue to hold in later decades. It might, therefore, be reasonable for a discount rate for years beyond a time horizon of several decades to be based on different assumptions.

When looking to the *extremely* long-term – say 100 years or more into the future – there is some evidence that peoples' preferences “flatten out”. People might wish for only slightly less weight to be given to the interests of people in the year 2200 than to those in the year 2100.

Neither of these effects arises often, but they can arise with some long-term environmental projects.

7.3. Cases Needing Especially High Accuracy

Occasionally situations arise where the broad brush numbers adopted for general use need to be refined for the particular case. One situation is where financing costs themselves need to be quantified especially accurately.

For example, if a government is considering the disposal of a financial asset, such as a stock of loans, the main point at issue may be the comparison of the revenue from the loans with the saving in interest on government borrowing if the loan portfolio were sold (and the sale revenue used to repay government debt). This would need a detailed analysis of interest rates and taxation to estimate the future cash flows. The standard, broad brush *cost of capital* would not be satisfactory. However, even in cases of this kind, the standard, broad brush *time preference* rate should be sufficient for making comparisons over time.

Such cases are, however, very rare.

8. Practical Application and Administration

8.1. Setting the Numbers

The technical analysis of public sector discounting is complex. However, for successful application, the discounting conventions have to be expressed in extremely simple terms, which can be sufficiently understood by officials with no technical background.

The best approach, if it is politically feasible and technically defensible, is to have a single number, expressed in real terms, which is the government discount rate and cost of capital. This number can then be applied throughout government and the public enterprises.

This number is usually best presented as an opportunity cost. This is more widely accepted than the term “time preference”, which is often seen by officials and ministers as academic and theoretical and is difficult to explain – for example to spending bodies or in Parliament.²⁸

It is difficult to manage a system in which more than one number is used by any single organisation (except for occasional special cases).

Few countries specify a shadow price for public expenditure. However, a shadow price is always applied implicitly. It is a matter for the Finance Ministry to decide whether setting an explicit number is helpful.

The numbers chosen for discount rates or other quantities will always be influenced by many factors. It is, however, helpful if careful analysis can be applied to define a technically defensible range. Political factors can then be applied to choose from within this range.

8.2. Decision Criteria for Proposed Policies, Programmes, or Projects

Discounting is needed to compare costs and benefits which can be expressed in monetary values, but which occur at different times. However, there is a danger that this numerical calculation gives a false sense of accuracy and completeness. There are many issues in appraisal and evaluation which are much more important than the choice of discount rate. These other issues include clear objectives; selection of a good range of options (including a do-nothing base case and clarity about marginal versus average costs); the use of opportunity costs; and thorough analysis of risk. (Profoundly important too, of course, are the quality of contracting, of project management during construction, and management of subsequent operation and maintenance.)

Textbooks are enthusiastic about the use of benefit-cost ratios and net present values. These can, however, be misleading, because they exclude and can conceal the other important factors which it has not been practicable to value in monetary terms.

The internal rate of return (IRR) is an especially misleading figure. It has the advantage, of providing a single figure without the need for a discount rate to be specified, but in government such a rate is, or should be, specified. However, in addition to the disadvantages of using benefit-cost ratios or net present values, the IRR is a misleading figure whenever it departs from the specified discount rate. For projects with a positive net present value, it will give undue weight to the short-term. It also has the well-known characteristic that, if negative net cash flows arise towards the end of a project as well the beginning, it will give multiple solutions. It is hard to imagine any situation in the public sector in which the use of an IRR could improve decision-making.

In most practical applications, there is a good case for requiring the present value of costs, and of benefits, and for these costs and benefits also to be presented in an undiscounted form over time, in real terms.

There is also a case for setting out the direct public expenditures in an undiscounted form over time, and sometimes to discount these. However, it is not clear that discounting these costs is always justified. It can misleadingly give undue weight to the direct public expenditures rather than the national costs and benefits.

Procedures are needed to ensure that factors which are not valued in monetary terms are considered alongside those which are.

8.3. Coverage

It is common for discount rates which are specified or recommended by central government to be applied over only part of the public sector. It is common for local government, public enterprises, or some agencies or departments to make their own decisions about the rate or rates appropriate to their circumstances.

The coverage of any centrally specified rate needs to be clearly defined.

8.4. Dissemination, Monitoring and Enforcement

Misunderstandings about discount rates are widespread. As noted above, guidance needs to be very simple; and it is probably best in most circumstances to present the discount rate as an opportunity cost, even though in practice it is most often being used as a time preference rate. The handling of changing prices – both general inflation and relative prices – needs to be explained especially carefully.

Monitoring and enforcement is difficult unless the Finance Ministry is directly responsible for approving some appraisals by the body concerned.

It is helpful if those responsible for external audit in the public sector have a good understanding of the government's discounting conventions and procedures.

8.5. Procedures for Revision

Because of the technical and administrative complexity of setting the discount rate, and the confusion which can arise when it is changed, there is much to be said for not changing it unless, and until, it has become clearly out of date – for example, because of a significant change in view about future long-term growth, or real interest rates.

It is helpful if control of the revision process can be held firmly within the Finance Ministry, and if senior officials and ministers can be persuaded to see it as

primarily a technical issue, not as a blunt instrument to achieve narrow objectives such as short-term public expenditure constraint.

9. Summary and Conclusions

The theory of public sector discounting is not yet adequately resolved in the academic literature. The practical implications of discounting also lead to many political pressures, often for high rates in general but for low rates in capital intensive, long-lived activities.

The governments of most developed economies set the public sector discount rate (or rates) either at a value similar to the real interest rate of government borrowing, or at a level which is believed to be similar to a real rate of return obtained in the private sector. These arguments generally lead to numbers between 3% and 10% in real terms.

Discount rates in the public sector serve two main purposes. In many applications (including cost-effectiveness analysis and cost-benefit analysis) they are being used as a *time preference rate*, to reflect the extent to which the nation is concerned about the marginal income of future populations relative to the present population. In other applications (including commercial appraisal of costs against sales revenue, and costing government outputs), they are being used as a *cost of capital*, to cost public sector outputs in ways which can be efficiently compared with the prices of private sector outputs.

In practice, it appears that in many economies it is realistic to use the same number for both of these purposes. To use different numbers would be administratively extremely difficult.

One weakness in the academic literature is the absence of analysis of the effects on national welfare of the variability of public sector costs and benefits, where these vary systematically with national income. Analysis of these effects finds that they are usually extremely small. It is administratively convenient to include this small factor in the discount rate, whether the rate is being used as a time preference rate or as a cost of capital.

Estimation of social *time preference* is hampered by the shortage of data on peoples' attitudes to future generations, and to the utility of marginal income. However, defensible values may be between 1 and 1.5 times the expected future long-term rate of growth of per capita income, plus 1 or 2 percentage points for "pure time preference", plus a very small factor for systematic risk.

The appropriate rate for the *cost of capital*, for efficient comparison with private sector prices, is equal to the risk free rate, plus an adjustment for the higher level of tax paid by the private sector, plus the small factor for systematic risk. This may typically lead to a discount rate, defined as a cost of capital, about 1 or 2 percentage points above the real interest rate paid on government borrowing.

The procedure of discounting should not be allowed to divert attention from other, more important aspects of appraising any policy, programme or project. These more important aspects include clarity of objectives, choice of a range of options, use of opportunity costs, and analysis of risk.

Costs and benefits should be presented both as present values and as undiscounted figures over time. However, the usefulness of net present values and benefit/cost ratios is more limited. They can be helpful, but they can also be misleading, because they conceal the importance of factors which have not been explicitly valued. The use of an internal rate of return in the public sector is probably always misleading.

It is not clear that discounting of the direct public expenditure costs of a proposal, as opposed to national costs and benefits, is generally helpful.

Guidance on the use of discount rates in the public sector needs to be extremely simple and clear. It is usually best to present the rate as an opportunity cost. It is always important to make it clear that it is defined in real terms, and to ensure that people understand what this means. It is generally best not to change the rate, unless there has been a clear, sustained and significant change of circumstances – for example in views about the long-term rate of growth.

An explicit shadow price for public expenditure, to reflect its opportunity cost and the distortions caused by taxation, can be a useful instrument, but is not essential. It is only relevant to a small minority of appraisals or evaluations.

Special guidance is needed for some exceptional cases, such as discounting in the very long-term, and cases where figures for the cost of capital and taxation need to be especially accurate.

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APPENDIX A

Welfare and Financial Economics Approaches to Discounting in the Public Sector

The Conventional Welfare Economics Approach

The conventional welfare economics approach was established in the 1950s and 1960s and has been little developed since then – as welfare economics declined sharply as an academic priority from the early 1970s. The approach in its purest form converts the consequences of a public sector proposal into streams of consumption, which are discounted over time at a social time preference rate.

This social time preference rate, as explained in the main text, is assumed to be the sum of pure time preference for marginal utility, and a factor to allow for the fact that, if per capita income and consumption are increasing over time, future marginal consumption will in future years bring less and less utility per Euro.

The literature often assumes that public capital expenditure has an opportunity cost, equal in theory to the present value of the consumption which this amount of investment would have generated in the public sector. Much literature published in the 1950s, especially, was on the consequences of alternative sources of funding. However, in practice the welfare economics approach is often applied as a discount rate equal to some average figure derived from private sector returns.

The focus of this literature is on cost-benefit analysis. It thus gives little attention to cost-effectiveness analysis, even though cost-effectiveness analysis is far

more common in practice. Thus, the literature only very occasionally notes that the opportunity-cost arguments should apply equally to all public expenditure, not only to capital, and that the opportunity-cost, defined in this way, is irrelevant to cost-effectiveness analysis because it applies equally to the costs and the cost savings.

The wider literature of welfare economics covers “systematic risk” in the context of aid projects – where, for example, some projects give benefits which are usefully correlated with income in ways which reduce variability – such as irrigation schemes to protect farmers from floods or drought. However, the literature does not apply this analysis to the risk premium in private sector returns. The total risk premium in private sector returns is treated instead as if it were a transfer, like taxation, rather than a social cost.²⁹

The literature thus often advocates for practical use in the public sector a “social opportunity cost” rate of return, equal to a typical private sector rate of return, including taxation and risk, which is unduly high, and usually assumed to be significantly higher than the social time preference rate.

The Conventional Financial Economics Approach

The conventional financial economics approach to discounting developed from the mid 1960s. It was developed in the context of the private sector and the literature is still overwhelmingly concerned with private sector applications. However, its practitioners sometimes argue that (apart from adjusting for any tax differences) the numbers they derive for the cost of capital or discount rate for an activity in private sector apply equally to the same or similar activities in the public sector.

Most of its discussion of the cost of capital and discounting is based on the Capital Asset Pricing Model (CAPM). In this model, the rate of return required by market investors in an asset is given by $R_f + \beta\{E(M) - R_f\}$, where

R_f is the risk-free rate;

$E(M)$ is the expected return from the market as a whole (often taken as the equity market); and

β is defined as $\text{cov}(R, M) / \text{var } M$; where R is the yield on the particular asset and M the market yield.

β (beta) reflects the extent to which variations in the expected yield on the particular asset moves in line with variations in the market as a whole. An asset

whose yield moved in exact proportion to the total market yield would have a beta of 1. An asset whose yield was not correlated at all with the market yield would have a beta of zero.

This literature until the early 1980s (and much of the literature since then) accepted that financial markets were for most practical purposes perfectly efficient. From this it was (and sometimes still is) argued that people's time preferences are fully revealed by the market risk free rate; and also that it is impossible for the public sector to reduce the social cost of risk of an activity by financing publicly rather than privately.

The effect of this view of risk is increased by the way in which the equity risk premium is usually estimated in this literature. It often assumes for this purpose that equity markets are random, and not fluctuating around any more stable long-run trend, and that the geometric mean of expected future annual risk premia is best estimated as the arithmetic mean of past annual premia.³⁰ These assumptions lead to estimates of the future cost of equity much higher than the actual long-run geometric rate of return to equity, which in long established markets, including those of the US and the UK, has been about 6% in real terms.

The literature has not developed any argument to suggest how the equity market risk premium, which arises mainly from the large fluctuations in equity values, might affect the social cost of an activity which is publicly financed.

APPENDIX B

Some International Comparisons

The following table summarises how some countries specify the methodology to be used in the public sector for appraisal and evaluation, including the values of discount rates.³¹

Country	Central guidance on appraisal and evaluation	Degree of standardisation across government	Discount rate	Theoretical basis of discount rate
Canada	Treasury Board Secretary issues a 'Benefit-Cost Analysis Guide'.	Applied by all national government organisations.	Social discount rate of 10% real. Treasury guide 1976 suggested a range of 5- 15%, but subsequently revised it to between 8-12%.	Based on the opportunity cost of foreign borrowing, foregone investment in the private sector, or forgone consumption.
France	No general guidance; although in 1995 an expert committee for the <i>Commissariat General du Plan</i> prepared recommendations on transport appraisal.	Each sector is responsible for drawing up its own methodology.	A real discount rate has been specified since 1960 and was last examined in 1985. The rate was set at 8%.	In 1985 a working group estimated the cost of capital as 6%, but the rate was set at 8% to keep a balance between public and private sector investment.

Country	Central guidance on appraisal and evaluation	Degree of standardisation across government	Discount rate	Theoretical basis of discount rate
Germany	The Federal Finance Ministry publishes guidance.	Applied at federal level.	4% real.	The rate is the average of the federal government's refinancing rate over the past 5 years. This is currently 6% nominal. The average GDP deflator (2%) is subtracted, giving 4%.
New Zealand	The NZ Treasury. Issues a handbook on 'Estimating the Cost of Capital for Crown Entities and State Owned Enterprises'. This includes capital budgeting and the costing of public services.	Project appraisal is done on a departmental basis.	Varies with specific cost or benefit being discounted.	The costing and discounting of capital in project appraisal is based on the Capital Asset Pricing Model (CAPM), using private sector comparators to estimate asset betas.
Norway	Government-wide recommendations currently under review, prior to being issued as general guidance.	Official guidance supplemented by specific responses to individual departmental needs.	Set in 1978 at 7% real. A new proposal is to use world prices as shadow prices for traded goods. 3.5% real has been suggested for the discount rate.	Theoretical background for setting the rate is unclear.
United Kingdom	Treasury guidance to all central government departments.	Applied in central government, supplemented by departmental guidance to fit individual needs.	6% real in most cases since 1989. Consideration being given to reducing rate(s) to around 4%.	Social time preference and cost of capital both derived as being in range of 4-6%. 6% chosen from top of the range.

Country	Central guidance on appraisal and evaluation	Degree of standardisation across government	Discount rate	Theoretical basis of discount rate
USA	The Office of Management and Budget (OMB) issues a Capital Programming Guide (1997) and OMB Circular A-94.	Individual departments take note of OMB guidance, but also have their own standards and guidelines.	Since 1992 the discount rate has been 7% real. For some purposes a shadow price of capital is also recommended.	7% real discount rate based on estimate of the average private return to capital in the US in the 1970s and 1980s. Before 1992, the OMB discount rate had been 10% real, based on the estimated return to capital in the 1960s.

Notes

1. This article is drawn from two advisory papers that the author completed for the SIGMA (Support for Improvement in Governance and Management in Central and East European Countries) Programme, which is a joint initiative of the OECD and European Union. The initiative supports public administration reform efforts in the ten candidate countries for EU accession and is principally financed by the European Union's Phare Programme.
2. Some relevant publications are listed in the bibliography at the end of this paper. Information is also taken from a comparative study made in 1999 of the UK, France, Germany, the Netherlands, New Zealand and the US ("Modern Budgeting in the Public Sector: Treasury Rules in a Comparative Context", Ray Barrell and Florence Hubert (eds.), Occasional Paper 53, National Institute of Economic and Social Research, London). Several developed, non-EU OECD Member countries are following or leading reforms similar to those within the EU, and are seen by EU member states as useful case studies.
3. Grateful acknowledgements are due to Richard Allen, Daniel Tommasi, Stephen MacLeod, Jón Blöndal and Brian Finn. Remaining errors or omissions are wholly the responsibility of the author.
4. In particular by the Office of Management and Budget (OMB) in the Executive Office of the President (the Executive), and the General Accounting Office (GAO), which is the investigative arm of Congress (the Legislature). The OMB has similarities with parts of a European Ministry of Finance and the GAO has similarities with a European Supreme Audit Institution. Both have been concerned in recent years with the quality of capital investment programming in US federal agencies. One publication by each of these bodies is listed in the bibliography at the end of this paper, together with the report of the Presidential Commission on Capital Budgeting.

5. "Planning" in this context is sometimes described more technically as "efficient allocation", or in administrative terms as "budgetary allocation" or sometimes "strategic prioritisation". "Control" in this context is sometimes described as "fiscal discipline".
6. France is untypical in having strictly separate capital and current budgets (for both spending and revenue); however, the budget proposals for each line ministry are negotiated and drafted together by the relevant ministerial "desk" in the Ministry of Finance. The Netherlands had separate capital and current budgets from 1927 to 1976; subsequently there has sometimes been pressure to return to this arrangement, from those who believe that this may lead to more public investment, but these arguments have been resisted. In many countries there is a stronger distinction between capital and current expenditure planning in *regional or local* government. However, this is generally for reasons which do not apply to central government; but which arise from the complex relationships between the different levels of government.
7. The World Bank is, however, one of the most perceptive critics of problems associated with PIPs. It is an especially severe critic of the separation of capital from current budgeting (dual budgeting), which it says "may well be the single most important culprit in the failure to link planning, policy and budgeting, and poor budgetary outcomes".
8. One exception is the UK. The government elected in 1997 introduced a system in which spending ministry budgets are renegotiated at two-year intervals, with the intervening years devoted to major programme reviews. This would not be appropriate for most CEECs, with their more rapid rate of change in economic development from year to year, but it illustrates that even such concepts as the annual budget negotiation should not be taken for granted.
9. The US federal budget is, however, required by legislation established over 100 years ago, to provide for full lifetime budgeting of capital projects. This "up-front" budgeting has been criticised for being applied to large projects which might better be approved in successive stages, but is otherwise uncontroversial.
10. As noted above, the United States Administration has given more specific, high-level attention to capital.
11. Subject to a sensible balance between the effort put into appraisal and the nature of the project. A large project with important uncertainties needs very extensive appraisal before it is approved; a small routine procurement may need virtually none.
12. Over a period of about 10 years, following a change of government in 1984, New Zealand moved from being one of the most regulated of all OECD Member countries to one in which market disciplines have been applied probably more widely than in any other OECD Member country. This has included the creation, within the public service, of providing bodies who sell their services to

procuring bodies. For this, accrual accounting is needed to provide commercial-style accounts for the providers. The success of this reform so far has been mixed.

13. Achieving such a change is administratively complex and some major technical issues are unresolved, such as the choice between historic and real terms accounting, the basis of the capital charge, and the capital maintenance principle (i.e. whether balance sheet revaluations should be reflected also in the current account, as they need to be if all capital is to be eventually charged against the spending unit's output).
14. Including many building services (offices, hospitals, prisons, courts); public infrastructure such as certain roads; and other activities such as computer systems, and military logistic and training facilities.
15. "Managing Public Expenditure: A Reference Book for Countries in Transition".
16. These costs will generally create indirect pressures for expenditure, but this is normally overlooked in this kind of analysis.
17. Unfortunately the term "year XXXX prices" is widely used to describe valuations at the general price level of the year XXXX. People sometimes misunderstand this and believe that it means that each individual good and service is valued at its year XXXX price. (Indeed "year XXXX prices" is also sometimes used in this second sense!) This contributes to the confusion noted in the following section.
18. Strictly, if the real rate is $100r\%$ and the predicted rate of inflation is $100p\%$, the nominal rate is of course equal to $100(r+p+rp)\%$, rather than $100(r+p)\%$. However this extra precision for calculations of this kind is rarely, if ever, justified in the context of discount rates.
19. "Shadow price" here means a factor, generally greater than unity, by which a monetary value is multiplied to calculate its social value.
20. This integrated approach is derived largely from work in the UK Treasury in the 1980s. It is applied in the UK and has been reaffirmed in a recent review of the discount rate for UK Treasury by academic experts. It has been broadly accepted by British academic experts in public sector economic analysis.
21. Unless the stream of consumption foregone by diverting money away from other uses grows over time, for ever, at a rate which exceeds the time preference rate. This stream of foregone consumption may grow at the economic growth rate. There is, therefore, a good case for saying that the discount rate should not be less than this rate. However, it is rarely, if ever, argued that social time preference is as low as the national economic growth rate.
22. This is not an unreasonable assumption. It implies that richer and poorer populations would be prepared to forego the same percentage of their income in exchange for being relieved of the same proportionate small variability in their income.

23. A constant value of b implies that that if a household has Z times the income of another (otherwise similar) household, it enjoys only $1/Z^b$ as much utility from each extra €1 of income. If $Z=2$ (*i.e.* household A has twice the income of household B) and $b=1$, then household B will enjoy twice as much extra utility from an extra €1 as would household A.
24. The financial economics literature often takes very short-term debt (Treasury Bills) as a measure of the risk free-rate, to avoid the problem that there is very little data on expected inflation over longer periods – nor, therefore, on investors' expected real returns on longer term government debt. However, for deriving a cost of capital for general use an estimate is needed for the cost, in real terms, of medium- to long-term government debt.
25. Or sometimes with a wider range assets or income, but the literature is overwhelmingly related to correlation with equity markets.
26. The UK tried an experiment of this kind in the early 1970s, by raising the public enterprise discount rate to 10% in real terms. It later concluded that this had not succeeded in reducing demands on expenditure.
27. This implies that the equity market value of companies is typically higher than the current cost accounting value of their capital assets.
28. The concept of time preference does, however, need to be used when discussing the discounting of environmental impacts with environmental pressure groups.
29. Or, alternatively, it is treated as if the public sector could undertake the same activities as the private sector, with the same efficiency, but without incurring a similar risk premium.
30. The 1980s and 1990s saw a considerable scaling down of the claims for perfect capital markets, with the discovery of an increasing number of persistent anomalies. It is now widely accepted that equity markets are subject to bubbles, which can cause fluctuations temporarily away from their equilibrium value. The literature has not examined the extent to which equity markets respond to real world events which, as with oil crises and economic cycles and even wars, are also often in the long-run largely self-correcting.
31. I am indebted to James Foreman-Peck of HM Treasury, London, for most of this data, although responsibility for errors and omissions is entirely mine.

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