Oxera

The effect of cross-border investment restrictions on certain pension schemes in the EU

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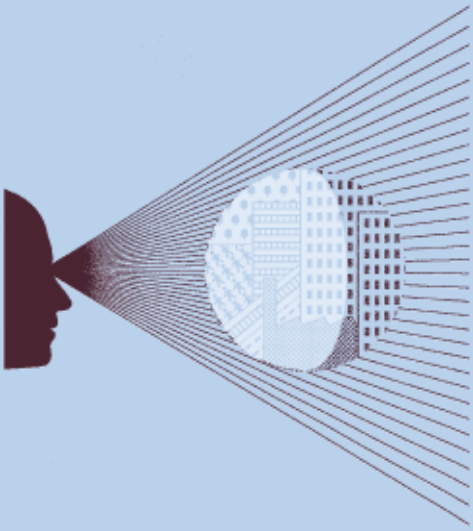

Executive summary

In response to the growing pension problem, many EU Member States have taken steps to reform their pension systems. In addition to developing occupational and private pension schemes in the Second and Third Pillar, they are reforming their social security systems in the First Pillar by introducing or developing funded elements to complement the traditional pay-as-you-go (PAYG) structure.

National legislation often restricts the investment activities of funded pension and social security schemes. The restrictions set quantitative limits on investment in different asset classes as well as on international asset allocation. Cross-border investment restrictions may not only violate the EC Treaty freedom of capital movement, they may also have wider negative economic consequences if they impede efficient international portfolio diversification.

Oxera was commissioned by the European Commission (DG Internal Market and Services) to identify the quantitative restrictions that apply to certain funded pension and social security schemes in the 27 EU Member States, and to evaluate the economic costs of those restrictions in terms of their impact on the risk–return profile of the investment portfolios. The main findings of the study can be summarised as follows.

Social security and pension schemes within the scope of the study

The study focuses on two types of funded Pillar 1 scheme: (demographic) reserve funds and statutory funded private pension schemes.

– **(Demographic) reserve funds**. Some predominantly PAYG-financed social security systems have statutory requirements for partial pre-funding and, particularly in view of the increasing pension expenditure, reserve funds have been set up to support the traditional PAYG schemes.

– **Statutory funded private pension schemes.** These are often described as the separate second tier of the First Pillar (referred to as Pillar 1 bis).[1] Some countries have switched part of their social security pension schemes into privately funded schemes; the provision and participation is usually statutory, but the schemes are generally operated and managed by private institutions.

Supplementary occupational schemes in the Second Pillar are not considered further, mainly because the majority fall under the IORP Directive (Directive on the Activities and Supervison of Institutions for Occupational Retirement Provision) or other EU Directives; as such, investment regulations are already addressed. Voluntary individual pension schemes are also beyond the scope of the study.

The study identified relevant schemes in 18 Member States: 11 countries have a reserve fund, and nine countries have statutory funded private pension schemes. Reserve funds are concentrated in the EU 15 (nine countries), while statutory private schemes are mainly observed in the new Member States (seven countries).

[1] Under the World Bank terminology, and as adopted in many of the new Member States, these schemes are referred to as Pillar 2 schemes.

The total assets of the schemes analysed amounted to €455.3 billion in 2005 (see Table 1)—corresponding to around 4.2% of total EU GDP. The assets managed by reserve funds are around four times greater than those managed by statutory private schemes. The largest reserve funds are in Finland (€102 billion), Sweden (€84 billion) and France (€76 billion). Statutory schemes have accumulated large funds in Denmark (€49 billion), Poland (€21 billion) and Sweden (€20 billion).

Several schemes have been introduced recently and have been growing at a rapid pace due to regular contributions—eg, the National Pensions Reserve Fund (NPRF) in Ireland, and the statutory funded private schemes in the new Members States—suggesting that the economic importance of these schemes is likely to increase in the near future.

Table 1 Size of reserve funds and statutory funded private schemes

	Total value of assets (€ billion)	% of EU 27 GDP	% of gross public pension expenditure (EU 25)
Reserve funds	358.3	3.3	27.5
Statutory funded private schemes	97.0	0.9	7.4
Total	**455.3**	**4.2**	**34.9**

Notes: The volume of funds is in general measured as of end 2005, as is GDP. Data on gross public expenditure refers to 2004.
Sources: Economic Policy Committee (2006), 'Age-related Public Expenditure Projections for the EU 25 Member States up to 2050: European Economy—Special Reports'; Eurostat, and Oxera calculations.

Cross-border investment limits for the relevant schemes

Restrictions on the investment of pension fund portfolios take many forms. This study focuses on quantitative investment limits that act as an explicit barrier to cross-border investment and that are specified by the relevant national laws or regulations.

Among the schemes considered, only a few are not subject to any form of quantitative limit on foreign investment. Examples of the unconstrained schemes are the Lithuanian statutory pension schemes, the Swedish Premium Pensions system (PPM) and the Irish NPRF.

There are some instances where the investment rules for the relevant schemes are significantly stricter than those set out in the EU Directives that apply to other pension schemes—ie, the allowed currency risk exposure limits of 30% and 20% in the IORP and Life Directives, respectively.

– Some reserve funds are required to invest all or half of their assets in domestic securities, usually in government bonds (ie, Belgium, Poland, Portugal and Spain). This directly contrasts with the provisions for the Irish NPRF, which by law is not permitted to hold domestic government bonds.

– Among the statutory funded private pension schemes, the requirement to invest in domestic assets is strictest in Poland (foreign investment is limited to 5%), but also applies in Slovakia, where at least 30% must be invested domestically. The limit on foreign investments also used to be strict for the statutory schemes in Bulgaria (10%), but the law was changed in 2006, and now the only remaining cross-border restriction is the requirement that 80% of the assets be denominated in either Bulgarian lev or euros.

– In other cases, existing restrictions do not refer to all foreign investments, but only to currency risk exposure or investments outside a certain area—the Eurozone (eg, the reserves of Agirc–Arrco in France), the EEA (eg, the Finnish TEL funds), or the OECD (eg, Hungarian mandatory pension funds). The observed limits are in most cases not stricter than the limits allowed under the EU Directives.

Impact on the asset allocation of the relevant schemes

A key precondition for cross-border investment limits to have an economic impact is that they present a binding constraint on international asset allocation. With the exception of those reserve funds that are subject to a fully binding constraint of investing the entire portfolio in domestic assets, the actual portfolio allocation of the relevant schemes falls short of the statutory limits to foreign investment—ie, schemes are less internationally diversified than would be permitted under existing laws or regulations.

This does not imply that observed limits are irrelevant for normal business decisions. Rather, the existence of strict limits (as well as uncertainty about possible changes in the limits) may lead to a cautious asset allocation strategy that leaves sufficient headroom between actual portfolio weights and limits—eg, because of a risk of breaching the limits if markets soar, and because short-term portfolio adjustments can be costly.

The evidence suggests that schemes subject to the stricter limits tend to invest less abroad. Among the reserve funds, the most diversified is the fund without cross-border limits to investment (the Irish NPRF invests more than 90% abroad)—sharply contrasting with the funds that are required to invest only or mainly in domestic assets (government bonds). The same observation applies to the statutory private schemes. Among the top three schemes in terms of foreign investment (all invest more than 70–80% abroad), two face no legal constraints when it comes to international investment decisions (Lithuania and Sweden) and one is subject to a limit that constrains investment only outside the EEA and OECD area (Estonia). In contrast, at the bottom of the list are the Polish Open Pension Funds, which are subject to a 5% limit on foreign investment and invest only 1% of assets abroad.

Importantly, given the limits in place, the schemes with strict limits would not be able to attain the degree of international diversification observed for comparable schemes that are subject to no, or weaker, restrictions.

There is also evidence of significant shifts in portfolio allocations towards increased international investment in cases where cross-border investment limits have been relaxed (eg, recent changes in the laws applying to the statutory private schemes in Latvia and Bulgaria). This suggests that investment limits can present, and indeed have presented, a binding constraint on international asset allocation.

The asset managers interviewed as part of the study, and particularly those operating in regimes with tight cross-border investment limits, confirmed the view that restrictive limits can interfere in their asset allocation decisions.

However, while seen as important, cross-border investment limits are not the only, or in most cases even the main, restriction to foreign investment. Rather, it is the combination of factors, including explicit quantitative investment restrictions, that explains the investment portfolios of the relevant pension schemes. Other factors may arise from additional provisions in the laws and regulations that have an indirect impact on cross-border investment including, in particular, quantitative limits on equity, mutual funds or other asset classes through which international diversification would otherwise be achieved; minimum-return guarantees; performance benchmarking; and caps of fees. A degree of home bias can also be explained by, for example, aversion to currency risk (and impediments to hedging this risk); temporarily favourable domestic market conditions; lack of scale and expertise of the more recently established schemes; taxes; and transaction costs.

Therefore, although they cannot fully explain the international asset allocation patterns observed for the relevant schemes, cross-border investment limits—if strictly defined—are of importance.

Impact on the risk–return performance of investment portfolios

The academic literature provides a strong basis for arguing that quantitative limits restricting cross-border investment have a negative impact on portfolio performance. The main reason for this is that such restrictions prevent funds from holding an internationally diversified portfolio, which in turn prevents them from taking advantage of the opportunity to diversify away non-systematic risks associated with their domestic economies. A number of academic studies examine the costs of such investment restrictions and show that the reduction in the risk–return performance of pension funds can be significant.

The new empirical results presented in this report support these findings. They show that investors in the EU can improve the risk–return performance of their portfolios by increasing the exposure to international investment. On average, changing portfolio allocations from a fully domestic portfolio to one that is diversified internationally allows reductions in the risk of the portfolio without forgoing returns. This conclusion applies mainly to diversification across equity markets. The estimates show that investing in international government bonds produces lower, and in many cases, negligible improvements in portfolio performance.

The study also conducted case study analysis of relevant pension schemes that are subject to comparatively tight cross-border investment limits in order to examine the extent to which the risk–return characteristics of the schemes' portfolios would improve if the actual asset allocation were adjusted to increase international investment up to and beyond the levels permitted under existing regulations. These simulations generated results that are broadly consistent with the conclusion that international diversification beyond the maximum diversification allowed improves the risk–return performance. However, for the relevant schemes and countries, the time series of data is often too limited to allow robust estimation of the relevant parameters.

The estimates obtained using longer time periods of data suggest that international diversification has benefits in terms of improving the risk–return characteristics of investment portfolios. In other words, any restrictions to cross-border investment that impede efficient diversification impose a corresponding cost since they prevent investments that would allow higher returns for the same level of risk or lower risks for the same level of returns.

Asset managers operating under restrictive regulation confirmed that tight investment restrictions can impede their ability to invest assets in a way that is in the best interests of pension scheme members. Where strict limits continue to apply going forward, their impact is likely to become more significant as other barriers to international investment fall and the size of pension assets to be invested increases. This can present a particular problem where domestic capital markets are not appropriate in terms of size, quality, liquidity and availability of asset classes to meet the increasing demand arising from the growth of pension assets.

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1 Introduction

1.1 Summary of research and structure of the report

In response to the growing pension problem, many EU Member States have taken steps to reform their pension systems. As part of this reform process, they are developing occupational and private pension schemes (Pillars 2 and 3), as well as reforming state social security pensions systems. In particular, countries are implementing measures to strengthen the sustainability and performance of their Pillar 1 social security systems by increasing the importance of the funded element of these systems to complement traditional pay-as-you-go (PAYG) funding. Funded arrangements are therefore beginning to play an increasingly important role in all three pillars of the pension system (see section 2.1 for an explanation of the three-pillar system).

National legislation often restricts the investment activities of such funded pension schemes. The restrictions set quantitative limits on investment in different asset classes as well as on international portfolio diversification. Cross-border investment restrictions may not only violate the EC Treaty freedom of capital movement, they may also have wider negative economic consequences if they impede efficient international portfolio diversification and prevent investments that would allow higher returns for the same level of risk or lower risks for the same level of returns.

The objective of this study is to assess the economic implications of investment restrictions in certain funded social security and pension schemes in the EU Member States. It focuses on those restrictions that present a quantitative limit to international portfolio diversification, as well as on the extent to which these restrictions adversely affect the risk–return profile of the funded schemes.

The analysis consists of two main workstreams.

– **Workstream 1: Inventory of relevant schemes and investment restrictions**. Identification and description of those schemes that fall within the scope of this study, including mainly statutory schemes in Pillar 1 which have a funded element. Supplementary occupational schemes are included only if they are economically important, if they are subject to cross-border investment restrictions, and if they do not fall under the IORP Directive (or other European Directives), which already deals with investment restrictions.[2] Voluntary individual pension funds are beyond the scope of this study. For the relevant schemes, the analysis provides an inventory and description of the main investment restrictions that apply under national laws and regulations, particularly those of cross-border relevance. It also describes the actual asset allocation of the relevant schemes. This provides the factual basis for the actual assessment of the economic impacts of cross-border investment restrictions.

– **Workstream 2: Impact assessment**. Assessment of the economic impact of cross-border investment restrictions on the financial performance of the schemes. In particular, the analysis considers the extent to which the existing investment restrictions influence

[2] Directive 2003/41/EC on the activities and supervision of institutions for occupational retirement (IORP) eliminates or at least reduces quantitative investment restrictions and instead shifts emphasis on the 'prudent-person' rule. This rule requires that assets be invested according to the best interest of members without imposing undue restrictions on what those investments should be.

the asset allocation of pension funds and result in inferior risk–return performance of the investment portfolios.

This report summarises the analysis conducted and is structured as follows:

– Section 2 contains an overview and description of the relevant schemes, including a summary of quantitative cross-border investment restrictions and the actual international asset allocation of the schemes. The summary draws from the more detailed country descriptions provided in Appendix 2.

– Section 3 presents a review of the academic literature. This literature helps to define the research issues and the empirical research methodology, and presents evidence on the likely impact of cross-border investment restrictions.

– Section 4 examines the extent to which cross-border investment limits that are currently imposed on the relevant schemes influence investment decisions, and considers other factors that might explain the current level of international diversification.

– Section 5 summarises the empirical modelling work undertaken to simulate the potential costs associated with the current restrictions on cross-border investment. It sets out the approach and methodology adopted, and presents the results in terms of what sub-optimal international portfolio allocations could mean in terms of risk–return performance.

– Section 6 concludes with an overall assessment of the impact of cross-border investment restrictions.

– Section 7 contains a bibliography, including references from the review of the relevant literature.

– Appendix 1 summarises the data used in the empirical analysis and simulations of the impact on the risk–return profiles of pensions funds.

– Appendix 2 provides country-specific descriptions of the relevant schemes, including information on quantitative investment restrictions and asset allocation.

1.2 Methodology

This study has required considerable information-gathering and analysis, using the sources outlined below.

– **Studies on pension systems and investment restrictions**. There are a number of studies that provide an overview of national pension systems in the EU. These have provided background information and have been instrumental in describing key characteristics of pension schemes, and in identifying those schemes and Member States that are most relevant for this study.

– **Academic literature**. The extensive body of academic literature has been reviewed to formalise testable hypotheses, define the conceptual framework and methodology, and provide empirical evidence on the likely impact of investment restrictions (see section 3).

– **Interviews and questionnaire**. Much of the required information is not available in the public domain—at least not on a consistent and comprehensive basis for all countries. Consequently, key sources of information have been the national ministries, regulatory authorities, scheme operators and fund managers. Oxera has sought to engage the relevant stakeholders extensively, with more than 70 stakeholders from different countries participating in meetings or conference calls, and others providing information in written form.

  In general, the interviews with ministries and regulators focused on identifying the pension schemes that fall within the scope of this study, the laws and regulatory framework that apply, and the nature of cross-border investment limits and other investment regulation.

  The interviews with scheme operators and asset managers focused on the asset allocation of the relevant schemes and the importance of investment limits in determining international investment decisions.

  Where data on actual asset allocation was not available from public domain sources, scheme operators (or the responsible regulatory authorities) were asked to provide the data by completing a questionnaire. The questionnaire also covered questions on quantitative investment limits as well as other factors that may influence international asset allocation.

– **Laws and regulations**. Where investment restrictions apply, in many cases it has been necessary to refer to the legislation or implementing rules to obtain detailed references and precise definitions of the restrictions. The interviews and questionnaire have helped in identifying the relevant laws and regulations.

– **National statistics and other country information**. Other national information sources consulted include national statistics (eg, on GDP) and, where available, published studies that specifically analyse pension systems, pension reform, and investment restrictions for specific countries.

– **Thomson Financial Datastream**. Large datasets were created using data from Thomson Financial Datastream to conduct the empirical simulations of risks and returns of actual and notional investment portfolios.

1.3 Acknowledgements

The country descriptions and analysis are the result of an extensive consultation process. Oxera would like to express its appreciation to all those who participated, in particular the representatives from the national ministries, regulatory authorities, national pension fund associations, scheme operators and managers who were available for interview, responded to information requests, and verified descriptions of the relevant pension schemes and laws applying. We would like to thank the European Federation of Retirement Provision (EFRP), which helped in establishing the initial key contacts in the different countries. We would also like to extend our thanks to the European Commission staff who provided insight and support throughout this study.

2 Overview of relevant schemes and investment restrictions

This section presents an overview of the social security and pension schemes that fall within the scope of this study, and summarises the quantitative cross-border investment limits that apply to the schemes under the relevant national laws and regulations. It is based on information collected for each of the 27 Member States, drawing from the more detailed country descriptions presented in Appendix 2.

2.1 Relevant schemes: scope, terminology and identification

2.1.1 Scope of study and terminology

Pension systems are very diverse in the EU Member States, and there are significant differences not only in the structure but also the terminology used. In broad terms, individuals can draw retirement income from:

– statutory social security schemes (Pillar 1);
– occupational pension schemes that are linked to the employment status of the individual (Pillar 2);
– individual pension savings, based on individual voluntary decisions that are independent of the occupational position (Pillar 3).

The boundaries between these three pillars are not always clear, and are not embedded in EU legislation. Although different classifications of national pension systems have been proposed (see Box 2.1 for an example), this study broadly follows the classification and terminology adopted in European Commission studies—a statutory First Pillar, a Second Pillar comprising supplementary occupational schemes, and Third Pillar with individual pension provision.[3]

Relevant Pillar 1 schemes

Using this classification and terminology, the scope of the study largely includes Pillar 1 schemes,[4] provided that these are not financed exclusively on a PAYG basis, but have funded elements. The funded elements can fall into two broad categories.

– **(Demographic) reserve funds**. Some predominantly PAYG pension schemes have statutory requirements for partial pre-funding and, particularly in view of the increasing pension expenditure, reserve funds have been set up to support the traditional PAYG schemes.

– **Statutory funded private pension schemes**. Often described as the separate second tier of the First Pillar (referred to as Pillar 1 bis).[5] Some countries have switched part of their social security pension schemes into private funded schemes; provision and

[3] European Commission (2005), 'Privately Managed Pension Provision: Report by the Social Protection Committee', February and Economic Policy Committee and the European Commission (DG ECFIN) (2006), 'The Impact of Ageing on Public Expenditure: Projections for the EU 25 Member States on Pensions, Health Care, Long-term Care, Education and Unemployment Transfers (2004–2050)'.

[4] From the point of view of EU legislation, Pillar 1 broadly coincides with schemes covered by Regulation 1408/71, which applies to statutory schemes. Council Regulation (EEC) No. 1408/71 of 14 June 1971 on the application of social security schemes to employed persons and their families moving within the Community.

[5] Under the World Bank classification set out in Box 2.1, these statutory schemes are classified as Pillar 2 schemes.

participation is usually statutory, but the schemes are generally operated and managed by private institutions.

Box 2.1 The World Bank three-pillar system

The World Bank three-pillar classification has been adopted by many of the new EU Member States and encompasses the following.

– A First Pillar, which is public and financed by social security contributions or general tax revenue. It is aimed at providing a social security safety net for the elderly, particularly for those with low income.

– A Second Pillar, which is funded and is mandatory in order to ensure maximum participation. Individual contributions are privately managed and invested to pay for future pensions.

– A Third Pillar consisting of voluntary retirement savings, either occupational or personal.

This classification differs substantially from the terminology used in the EU 15 and adopted in European Commission studies (and this study). In particular, the statutory funded private pension schemes are, according to this terminology, classified as Second Pillar schemes rather than schemes in the First Pillar (Pillar 1 bis).

Source: World Bank (1994), *Averting the Old Age Crisis. Policies to Protect the Old and Promote Growth*, Oxford University Press.

Relevant Pillar 2 schemes

This study mainly focuses on funded schemes in the First Pillar. As for supplementary occupational schemes in the Second Pillar, all EU Member states have transposed, or are in the final process of transposing, the IORP Directive into national legislation (see Box 2.2). The IORP Directive deals with investment restrictions and provides for the elimination of, or at least a reduction in, quantitative restrictions, by requiring investments to be based on 'prudent person' principles—ie, a qualitative rather than quantitative approach to investments. Member States are allowed to be more restrictive in terms of investment regulation only if this is justified.

The IORP Directive applies to all occupational schemes operating on a funded basis. It excludes schemes that come under other financial services Directives, particularly insured schemes that fall under the remit of the Life Insurance Directive (which also deals with investment diversification);[6] company book reserve schemes; schemes which are not established separately from the sponsoring undertaking, where employees have no legal rights to benefits; and schemes with a small number of members.

Since investment diversification and prudent person principles are enshrined in the IORP Directive and in other European Directives that deal with investment restrictions (in particular the Life Directive), Pillar 2 pension schemes that fall under the scope of those Directives are excluded from the scope of this study. Other occupational schemes are included only where they:

– are funded and invested in financial assets;
– are subject to a legislative measure that defines quantitative cross-border investment restrictions;
– form an economically significant part of national pension provision.

As part of the research for this study, Oxera collected information on Pillar 2 schemes and assessed their relevance in light of the above scoping criteria. Using a process of elimination

[6] Directive 2002/83/EC of the European Parliament and of the Council of 5 November 2002 concerning life assurance.

(ie, starting with the full set of occupational schemes and working through each of the criteria), it emerged that none of the supplementary occupational schemes was relevant—largely because the IORP or Life Directives apply (or will apply, following a transitional period of IORP implementation), or because, where the Directives do not apply, none of the other above criteria could be met.

Invested funds accumulated for individual pension provision in the Third Pillar of national pension systems are also beyond the scope of this study.

Schemes considered in this study are therefore in Pillar 1—reserve funds that support the PAYG social security system, as well as statutory private funded pension schemes.

Box 2.2 The IORP Directive

The Directive on the Activities and Supervision of Institutions for Occupational Retirement Provision (IORP), 2003/41/EC, aims to create a European legal framework for funded occupational pension schemes. Member States were required to implement the Directive in national legislation by September 2005, although there have been implementation delays in a number of countries.

One of the objectives is to facilitate access by improving efficiency and affordability, thereby eliminating or at least reducing investment restrictions. In particular, Article 18 specifies that 'Member States shall require institutions located in their territories to invest in accordance with the "prudent person" rule', thus moving from a quantitative approach of regulating investment to a more qualitative one that allows investment to be made in the best interests of scheme members, and takes account of security, quality, liquidity and profitability of the portfolio as a whole.

Member States can, however, be more restrictive and set quantitative investment limits if appropriately justified, but only up to defined limits. For example, Member States cannot prevent institutions from investing up to 70% in shares, negotiable securities and corporate bonds; neither can they prevent investment of up to 30% of technical reserves in currencies other than those in which liabilities are expressed.

Source: IORP Directive.

Investment restrictions

Restrictions on the investment of pension fund portfolios take many forms. This study focuses on quantitative investment limits that act as an explicit barrier to cross-border investment and that are specified by the relevant national laws or regulations. These limits can differ along the following dimensions:

– the object of the restriction (asset class, currency, location of the issuer);
– geographic scope (currencies or countries included in the restriction);
– level of the restriction (typically expressed in terms of a percentage of the asset portfolio).

Investment restrictions can arise not only from the imposition of quantitative limits on portfolio investment. While the focus is on quantitative limits that explicitly restrict cross-border investment, any other significant legal or regulatory impediments to cross-border investment are described where information was available, or where the asset managers or other national experts consulted as part of the study deemed these significant.

In the cross-border context, for example, the tax regime may be such that international investments are relatively less attractive than investment in domestic assets. Similarly, other regulations governing pension schemes (eg, minimum funding requirements, guaranteed rates of return) may effectively act as barriers to international portfolio allocation. In addition to legal and regulatory restrictions, there may be implicit barriers to cross-border investment that result from, for example, internal investment guidelines, transaction costs, or other

factors that may explain a home bias in portfolio allocation. These are reviewed in the literature survey in section 3.

The economic impact of quantitative investment limits can only be assessed in the context of other restrictions on cross-border investment. Hence, when conducting the empirical analysis and drawing conclusions, these other restrictions are taken into account.

While the study focuses on restrictions with direct cross-border relevance, information has also been gathered on legal provisions and regulations that limit investment in asset classes. This is important when considering that asset class limits may indirectly influence international investment—eg, to the extent that diversification benefits of foreign investment are greatest in equity markets, limiting the equity exposure of portfolios may have an indirect effect on cross-border investment even if the restriction is not discriminatory. The overview of restrictions contained in section 2.4 focuses on quantitative limits on cross-border investment (with some discussion of limits on equity investment), but the identified asset class limits for the relevant schemes are summarised in the country descriptions in Appendix 2.

2.1.2 Identification of relevant schemes and investment restrictions

The relevant schemes and investment restrictions were identified by drawing on four main sources:

- Europe-wide or country-specific studies describing the structure of the national pension systems;
- interviews with country experts;
- national laws and regulations;
- where required, a questionnaire for the relevant ministries, regulators or scheme operators.

The information-gathering process and data sources used for this study are described in more detail in Appendix 1.

2.2 Overview of reserve funds

2.2.1 Definition and scope

A reserve fund can be broadly defined as an accumulation of monies that are capitalised to support the operation of a PAYG scheme. It involves the communal pre-financing of a portion of anticipated and promised future plan benefits. Reserve funds can take different forms and serve different purposes. They can be set up for precautionary purposes, whereby the existing reserves (equal to several months' pension expenditure) are used to offset the impact of the business cycle on scheme balances and cover financing contingencies during the low points in the cycle. Alternatively, a reserve fund can be set up as a smoothing fund to enable the transfer of savings to pre-finance some of the additional costs incurred by the retirement of the 'baby boom' generation. These funds are generally temporary, being built up in an accumulation phase and used in the future payout phase to limit increases in scheme contributions. Reserve funds may also be built as non-lapsing reserves, where the reserves allow the pension scheme to top up current contributions with interest earned on the funds invested.

The following provides an overview of reserve funds established in 11 countries (see Table 2.1), each set up with a view to support, through additional assets, the traditional PAYG schemes in the First Pillar of the national pension system. The reserve funds cover all types discussed above, although many funds have been established with the explicit goal of covering funding problems that are expected to arise in the coming decades due to changes in the demographic structure of the population. Because their goal is to safeguard the

sustainability of social security systems, these schemes are often referred to as 'demographic reserve funds' or 'social security reserve funds'.

Many countries not discussed in this study have a funded component within their PAYG scheme, but the funds generally present short-term surpluses and have a working capital function. To meet their objective, the funds are held in cash or are invested in short-term, highly liquid instruments. This study does not examine these working capital funds, due to their limited scope for investment diversification and limited function in the First Pillar pension financing—ie, the pension schemes they support are purely PAYG schemes.

Reserve funds are included only if they meet at least one of the following criteria:

– they have been set up as a demographic reserve fund;
– they are economically significant when compared with pension obligations, and provide financing support in the long term;
– they are managed and properly invested in public or private financial assets.

Not all reserve funds meet these criteria. For example, while being a reserve to support the future financing of public pensions, the reserve fund in the Netherlands is a notional fund that exists only in the books of the Dutch government and is therefore not invested in financial assets. By contrast, the Agirc–Arrco scheme in France is financed on a PAYG basis, without long-term accumulation of reserves to meet future expenditure increases; however, its technical reserves are sizeable (covering, on average, around one year of expenditure), helping to cover troughs in the financing cycle, and are to a large part invested actively.

2.2.2 Summary of main features of the reserve funds

Table 2.1 summarises some of the main features of the reserve funds considered in this report—the name of the fund, the year of establishment, the means by which contributions are made to the fund, the operator of the fund (public or private), and whether parts or all of the funds are externally managed by professional asset managers. It also shows the size of the reserve funds in terms of amounts accumulated by the end of 2005. Figures 2.1 and 2.2 show the amount of funds relative to the country's GDP and gross public pension expenditure. Some of the main differences include the following (the country-specific descriptions in Appendix 2 provide further details).

– **Number of reserve funds**. While in most countries there is a single reserve fund that supports the public pension scheme, three countries (Finland, France and Sweden) have more than one reserve fund. In Finland, there is no centralised social security scheme; instead, there is an earnings-related scheme for the private sector (TEL), which is managed by specialised 'pension-insurance' companies. Each company uses most (around 75%) of the contribution to finance a PAYG scheme, while the remainder is set aside in a reserve fund. In addition, the pension schemes for local government and central government (KuEL and VEL, respectively) have separate reserve funds. France has a large public PAYG scheme providing a basic state pension, supported by a demographic reserve fund, Fonds de réserves pour les retraites (FRR). There is also a separate private scheme—Agirc–Arrco—which is compulsory and earnings-related, with large technical reserves, and which provides additional benefits for private sector employees.

  Sweden has different reserve funds that are linked to the same, public, earnings-related pension scheme. The four national reserve funds (AP funds 1, 2, 3 and 4) have a similar structure and fulfil the same function, but are separated to reduce the impact of asset allocation decisions on financial markets. A smaller reserve fund, AP6, operates under different rules and is in part focused on industrial policy objectives (development of domestic innovative industries).

– **Year of establishment**. Many funds were established as demographic reserve funds in the late 1990s or early 2000s, with a view to pre-financing in particular those future public liabilities related to the impacts of demographic ageing. In some countries, accumulation of reserves started much earlier, although subsequent reforms to the public pension system changed the investment and financial management of the funds. For example, the Swedish system of AP funds was originally established in the 1960s, but it was reformed in 1999. Similarly, the Fonds de compensation au régime général de pension in Luxembourg manages assets that were accumulated prior to its establishment in 2004. The public reserve fund in Portugal, Fundo de Estabilização Financeira da Segurança Social (FEFSS), was also introduced earlier than many other reserve funds (in 1989). In addition to the public reserve funds, Table 2.1 includes the reserve funds of two privately operated schemes, Agirc–Arrco in France and TEL in Finland, which were both established in the 1960s.

– **Financing**. Reserve funds can be financed from a number of sources, including regular annual contributions made to the PAYG scheme, general tax revenue or budget surpluses, or non-recurring government revenue such as that arising from the proceeds of privatising state-owned assets. For example, the Portuguese FEFSS receives funds from regular contributions that amount to between two and four percentage points of the 11% of employees' earnings paid in social security contributions; the Irish government is obliged by statute to contribute 1% of GNP to the National Pensions Reserve Fund (NPRF); the French and Belgian reserve funds have been financed largely by privatisation revenues or budget surpluses; and in Sweden, AP1–4 are buffer funds, the balance of which is linked to that of the PAYG system—ie, the funds' balance increases if contributions to the PAYG system exceed benefits to be paid.

– **Treatment in national accounts**. According to the European System of Accounts (ESA95), pension schemes are classified as 'social insurance' if they fulfil at least one of the following conditions:

  – they are compulsory;
  – they are collectively organised;
  – contribution is part of labour costs.

  Moreover, pension schemes are classified as 'social security schemes' if they are managed by a government unit.[7] Most reserve funds are integrated in the compulsory PAYG system and are managed by government units. Hence, they are in general classified as 'social security systems'. The only exceptions are the two privately operated schemes, TEL and Agirc–Arrco. However, for national account purposes, both TEL and Agirc–Arrco are classified as 'social security schemes'.[8]

– **Ownership of assets**. Reserve funds are in general linked to the public PAYG schemes that form social security, meaning that the assets are typically owned by the government or a government agency. This is unlike the statutory private pension schemes where the scheme participant owns the assets in individual accounts.

[7] Eurostat (2004), 'Classification of Funded Pension Schemes and Impact on Government Finances', August, pp. 2–3.

[8] Eurostat (2002), 'Manual on Sources and Methods for the Compilation of ESA95 Financial Accounts, May, pp. 116 and 126.

– **Payout restrictions**. The reserve funds back up the global obligations of the PAYG pension schemes and, unlike the statutory funded private pension schemes described below, their assets are not attributable to individual members. In some countries—eg, Sweden, Finland and France (Agirc–Arrco)—the reserve funds are an integral part of the operations of the PAYG scheme in the sense that the assets provide precautionary reserves that can be used to finance the gap between contributions and pension expenditure in financing cycle troughs. In other countries, where the fund is intended to meet future increases in financing requirements resulting from an ageing population, the use of the funds' assets is restricted for payment starting at a predefined date. For example, the funds of the French FRR are intended to be used between 2020 and 2040, and payment from the Irish NPRF is expected to start in 2025. The Belgian Ageing Population Fund (Fonds de vieillissement) is intended to absorb additional expenditure during the period 2010–30, not only that arising from pension benefits, but also other public expenditures (eg, health-related costs) that can broadly be attributed to the 'ageing population'.

– **Operation and management**. Most reserve funds support the state PAYG social security system and are therefore operated by public institutions, either the state treasury directly or an independent public agency. Only two of the reserve funds support private sector schemes and are operated by private bodies (Agirc–Arrco in France and TEL in Finland). Even if publicly operated, the assets may be managed privately under mandates given to external fund managers. For example, the assets of the French FRR are all managed by private fund managers, and reforms passed in Luxembourg will allow part of the assets of the Fonds de compensation to be managed externally. The reserve funds that remain largely or exclusively publicly managed include the Polish Demographic Reserve Fund (DRF), the Belgian Ageing Population Fund and the Portuguese FEFSS.

– **Size of reserve funds**. The largest reserve funds tend to be the oldest ones, with the more recently established schemes still accumulating funds. In 2005, the assets of the different Finnish reserve schemes amounted to €102 billion (equal to 66% of national GDP); those of the Swedish AP1–6 amounted to €84 billion (equal to 30% of GDP). Of the more recently established schemes, the Irish NPRF is among the largest relative to GDP: established in 2001 and having received regular annual contributions, the fund has grown rapidly to reach €15 billion (almost 10% of GDP) in 2005. The smallest scheme is the Polish DRF, with total assets of €385m. Figures 2.1 and 2.2 show the volume of assets in 2005 relative to GDP and gross public pension expenditure, respectively. The volume of assets held in most reserve funds is likely to grow significantly, particularly in those countries where governments have committed to making regular sizeable contributions to the funds.

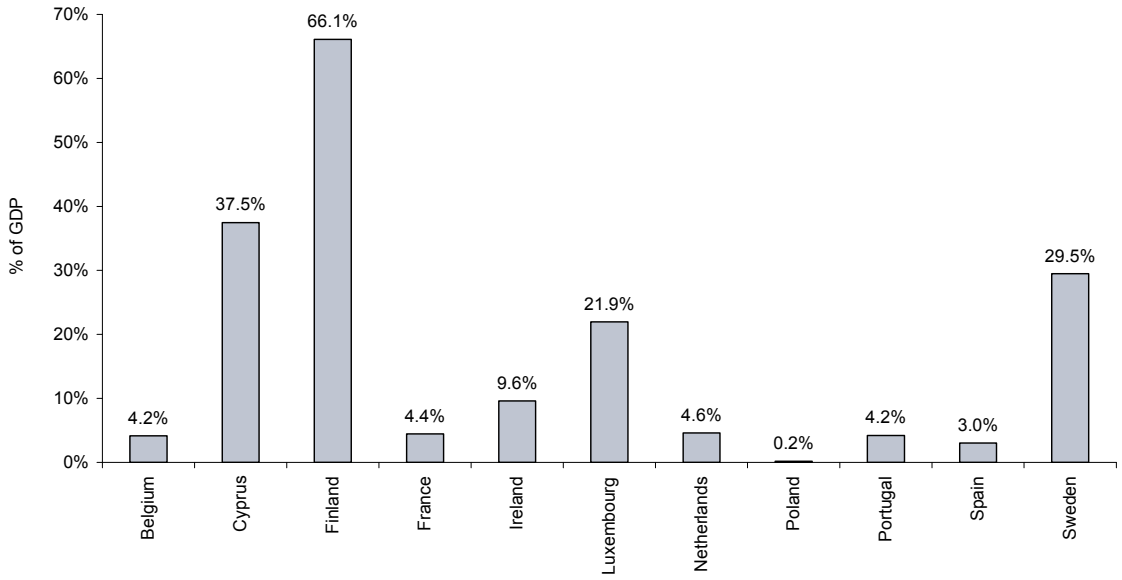
Table 2.1 Overview of reserve funds

	Name of fund	Established in	Contributions	Operator	External managers	Amount in 2005 (€m)
Belgium	Zilverfonds, Fonds de vieillissement (Ageing Population Fund)	2001	Budget surpluses, non-recurring revenues (privatisation)	Public. Zilverfonds as public agency under auspices of Ministry of Finance	No	12,392
Cyprus	Social Insurance Reserve Fund	1980 (fund established as an operational fund in 1957; became a reserve fund with reforms in 1980)	Surpluses from social insurance contributions	Public. Ministry of Labour and Social Insurance and Ministry of Finance	No	5,059.1
Finland	TEL (private sector)	1962	Contributions from employees and employers	Private	Yes	66,600
	KuEL (local government)	1988	As above	Public	Yes	19,100
	VEL (central government)	1990	As above	Public	Yes	8,200
	Other (including LEL, TaEL, MyEL, MEL)	n/a	As above	Private	n/a	8,100
France	FRR	2001	Privatisation revenues, surpluses	Public. FRR as public agency under auspices of ministries for social security and for the economy	Yes	26,650
	Technical reserves of Agirc–Arrco	1961 and 1972[1]	Contributions to Agirc–Arrco	Private. Agirc–Arrco[2]	Yes	49,396
Ireland	NPRF	2001	Annual contributions by treasury at rate of 1% of GDP	Public. National Treasury Management Agency	Yes	15,419
Luxembourg	Fonds de compensation au régime général de pension[3]	2004[3]	Social security contributions. The fund must cover a minimum of 1.5 times annual expenditure	Public. Fonds de compensation	Yes[3]	6,594
Netherlands	Public Old Age Benefit Savings Fund	1998	Annual deposits from general tax revenue	Public. Fund is a notional reserve that exists only in the books of the Dutch government	No	23,000

	Name of fund	Established in	Contributions	Operator	External managers	Amount in 2005 (€m)
Poland	DRF	2002	Contributions from social security pensions and privatisation revenue	Public. ZUS (although the DRF is a separate legal entity)	Allowed: up to 15% of fund per external fund manager Currently none	385
Portugal	FEFSS	1989	Initially financed from unclaimed tax refunds; further contributions from social security and sale of social security assets	Public. IGFCSS	No	6,176
Spain	Social Security Reserve Fund	1997 (operational from 2000)[4]	Surpluses from social security contributions	Public. Social Security Reserve Fund Management Committee	No	27,185
Sweden	AP Funds (1, 2, 3, 4 and 6)	1960s (reformed in 2000)[5]	Balance of public earnings-related pension scheme	Public. Independent national pension funds (AP Funds)	Yes	83,500

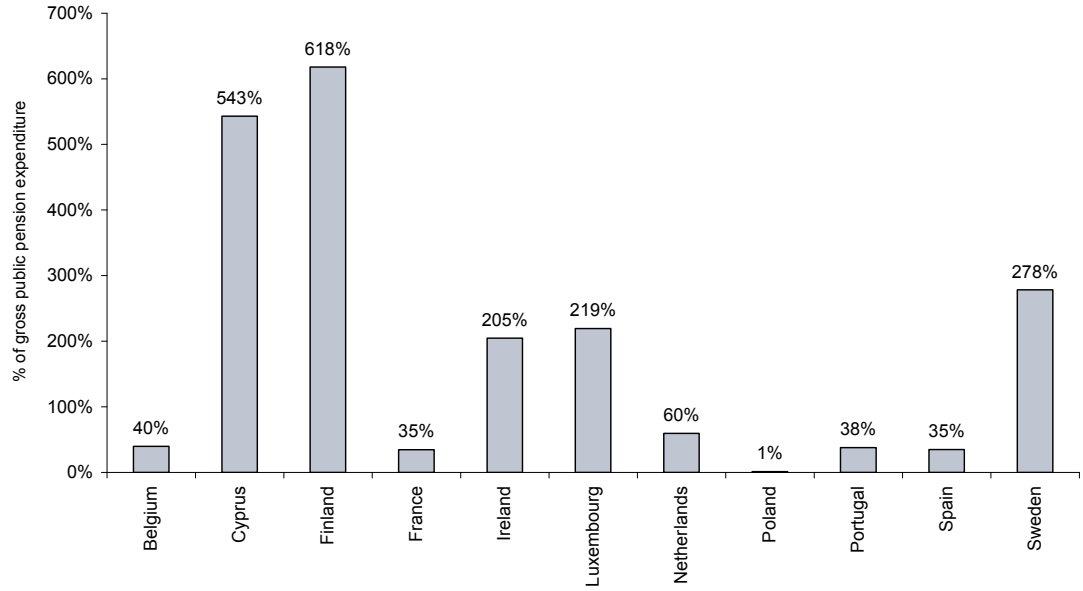
Note: [1] Agirc and Arrco merged in 2003. [2] The operation is decentralised among participating institutions. [3] The Fonds de compensation is a new investment vehicle (created in 2004) through which the reserves (including those accumulated prior to its creation) are invested. Asset managers are in the process of being selected. [4] Established in 1997 and the transfers started in 2000. [5] AP7 is not included because it is not a reserve fund. Following the 2000 reform, the fifth fund no longer exists.

Figure 2.1 Reserve funds: amount of funds relative to GDP, 2005 (%)



Note: Results for France refer to the combined funds of the FRR and Agirc–Arrco; the funds for Finland are also combined.
Source: Oxera, Eurostat and Datastream.

Figure 2.2 Reserve funds: amount of funds relative to gross public pension expenditure, 2005 (%)



Note: Data on gross public pension expenditure refers to 2004. Results for France refer to the combined funds of the FRR and Agirc–Arrco; the funds for Finland are also combined.
Source: Economic Policy Committee (2006), 'Age-related Public Expenditure Projections for the EU 25 Member States up to 2050: European Economy—Special Reports', and Oxera calculations.

2.3 Overview of statutory funded private pension schemes (Pillar 1 bis)

Nine of the 27 countries have switched part of their social security pension provision into statutory funded private pension schemes. As can be seen from Table 2.2, such schemes are mostly observed in the new EU Member States, introduced on the basis of the World Bank model of defined contribution (DC)—privately managed funds with mandatory

participation. Among the EU 15, statutory private schemes can be found in Sweden (the Premium Pensions system) and Denmark (the ATP scheme).

Table 2.2 summarises some of the key features of the schemes—ie, year of establishment, level of contributions, participation requirements, type of benefit, management, and the amount of funds accumulated by the end of 2005. Figure 2.3 reports the size of the accumulated funds relative to the countries' GDP, and Figure 2.4 reports fund size relative to total public pension expenditure. Further details are provided in the country-specific descriptions in Appendix 2.

– **Year of establishment**. Almost all schemes were introduced over the past decade, the exception being the Danish ATP scheme, which was initiated in the 1960s. Among the new Member States, the first country to implement a statutory funded private scheme was Hungary in 1998, followed by Poland in 1999. Of the countries listed, Lithuania was the last to implement such a scheme (2004), but Romania and Malta plan to introduce statutory funded schemes as part of the pension reforms that are currently in discussion.

– **Participation**. Participation is mandatory in all Member States, with the exception of Lithuania. In Lithuania, joining the scheme is voluntary, but it is not possible to exit the scheme once joined. In the new Member States, participation was mandatory only for younger workers when the schemes were implemented. The older workers could join on a voluntary basis or, in some cases, were prohibited from joining. For example, in Latvia, when the scheme was introduced in 2001, all members of the social insurance system aged under 30 years of age were required to join; participation was voluntary for those aged 30–49 years, while those aged over 50 years of age were required to remain in the PAYG social security system. As a result, many schemes will cover all workers in a few years time, when voluntary participants retire.

  While in most countries the statutory schemes are not differentiated by sector of employment, there are exceptions. For example, in Bulgaria, Professional Pension Funds (PPFs) are mandatory for workers in certain hazardous occupations. Mandatory participation is in general limited to the working population, although in some countries, such as Denmark, the scheme also covers people out of work and receiving social assistance.

– **Treatment in national accounts**—according to ESA95, pension schemes managed by financial institutions should be defined as 'autonomous private funds'. In particular, DC schemes are classified as 'money purchase pension schemes' in the sub-sector 'insurance corporations and pension funds'.[9] While such schemes still fall under the definition of 'social insurance', they are not classified as 'social security schemes.' The classification of pension schemes has repercussions for the calculation of government debt.[10] Statutory funded private pension schemes are for the most part managed by financial institutions, and follow this classification. The main exceptions are the Danish ATP, and the Swedish Premium Pension system. The ATP scheme is classified as a 'social security fund'.[11] In Sweden, the PPM is also classified as a 'social security fund'; however, according to a decision by Eurostat, the PPM is to be moved from the government sector to the insurance sector in 2007.[12]

[9] Eurostat (2004), 'Classification of Funded Pension Schemes and Impact on Government Finances', August, p. 5.

[10] In the context of the Excessive Deficit Procedure related to the Maastricht criteria, any debt instrument issued by a government unit and held by another government unit is not accounted for in government debt. Any investment in government debt by funded pension schemes classified as 'social security schemes' (and hence part of the government sector) contributes to reduce government debt. As a result, the pension liabilities of the government towards households is not reflected in the accounts. See Eurostat (2004), op. cit., p. 10.

[11] Eurostat (2002), 'Manual on Sources and Methods for the Compilation of ESA95 Financial Accounts, May, p. 125.

[12] Eurostat (2002), 'Manual on Sources and Methods for the Compilation of ESA95 Financial Accounts', May, p. 127. Statistics Sweden (2004), 'Financial Accounts 1998–2003', http://www.scb.se/templates/Publikation____108193.asp.

– **Ownership of assets**. Statutory funded private pension schemes are based on individual accounts owned by the scheme participants. The Danish ATP scheme, where members do not have individual accounts and do not own the assets, is an exception.

– **Contributions**. Contributions are typically calculated as a percentage of gross wages, or expressed as a percentage of the total social security contributions that are then divided between those directed to the PAYG scheme and those going into the individual accounts held by employees in the private schemes. In some countries, the contribution rate to the private schemes is expected to grow in the future. For example, in Latvia, the contribution rate will be increased from 2% in 2006 to 10% in 2010, matched by a corresponding reduction of contributions to the PAYG scheme. The contribution rates vary across countries, with the highest rates being observed for Bulgarian Professional Pension Funds and for Hungarian Mandatory Pension Funds (12% and 8.5% of gross wages, respectively).

– **Benefits**. All schemes are DC schemes where the amount of contribution paid and the investment returns determine the level of benefits. Typically, the level of benefits is calculated on the basis of the capital accumulated in the individual account as a result of the contribution and investment performance. Although the risk is generally borne by participating individuals, the regulation of some schemes is such that funds are required to guarantee a minimum annual return (eg, in Poland and Bulgaria). On retirement, members typically have to buy an annuity from the state or a private insurance company; lump-sum payouts of the accumulated assets do not tend to be permitted.

– **Management**. Although the state (or a public agency) often fulfils an important role in collecting the contributions, administering the individual accounts, and ultimately paying out benefits, the schemes are managed by private institutions—special pension fund management companies or insurance companies. The exception is Denmark where the ATP scheme is operated and assets managed by an independent agency, the board of which is appointed by the organisations of the employees and employers (including the state). In Sweden, a public fund (managed by AP7) operates alongside private fund managers. The private pension scheme managers are subject to authorisation and supervision by the relevant regulatory authority, typically the regulator responsible for financial services as a whole or for the pension or insurance part of the industry. The number of pension fund providers varies across countries, depending in part on country size, market structure and scheme regulations. For example, while there are 15 providers in Poland, each offering a mandatory pension fund, there are 85 fund managers offering a total of 698 funds to choose from within the Premium Pensions system in Sweden.[13]

– **Individual choice**. Individuals generally have a choice of which provider to manage their accounts, and can often also choose among the funds provided by the companies. The greatest choice is available to members of the Swedish Premium Pensions system, who can choose up to five funds out of the almost 700 offered on the market. There are exceptions and, in some cases, individuals have limited choice regarding investment. For example, in Denmark, all investments are made by the ATP, using the same strategy for all participants. In Poland, there are several providers all offering one fund, although they all have to follow a similar investment strategy. In most other countries, individuals have some choice among funds, although they can usually contribute to only one. Pension providers may offer a choice of funds—eg, often with three different risk profiles (conservative, balanced, active) defined in terms of the allocation to equity. In some countries (eg, Estonia), the set of funds offered is defined by statute; in others (eg, Latvia), it is the choice of the provider.

[13] The number of funds for the Swedish Premium Pensions system refers to 2004.

Two further factors are relevant when considering the investment choice available to individual members—namely whether they are permitted to switch between funds after the initial choice has been made, and what happens when they fail to make a choice. Switching is usually allowed, although it may be restricted (eg, to once a year) or subject to a penalty. Members that fail to choose a provider are often assigned to a default fund—usually one that follows a low-risk investment strategy. In Sweden and Latvia, the default fund is a publicly managed fund—in Sweden, by AP7, and in Latvia, by the Treasury (although the Treasury is to give up this function). In other countries, there is no default fund as such, but individuals who do not choose one are allocated (eg, by means of a lottery) one of the better-performing funds.

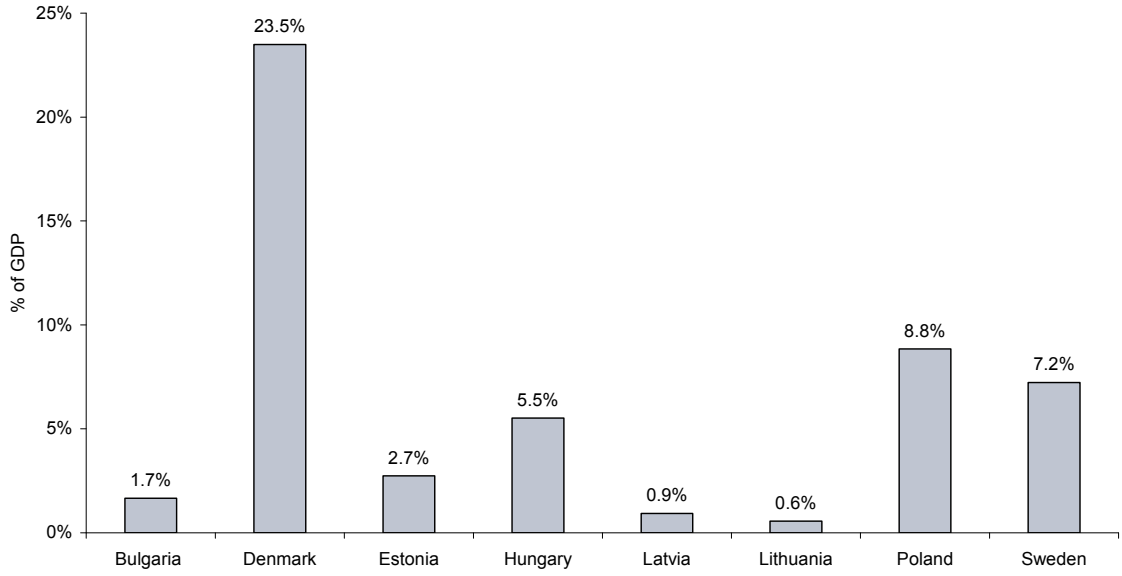
– **Size of funds**. The Danish ATP system is the longest established and has the largest accumulated funds, both in absolute terms (€49 billion) and, as shown in Figure 2.3, relative to GDP (24%). Among the new Member States, the mandatory Open Pension Funds (OPFs) in Poland hold most assets (€21.4 billion, or 9% of GDP). The schemes in Latvia and Lithuania are both relatively new (established in 2004) and small, amounting to less than 1% of GDP. Comparing the size of the funds with the gross public pension expenditure conveys a similar picture (Figure 2.4). The Danish ATP has assets corresponding to over 250% of the public pension expenditure.

Table 2.2 Overview of statutory funded private pension schemes

	Name of scheme	Established in	Contributions (% of gross wages)	Participation	Defined contribution or defined benefit?	Managers	Amount of funds in 2005 (€m)
Bulgaria	Universal Pension Funds	2002	4%	Mandatory	DC	8 private insurance companies	225
	Professional Pension Funds	2000	12% (category 1) 7% (category 2)	Mandatory in hazardous occupations	DC	8 private insurance companies	130
Denmark	ATP	1964	Around 1% of average wage	Mandatory	DC	Independent public agency (ATP)	48,930
Estonia	Mandatory Pension Funds	2002	6%	Mandatory	DC	5 private asset managers	298
Hungary	Mandatory Pension Funds	1997/98	8.5%	Mandatory	DC	18 pension funds and managers	4,847
Latvia	State-funded pension schemes	2001	2%	Mandatory	DC	9 asset managers	119
Lithuania	Pension funds accumulating part of the state social insurance contributions	2004	3.5%	Voluntary, but once joined mandatory (ie, no exit)	DC	6 fund managers and 5 insurance companies	118
Poland	Open Pension Funds	1999	7.3%	Mandatory	DC	15 common pension societies (PTEs)	21,369
Slovakia[1]	Old-age Pension Savings	2004	9%	Mandatory	DC	6 pension asset management companies	477
Sweden	Premium Pensions	1999	2.5%	Mandatory	DC	AP7 and private fund managers	20,447

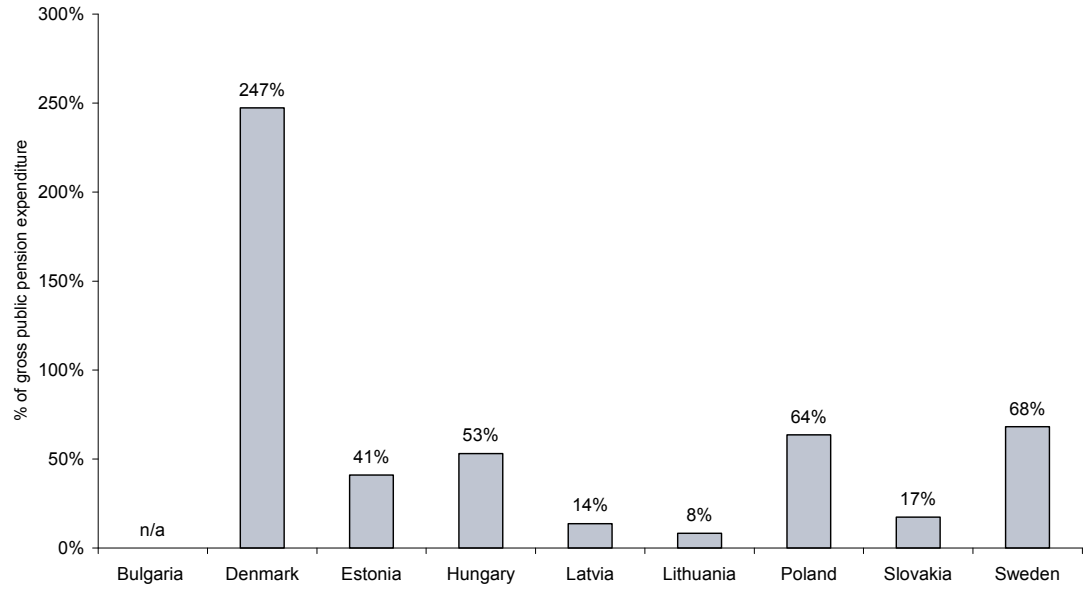
Notes: [1] Data on amount of funds refers to June 2006.
Source: Oxera research.

Figure 2.3 Statutory funded private pension schemes: amount of funds relative to GDP, 2005 (%)



Sources: Oxera, Eurostat and Datastream.

Figure 2.4 Statutory funded private pension schemes: amount of funds relative to gross public pension expenditure, 2005 (%)



Note: Data on gross public pension expenditure refers to 2004.
Source: Economic Policy Committee (2006), 'Age-related Public Expenditure Projections for the EU 25 Member States up to 2050: European Economy: Special Reports', and Oxera calculations.

2.4 Overview of cross-border investment restrictions

The study focuses on statutory quantitative limits on foreign investments. These restrictions are typically set out as an explicit maximum percentage allocation of the investment portfolio, defined with respect to the country of the issuer of the security or to the currency of denomination of the asset.

The following sets out the main quantitative cross-border investment limits (including currency-matching requirements) observed, first for the reserve funds and then for the statutory funded private pension schemes. Further details, including the relevant law or regulation that specifies the limits, are set out in the country-specific descriptions in Appendix 2.

As discussed above, quantitative limits are not the only restrictions on cross-border investments. While the following focuses on quantitative limits set down in laws and regulations, the country-specific descriptions in Appendix 2 highlight, where available, any other legal and regulatory constraints, as well as internal investment guidelines, that may influence international portfolio allocation for the relevant schemes. Moreover, section 4 discusses quantitative limits in the wider context, referring to specific examples where other investment restrictions present a binding constraint on international investment over and above existing quantitative limits.

2.4.1 Reserve funds

Table 2.3 provides an overview of the main quantitative limits that apply by law or regulation to cross-border investment for the reserve funds considered in this study. The table also sets out the limits on equity allocation of the funds' portfolio since these limits are often linked with international investment limits, and constraints on equity investment tend to reduce the scope of international diversification of the portfolio.

Table 2.3 Reserve funds: overview of quantitative limits on cross-border investment

	Quantitative limits on cross-border investment	Maximum allocation into equity
Belgium	0%. Investment restricted to specifically issued domestic government bonds	0%
Cyprus	No formal restrictions; precedent is for almost all assets to be invested in Cypriot government debt	No limit
Finland[1]	Maximum 10% outside the EEA Maximum 20% currency risk exposure (hedging allowed) Pension insurance companies can achieve additional exposure through mutual funds that reside in the EEA	50%
France (FRR)	25% in securities outside the EEA or outside a regulated market in OECD area. Currency risk exposure cannot exceed 20% (hedging permitted)	No limit
France (Agirc–Arrco)	Equities (bonds) outside the Eurozone cannot exceed 10% (5%) of total portfolio. Only investment within OECD area[2]	40%[2]
Ireland	No limit	No limit
Luxembourg	No limit	No limit
Netherlands	0%. Fund only exists in the books of the government	0%
Poland	0%. Investment restricted to Polish securities	30%
Portugal	50% must be invested in Portuguese government debt. Currency risk cannot exceed 15% (hedging allowed)	25%
Spain	50% in foreign public debt with AAA rating[3]	0%
Sweden	40% maximum currency risk exposure (hedging permitted)	70%

Notes: [1] Restrictions refer only to the TEL. No restrictions apply to the public sector schemes (KuEL and VEL). Pension funds are not permitted to increase their non-EEA exposure through mutual funds. [2] This is based on financial regulations issued by Agirc–Arrco, rather than legal statute. [3] According to Spanish law, the Spanish Social Security Reserve Fund can only invest in government debt. The investment guidelines require 50% of the funds' assets to be in Spanish government debt.
Source: Oxera research.

The restrictions on foreign investments range from an obligation to buy only domestic government bonds (in Belgium) to a prohibition on the purchase of domestic government bonds (in Ireland). The extent of these restrictions reflects, at least in part, the policy objectives of the reserve funds. In Ireland, the goal is to accumulate assets to face a future increase in the liabilities of the public PAYG schemes. In Belgium, as well as in the Netherlands, the reserve fund is of a 'notional' nature—it highlights the future pension liabilities of the government, and therefore has an accounting and public debt management function, but does not accumulate external assets as such (see Box 2.3).

Box 2.3 'Notional' reserve funds

The Public Old Age Benefit Savings Fund in the Netherlands is a notional fund that exists only in the books of the Dutch government. The fund is not invested in financial assets and presents only a credit position to the government.

The Ageing Population Fund in Belgium has accumulated assets, but these constitute domestic government bonds only—ie, investment is restricted to specific tailor-made zero-coupon instruments—the 'Schatkistbons-Zilverfonds'—which are issued by the Treasury and expire in, or after, 2010. As such, the fund can be considered a 'notional' fund, since its net financial position towards the government is always zero (ie, funds received from the government are reinvested in government bonds). An example of another reserve fund that is permitted to invest only in domestic government bonds is the Social Security Trust Fund in the USA.

Notional funds have been subject to much controversy.[1] Critics argue that they contain no genuine assets, but only commit to imposing taxes or cutting expenditure in the future. It is argued that the funds are only accumulating a right to future government revenues—in this respect they are regarded as little more than an accounting exercise. For the same reason, the interest 'paid' to the funds is considered to be of little value.

Another view pertaining to notional funds is that they are an important accounting mechanism that facilitates public debt management. The funds have liabilities to the government (ie, they support future pension expenditures), but the government has liabilities to the fund of the same value (ie, in the form of government bonds). Setting up a notional reserve in the books allows more effective tracking of receipts and spending for programmes that have specific taxes or other revenues earmarked for their use.

Note: [1] See, for example, Mitchell, D. (1999),'The Social Security Trust Fund fraud', The Heritage Foundation, Backgrounder No. 1256.
Source: Oxera interviews.

The overview of restrictions in Table 2.3 suggests that all but two reserve funds (the Irish NPRF and the newly established reserve fund in Luxembourg) are subject to investment limits with cross-border relevance. The nature of the restrictions differs widely and includes the following.

– **Restrictions on the location of the issuer**. In France, the FRR is permitted to invest up to 25% in securities issued outside the EEA or the OECD. Agirc–Arrco cannot invest more than 10% (5%) of the total portfolio in equities (bonds) outside the Eurozone. In the Finnish TEL scheme, up to 10% can be invested outside the EEA; however, it is possible to increase the exposure via mutual funds that are domiciled in the EEA. In Spain, investment is restricted to government debt only, of which no more than 50% can be invested outside Spain. In Poland, the reserve fund is permitted to invest in domestic assets only, but unlike Belgium, investment other than treasury bonds is possible. At the other end of the spectrum, the Irish NPRF is explicitly prohibited from investing in domestic government bonds—this is to avoid any political pressure to use fund assets to finance the government budget.

– **Restrictions on the currency of denomination**. The French FRR and the Finnish TEL schemes combine restrictions on issuer location with restrictions on currency risk

exposure. In both countries, the regulation does not define the amount that can be allocated to assets denominated in foreign currencies, but states that any amount above a certain threshold must be hedged to limit currency risk—currency risk exposure cannot exceed 20% of the assets. Similarly, in Sweden, the restriction for AP1–4 refers to a maximum unhedged position (ie, exposure to currency risk) equal to 40% of the portfolio. Restrictions that focus on currency risk allow pension funds to achieve international diversification and at the same time avoid a mismatch between assets and liabilities. However, the level of flexibility and the cost of hedging depend on the liquidity of the foreign exchange market. For example, it may be cheaper for Finnish funds to buy protection against currency risk on the euro market than for Swedish funds on the krona market.

– **Maximum allocation to equity**. The French FRR, the Irish NPRF and the Luxembourg reserve fund have no legal limits on the proportion of equity that can be held in the portfolio. In Belgium and Spain, the reserve fund cannot buy any shares, and investment is restricted to government debt. In Portugal, the proportion of equity is limited to 25% (and 50% of assets must be invested in Portuguese government debt); in Poland it is limited to 30%; and for Agirc–Arrco the limit is 40%. The Swedish AP funds can invest up to 70% of their portfolio in equity. To the extent that international diversification benefits are largest for equity investment, any strict equity limits can be expected to have an effect on international portfolio allocation over and above direct cross-border limits.

2.4.2 Statutory funded private pension schemes

Table 2.4 shows the quantitative limits for the nine countries with statutory funded private pension schemes. Only two countries (Sweden and Lithuania) have not imposed any limits on foreign investments for these schemes. The other seven countries have imposed either limits on the location of the issuer or on the currency of denomination of the securities in the portfolio of statutory pension schemes.

Table 2.4 Statutory funded private pension schemes: overview of quantitative limits on cross-border investment

	Quantitative limits on cross-border investment	Maximum allocation into equity
Bulgaria[1]	Maximum 20% in assets denominated in currencies other than Bulgarian lev or euros	20%
Denmark	Maximum 10% in non-EU and non-OECD countries	70% in public-listed holdings (including equity) 20% non-listed holdings (including equity)
Estonia	Maximum 30% in non-EU and non-OECD countries	50%
Hungary	30% currency risk exposure limit Non-OECD securities limited to 20% of foreign portfolio Maximum 10% each for: foreign corporate bonds, foreign municipality bonds, and foreign non-listed equity Real-estate investments only in the EEA	None
Latvia	30% currency exposure limit (lats and euros are matching currencies)[2] Government bonds must be issued by EEA or OECD states Equities and corporate bonds must be listed on an exchange in the EEA or OECD	30%
Lithuania	None	None
Poland	Maximum 5% in foreign assets	Maximum 40% in publicly listed equity (maximum 70% in equity securities)
Slovakia	30% of portfolio must be invested in Slovakia[3]	None
Sweden (Premium Pensions)	None	None

Notes: [1] Restriction as of April 2006; prior to the change in law, cross-border investment was limited to 10%, and 50% of the portfolio had to be invested in domestic government bonds. [2] Until 2005, the requirement referred to lats only. [3] Depending on the type of chosen fund (conservative, balanced or growth), currency exposure limits apply.
Source: Oxera research.

As with the reserve funds the restrictions for statutory funded private pension schemes differ across countries and include the following.

– **Restrictions on the location of the issuer**. Statutory schemes in Poland are subject to the strictest limits—not more than 5% of total assets can be allocated to foreign investments. Other countries generally allow more foreign investment, although they prohibit or limit investment outside the OECD or EEA. For example, Denmark limits such investment to 10% and Estonia to 30%. In Slovakia, 30% of the total portfolio must be invested domestically.

– **Restrictions on the currency of denomination**. Some countries express the quantitative limit in terms of the currency of denomination—eg, by imposing a currency-matching requirement. In Hungary, the regulation states that no more than 30% of the assets should be denominated in a currency other than the one in which liabilities are denominated. A similar regulation applied to statutory pension funds in Latvia until 2005, when the provision was changed to include euro-denominated assets as suitable for meeting the currency-matching requirement. The change followed the decision by the Latvian government to peg the lat to the euro, thus effectively minimising currency risk.

However, these limits are currency exposure limits, with pension funds being able to increase their position in foreign assets provided that the currency risk is hedged. In Bulgaria, the currency restriction presents an absolute limit to the extent that the funds cannot hold more than 20% of assets denominated in a currency other than the Bulgarian lev.

– **Maximum allocation to equity**. The scope for international diversification also depends on the degree to which schemes are allowed to invest in equity. Quantitative limits on the maximum allocation to equity range from 20% in Bulgaria to 70% in Denmark. Some countries (eg, Denmark and Poland) distinguish between listed and unlisted equities. Sweden, Lithuania and Hungary have no restrictions on equity investments.

2.5 Overview of asset allocation

2.5.1 Reserve funds

Within the constraints of investment regulations, reserve funds follow a wide range of investment strategies. Asset allocation for 2005 is summarised in Tables 2.5 and 2.6: Table 2.5 shows the proportion of total investments in domestic assets, and Table 2.6 shows the domestic allocation for the equity portfolio and the bond portfolio.

At one extreme are funds that invest exclusively in domestic assets—such as the Belgian Ageing Population Fund (domestic government bonds only) and the Polish DRF (domestic investments only, of which 20% is domestic equity).

At the other extreme, the Irish NPRF's strategy is focused on achieving a high level of international diversification. The NPRF's fixed-income portfolio is allocated in full to foreign securities; the allocation to Irish equities is in line with the relative international weight of the Dublin stock market (around 1%).

Between these extremes are reserve funds that give more or less weight to the domestic market. The Finnish schemes, which have the largest component in the EU as a percentage of domestic GDP, invest less than one-third of their assets in the home market. In Sweden, the allocation of different AP funds to domestic assets ranges from 27% to 41%. In France, the FRR invests almost half of its portfolio outside the Eurozone.

Table 2.5 Reserve funds: asset allocation into domestic assets, 2005 (%)

	Percentage of total portfolio allocated to domestic assets
Belgium	100
Cyprus	100
Finland	34[1]
France—FRR	53 (total Eurozone)[2]
France—Agirc–Arrco	94 (total Eurozone)[2]
Ireland	8
Luxembourg	n/a[3]
Netherlands	100[4]
Poland	100
Portugal	56
Spain	79
Sweden	27–41 (AP1–4) 100 (AP6)[5]

Notes: [1] Refers only to TEL, KuEL and VEL. [2] Refers to allocation to all euro equities and bonds. [3] The newly created fund is going through a transitional period in which asset managers are being selected and most assets are held in bank deposits. [4] The fund is a notional fund that exists only in the books of the Dutch government. [5] The AP6 investment strategy focuses on the domestic private equity market.
Source: Oxera research and calculations.

Table 2.6 Reserve funds: international asset allocation by asset class, 2005 (%)

	% public equity in total portfolio	% domestic in public equity portfolio	% domestic in debt portfolio
Belgium	0	n/a	100
Cyprus	0	n/a	100
Finland[1]	22	36	24
France—FRR	56	69[2]	82[2]
France—Agirc–Arrco	32	84[2]	98[2]
Ireland	79	1	0
Luxembourg	< 6[3]	n/a	n/a
Netherlands	0[4]	–	100
Poland	20	100	100
Portugal	27	12	75
Spain	0	n/a	79
Sweden (AP1–4)	55–61[5]	22–45[5]	34–58[5]

Notes: [1] Refers only to TEL, KuEL and VEL. [2] Domestic refers to investments in the Eurozone. [3] Assets held in bank deposits during the transitional period until asset managers have been selected; the new law envisages that 33% will be held in equity. [4] The fund is a notional fund that exists only in the books of the Dutch government. [5] Range for AP funds 1–4; AP 6 is exclusively invested domestically, focusing on private equity.

2.5.2 Statutory funded private pension schemes

As summarised in Table 2.7, there are no statutory funded schemes that invest exclusively in the domestic market. However, in Poland, Bulgaria and Hungary, the allocation to domestic assets is over 90%. All three countries have comparatively tight restrictions on foreign investments. However, quantitative limits do not appear to explain in full the domestic

concentration of the portfolio: the actual allocation to foreign assets is significantly lower than the maximum allowed (1% actual compared with 10% allowed in Bulgaria; 2% compared with 5% in Poland; 5% compared with 30% in Hungary).

Latvian statutory pension schemes also invest mainly in domestic assets; 72% of the portfolio is invested at home, mainly in fixed-income securities. Until 2005, Latvian funds faced a 30% limit on foreign currency exposure, and the relaxation of the provision has led to a substantial increase in foreign investment. Moreover, in Latvia, bank deposits represent an important form of investment (over 30% of the assets), leading to a further home bias in the portfolio.

Table 2.8 reports the allocation between equity and debt, and for each portfolio shows the proportion invested domestically. Pension schemes in Latvia, Bulgaria and Hungary have a low allocation to equity (less than 8%). To the extent that international diversification is more effective for the equity than the bond portfolio, this could partly explain the high proportion of domestic assets. However, the degree of international diversification is also limited for Polish pension funds, notwithstanding the significant allocation to equity (32% of the portfolio).

In the other countries, statutory private schemes have significant allocations to foreign assets. In Lithuania and Estonia, the schemes invest over 80% of their assets abroad. In Lithuania, the high allocation to foreign assets is combined with a low allocation to equity (9%). Lithuania has no quantitative limits on foreign investments, and in Estonia restrictions refer only to non-EU and non-OECD countries. In Sweden, AP7, the default fund of the Premium Pension system, invests 82% of its assets in foreign equities, while the fixed-income portfolio is exclusively domestic. The Danish ATP fund invests over 60% of its assets abroad; as in the case of Sweden, the equity portfolio is more internationally diversified than the bond portfolio.

Table 2.7 Statutory funded private pension schemes: asset allocation into domestic assets (2005)

	Name of fund	Percentage of total portfolio allocated to domestic assets (%)
Bulgaria	Universal Pension Funds	98.5
	Professional Pension Funds	98.8
Denmark	ATP	39
Estonia	Mandatory Pension Funds	15
Hungary	Mandatory Pension Funds	95
Latvia	State-funded pension schemes	72
Lithuania	Pension funds accumulating part of the state social insurance contributions	19
Poland	Open Pension Funds	98.9
Slovakia	Old-age Pension Savings	89
Sweden	Premium Pensions/AP7[1]	27

Note: [1] Refers only to the equity and bond portfolio of AP7, the default fund. Detailed data for the other (720) funds is not available.
Source: Oxera research.

Table 2.8 Statutory funded private pension schemes: international asset allocation by asset class (2005)

	Name of fund	% equity in total portfolio	% domestic in equity portfolio	% domestic in debt portfolio
Bulgaria	Universal Pension Funds	7	100	98.2
	Professional Pension Funds	8	100	98.4
Denmark	ATP	32	50	29
Estonia	Mandatory Pension Funds	37	8	11
Hungary	Mandatory Pension Funds	8	67	99
Latvia	State-funded pension schemes	6.6	0.4	41
Lithuania	Pensions funds accumulating part of the state social insurance contributions	8.7	24	21
Poland	Open Pension Funds	32	97.8	99.7
Slovakia	Old-age Pension Savings	10.5	0.0	100.0
Sweden	Premium Pensions/AP7[1]	82	21	100

Note: [1] Data refers only to AP7, the default fund.
Source: Oxera research.

2.6 Summary

The schemes that fall within the scope of this study include the reserve funds established in 11 countries, as well as the statutory funded private pension schemes in nine countries.

Where quantitative investment limits with cross-border relevance are concerned, most reserve funds and statutory private schemes are subject to some form of restriction, although the specification and strictness of the limits differ significantly.

Among the reserve funds, there are some that are by law or regulation prohibited from investing in non-domestic assets and, correspondingly, actual investment is exclusively domestic. The statutory private pension schemes are permitted to hold at least some non-domestic assets, but the question is whether existing investment limits influence actual asset allocation. It appears that schemes facing stricter limits invest less abroad, but the allocation to foreign assets is generally lower than the statutory limit.

Sections 4 and 5 examine the economic relevance of these restrictions, and consider factors other than quantitative limits that may restrict the degree of international investment.

3 Review of the literature

There is a large body of academic literature that is of direct relevance to assessing the economic impact of cross-border investment restrictions on the risk–return performance of pension scheme investment portfolios. The literature survey covers academic studies on:

– the benefits of international portfolio diversification (section 3.1);
– home bias and impediments to international diversification (section 3.2);
– reasons for and against investment restrictions for pension funds (section 3.3);
– quantitative evidence on the costs of cross-border investment limits for pension funds (section 3.4).

3.1 Benefits of international portfolio diversification

The case for international portfolio diversification has been well established for some time in the literature. Portfolio theory suggests that investors can eliminate risks associated with individual companies by holding a well-diversified portfolio of assets, but not the systematic risk associated with the performance of the economy as a whole. However, the systematic risk can be minimised by holding a global portfolio, where assets are held in market-value-weighted proportions across countries.

Following the early study of Grubel (1968), Levy and Sarnat (1970), Lessard (1976), Solnik (1974a, 1974b, 1988), Grauer and Hakansson (1987), Meric and Meric (1989), Solnik, Boucrelle and Le Fur (1996) and Jorion and Goetzmann (1999) are among the numerous studies showing that greater international diversification results in higher average returns and/or lower risk compared with a domestic investment strategy.[14]

For example, Solnik (1988) provides empirical evidence that national trade cycles are not correlated and that equity market shocks tend to be country-specific. This allows investors holding a global portfolio to diversify away all but global systematic risk. Thus, despite limitations resulting from currency risk and other factors, the benefits largely stem from the fact that movements of the performance of different countries and their stock markets are sufficiently uncorrelated to reduce portfolio volatility and generate higher risk-adjusted returns.

3.2 Home bias and impediments to international diversification

Despite the benefits of international portfolio diversification, there is substantial evidence that portfolios are concentrated in the domestic market of investors. French and Poterba (1991), Cooper and Kaplanis (1994), Tesar and Werner (1995), Davis (1995) and Pinkowtiz, Stulz and Williamson (2001) all show that domestic equities dominate the equity portfolios of investors. Pinkowtiz, Stulz and Williamson (2001) show that, while US stocks make up 49% of the world market portfolio, US investors hold 91% of equity investments in domestic (US) equities. Cooper and Kaplanis (1994) and Davis (1995) show that this is consistently observed across developed countries.

There is evidence from Folkerts-Landau and Ito (1995) that, due to the higher degree to which pension fund managers are risk-averse, home bias is more prevalent for pension

[14] See section 7 for full references to the studies cited in the literature review.

funds than for other institutional investors. However, there is also evidence that the home bias is falling: Hepp (1992) notes that, between 1980 and 1985, the foreign assets of Japanese pension funds rose from 1% to 8%, and from 0.8% to 3% of US pension fund assets. These portfolio adjustments have continued. The International Monetary Fund (IMF) (2005) reports increases in foreign asset holdings of institutional investors, including pension funds, in France, Germany, Japan, the UK and the USA. From 1997 to 2003, pension funds' foreign asset holdings increased from 14% to 17%; this exceeded the holdings of life insurance companies (14%) or mutual funds (15%).

A range of factors, including the following, have been suggested as the cause of home bias in investors' portfolios.

– **Asymmetry of information**. The most common reason (by a substantial margin) given for the home bias in investment portfolios. Investors must be informed about foreign assets, particularly their prospective returns, in order to price investment assets correctly. Chuhan (1992) reports that market participants cite limited information on emerging markets as the main obstacle to international investment. Carlos and Lewis (1992) provide historical evidence of British investments in Canadian railroads in the 19th century to demonstrate asymmetry of information. Gehrig (1993) notes that, for Germany and Switzerland, the home bias is stronger in equities than bonds, suggesting that this is due to informational requirements for equities being higher than for bonds. This has also been by modelled by Kang and Stulz (1995), who show that foreign investments in Japanese companies are limited to the largest companies, as international investors lack information on smaller Japanese companies. Coval and Moskowitz (1999, 2001) show evidence of a local equity preference even within domestic portfolios, confirming information asymmetries and preferences for locally headquartered firms. Blake and Timmermann (2005) show that returns on actively managed foreign equity mandates underperform passive foreign equity mandates by 70 basis points per annum. Although they do not draw conclusions of causality, they note the consistency of their findings with the informational asymmetries theory of the home bias. Lewis (1999) concludes that foreign investors use market timing rather than buy-and-hold strategies for investments in foreign equity markets. Timmermann and Blake (2005) support this view, but conclude that foreign market-timing skills are weak and that performance is negative.

  Other contributions to the evidence of asymmetries of information leading to home bias include Tesar and Werner (1995), Shiller, Kon-Ya and Tsutsui (1996), Brennan and Cao (1997), Tesar (1995), Froot and Dabora (1999), Brennan and Aranda (1999), Hau (1999), Portes and Rey (1999), and Kilka and Weber (2000).

– **Exchange rate risk**. Investment in foreign assets exposes the investor to another risk—that of exchange rate risk. Solnik (1988) views currency risk as the one explanation of home bias that is consistent with portfolio theory. However, this risk can be hedged, and the analytics of hedging are discussed among others by Bodie, Kane and Marcus (1999) and Solnik (1998). Adler and Dumas (1983) and Black (1990) also note the importance of currency hedging in establishing the optimal portfolio. Grauer and Hakansson (1987) and Eun and Resnik (1988) find significant gains from international diversification for US investors when feasible hedging strategies are taken into account. Eun and Resnik (1988) conclude that 'all of the hedging strategies, designed to control both estimation and exchange risks, were found to outperform any of the unhedged strategies by far'.

  Davis (2002b) also concludes that exchange rate risk presents a weak justification for home bias of pension funds because 'exchange rate risk can be hedged, and viewed in the context of modern portfolio theory rather than in isolation, contributes to, rather than offsets, the benefits of offshore investment in terms of returns and diversification of risk'. If properly managed, currency risk can be a source of additional returns.

Adjaouté and Danthine (2002) suggest that the European Monetary Union (EMU) has reduced the costs of international diversification within Europe, which is confirmed by Al-Khail and Berglund (2001) and Blake and Timmermann (2005). However, Adjaouté, Danthine and Isakov (2003) find evidence of only modest increases in diversification in Europe following the introduction of the euro.

– **Higher transaction costs**. Transaction costs, including broker commission rates or clearing and settlement costs, tend to be higher on foreign securities than for domestic trades. For example, Adjaouté and Danthine (2001) estimate that cross-border transactions cost 10–20 times more than domestic ones—from $10–$50 for cross-border trades between European markets as opposed to $1–$5 for domestic transactions. Furthermore, Mann and Meade (2002) conclude that higher transaction costs do help to explain asset allocations for US companies.

– **Tax**. The issue of tax was first raised by Black (1974), and was also examined by Cooper and Kaplanis (1994), French and Poterba (1991) and Adjaouté and Danthine (2002). These papers highlight discriminatory taxation—usually resulting from an inability to offset foreign tax liabilities against domestic tax liabilities—as a potential explanation for the home bias in investment portfolios. However, both French and Poterba (1991) and Cooper and Kaplanis (1994) note that this would only affect tax-exempt investors (ie, those who could not offset the taxes in the foreign country against taxes in the home country), and that even for those that would be affected, the impact would be too small to explain the home bias.

– **Purchasing power risk**. For reasons similar to those relating to exchange rate risk, the investor will (primarily) want to consume goods denominated in the domestic currency, which may be more susceptible to inflation than the currency of the country in which the funds are invested. As such, this increases the real exchange rate risk to which the investor is exposed. Stulz (1981), Adler and Dumas (1983) and Uppal (1993) all suggest this as a reason for the home bias. However, Cooper and Kaplanis (1994) suggest that the effect is unable to explain the observed home bias, given conventional levels of risk aversion.

– **Political risk**. The investment of assets in a different political jurisdiction may involve politically related risks, reducing the attractiveness of international investment. Bartram and Dufey (2001) outline three such risks: transfer risks (ie, restrictions on future capital flows); operational risks (ie, constraints on managerial actions); and ownership-control risks (ie, the risk of nationalisation of industries).

3.3 Cross-border investment regulation of pension funds

Most of the literature that assesses the potential benefits of international diversification and the existence and cause of the home bias evaluates these concepts for a ‘typical investor’. However, there are particular characteristics of pension funds that may result in the investment decisions of these funds being different from those of such a typical investor. In other words, the costs and benefits of international diversification for pension funds may differ from those of other investors.

However, the relevant question in the context of this study is whether there is a case for regulating pension funds’ international investment through the imposition of quantitative cross-border investment limits, or whether a more qualitative approach, using prudent-person principles, is more appropriate since it reduces the costs of forgone international diversification benefits.

Overall, the academic literature favours prudent-person rules over quantitative investment limits. Nonetheless, the following sets out the main reasons that may warrant the imposition

of quantitative limits, as discussed in the literature, before discussing the main costs of such limits (with quantitative evidence of those costs presented in section 3.4).

The potential rationale of quantitative investment restrictions

Fontaine (1997) discusses how quantitative investment restrictions are able to limit volatile capital flows, which in turn may enable governments to achieve greater monetary sovereignty and stability. This line of reasoning motivated the quantitative investment restrictions imposed in Chile in the 1980s, which are discussed in Bernstein and Chumacero (2006), who recognise that the Chilean quantitative investment restrictions were designed to prevent capital flight and ensure Chilean capital market development. Similarly, Reisen (1997) and Hu (2005) argue that quantitative investment restrictions reduce capital flight from an economy, thus deepening domestic capital markets.

Shah (1997) and Vittas (1998) both recognise that there are advantages to cross-border investment restrictions for under-developed pension schemes in developing countries. Vittas (1998) goes on to suggest that these restrictions should be relaxed as the pension funds mature. Roldos (2004) stresses that there is a trade-off between optimal portfolio diversification and the development of local securities markets. Roldos outlines two arguments for using investment restrictions in developing markets: first, to allow local fund managers to develop risk management skills and investment strategies; and second, to develop local securities markets. In both cases, Roldos supports a 'gradual approach' to loosening investment restrictions. Rocha, Hinz and Gutierrez (1999) go so far as to suggest that there is a consensus that investment restrictions are justifiable in emerging economies, but that they should be relaxed as the economy develops. Although Lane and Miles-Ferretti (2004) accept this suggestion, they also note that, due to smaller domestic capital markets, pension funds in developing countries can gain proportionately more from international diversification.

Consistent with these considerations for developing economics, Srinivas, Whitehouse and Yermo (2000) outline five main arguments for justifying domestic portfolio limits:

– there may be a lack of experience among fund managers, leading to greater risks if investment is unrestricted;
– developing capital markets lack necessary liquidity;
– the fragility of domestic financial markets may threaten the development of pension reform, and they may therefore need to be promoted;
– where there are government guarantees on funded pensions, the government may wish to limit potential issues of moral hazard in fund managers' investment decisions;
– requirements to hold public debt instruments can ease the costs of transition to funded pensions. This fifth argument has also been put forward in Holzmann (1998).

Although most of the literature on the benefits of quantitative investment restrictions focuses on developing economies, Davis (2001) looks at how far benefits may be applicable to developed economies. First, quantitative limits are easily verifiable, whereas prudent-person rules tend to be less precise and difficult to apply, an argument that is also supported by Vittas (1997). Second, quantitative limits are more stringent than prudent-person rules, and can therefore provide a greater safeguard for the protection of the pension fund assets. Third, Davis also highlights the fact that quantitative limits have a capacity to reduce moral hazard of mandatory (and guaranteed) pension funds.

The costs of quantitative investment restrictions

There is extensive literature on the cost of quantitative investment restrictions, focusing on the impact in terms of portfolio performance. The arguments are in line with those in the literature on the benefits of international diversification—quantitative investment limits restrict the proportion of the portfolio that can be held in overseas assets, and therefore limit the potential for international diversification of the fund, leading to a sub-optimal risk–reward

trade-off, with lower rewards (ie, returns) and/or higher risks. Examples of this discussion can be found in Davis (1995, 2001, 2002b, 2002c) and Vittas (1997), among others.

Another cost of investment restrictions commonly referred to is that described by Rees and Kessner (1999)—ie, that quantitative investment limits restrict competition. This is also discussed by Srinivas, Whitehouse and Yermo (2000), who suggest that tight restrictions on pension funds lead to these funds being almost identical in their portfolios and investment strategies. This prevents competition in the markets for pension fund management, thus reducing the incentives for innovation or efficiency improvements.

European Commission (1999) also highlights performance costs related to investment restrictions due to the focus on meeting legal restrictions rather than achieving investment returns. This inflexible approach suggests that there may be little concern for asset–liability matching. For the industry as a whole, quantitative investment limits prevent the development of the fund management industry, both as a result of the limitation on competition, and also because of the disincentive to develop financial analytical skills and appoint skilled fund managers. This can lead to an inefficient allocation of capital for the economy and a dependence on pension funds to finance budgetary requirements. Furthermore, because of the reduction in pension fund performance, increased costs of financing pensions can lead to higher costs of labour.

Davis (2001) also outlines these costs of quantitative investment restrictions, adding that such restrictions:

– focus on the risk and liquidity of individual assets rather than the risk and liquidity of the entire portfolio;
– limit the use of derivatives, thus restricting hedging strategies and the ability to diversify away country-specific risks;
– limit the development of the dynamic small-firm sector of economies.

Srinivas, Whitehouse and Yermo (2000) focus on three main costs of restrictions:

– constraints on portfolio diversification create market systematic risk (therefore, higher returns can be generated only at higher relative risk);
– pension funds are more likely to control large shares of the markets in which they can invest, leading to liquidity problems;
– capital market development may actually be hindered.

Although prudent-person rules can also constrain investment behaviour and be costly in terms of inefficient diversification of funds, as discussed in Del Guercio (1996), the economic cost is argued to be lower than that of quantitative investment restrictions. This is discussed in Srinivas, Whitehouse and Yermo (2000), as well as in Davis (2002c), who suggests that prudent-person rules are superior to quantitative investment restrictions for both pension funds and life companies, but particularly for pension funds.

3.4 Measuring the costs of quantitative investment restrictions

A number of academic papers compare the performance of portfolios under either quantitative investment restrictions or prudent-person rules.

In a series of papers, Davis (1995, 1998, 2001, 2002c) compares the risk–return performance of funds under both prudent-person rules and quantitative investment restrictions. For example, Davis (1995) compares the performance of pension funds in 14 OECD countries from 1967 to 1990, finding that the returns under prudent-person rules (returns at 3.4%, standard deviation of 11.1%) were higher than for pension funds under quantitative investment restrictions performance (returns at 2.9%, standard deviation of 8.1%).

Davis (1998) makes an anecdotal comparison of pension fund performance in Switzerland and Australia in the 1980s, where Australia had removed investment restrictions in the early 1980s. From 1970 to 1995, Switzerland and Australia reported 1.7% and 1.8% real returns respectively, given standard deviations of 7.5% and 11.4%, respectively. From 1980 to 1995, Switzerland reported 1.8% real returns, while Australia reported 6.1% real returns, given standard deviations of 7.7% and 8.6%, respectively.

Davis (2001, 2002c) shows that, for pension funds in six OECD countries over the period 1980–1995, those regulated by quantitative restrictions show real returns some 200 basis points lower than those regulated by prudent-person rules, while the standard deviation of pension funds regulated by quantitative restrictions is 190 basis points higher than that of pension funds regulated by prudent-person rules. The performance was compared by analysing the difference in the estimated average risk and return from both life insurance and pension funds, distinguishing between those subject to investment restrictions and those subject to prudent-person rules. Fund performance is estimated according to asset allocation data and index performance data, while administrative and transactions costs are disregarded. The average annual real return of pension funds under prudent-person rules was 7.8%, with a standard deviation of 9.5%; for those funds under quantitative investment restrictions, average annual real returns were 5.8%, with standard deviation of 11.4%.

This method was also applied in Srinivas, Whitehouse and Yermo (2000), who compare the performance of pension funds in countries with quantitative investment restrictions with those with prudent-person rules in 15 OECD countries between 1984 and 1993. They report that average annual actual returns were 9.5% for funds under prudent-person rules, but were 6.9% for those under quantitative restrictions. This analysis does not include data on the volatility of returns. However, Srinivas, Whitehouse and Yermo (2000) construct market benchmark portfolios, finding that the performance of these portfolios was 3.4% in those countries with prudent-person rules and 4.0% in countries with quantitative investment restrictions. This suggests that the superior performance of pension funds in countries with prudent-person rules was not driven by superior performance of the financial markets in those countries. Srinivas, Whitehouse and Yermo conclude that, although prudent-person rules are not perfect, they are significantly preferable to quantitative investment restrictions.

As Vittas (1998) stresses, it is important to make comparisons with the relevant counterfactual—ie, the risks and returns that could be achieved if no investment regulations were in place for the specific country or fund.

Bernstein and Chumacero (2006) recognise that identifying and constructing the relevant counterfactual for comparison is the principal difficulty in undertaking such analysis. Their study focuses on establishing the cost of quantitative investment limits that applied to pension funds in Chile during the period 1981–2002. These limits have changed six times since the statutory pension funds were established in 1981, with restrictions on international investment ranging from 0% of the funds' assets (1981–1990) to 20% (since 1999). For the empirical evaluation, the authors undertake three approaches to constructing a counterfactual portfolio: a minimum-variance portfolio; a quadratic preferences portfolio; and a value-at-risk portfolio. To ensure consistency, these portfolios are constructed both with and without investment restrictions, but with both portfolios having the same expected volatility. Bernstein and Chumacero develop the results of the minimum-variance portfolio: given the same standard deviation of 2.46%, the portfolio under restrictions provided average monthly returns of 0.66% compared with average monthly returns for the unrestricted portfolio of 0.84%. This is equivalent to an annual rate of return of 8.21% and 10.56%, respectively. Furthermore, Bernstein and Chumacero quantify this difference, estimating that the cost to individual account holders would be between US$680 and US$1,300 over the individual's lifetime.

3.5 Summary

The academic literature provides a strong basis for arguing that quantitative investment limits that restrict cross-border investment for pension funds have economic costs. The main reason is that such restrictions prevent funds from holding an internationally diversified portfolio, which in turn prevents them from taking advantage of the opportunity to diversify away non-systematic risks of individual economies. Thus, cross-border investment limits can have a significant negative impact on investment portfolio performance, both in terms of reducing returns on invested funds and in increasing the volatility (and therefore risk) of the returns on funds' portfolios.

However, the literature also suggests that there are numerous reasons why investment portfolios are in practice not fully diversified internationally. While investment restrictions are considered relevant, there are other barriers to international investment that result in a home bias in portfolios, not just for pension funds but also for other investors. This suggests that quantitative limits to cross-border investment need to be evaluated in the wider context, taking into account these other factors.

A number of academic studies have quantified the costs of investment restrictions empirically. Although not covering the pension schemes and investment restrictions that are the subject of this report, the existing studies illustrate how substantial the costs can be. Moreover, they establish different simulation approaches for the empirical analysis; these have been taken into account in defining the empirical methodology set out in section 5.

4 Empirical analysis: are investment restrictions binding?

This section examines whether the cross-border investment limits currently imposed on the relevant schemes influence investment decisions and explain the international asset allocation of the schemes. It looks at the extent to which the differences between the observed asset allocation and internationally well-diversified portfolios can be explained by cross-border investment limits. It also considers the importance of other factors that might explain current international asset allocation.

The analysis draws on the data on asset allocation and investment restrictions summarised in section 2 and described in more detail in Appendix 2, as well as on the interviews conducted as part of this study. In particular, interviews were conducted with fund managers and scheme operators responsible for the asset allocation decisions of the relevant schemes in order to identify the importance of cross-border investment limits for international asset allocation decisions and to examine how these compare with other factors that may bias portfolio allocation to domestic assets. The conclusions drawn in this section include the main points that emerged from these interviews.

4.1 Comparison of actual asset allocation and investment limits

As discussed in section 2, only a few of the relevant schemes are not subject to any form of cross-border investment limits and strictly adhere to prudent-person rules when it comes to international investment. Among the reserve funds, this includes most notably the NPRF fund in Ireland. Among the statutory funded private pension schemes, only the pension funds in Lithuania and the funds under the PPM scheme in Sweden are fully unconstrained in terms of international asset allocation. All other schemes are subject to some form of quantitative restriction, although there are significant differences regarding type and strictness of the restriction.

To evaluate the strictness of the limits observed, the limits allowed under EU Directives that apply to other pension schemes—particularly those subject to the IORP and Life Directives—provide useful benchmarks.

– **IORP Directive**. Under the investment principles specified in the Directive, Member States are required to invest in accordance with the prudent-person rule, aiming to invest assets in the best interests of members and beneficiaries. In particular, Member States cannot prevent pension funds from investing up to 30% of assets in currencies other than those in which the liabilities are expressed (see also Box 2.2).

– **Life Directive**. The Directive enshrines the principle of diversification across investment or asset categories and also across investment markets. For liability-matching purposes, however, it does specify a currency-matching requirement that limits the exposure to 20%, whereby the euro can also cover the commitment for liabilities in non-euro currencies.

Tables 4.1 and 4.2 summarise again the limits observed for the reserve funds and statutory private pension schemes, distinguishing between the limits that prescribe a minimum (maximum) level of domestic (foreign) investment and the weaker limits that restrict investment in certain geographic regions (eg, outside the EEA or OECD countries) or impose currency-matching requirements.

There are only a few instances where the investment rules applying to the relevant schemes are significantly stricter than those set out in the EU Directives. Among the reserve funds,

this includes in particular the funds that are required to invest all or half of their assets in domestic assets, usually in government bonds (ie, Belgium, Poland, Portugal and Spain). Among the statutory private pension schemes, the requirement to invest in domestic assets is strictest in Poland (foreign investment is limited to 5%), but also applies in Slovakia (at least 30% must be invested domestically). It also used to be strict for the Universal Pension Funds (UPFs) and PPFs in Bulgaria, which could invest only up to 10% abroad and were required to hold at least 50% of their portfolio in domestic government bonds; a change in the law in 2006 replaced these limits with a 20% currency risk restriction (lev and euro).

For most other schemes, the quantitative restrictions take the form of wider geographic or currency limits that are either weaker or broadly correspond to the 20% or 30% limits allowed under the Directives. The exceptions may be considered to be the investment regulations set for the reserves of Agirc–Arrco (non-Eurozone investment is limited to 10% (5%) for equities (bonds) of the total portfolio) and the geographic restriction applying to the Finnish TEL (non-EEA investment cannot exceed 10%).

The main question to be addressed in this section is the extent to which the observed investment limits, in particular the tighter ones, present a binding constraint for investment decisions—ie, how close are the actual portfolio allocations to the allowed limits?

Tables 4.1 and 4.2 compare the proportion of assets invested non-domestically (in general, as of end 2005) with the maximum proportion of foreign investment permitted under regulation. They also report the proportion of assets invested outside the EEA or EU (in some cases Eurozone) in order to indicate how binding the weaker restrictions are that allow foreign investment but only within the region or in euros. It was not possible to collect detailed asset allocation data to precisely match geographic region or currency on a consistent basis in order to evaluate comprehensively all relevant limits.

Table 4.1 Reserve funds: actual asset allocation compared with investment limits

	Actual foreign investment (%)	Maximum foreign investment allowed (%)	Other cross-border investment limits	Actual investment outside EU or EEA (%)
Ireland	92	100	–	26
Sweden (AP1–4)	59–73	100	40% maximum currency risk exposure	29–50
Finland (TEL)	66	100	Maximum 10% outside the EEA. Maximum 20% currency risk exposure	22[1]
France (FRR)	> 20[2]	100	25% in securities outside the EEA or outside a regulated market in OECD area. Maximum 20% currency risk exposure	20[1]
France (Agirc–Arrco)	> 6[2]	100	Equities (bonds) outside Eurozone cannot exceed 10% (5%) of total portfolio. Only investment within OECD area	6[1]
Portugal	44	50	Maximum 15% currency risk exposure. Only investment within OECD area	18
Spain	21	50	Maximum 50% in foreign public debt with AAA rating	0
Belgium	0	0	–	0
Cyprus	0	100	No legal restriction; precedent is for almost all assets to be invested in Cypriot government debt	0
Netherlands[3]	0	0	–	0
Poland	0	0	–	0
Luxembourg	n/a	100	–	n/a

Notes: See Tables 2.3 and 2.5 as well as the country-specific descriptions in Appendix 2. [1] Refers to investment outside the Eurozone. [2] No data was available to distinguish between domestic and other Eurozone investments. [3] The fund is a notional fund that exists only in the books of the Dutch government.
Source: Oxera research.

Starting with the tightest form of limits—those that prescribe a minimum (maximum) level of domestic (foreign) investment—among the reserve funds, Belgium and Poland require all assets to be invested domestically (Table 4.1). These limits are clearly binding, and no foreign investment is observed. Portugal and Spain require 50% of reserve fund assets to be invested in domestic government bonds. The 50% foreign allocation permitted is close to being used up in Portugal (44%), but not in Spain (21%) where foreign investment is also restricted to AAA-rated government bonds. Although not strictly binding, what is clear is that the rules for these reserve funds would not permit the degree of international diversification observed for funds that are subject to no or weaker restrictions (particularly the Irish fund, which invests 92% of assets abroad).

Among statutory private pension schemes (Table 4.2), only two are subject to limits that restrict any type of foreign investment. However, the actual portfolios of the funds (on aggregate) fall short of the allowed limits—foreign assets make up 1.1% of the portfolio of Polish OPFs compared with the allowed 5%, and non-domestic investment in Slovakia amounts to 12% compared with the allowed 70%.

Table 4.2 Statutory funded private pension schemes: actual asset allocation compared with investment limits

	Actual foreign investment (%)	Maximum foreign investment allowed (%)	Other cross-border investment limits	Actual investment outside EU or EEA (%)
Estonia	85	100	Maximum 30% in non-EU and non-OECD countries	15
Lithuania	81	100	–	2
Sweden	73	100	–	n/a
Denmark	61	100	Maximum 10% in non-EU and non-OECD countries	21
Latvia	28	100	30% currency exposure limit (euro is additional matching currency since 2005). Government bonds must be issued by EEA or OECD states. Equities and corporate bonds must be listed on an exchange in the EEA or OECD	4
Slovakia	11	70	–	5[1]
Hungary	5	100	30% currency risk exposure limit. Non-OECD securities limited to 20% of foreign portfolio. Maximum 10% for each of foreign corporate bonds, foreign municipality bonds and foreign non-listed equity. Real estate only in the EEA	n/a
Bulgaria	1.4	100	Maximum 20% in assets denominated in currencies other than Bulgarian lev or euros. Until 2006, foreign investment restricted to 10% and requirement to hold 50% in domestic government bonds	0
Poland	1.1	5	–	0

Notes: See Tables 2.4 and 2.7 and the country-specific descriptions in Appendix 2. [1] Refers to investment in foreign currencies other than euro.
Source: Oxera research.

Other reserve funds and statutory funded private pension schemes are, in principle, permitted to invest all assets abroad, although this is often subject to geographical or currency constraints. Evaluating whether these weaker constraints are binding is complicated by the diversity of restrictions observed and the lack of data to match actual portfolio allocations with the limits. Nonetheless, a case-by-case inspection of the limits suggests that they are not binding, and that international diversification is lower than what would be allowed by statute. For example, the aggregate investment of mandatory pension funds in Hungary amounts to only 5% of the total portfolio despite the comparatively weak restrictions in place. Moreover, for schemes that are more diversified internationally, investment often remains within the EEA or EU, and in many cases within the Eurozone, although the portfolio could, in principle, be diversified more widely under existing regulation.

Given that actual portfolios generally fall short of the allowed limits, even for schemes with strict limits, it is clear that the cross-border investment regulations cannot fully explain the international asset allocation patterns observed for the relevant schemes. The headroom between actual portfolios and limits has also been reported in previous studies, such as Davies (2002c). However, the headroom does not imply that the restrictions have no effect on normal business.

The evidence is consistent with the view that tighter limits are related to less internationally diversified portfolios. The reserve funds in Table 4.1 and statutory private schemes in

Table 4.2 have been ranked in terms of the degree to which they invest internationally. Among the reserve funds, the most diversified is the fund without cross-border limits to investment—sharply contrasting with the funds that are required to invest only or mainly in domestic assets (government bonds). The same observation applies to the statutory private schemes. Among the top three schemes in terms of foreign investment, two face no legal constraints when it comes to international investment decisions, and one is subject to a limit that only constrains investment outside the EEA and OECD area. In contrast, at the bottom of the list are Polish OPFs, which are subject to the tight 5% limit on foreign investment. The schemes with the stricter limits would not have the opportunity to attain the internationally diversified investment allocation of the unconstrained or less constrained schemes.

The fact that cross-border investment limits can be binding even if the limits are not fully reached is reinforced by evidence from countries that have relaxed legal restrictions over time, followed by significant shifts in asset allocation towards greater international diversification.

Box 4.1 provides an illustration for Latvian state-funded pension schemes. The schemes are subject to a minimum 30% currency-matching requirement, which in 2005 was relaxed to include the euro as a matching currency in addition to the lat. As a result, the allocation to foreign assets increased from 15% to 28% by the end of 2005.

Box 4.1 Are investment restrictions binding? Latvia

Latvian state-funded pension schemes can invest up to 30% of their assets in currencies that do not match the obligations of the plan (Section 12 of the Law on State Funded Pensions). Since the lat is pegged to the euro, investments in euro-denominated securities can be included in the matching requirement. There is therefore no restriction on investments in the Eurozone.

In theory, Latvian pension funds could invest up to 100% of their portfolio abroad, as long as it is within the Eurozone. The actual allocation is 72% in Latvia, 24% in Europe and 4% in the rest of the world. The restriction does not appear to be binding. However, there is evidence that the allocation to foreign assets by state-funded pension schemes has been influenced by regulation.

– **Recent changes in regulation**. The currency-matching requirement was relaxed in 2005. Until then, the provision referred to all foreign currencies, including the euro. During 2005, Latvian pension funds stepped up their foreign exposure from 15% to 28%, largely due to the relaxation of the requirement. The fact that international investment picked up significantly after the requirement was relaxed suggests that the regulation was initially binding. Moreover, the process of reallocation is not yet complete, and pension funds may further increase their foreign investments.

– **Limit on equity and corporate bonds**. State-funded pension schemes face a 30% limit on investments in equities and corporate bonds. At the end of 2005, the actual allocation to these asset classes was 20% of total assets. To the extent that diversification is more effective in reducing risk for equities and corporate bonds than for government bonds, the asset class restriction may indirectly affect the incentives for pension funds to invest abroad. Indeed, while the government bond portfolio of state-funded pension schemes is almost exclusively domestic, the equity and corporate bond portfolios are focused on foreign assets.

– **Limit on fund investments**. Allocation to foreign investment funds can be a cost-effective way to achieve international diversification quickly. State-funded pension schemes have a 10% maximum allocation to other investment funds. This restriction could further limit the opportunity for state-funded pension schemes to invest abroad.

Domestic capital market conditions help explain the link between foreign investments and equity allocation. First, the yield on domestic government bonds has been high by international standards, reducing the incentive for foreign investments in the fixed-income portfolio. Second, the domestic stock market is small and illiquid, increasing the incentive to invest the equity portfolio abroad.

The second example refers to the UPFs and PPFs in Bulgaria (Box 4.2). The 2006 changes in investment regulation—in particular, the removal of the requirement to invest 50% in domestic government bonds and the 10% foreign asset limit—triggered a portfolio reallocation process. The share of domestic government bonds fell, and the share of foreign investments doubled (albeit from a very low level). Further portfolio adjustments are expected. Like the illustration from Latvia, the evidence on changes in asset allocation following the relaxation of investment restrictions suggests that these restrictions were binding prior to the reforms.

Box 4.2 Are investment restrictions binding? Bulgaria

Investment restrictions for UPFs and PPFs in Bulgaria are outlined in the Social Insurance Code 2003. The Code has been subject to several revisions, the latest of which, in April 2006, led to the removal of cross-border investment restrictions—namely the requirement that 50% of the portfolio be invested in domestic government bonds and that no more than 10% be held in cross-border investments. Following these changes, the only remaining cross-border restriction is the requirement that 80% of the portfolio be invested in assets denominated in either Bulgarian lev or euros. Asset allocation started to change significantly as a result, as illustrated in the table below, which compares the aggregate portfolio weights of UPFs and PPFs four or five months before and after the April 2006 revisions of the law.

	Portfolio weights (%) on December 31st 2005	Portfolio weights (%) on September 30th 2006
Securities issued or guaranteed by Bulgarian government	55.3	39.4
Domestic equity	7.5	17.5
Domestic corporate bonds	9.8	13.1
Bank deposits	17.0	20.0
Other domestic investments	9.0	6.6
Foreign investments	1.4	3.3
Total	**100.0**	**100.0**

Source: Financial Supervision Commission.

At the end of 2005, 55% of assets were held in domestic government securities, close to the required minimum of 50%. Foreign investment amounted to only 1.4% of the portfolio. By the end of September 2006, less than six months after the relaxation of investment limits, the proportion of funds invested in domestic government bonds had fallen to 39%. The proportion of cross-border investment has doubled, although it remains low at 3.3%.

Further adjustments to the investment portfolios are expected. As confirmed in interviews conducted as part of this study, it is mainly the larger UPFs and PPFs belonging to international groups with the required expertise and capacity that have started to invest increasingly in foreign assets. In addition, fund managers noted in the interviews that they had adopted a cautious asset allocation policy given uncertainty about changes in the regulation; now that further changes are unlikely, they intend to adjust their portfolios, although they will always leave headroom between portfolio weights and the limits.

The interviews conducted as part of this study provide further evidence. In particular, the asset managers interviewed—mainly those operating in regimes with tight cross-border investment limits—confirmed the view that restrictive limits can interfere in their asset allocation decisions. They argued strongly against restricting foreign investment, noting that, for the new Member States in particular, domestic capital markets are not appropriate in terms of size, quality, liquidity and availability of asset classes to meet the increasing demand due to the growth of pension assets.

The fact that actual portfolios do not reach the cross-border investment limits, even where these are strict, is not necessarily evidence that there is no effect of the restrictions on normal business. Rather, the existence of such limits (as well as uncertainty about changes in regulations among the more recently established schemes) may lead to a cautious asset allocation strategy that leaves sufficient headroom between actual portfolio weights and limits—for example, because of a risk of breaching the limits if markets soar and because short-term portfolio adjustments can be costly.

However, all asset managers agreed that while cross-border investment limits can be important, they are not the only, and in most cases not the main, restriction to foreign investment. Instead, quantitative investment limits should be seen in the context of other

factors—additional laws and regulations, market conditions and institutional practices—influencing international asset allocation. It is the combination of many factors, including explicit quantitative investment restrictions, that explains the investment portfolios of the relevant pension schemes.

4.2 Other factors influencing international investment decisions

Although the focus of this study is on explicit quantitative restrictions to cross-border investment that result from national laws and regulations, there are other factors that impede pension schemes' ability or willingness to diversify their portfolios internationally. The home bias in portfolios is well documented in the literature and, although it has been decreasing over time, pension funds and other investors continue to have a tendency to select domestic over foreign assets, beyond the relative market weights. Box 4.3 illustrates that a home bias applies to the portfolios of pension funds and other institutional investors, not just those that fall within the scope of this study.

The literature review in section 3 contains a summary of the main factors that may contribute to biasing investment portfolios towards domestic assets—for the relevant pension schemes as much as for other investors.

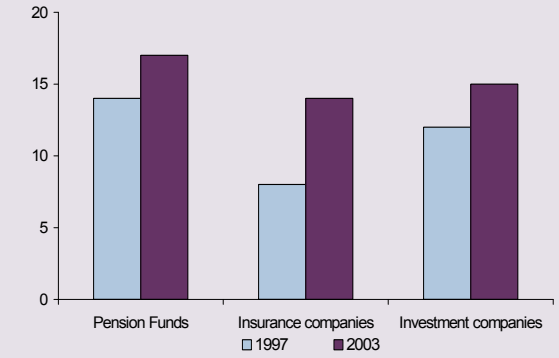
The following summarises the factors that emerged from the interviews conducted with asset managers and operators of the relevant schemes as being particularly relevant in impeding international investment in conjunction with, or over and above, existing cross-border investment limits.

Although more widely applicable, many of the points summarised below emerged in the interviews with asset managers of the statutory private pension schemes that either are, or used to be, subject to strict cross-border investment limits. Some of the reserve funds are also subject to strict investment limits; however, to the extent that these funds are used in the management of public debt and invested in public (and domestic) rather than private (including international) assets, the question regarding factors influencing international asset allocation is less important to this study.

Box 4.3 Foreign asset allocation of institutional investors

A degree of home bias characterises not only some of the pension schemes that fall within the scope of this study, but pension funds and other institutional investors more generally. IMF (2005) reports that, for institutional investors in five major economies (France, Germany, Japan, UK and USA), the share of foreign assets in 2003 amounted to around 12% on average, differing by type of investor and country, as shown in the figures below.

Foreign asset allocation of pension funds and other institutional investors (%)



Foreign asset allocation (%) of institutional investors in three EU countries (%)

Source: IMF (2005).

Evidence from mature markets points to a significant reduction in the home bias and an increase in the acceptance of foreign assets over time. Factors driving the reduction in the home bias have been shown to include an increase in investor sophistication; an emphasis on achieving higher risk-adjusted returns; a reduction in the average costs of international trading of portfolio assets; and lower information costs and asymmetries, particularly with advances in global communications. However, barriers to international investment remain—eg, cross-border transaction costs continue to be high; information about some markets remains scarce; and currency and other market risks remain prevalent. Cyclical factors may also influence the home bias—eg, if they explain temporarily favourable domestic market conditions.

For (defined-benefit, DB) pension funds and life insurers, liability-matching considerations may present an additional reason for home bias, although it has been shown that currency-matched assets are not always the most appropriate, particularly for pensions. Since they are ultimately concerned about future consumption rather than nominal income, beneficiaries may be better off with a portion of benefits pledged in real terms. In this case, foreign currency assets may be better suited than domestic assets to providing the requisite inflation hedge.

For a more detailed discussion, see IMF (2005) and other studies summarised in the literature review in section 3.

In addition to the quantitative cross-border investment restrictions, which, if defined strictly, directly limit the degree of international investment or induce a more cautious asset allocation approach, the asset managers interviewed as part of this study noted that there are other provisions in the national laws and regulations that reduce the attractiveness of international investment. Their relevance varies from country to country, but the main provisions with such an effect include the following.

– **Asset class limits**. Asset managers in a number of countries highlighted the importance of investment rules that restrict the asset class in which pension schemes can invest. Even in the absence of direct cross-border restrictions, investment rules could have an indirect but otherwise similar effect if they limited those asset categories that deliver a cheap route to diversification (eg, investment funds) or that have the greatest potential to improve the risk–return performance (eg, equity). Restrictions on the use of derivatives to allow hedging—particularly against currency risk—were also noted as reducing the incentives to diversify internationally. Asset class limits were

considered to be important at present, or to have the potential to become binding in the future, by, for example, asset managers of statutory private pension schemes in Bulgaria, Latvia (see Box 4.1) and Poland (see Box 4.4).

– **Minimum returns and benchmarking**. The requirement of minimum returns based on an industry benchmark may result in asset managers not wishing to deviate from the average asset allocation, which may lead to herding behaviour. For example, Polish OPFs face a mandatory minimum return calculated on the basis of the performance of an industry average benchmark.[15] If a fund significantly underperforms the industry benchmark, the asset manager must use its own resources to achieve the minimum guaranteed return. Polish OPFs tend to follow similar investment strategies, and this has been linked to the existence of a minimum guaranteed return.[16] Herding has also been noted as a possible explanation for investment patterns of mandatory pension funds in other new Member States, where minimum returns are also specified with reference to a benchmark that depends on average industry performance. Minimum guaranteed returns can increase the risk involved for fund management companies when pursuing innovative investment strategies, and in an industry that invests mainly in domestic assets, the minimum return requirement can represent a barrier to exposure to foreign investments.

– **Fees**. Given concerns about the effectiveness of competition in the market for statutory private pension schemes, rules have been implemented in some countries that cap the fees charged by the fund manager and/or that specify what transaction costs can or cannot be passed on in the form of charges to the fund and its members. Since international transactions tend to be more costly, these rules may provide a disincentive to foreign investment. An illustration of a particularly stringent rule affecting Polish OPFs is provided in Box 4.4. Management companies are not authorised to pass on the excess cost of foreign transactions over domestic transactions to the funds. The excess costs therefore need to be borne by the companies, reducing their incentive to engage in foreign transactions where these incur higher costs. Fee regulations also apply to statutory private pension schemes in other countries (eg, Bulgaria, Slovakia and Sweden). Asset managers noted that these rules can be important for business decisions, but they did not list them as a significant factor in influencing international asset allocation decisions.

Box 4.4 shows how quantitative investment limits can interact with other rules in the relevant law or regulation to limit pension schemes' ability or willingness to diversify the portfolio internationally.

[15] 'The mandatory minimum rate of return shall be understood as a rate of return lower by 50 percent than the weighted average rate of all the open funds established for a given period, or a rate of return 4 percent points lower than the aforesaid average, whichever is lower.' Law on Organisation and Operation of Pension Funds, Article 175 (2).

[16] See Stanko, D. (2003), 'Polish Pension Funds: Does The System Work? Cost, Efficiency and Performance Measurement Issues', The Pensions Institute, Discussion Paper PI-0302, and Kominek, Z. (2006), 'Regulatory Induced Herding? Evidence from Polish pension funds'. EBRD Working Paper No. 96.

Box 4.4 Other regulations influencing international investment: Poland

OPFs in Poland face a 5% quantitative limit on foreign investments (Article 143 of the Law on Organisation and Operation of Pension Funds). However, the actual allocation to foreign assets in 2005 was less than 2%. This would suggest that the quantitative limit is not binding.

According to interviews with common pension societies (PTEs), the management companies of the OPFs, the low level of international diversification can also be attributed to three additional legal provisions.

– **Transaction costs**. Article 136a states that transaction costs related to foreign investments can be covered by the fund's assets only to a level equal to the transaction's costs of domestic investments. Any further costs must be covered by the PTEs. Since cross-border transactions are more expensive than domestic ones, the result of this provision is that PTEs must cover additional costs out of their budget, making foreign investment less attractive.

– **Mutual funds**. Article 136.3 excludes assets invested in mutual funds from the calculation of the asset management fee for PTEs. As a result, PTEs forgo any revenue from investments in mutual funds. Since investments in mutual funds are a cost-effective way to achieve international diversification, the provision creates a disincentive for cross-border investments.

– **Currency risk hedging**. Derivatives are not included in the list of allowed assets in which PTEs can invest. One of the consequences is that PTEs cannot hedge currency risk arising from cross-border investments.

These legal provisions increase the cost or risk of foreign investments for PTEs over and above the 5% quantitative limit, and appear to have an important role in explaining the low level of international diversification observed for Polish OPFs.

Other than the laws or regulations applying to the relevant schemes, asset managers noted the following factors as relevant barriers to greater international investment.

– **Taxes**. Discriminatory taxation is another possible reason for home bias in portfolios. In the case of pension schemes, this may result from the fact that, while exempt from income tax at the national level, the schemes are subject to a withholding tax on dividend and interest income from foreign assets, which they cannot deduct from or credit against domestic tax. Double tax treaties generally reduce the level of withholding tax, but do not always eliminate the tax disadvantage. However, the asset managers interviewed assigned varying levels of importance to these tax barriers. While the barriers were considered relevant in principle, some respondents argued that the cost was not more than a detail and not significant enough to prevent international investment. In some cases, the main burden was considered to be the additional administrative work involved in gaining exemption from local taxation of the interest earned on fixed-income securities. Withholding taxes on dividend income applied, but again was not a key consideration since the focus was on capital gains rather than dividends. There was no evidence to suggest that taxes are systematically taken into account in international investment decision-making. In addition to the interviews with asset managers, the academic literature reviewed in section 3 identifies differential taxation as a potential reason for home bias, but concludes that taxes cannot explain observed asset allocation patterns.

– **Currency risk**. Aversion to currency risk is an important determinant of international investment, particularly with regard to bond investments, but also for other asset classes. While currency risk can be hedged, the availability of longer-term hedges may be limited and the additional hedging costs may raise the required return threshold of a foreign portfolio investment. Moreover, regulation may limit the ability of pension schemes to hedge, either by directly restricting the currencies in which funds can be invested (eg, Bulgaria) or by limiting the use of derivatives in the list of allowed assets

(eg, Poland). An illustration of this is the Latvian state-funded pension schemes (see Box 4.1), for which currency-matching requirements were relaxed after the lat was pegged to the euro, resulting in a significant increase in foreign investment. Asset managers of statutory private pension schemes in other new Member States also noted that they expected the share of foreign investment to increase if the relevant countries joined the euro.

– **Domestic market conditions**. The low degree of international diversification observed for some pension schemes in the new Member States can be explained in part by favourable domestic market conditions in the period following establishment of the relevant schemes. Yields on fixed-income securities were comparatively high by international standards, and privatisations offered opportunities to invest in new assets. However, asset managers noted that as these conditions change, and given the low supply of new fixed-income and equity securities and lack of domestic market liquidity, they will increasingly need to look for investments abroad.

– **Fund size**. Most pension schemes considered in this study were established only in the last decade and, in some cases, as late as 2004. Although they typically benefit from a steady flow of new funds, the size of the accumulated funds remains small for many schemes. Some asset managers of statutory private pension schemes in the new Member States noted that their funds had not yet reached a sufficient size to justify an asset allocation strategy that involved significant international investment.

– **Information and expertise**. Related to the above, the same asset managers explained that there remains insufficient asset management capacity (expertise, systems and controls) to be able to engage extensively in foreign investment. It was argued that ownership and size of the fund management company matter in some countries, with the larger and internationally owned companies more likely to invest a larger share in foreign assets. A number of asset managers also highlighted the informational advantages they had in the domestic market compared with abroad, in accordance with the home bias literature on information costs and asymmetries.

– **Risk aversion**. Some of the asset managers of statutory private pension schemes in the new Member States highlighted the lack of experience of domestic consumers and their generally cautious approach to savings and investment as a key justification of a conservative investment policy, in terms of asset class as well as geographic scope of the portfolio. Given the recent establishment of the schemes, they argued that a 'safe start' was important to build consumer confidence in the market and that they would progressively adjust their portfolios to not only include riskier asset classes but also to increasingly invest internationally.

– **Transaction costs**. Although they have fallen over time, transaction costs of international asset trades are often higher than the costs of domestic trades. For example, the European Commission has identified high cross-border clearing and settlement costs as one of the main barriers to integration of national pools of capital in the EU.[17] In other words, a reduction in cross-border transaction costs in equity markets would result in increased cross-border investments, leading to a reduced 'home bias' in investing. To achieve this objective, the Commission has launched a series of initiatives aimed at reducing the main barriers to cross-border investing (Giovannini barriers).[18] As illustrated in Box 4.4, the higher transaction costs combined with regulations limiting the ability to pass on these costs to the pension funds were noted as an important factor explaining the low levels of international diversification of Polish OPFs. However, other

[17] The Giovannini Group (2001), 'Cross-border Clearing and Settlement Arrangements in the European Union', November.

[18] The Giovannini Group (2003), 'Second Report on EU Cross-border Clearing and Settlements Arrangements, April; and McCreevy, C. (2006), 'Clearing and Settlement: The Way Forward', Economic and Monetary Affairs Committee of the European Parliament, July 11th.

asset managers did not attach the same importance to transaction costs, arguing that the discrepancy in costs between domestic and foreign assets (at least in many markets) was not sufficiently large to reduce incentives to invest abroad. Instead, they highlighted the importance of indirect transaction costs—namely, the costs arising from a lack of liquidity in their home markets and the need to seek investment opportunities abroad, particularly going forward as the volume of pension assets increases.

4.3 Summary

A key precondition for cross-border investment limits to have an economic impact is that they present a binding constraint on international asset allocation. Among the relevant schemes, most are subject to some form of cross-border investment limits, although there are only a few for which the limits are significantly stricter than those allowed by the IORP or Life Directives.

With the exception of the reserve funds that are subject to the fully binding constraint of investing the entire portfolio in domestic assets, the actual portfolio allocation falls short of the statutory limits to foreign investment—schemes are less internationally diversified than is permitted by statute.

Nonetheless, schemes subject to the stricter limits tend to invest less abroad. Importantly, given the limits in place, these schemes would not be able to attain the degree of international diversification observed for comparable schemes that are subject to no or weaker restrictions.

There is also evidence to suggest significant shifts in portfolio allocations where cross-border investment limits have been relaxed, indicating that these limits can present, and indeed have presented, a binding constraint on international asset allocation.

There are other factors that influence investment decisions in conjunction with, or over and above, the quantitative restrictions. These include provisions in laws and regulations that have an indirect impact on cross-border investment (eg, limits on asset classes, rules on fees and minimum guaranteed returns), institutional practices, and market conditions.

Therefore, although they cannot fully explain the international asset allocation patterns observed for the relevant schemes, cross-border investment limits matter if defined strictly. As confirmed by asset managers operating under restrictive regulation, they can impede the ability to invest assets in a way that is in the best interests of members (while using prudent-person principles).

Going forward, the economic cost of strict limits may increase as other barriers to international investment fall and the size of pension assets to be invested increases. Limiting foreign investment presents a particular problem where domestic capital markets lack the required liquidity to absorb growing pension assets.

5 Empirical analysis: what is the impact on the risk–return profile of investment portfolios?

This section sets out the methodology and presents the results of the empirical analysis undertaken to illustrate the impact of cross-border investment restrictions on the risk–return performance of pension schemes. Building on the literature that seeks to quantify the benefits of international diversification, and hence the costs of impediments to this diversification, it presents estimates of the degree to which the risk–return trade-off may be improved by increasing the portfolio weight in non-domestic assets.

The section starts with a summary of the methodology and data sources (section 5.1). It then presents estimates of the potential benefits of international diversification—particularly those that result from cross-border investment in Europe (section 5.2). Section 5.3 considers the risk–return performance of a sample of relevant pension schemes and simulates the extent to which the performance of actual portfolios would change were they to be invested on a more international basis. Sections 5.4 to 5.6 provide further discussion and conclude.

5.1 Methodology and data

Among the schemes identified in section 2, many are relatively new (eg, established after 2000), such that there is insufficient historical data on investment and financial performance. Therefore, to conduct the empirical assessment of the economic costs of quantitative investment restrictions, it is necessary to apply simulation techniques to infer the potential adverse impact.

The conceptual approach to the simulations is to estimate the improvement in the risk–return trade-off that can be obtained by shifting the portfolio to one that is more internationally diversified. Put differently, the analysis considers the extent to which returns of the schemes could be improved (or risks reduced) by increased investment in non-domestic assets.

The analysis focuses on the two main asset classes in the portfolios of the relevant pension schemes—equity investments and government bond investments. Although additional benefits could potentially be achieved through diversification in other asset classes, the small proportion currently allocated to these asset classes suggests that almost all of the total economic impact can be captured through the assessment of public equity and government bond investments. Another reason for focusing on these two asset classes is a practical one—that of data availability.

Keeping the allocation between equity and debt constant, the simulations examine the performance of portfolios that differ in their degree of international diversification. Portfolio performance is measured by:

- **returns**—these are average (arithmetic) returns, measured on a monthly basis but annualised for presentation purposes;
- **volatility**—the volatility of a portfolio is measured by the standard deviation of the returns;
- **variance coefficient**—this measure captures the trade-off between returns and risk in one measure and is calculated as the ratio of volatility to average return measured over the same period.

Returns are reported both on a nominal and real basis in local currencies, as further discussed in Appendix 1.

The domestic portfolio is measured by the domestic equity market index of the relevant country, which, with the exception of a few countries, is sourced from Morgan Stanley Capital International (MSCI). The government bond portfolio is measured by the Citigroup Government Bond Index (CGBI) (unless unavailable).

The internationally diversified portfolios are measured by the corresponding indices that capture the European and world markets (or geographic regions within those markets) in equity and government bonds, sourced again from MSCI or CGBI, respectively, with other data providers considered if required.

All return index data, as well as the consumer price indices (CPI) (to adjust the nominal returns for inflation and measure real returns) were downloaded from Thomson Financial Datastream. Data was downloaded on a monthly basis, using the maximum time period available for each index series.

The simulations involve estimation of the risk–return performance of portfolios that differ in the weight given to the domestic and internationally diversified portfolios. For example, section 5.2 compares fully domestic portfolios—ie, 100% invested in the domestic market index—with portfolios that are fully diversified—ie, 100% invested in the international market index. It also considers partially diversified portfolios, in particular portfolios that are weighted 60% in the domestic index and 40% in the regional index. This corresponds to Davis (2002b), whose results show that there are no or little additional gains from international diversification after 40% has been invested in foreign assets. The partially diversified portfolios can also be interpreted as the portfolios that are internationally diversified but remain subject to home bias.

Taking the analysis a step further, section 5.3 provides case study evidence of a sample of pension schemes that are subject to cross-border investment restrictions. The sample is selected for illustrative purposes and includes those schemes subject to quantitative limits that are tighter than those set out under the IORP or Life Directives. The simulations estimate the risk–return performance of three different portfolio scenarios for the selected schemes.

– **Actual portfolio**. The portfolio weights are determined by the actual portfolio weights of the relevant schemes, summarised in section 2 and Appendix 2.

– **Maximum diversification portfolio**. Portfolio weights are determined by the weights implied by the cross-border investment limits applying to the relevant schemes, summarised in section 2 and Appendix 2.

– **Internationally diversified portfolios.** The portfolio allocation is unconstrained, and the portfolio weight given to the international index (Europe or world) is 100%. Partial diversification (eg, 60% domestic and 40% international) has also been considered to allow for home bias that may remain even in the absence of investment limits.

The empirical approach and data are discussed in more detail in Appendix 1.

While illustrative of the benefits of international diversification (and the corresponding costs of cross-border investment limits), the modelling approach has a number of limitations. In addition to the data issues described below, the approach does not take account of differences in the risk–reward preferences of pension schemes and the fact that these preferences may change over the asset accumulation phase and investment horizon. Instead, the approach captures the benefits or costs using a metric that measures risk per unit of return.

The modelling is based on historical returns. This limits the conclusions that can be drawn on a forward-looking basis, particularly where the time-series data for estimation is short and covers a period of unusual returns and market conditions, as further discussed in section 5.5.

The analysis does not capture all the costs of a shift in portfolio allocation towards greater international investment. For example, in the smaller and less liquid markets, the relevant pension schemes hold a significant share of domestic market capitalisation and, at least on aggregate, may not be able to sell their positions over a short period of time without affecting security prices. The consequences of these liquidity effects, as well as other costs or risks of international investment, are not accounted for in the estimations, but are further discussed in section 5.4.

5.2 Potential benefits of international diversification

Diversification benefits arise from the fact that different assets are less than perfectly correlated—ie, the relative performance of different assets varies over a given period of time. By holding multiple assets, the risk of poor or negative returns for the portfolio is reduced. Essentially, diversification allows investors to diversify away all but the systematic risk in the market, reducing the *total* risk of their portfolio. These benefits of diversification also apply in an international context—ie, by holding assets from a number of countries, investors can diversify away all but the systematic risk in the international market.

The existence of such benefits from international diversification within Europe is shown in Tables 5.1 and 5.2, which report the monthly correlations of European equity market indices and government bond indices for a number of Member States.

The correlations are significantly less than 1, suggesting that both equity markets and bond returns are less than perfectly correlated between the EU countries. The correlations may have risen over time, due to greater integration and the growing scope for international investment, but they remain below 1.[19]

This is particularly the case for equity (Table 5.1), where correlations are in general lower than the correlations between government bond returns (Table 5.2). This supports the evidence that the benefits of international diversification are greater for equity than for debt, as discussed in this report.

The tables also show that the correlation levels vary considerably across pairs of countries, so the degree to which investors benefit from investing in any given country differs. However, all correlations remain well below 1, meaning that diversification benefits apply in all cases. While the tables are restricted to correlations within the EU, the same conclusions do of course also apply to non-EU investment.

[19] Low correlations are also reported in other studies such as Davis (2002b).

Table 5.1 Correlations between European equity market indices

		AT	BE	CZ	DK	FN	FR	DE	HN	IE	IT	NL	PL	PT	ES	SE	UK	EEA
Austria	**AT**	1.000																
Belgium	**BE**	0.575	1.000															
Czech Republic	**CZ**	0.183	0.104	1.000														
Denmark	**DK**	0.545	0.625	0.321	1.000													
Finland	**FN**	0.227	0.381	0.246	0.471	1.000												
France	**FR**	0.527	0.750	0.310	0.727	0.678	1.000											
Germany	**DE**	0.545	0.746	0.303	0.713	0.612	0.910	1.000										
Hungary	**HN**	0.403	0.394	0.620	0.560	0.440	0.531	0.517	1.000									
Ireland	**IE**	0.526	0.612	0.220	0.605	0.472	0.641	0.686	0.435	1.000								
Italy	**IT**	0.486	0.637	0.221	0.619	0.533	0.820	0.742	0.512	0.532	1.000							
Netherlands	**NL**	0.610	0.788	0.217	0.733	0.580	0.884	0.873	0.481	0.713	0.738	1.000						
Poland	**PL**	0.312	0.287	0.576	0.377	0.523	0.492	0.476	0.613	0.406	0.344	0.447	1.000					
Portugal	**PT**	0.438	0.577	0.275	0.638	0.516	0.704	0.653	0.555	0.533	0.676	0.636	0.439	1.000				
Spain	**ES**	0.518	0.638	0.318	0.640	0.536	0.822	0.775	0.561	0.671	0.747	0.753	0.464	0.738	1.000			
Sweden	**SE**	0.424	0.557	0.338	0.659	0.680	0.851	0.860	0.504	0.575	0.696	0.783	0.466	0.667	0.762	1.000		
UK	**UK**	0.607	0.714	0.249	0.689	0.568	0.785	0.761	0.487	0.718	0.684	0.826	0.483	0.593	0.755	0.696	1.000	
EEA		0.610	0.781	0.313	0.772	0.685	0.955	0.931	0.581	0.733	0.830	0.931	0.522	0.727	0.859	0.867	0.903	1.000

Note: The table shows correlations between monthly nominal rates of return of MSCI stock market indices for individual countries and the EEA. Only countries for which MSCI index data is available over the period (July 1996 to June 2006) are included.
Source: Thomson Financial Datastream and Oxera calculations.

Table 5.2 Correlations between European government bond market indices

		AT	BE	DK	FN	FR	DE	IE	IT	NL	PL	PT	ES	SE	UK	EEA
Austria	**AT**	1.000														
Belgium	**BE**	0.998	1.000													
Denmark	**DK**	0.987	0.986	1.000												
Finland	**FN**	0.983	0.987	0.977	1.000											
France	**FR**	0.999	0.998	0.986	0.982	1.000										
Germany	**DE**	0.998	0.998	0.985	0.981	0.999	1.000									
Ireland	**IE**	0.994	0.995	0.986	0.987	0.994	0.994	1.000								
Italy	**IT**	0.991	0.989	0.974	0.960	0.992	0.990	0.982	1.000							
Netherlands	**NL**	0.998	0.999	0.984	0.985	0.999	0.998	0.994	0.988	1.000						
Poland	**PL**	0.709	0.711	0.725	0.728	0.706	0.708	0.717	0.711	0.705	1.000					
Portugal	**PT**	0.993	0.996	0.981	0.993	0.991	0.990	0.991	0.976	0.993	0.702	1.000				
Spain	**ES**	0.999	0.998	0.986	0.982	0.999	0.998	0.994	0.992	0.998	0.716	0.992	1.000			
Sweden	**SE**	0.932	0.932	0.938	0.933	0.931	0.933	0.937	0.919	0.928	0.732	0.929	0.932	1.000		
UK	**UK**	0.866	0.870	0.846	0.849	0.874	0.878	0.871	0.849	0.878	0.627	0.857	0.868	0.809	1.000	
EEA		0.996	0.996	0.982	0.978	0.998	0.998	0.993	0.989	0.997	0.712	0.988	0.997	0.932	0.902	1.000

Note*:* The table shows correlations between monthly nominal rates of return of CGBI bond indices for individual countries and the EEA. Only countries for which CGBI data is available over the period (July 2001 to June 2006) are included.
Source: Thomson Financial Datastream and Oxera calculations.

Tables 5.3 to 5.10 provide further evidence to inform an assessment of the potential diversification benefits that emerge from holding a more internationally diversified portfolio in both equity and government bonds.

The tables compare the risk–return performance of portfolios that are invested domestically with those that are diversified across Europe. The portfolios are represented by the relevant domestic market indices and an EEA index that includes the country constituents on a market-value-weighted basis.

Separate tables are provided for equity and debt, for nominal and real returns, and for different time periods. Importantly, the time horizon for pension fund investment is long-term in nature, so while short-term volatility of investment returns is a concern,[20] what matters more is the risk–reward performance of portfolios in the asset accumulation phase over the potentially long period until payout.

Moreover, from a methodological point of view, robust estimation of the risk–return parameters requires a sufficiently long time period for measurement, but the length of the time-series data available varies significantly between the countries. While a measurement period of more than 30 years is possible for most of the EU 15, at least on the equity side, the data series is considerably shorter for the new Member States. Furthermore, there is considerably less time-series data available for government debt indices than for equity, even for the EU 15.

The tables therefore present estimates first for a sample of the EU 15 over a longer time period (30 years for equity and 15 years for debt), and then for a larger number of countries, including some new Member States, over a shorter period (ten years for equity and five years for debt). Countries for which the relevant indices are not available are omitted from the results tables.

Table 5.3 compares the risk–return performance, as measured by the average returns, the volatility and the variance coefficient, for three equity portfolios—the domestic market portfolio; a portfolio that is invested 60% domestically and 40% in the EEA index; and the EEA diversified portfolio. The risk–return parameters are estimated using monthly nominal returns over a 30-year period (July 1976 to June 2006).

Moving towards the more diversified equity portfolios does not improve the portfolio performance for all countries in the sample in terms of average returns—for some, domestic returns exceed the EEA average over the period. However, greater diversification results in a significant reduction in the portfolio volatility—the volatility of the EEA return index is lower than the volatility of each of the domestic market indices. As a result, the variance coefficient—ie, the ratio of the portfolio volatility to the average return—generally declines as the portfolio is diversified to include EEA equity. Put differently, for a given level of return, greater diversification across European equity results in a portfolio with lower risk. A comparison of the variance coefficients between the portfolios shows, however, that a 40% investment in the EEA equity index can be sufficient to reap the diversification benefits for some countries.

[20] For example, some of the asset managers of statutory private pension schemes in the new Member States noted that they pursued a risk-averse strategy and aimed to minimise portfolio volatility in the short term in order to build the confidence of consumers in a relatively new system of which they have little experience (see section 4.2).

Table 5.3 Comparison of risk–return performance (nominal) between domestic and diversified European equity portfolios, 30 years (July 1976–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA Index	Local	Mixed (60:40)	EEA index
Austria	11.918	12.902	14.392	20.005	15.757	14.924	1.679	1.221	1.037
Belgium	15.859	15.270	14.392	17.303	15.172	14.924	1.091	0.994	1.037
Denmark	14.891	14.691	14.392	17.742	14.957	14.924	1.191	1.018	1.037
France	16.480	15.640	14.392	20.617	17.473	14.924	1.251	1.117	1.037
Germany	11.811	12.837	14.392	20.013	17.273	14.924	1.694	1.346	1.037
Italy	17.936	16.507	14.392	24.440	18.989	14.924	1.363	1.150	1.037
Netherlands	15.396	14.993	14.392	17.550	15.948	14.924	1.140	1.064	1.037
Spain	16.658	15.746	14.392	21.492	17.399	14.924	1.290	1.105	1.037
Sweden	12.303	13.134	14.392	15.980	14.817	14.924	1.299	1.128	1.037
UK	16.022	15.367	14.392	16.809	15.542	14.924	1.049	1.011	1.037

Note: Average nominal returns, volatility and variance coefficient are based on monthly data over the period, but are annualised for presentation purposes (see Appendix 1). Countries without MSCI index or insufficient data are excluded. Therefore, the EEA index includes equities in countries that are not included in this table.
Source: Thomson Financial Datastream and Oxera calculations.

Table 5.4 repeats the results for the same countries and time period, but measures returns on a real basis after adjusting for inflation. Again, the more diversified portfolios display a lower level of volatility than the domestic portfolios, and the variance coefficient also falls for most countries as the portfolio becomes more diversified.

Table 5.4 Comparison of risk–return performance (real) between domestic and diversified European equity portfolios, 30 years (July 1976–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index
Austria	8.705	9.071	9.623	19.978	15.750	14.999	2.295	1.736	1.559
Belgium	12.099	11.103	9.623	17.365	15.236	14.999	1.435	1.372	1.559
France	11.536	10.767	9.623	20.643	17.517	14.999	1.790	1.627	1.559
Germany	9.050	9.279	9.623	20.085	17.348	14.999	2.219	1.870	1.559
Italy	10.228	9.986	9.623	24.404	18.997	14.999	2.386	1.902	1.559
Netherlands	12.292	11.218	9.623	17.755	16.085	14.999	1.444	1.434	1.559
Spain	8.577	8.994	9.623	21.799	17.579	14.999	2.542	1.954	1.559
Sweden	9.779	9.716	9.623	16.081	14.898	14.999	1.644	1.533	1.559
UK	9.972	9.832	9.623	16.862	15.605	14.999	1.691	1.587	1.559

Note: As with Table 5.3, but the monthly returns are adjusted by the inflation rate (CPI) in the relevant country. The EEA index is adjusted using a constructed inflation rate that reflects the underlying national country inflation rates, weighted by the countries' market capitalisation. Countries without MSCI index or insufficient data are excluded. Therefore, the EEA index includes equities in countries that are not included in this table.
Source: Thomson Financial Datastream and Oxera calculations.

Tables 5.5 and 5.6 continue with a comparison of different equity portfolios (nominal and real), but estimate the risk–return parameters for the shorter ten-year period so as to include countries in the analysis that do not have a full 30-year time series of data available (eg, Czech Republic, Hungary and Poland).

For example, average nominal returns in Poland were considerably higher in the ten-year period than the EEA average, but returns also displayed greater volatility. The variance coefficient falls as the portfolio is shifted to reduce the weight in Polish equity and increase exposure to EEA equity.

The conclusions on return volatility also hold for the Czech Republic and Hungary, but the results in Table 5.5 show that nominal returns in the two countries were higher than average returns in the EEA, so that overall investment in the EEA index would not have paid off in terms of reducing the variance coefficient. However, the risk–return performance may be attributed to temporarily favourable conditions in those markets. A longer time period for estimation is required to reduce the noise and estimate long-run parameters.

Table 5.5 Comparison of risk–return performance (nominal) between domestic and diversified European equity portfolios, 10 years (July 1996–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index
Austria	15.325	13.789	11.521	17.777	15.652	16.673	1.160	1.135	1.447
Belgium	12.944	12.373	11.521	17.460	16.228	16.673	1.349	1.312	1.447
Czech Republic	21.153	17.212	11.521	27.073	19.392	16.673	1.280	1.127	1.447
Denmark	16.826	14.677	11.521	19.051	17.110	16.673	1.132	1.166	1.447
Finland	27.885	21.092	11.521	37.696	27.618	16.673	1.352	1.309	1.447
France	13.408	12.650	11.521	19.682	18.287	16.673	1.468	1.446	1.447
Germany	11.897	11.746	11.521	23.885	20.682	16.673	2.008	1.761	1.447
Hungary	31.443	23.112	11.521	32.997	24.286	16.673	1.049	1.051	1.447
Ireland	10.288	10.780	11.521	18.883	16.840	16.673	1.835	1.562	1.447
Italy	14.628	13.376	11.521	21.542	18.834	16.673	1.473	1.408	1.447
Netherlands	10.303	10.789	11.521	20.151	18.459	16.673	1.956	1.711	1.447
Poland	14.469	13.281	11.521	30.244	22.360	16.673	2.090	1.684	1.447
Portugal	12.332	12.007	11.521	20.583	17.798	16.673	1.669	1.482	1.447
Spain	17.866	15.289	11.521	22.095	19.293	16.673	1.237	1.262	1.447
Sweden	11.172	11.311	11.521	17.354	16.531	16.673	1.553	1.461	1.447
UK	8.747	9.849	11.521	13.727	14.543	16.673	1.569	1.477	1.447

Note: See Table 5.3.
Source: Thomson Financial Datastream and Oxera calculations.

Table 5.6 repeats the results in real terms after deducting local inflation. For most countries, diversification benefits can be observed (including Poland, the Czech Republic and Hungary) although, as already indicated above and also noted in the literature, the risk–return performance of the portfolio that is only partially invested in the EEA index is often superior to one that is fully invested in the EEA index.

Table 5.6 Comparison of risk–return performance (real) between domestic and diversified European equity portfolios, 10 years (July 1996–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index
Austria	13.397	11.676	9.140	17.730	15.654	16.755	1.323	1.341	1.833
Belgium	10.828	10.150	9.140	17.658	16.371	16.755	1.631	1.613	1.833
Czech Republic	16.627	13.577	9.140	27.108	19.371	16.755	1.630	1.427	1.833
Denmark	14.376	12.254	9.140	19.214	17.240	16.755	1.337	1.407	1.833
Finland	26.131	19.063	9.140	37.813	27.730	16.755	1.447	1.455	1.833
France	11.700	10.670	9.140	19.770	18.377	16.755	1.690	1.722	1.833
Germany	10.292	9.830	9.140	23.892	20.732	16.755	2.321	2.109	1.833
Hungary	21.416	16.361	9.140	32.686	24.110	16.755	1.526	1.474	1.833
Ireland	6.792	7.725	9.140	19.068	16.958	16.755	2.808	2.195	1.833
Italy	12.162	10.944	9.140	21.509	18.846	16.755	1.769	1.722	1.833
Netherlands	7.867	8.375	9.140	20.505	18.688	16.755	2.606	2.232	1.833
Poland	8.225	8.590	9.140	30.028	22.177	16.755	3.651	2.582	1.833
Portugal	9.123	9.130	9.140	20.528	17.775	16.755	2.250	1.947	1.833
Spain	14.466	12.308	9.140	22.177	19.351	16.755	1.533	1.572	1.833
Sweden	10.205	9.778	9.140	17.444	16.603	16.755	1.709	1.698	1.833
UK	5.959	7.221	9.140	13.775	14.610	16.755	2.312	2.023	1.833

Note: See Table 5.4.
Source: Thomson Financial Datastream and Oxera calculations.

The following tables focus on investment in government bonds. Based on the correlation results in Tables 5.1 and 5.2 above, the diversification benefits in bond portfolios would be expected to be lower than for equity. This is confirmed in the results in Tables 5.7 to 5.10, which compare the risk–return performance of domestic government bond portfolios with partially and fully market-weighted European bond portfolios.

Table 5.7 measures bond index returns in nominal terms for a sample of nine countries with sufficient comparable index data available over a 15-year period. The difference in average bond returns between countries is small, and while the volatility declines as the portfolio is re-weighted to include more EEA government bonds, the diversification benefits are less notable than in the case of equity. These benefits remain for all countries (at least for investments of up to 40% in the EEA index), but the reduction in the variance coefficient is somewhat smaller than in the case of equity (although the results are not directly comparable due to differences in the measurement period, for example.)

Table 5.7 Comparison of risk–return performance (nominal) between domestic and diversified European debt portfolios, 15 years (July 1991–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index
Belgium	7.536	7.737	8.038	3.396	3.392	3.549	0.451	0.438	0.442
Denmark	7.676	7.820	8.038	3.850	3.611	3.549	0.502	0.462	0.442
France	7.517	7.725	8.038	3.854	3.694	3.549	0.513	0.478	0.442
Germany	6.927	7.370	8.038	3.222	3.310	3.549	0.465	0.449	0.442
Italy	9.543	8.939	8.038	4.357	3.869	3.549	0.457	0.433	0.442
Netherlands	7.205	7.538	8.038	3.523	3.494	3.549	0.489	0.464	0.442
Spain	9.013	8.622	8.038	4.303	3.861	3.549	0.477	0.448	0.442
Sweden	5.418	6.459	8.038	3.626	3.320	3.549	0.669	0.514	0.442
UK	8.890	8.548	8.038	5.292	4.453	3.549	0.595	0.521	0.442

Note: Average nominal returns, volatility and variance coefficient are based on monthly data over the period, but are annualised for presentation purposes. See Appendix 1. Countries without a CGBI or with insufficient data are excluded. Therefore, the EEA index includes bonds issued by countries that are not presented in this table.
Source: Thomson Financial Datastream and Oxera calculations.

Adjusting for inflation does not significantly change these conclusions, as can be seen in Table 5.8, which reports the results for the analysis conducted on the basis of real returns.

Table 5.8 Comparison of risk–return performance (real) between domestic and diversified European debt portfolios, 15 years (July 1991–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index
Belgium	5.429	5.477	5.548	3.560	3.509	3.655	0.656	0.641	0.659
Denmark	5.499	5.519	5.548	4.060	3.764	3.655	0.738	0.682	0.659
France	5.715	5.648	5.548	3.981	3.810	3.655	0.697	0.675	0.659
Germany	4.784	5.089	5.548	3.465	3.468	3.655	0.724	0.682	0.659
Italy	6.318	6.009	5.548	4.369	3.906	3.655	0.692	0.650	0.659
Netherlands	4.736	5.060	5.548	3.885	3.707	3.655	0.820	0.733	0.659
Spain	5.213	5.347	5.548	4.532	4.012	3.655	0.869	0.750	0.659
Sweden	4.071	4.660	5.548	3.836	3.471	3.655	0.942	0.745	0.659
UK	6.085	5.870	5.548	5.481	4.605	3.655	0.901	0.785	0.659

Note: As with Table 5.7. The EEA index is adjusted by a constructed inflation rate that reflects inflation in the underlying countries, weighted according to their market capitalisation. Countries without a CGBI or with insufficient data are excluded. Therefore, the EEA index includes bonds issued by countries that are not presented in this table.
Source: Thomson Financial Datastream and Oxera calculations.

Bond market data—sourced from the same data provider (here CGBI) and tracked over a long period of time—is not as readily available as equity market data. To increase the sample of countries, Tables 5.9 and 5.10 repeat the results but for the shorter five-year period. However, even over this short period, it was not possible to obtain consistent data for all countries.

The reported results support the general findings described above—reductions in volatility for most countries as the portfolio becomes more diversified, and an improvement in terms of the overall risk–return performance for at least some countries. However, a five-year period

is likely to be too short to obtain robust findings and draw any conclusions about the risk–return characteristics of different portfolios.

Table 5.9 Comparison of risk–return performance (nominal) between domestic and diversified European debt portfolios, 5 years (July 2001–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index	Local	Mixed (60:40)	EEA index
Austria	5.736	5.695	5.635	3.439	3.430	3.425	0.600	0.602	0.608
Belgium	5.820	5.746	5.635	3.444	3.433	3.425	0.592	0.598	0.608
Denmark	5.489	5.547	5.635	3.034	3.176	3.425	0.553	0.573	0.608
Finland	5.284	5.424	5.635	3.049	3.182	3.425	0.577	0.587	0.608
France	5.504	5.556	5.635	3.377	3.395	3.425	0.614	0.611	0.608
Germany	5.349	5.463	5.635	3.359	3.383	3.425	0.628	0.619	0.608
Greece	5.873	5.777	5.635	3.399	3.404	3.425	0.579	0.589	0.608
Ireland	6.245	6.001	5.635	3.963	3.741	3.425	0.635	0.623	0.608
Italy	5.756	5.708	5.635	3.496	3.459	3.425	0.607	0.606	0.608
Netherlands	5.429	5.511	5.635	3.286	3.339	3.425	0.605	0.606	0.608
Poland	2.226	3.577	5.635	12.872	8.269	3.425	5.783	2.312	0.608
Portugal	5.521	5.567	5.635	3.245	3.307	3.425	0.588	0.594	0.608
Spain	5.858	5.768	5.635	3.459	3.442	3.425	0.590	0.597	0.608
Sweden	4.125	4.726	5.635	3.711	3.483	3.425	0.900	0.737	0.608
UK	5.786	5.725	5.635	4.404	3.923	3.425	0.761	0.685	0.608

Note: See Table 5.7.
Source: Thomson Financial Datastream and Oxera calculations.

Table 5.10 Comparison of risk–return performance (real) between domestic and diversified European debt portfolios, 5 years (July 2001–June 2006)

	Average returns (%)			Volatility (%)			Variance coefficient		
Country	Local	Mixed (60:40)	EEA Index	Local	Mixed (60:40)	EEA Index	Local	Mixed (60:40)	EEA Index
Austria	3.865	3.701	3.455	3.437	3.469	3.567	0.889	0.937	1.032
Belgium	3.854	3.694	3.455	3.624	3.572	3.567	0.940	0.967	1.032
Denmark	3.525	3.497	3.455	3.300	3.361	3.567	0.936	0.961	1.032
Finland	4.374	4.006	3.455	3.258	3.343	3.567	0.745	0.835	1.032
France	3.548	3.511	3.455	3.518	3.529	3.567	0.992	1.005	1.032
Germany	3.792	3.657	3.455	3.591	3.545	3.567	0.947	0.969	1.032
Greece	2.433	2.841	3.455	5.103	4.248	3.567	2.097	1.495	1.032
Ireland	2.937	3.144	3.455	4.193	3.906	3.567	1.428	1.242	1.032
Italy	3.431	3.441	3.455	3.616	3.573	3.567	1.054	1.039	1.032
Netherlands	3.449	3.452	3.455	3.668	3.566	3.567	1.064	1.033	1.032
Poland	0.456	1.646	3.455	13.167	8.494	3.567	28.886	5.160	1.032
Portugal	2.508	2.886	3.455	3.697	3.585	3.567	1.474	1.242	1.032
Spain	2.463	2.859	3.455	4.194	3.888	3.567	1.703	1.360	1.032
Sweden	3.245	3.329	3.455	4.154	3.771	3.567	1.280	1.133	1.032
UK	3.084	3.232	3.455	4.590	4.087	3.567	1.489	1.264	1.032

Note: See Table 5.8.
Source: Thomson Financial Datastream and Oxera calculations.

Overall, these results support the view that greater international diversification (here limited to Europe for illustrative purposes) can improve the risk–return performance of investment portfolios. In other words, quantitative investment limits or any other barriers to cross-border investment are costly if they impede efficient portfolio diversification. They can prevent investments that would allow higher returns for the same level of risk or lower risks for the same level of returns.

5.3 Case study analysis of relevant pension schemes

The above results show the international diversification benefits that apply in general, without specific analysis of the pension schemes examined in sections 2 to 4. To relate the analysis back to the relevant pension schemes, the following presents the results of case study analysis conducted to compare the risk–return performance of the actual restricted portfolios of the schemes with portfolios that are more internationally diversified. More specifically, the analysis simulates the risks and returns of portfolios that reflect:

– the actual asset allocation of the relevant schemes in domestic, European and rest of the world equities and government bonds;
– an asset allocation that increases the proportion of international investment up to existing quantitative limits for the relevant schemes (ie, the maximum diversification portfolio allowed by regulation);
– international diversification beyond existing investment limits—the relevant schemes are assumed to invest fully or partially (40%) in the European or world market indices for equity and government bonds.

The results are based on simulations of risks and returns, including those for the actual scheme portfolios, since an insufficient time series of actual returns data is available. (The country descriptions in Appendix 2 report some actual returns data of scheme portfolios for

which such data was available.) The time period for analysis varies between the selected schemes and was determined by data availability for the country. More generally, the lack of sufficient data limited much of the case study analysis, particularly since some of the schemes with comparatively strict limits are from countries with only a short history of data.

Each case study begins with a summary of the actual portfolio and applicable investment limits. The average returns, volatility and variance coefficient for portfolios that are increasing in the degree of international diversification are then presented.

Based on historical data, the comparison of the actual portfolio and the maximum diversification portfolio shows the extent to which the risk–return performance could have been improved if scheme assets had been invested up to the quantitative limits—ie, if other barriers to cross-border investment were non-existent or abolished, and quantitative limits were fully binding. The comparison with the partially or fully diversified portfolios shows what further improvements in terms of risk–return performance could have been made if the quantitative limits were non-existent or abolished and the scheme assets had been invested without constraints in international assets (measured by the European and world market indices).

For illustrative purposes, the results are reported for three demographic reserve funds (the Ageing Population Fund in Belgium, the Demographic Reserve Fund in Poland and the reserve fund in Portugal (FEFSS)), and the statutory private pension schemes in three countries (Bulgarian PPFs and UPFs, Hungarian mandatory pension funds, and OPFs in Poland). The case study analysis therefore does not include all pension schemes discussed in this report for the following reasons.

– **No or limited cross-border investment restrictions**. As discussed in section 4, although most of the pension schemes examined are subject to some form of quantitative cross-border investment restriction, only a few face limits that are stricter than those allowed under the IORP or Life Directives. Schemes with no or lower limits were generally excluded from the case study analysis.

– **Internationally diversified portfolios**. A related point is that many of the schemes subject to no or weak investment limits have investment portfolios that are already diversified internationally. For these schemes, further diversification would generate no or little additional benefits.

– **Nature of investment limit**. For some schemes, the cross-border investment limit is specified in a way that presents difficulties for the modelling methodology. For example, the reserve fund in Spain is allowed to invest internationally, but only in public debt with the highest credit rating. Corresponding index data to simulate the returns of such a portfolio was not available.

– **Nature of fund**. The Dutch Public Old Age Benefit Savings Fund was excluded because the fund is a notional fund that only exists in the books of the Dutch government, and as such is not invested.

– **Data availability**. Some schemes were excluded due to a lack of data. For example, the asset allocation data available for the technical reserves of Agirc–Arrco in France distinguished investments in the Eurozone from non-euro investments, but no information was available on the portfolio weight given to domestic assets. Hence, it was not possible to simulate the risk–return performance of the actual portfolio and compare it with more globally diversified portfolios. In other cases, the lack of data related to the return index series available, particularly in terms of length of time series available. These concerns apply particularly to the schemes in the new Member States. The case study results nonetheless include examples where the estimation period is very short.

5.3.1 Illustration 1: Ageing Population Fund in Belgium

According to the law that established the Ageing Population Fund in Belgium, investment of the fund is restricted to government bonds specifically issued by the Belgian treasury. The Fund's assets are therefore 100% invested in domestic government bonds; there is no investment in equity and no investment in foreign bonds.[21]

Tables 5.11 and 5.12 illustrate the potential cost of the restriction in terms of risk–return performance by reporting, for the actual portfolio, average returns, volatility and variance coefficient—measured first on a nominal and then on a real basis—and comparing it with internationally diversified portfolios. The actual portfolio corresponds to the maximum diversification portfolio (ie, the restriction is fully binding). Returns for this portfolio are proxied by the CGBI for Belgium. The diversified portfolios are proxied by the CGBI constructed for the EEA and world. The partially diversified portfolios comprise of the domestic index (60%) and the international indices (40%).

The results based on both nominal and real returns show that the portfolio volatility can be reduced by increasing the degree of diversification across Europe and more globally. This can come at the cost of somewhat lower returns. Nonetheless, at least in nominal terms, the overall risk–return performance tends to improve, although the reduction in the variance coefficient is small. Also, the partially diversified portfolios with only 40% investment in a diversified bond portfolio appear to outperform the fully diversified portfolio. Adjusting for local inflation[22] preserves the reductions in volatility, but affects the level of real returns such that the risk–return trade-off is not improved overall.

Thus, some diversification benefits can be observed, although these are limited given the exclusive investment of the Fund in government bonds. Put differently, based on historical data, there is only little evidence to suggest that the removal of the investment restriction and the shift to a more diversified government bond portfolio would have significantly improved the risk–return performance of the portfolio. It is the relaxing of the constraint to invest in government bonds (domestic or foreign) and a corresponding shift towards equity and other asset classes that would have the more significant effect on portfolio performance.

Table 5.11 Comparison of risk–return performance for Belgian Ageing Population Fund (nominal)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio (max. diversification portfolio)	60:40	EEA index	60:40	World index
Whole portfolio (Jan 1991–June 2006)					
Portfolio returns (%)	7.736	7.938	8.243	7.398	6.893
Portfolio volatility (%)	3.465	3.402	3.546	3.113	3.057
Variance coefficient	0.448	0.429	0.430	0.421	0.444

Notes: The actual portfolio is modelled assuming 100% investment in the CGBI for Belgium. The CGBI for the EEA and world represent the fully diversified portfolios in government debt. The 60:40 results refer to partial diversification, with 60% in the Belgian index and 40% in the EEA or world index.
Source: Oxera analysis.

[21] The Fund is described in more detail in A2.2 in Appendix 2.

[22] The adjustment for inflation is made with respect to the place of the investment, not the location of the investor.

Table 5.12 Comparison of risk–return performance for Belgian Ageing Population Fund (real)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio (max. diversification portfolio)	60:40	EEA index	60:40	World index
Whole portfolio (Jan 1991–June 2006)					
Portfolio returns (%)	5.589	5.615	5.655	4.777	3.570
Portfolio volatility (%)	3.616	3.504	3.631	3.199	3.249
Variance coefficient	0.647	0.624	0.642	0.670	0.910

Notes: See note to Table 5.11. However, in this table returns are adjusted to account for inflation using CPI data.
Source: Oxera analysis.

5.3.2 Illustration 2: Demographic Reserve Fund in Poland

The Demographic Reserve Fund in Poland is restricted by law to make investments in Poland only. Correspondingly, 100% of the Fund's actual portfolio is invested domestically. At the end of 2005, almost 80% of the Fund was invested in treasury bonds issued by the Polish government, with just over 20% invested in Polish equities (and a negligible fraction in bank deposits).[23]

Tables 5.13 and 5.14 report the results of the risk–return simulations for different portfolios, starting with the actual 100% domestic portfolio (which also corresponds to the maximum diversification portfolio allowed by law, given the fully binding nature of the restriction) and comparing it with the partially and fully international diversified portfolios.

The results are shown separately for the equity portfolio and the government debt portfolio, as well as combined for the whole portfolio, which preserves the actual equity–debt proportions and only increases the allocation to the EEA or world index in equity and debt, respectively.

Comparing first the risk–return characteristics of the equity portfolios, a shift towards international diversification results in a significant reduction in the volatility of the portfolio. Over the period of analysis (1993–2006), average returns on Polish equity have been high by international standards. Nonetheless, the risk-reduction benefits obtained from diversifying into European or world equities outweigh the forgone returns, at least for an allocation of up to 40% into non-domestic equity, such that the overall risk–return trade-off improves—ie, the variance coefficient falls compared with the actual domestic portfolio. This is irrespective of whether the analysis is based on nominal or real returns.

The period of analysis for the equity portfolio includes the early years following liberalisation and the rapid transition of the Polish market. More generally, the period is relatively short to enable robust estimates to be made of risk–return parameters that are also informative on a forward-looking basis. Nonetheless, diversification benefits are notable.

The time series available to estimate risk–return characteristics of the debt portfolio are even shorter. While the CGBI series for Poland starts in 1996, there are gaps in the monthly data prior to 2001. The period of analysis for the debt portfolio, as well as the portfolio that

[23] The Demographic Reserve Fund and its asset allocation and investment limits are described in more detail in section A2.20 in Appendix 2.

combines debt and equity, therefore includes just over 60 data points over a five-year period from 2001 to 2006.[24]

Bearing in mind that it is problematic to draw inferences given the short time period, the results for the debt portfolio show diversification benefits, in particular through the reduction in volatility as the purely domestic portfolio is reallocated to include European and world government bonds. The risk–return trade-off also improves, although the benefits are less notable when returns are measured on a real basis.

The risk–return performance for the equity and debt portfolio as a whole displays a similar pattern over the five-year period. The analysis covers a period of low and negative world equity market returns, explaining why the average return on the whole portfolio that is fully diversified (ie, investment in both world equity and debt indices) is lower than that for the fully diversified world debt portfolio (ie, investment only in the world debt index). Thus, although the estimation generates results that show diversification benefits, a longer time series would be required to reduce the noise in the data and obtain risk–return estimates that are sufficiently robust to draw stronger conclusions.

Table 5.13 Comparison of risk–return performance for Polish DRF (nominal)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio (max. diversification portfolio)	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1993–June 2006)					
Portfolio returns (%)	41.498	29.242	12.673	28.067	10.099
Portfolio volatility (%)	52.887	34.456	15.406	34.092	13.350
Variance coefficient	1.274	1.178	1.216	1.215	1.322
Debt portfolio (Feb 2001–June 2006)					
Portfolio returns (%)	6.442	5.994	5.324	5.420	3.905
Portfolio volatility (%)	6.156	4.753	3.388	4.644	2.894
Variance coefficient	0.956	0.793	0.636	0.857	0.741
Whole portfolio (Feb 2001–June 2006)					
Portfolio returns (%)	8.019	6.689	4.721	6.232	3.601
Portfolio volatility (%)	6.922	5.123	3.245	4.976	2.698
Variance coefficient	0.863	0.766	0.687	0.798	0.749

Notes: The actual portfolio is modelled assuming 100% investment in the Polish index for equity (MSCI) and government debt (CGBI). The indices for the EEA and world represent the fully diversified portfolios in equity and government debt. The 60:40 results refer to partial diversification, with 60% in the Polish index and 40% in the EEA or world index. The whole portfolio combines the equity and debt portfolios, preserving the actual equity–debt allocations. The time series of the CGBI is shorter than that of the MSCI, so the calculation period for the debt and whole portfolio differs from that for the equity portfolio.
Source: Oxera analysis.

[24] Appendix 1 summarises the data for the full time period, ignoring the gaps in the data.

Table 5.14 Comparison of risk–return performance for Polish DRF (real)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio (max. diversification portfolio)	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1993–June 2006)					
Portfolio returns (%)	27.113	20.013	10.043	18.550	6.694
Portfolio volatility (%)	52.410	34.142	15.489	33.835	13.439
Variance coefficient	1.933	1.706	1.542	1.824	2.008
Debt portfolio (Feb 2001–June 2006)					
Portfolio returns (%)	4.278	3.752	2.969	2.979	1.058
Portfolio volatility (%)	6.381	4.970	3.562	4.900	3.271
Variance coefficient	1.492	1.325	1.200	1.645	3.092
Whole portfolio (Feb 2001–June 2006)					
Portfolio returns (%)	5.825	4.427	2.360	3.769	0.752
Portfolio volatility (%)	7.096	5.309	3.498	5.213	3.186
Variance coefficient	1.218	1.199	1.482	1.383	4.234

Notes: See note to Table 5.13. However, in this table returns are adjusted to account for inflation using CPI data.
Source: Oxera analysis.

5.3.3 Illustration 3: FEFSS in Portugal

Unlike the reserve funds in Belgium and Poland, the Portuguese reserve fund is internationally diversified in both equity and debt. The main restriction applying is the requirement that a minimum of 50% of the portfolio is invested in domestic government bonds. In addition, there is a 15% currency exposure limit for the total portfolio, but investment outside the Eurozone is permitted provided that the currency exposure is hedged. Furthermore, foreign investment is limited to securities issued in the OECD or the EU.[25]

Table 5.15 summarises the actual portfolio allocations of the FEFSS (as at the end of 2005), focusing on investments in public equity and government bonds only. In the simulations, the performance of the actual portfolio is compared with that of portfolios that invest internationally up to the level allowed by regulation, as well as portfolios that are fully diversified across Europe and the world. The analysis focuses on the limit that requires 50% investment in domestic government bonds. The assumed allocations under alternative scenarios are also reported in the table. Further allocations were examined, but the results are omitted.

[25] A more detailed summary is contained in section A2.21 in Appendix 2.

Table 5.15 Portfolio asset allocations for Portuguese FEFSS (%)

	Actual portfolio	Max. diversification portfolio		European diversified portfolio	World diversified portfolio
		Europe	World		
Total equity	**30.3**	**30.3**	**30.3**	**30.3**	**30.3**
Domestic equity	3.4	0.0	0.0	0.0	0.0
European equity	9.0	30.3	0.0	30.3	0.0
World equity	18.0[1]	0.0	30.3[2]	0.0	30.3
Total debt	**69.7**	**69.7**	**69.7**	**69.7**	**69.7**
Domestic debt	55.1	50.0	50.0	0.0	0.0
European debt	14.6	19.7	0.0	69.7	0.0
World debt	0.0	0.0	19.7[2]	0.0	69.7

Notes: Only the equity and government debt allocations of the FEFSS actual portfolio are considered, and the equity–debt mix is fixed in all portfolio scenarios. The maximum diversification scenarios consider diversification in Europe (case 1) or globally (case 2) up to the allowed limit and preserving the equity–debt mix. The partial 60:40 diversification results are omitted because the actual and maximum diversification scenarios are already more diversified. [1] Refers to international investment outside Europe, and for modelling purposes this sub-portfolio is measured by the world equity index that excludes EEA equity markets. [2] Investment is restricted to international investment in the OECD or EU area, although, for modelling purposes, the total world index for equity or debt are used to estimate this sub-portfolio.
Source: Oxera analysis.

The results of simulating the risk–return performance of these portfolios using the relevant domestic, European and world indices are reported in Tables 5.16 and 5.17.

For government debt investment, the actual portfolio is invested close to the limit (55% in domestic bonds compared with the minimum required level of 50%). The comparison with the fully diversified European and world portfolios shows that diversification somewhat reduces the risk of the portfolio, but the returns on Portuguese government debt over the time period for which data was available (1995 to 2006) were also somewhat higher than the average European or world index returns. As a result, there is no improvement in the variance coefficient. This applies to both the nominal and real results.

While more limited for government bonds, diversification benefits tend to arise more for the equity part of the portfolio. For the FEFSS, the actual equity portfolio is already considerably diversified—there is no direct quantitative restriction on the level that can be invested in equity issued by non-Portuguese issuers in Europe and the OECD area (subject to appropriate currency hedging), and 89% of the actual equity portfolio is invested outside Portugal (two-thirds of which is outside Europe). The benefits of adopting this diversified international investment strategy are supported by the evidence in Tables 5.5 and 5.6 above, which compare risks and returns for a Portuguese portfolio with a portfolio that is diversified across Europe.

Since already diversified, one would not expect to see any significant improvements in terms of risks and returns by holding the fully diversified portfolios—measured by the EEA or world indices. As such, the comparisons of the equity portfolios in Tables 5.16 and 5.17 below are not informative. The fact that the equity portfolio is already internationally diversified, combined with the results obtained for the debt portfolio, explains why the estimates for the overall portfolio do not show the improvement in the risk–return performance between the actual and internationally diversified portfolios.

Table 5.16 Comparison of risk–return performance for Portuguese FEFSS (nominal)

		Max. diversification portfolio		European diversified portfolio	World diversified portfolio
	Actual portfolio	Europe	World	EEA index	World index
Equity portfolio (Jan 1988–June 2006)					
Portfolio returns (%)	9.942	12.900	9.737	12.900	9.737
Portfolio volatility (%)	13.318	15.303	13.455	15.303	13.455
Variance coefficient	1.340	1.186	1.382	1.186	1.382
Debt portfolio (Jan 1995–June 2006)					
Portfolio returns (%)	7.999	7.944	7.214	7.402	6.171
Portfolio volatility (%)	3.334	3.318	3.370	3.333	2.949
Variance coefficient	0.417	0.418	0.467	0.450	0.478
Whole portfolio (Jan 1995–June 2006)					
Portfolio returns (%)	8.730	9.258	7.773	8.876	7.318
Portfolio volatility (%)	4.595	5.031	4.703	5.045	4.338
Variance coefficient	0.526	0.543	0.605	0.568	0.593

Notes: The asset allocations for the different portfolios are those set out in Table 5.15. Returns are modelled using the relevant MSCI and CGBI for the Portuguese, EEA and world market in equity and government bonds. The index for the world is measured with the EEA included (eg, when modelling the actual portfolio) or excluded (eg, when modelling the fully diversified portfolio). The time series of the CGBI is shorter than that of the MSCI, so the calculation period for the debt and whole portfolio differs from that for the equity portfolio.
Source: Oxera analysis.

Table 5.17 Comparison of risk–return performance for Portuguese FEFSS (real)

		Max. diversification portfolio		European diversified portfolio	World diversified portfolio
	Actual portfolio	Europe	World	EEA index	World index
Equity portfolio (Jan 1988–June 2006)					
Portfolio returns (%)	5.419	9.586	4.788	9.586	4.788
Portfolio volatility (%)	13.401	15.398	13.586	15.398	13.586
Variance coefficient	2.473	1.606	2.837	1.606	2.837
Debt portfolio (Jan 1995–June 2006)					
Portfolio returns (%)	4.963	4.983	4.094	5.177	3.347
Portfolio volatility (%)	3.558	3.523	3.543	3.455	3.142
Variance coefficient	0.717	0.707	0.865	0.667	0.939
Whole portfolio (Jan 1995–June 2006)					
Portfolio returns (%)	5.703	6.439	4.630	6.576	4.375
Portfolio volatility (%)	4.640	5.072	4.716	5.160	4.472
Variance coefficient	0.814	0.788	1.019	0.785	1.022

Notes: See notes to Table 5.16. However, in this table returns are adjusted to account for inflation using CPI data.
Source: Oxera analysis.

5.3.4 Illustration 4: Universal and Professional Pension Funds in Bulgaria

Until early 2006, statutory funded private pension schemes in Bulgaria—both UPFs and PPFs—were required to invest 50% in domestic government bonds, with the additional restriction that not more than 10% of the portfolio could be invested in foreign assets. An amendment to the law removed these restrictions, and replaced them with the requirement that not more than 20% of assets can be denominated in currencies other than the Bulgarian lev or euro. In principle, therefore, the portfolio can now be fully internationally diversified, at least within the Eurozone.

As discussed in section 4, the change in the law triggered a reallocation of the portfolios of UPFs and PPFs. The allocation to non-domestic assets remains low, at least for the aggregate of funds.

Table 5.18 shows the allocation for equity and government bond portfolios as at end-2005, for both UPFs and PPFs combined. The equity portfolio is fully domestic, and only a fraction of the debt portfolio is held in the debt issued by other European governments.

With the relaxation of investment regulation, the portfolio could in principle be invested fully into Eurozone assets. The modelling results below therefore do not consider a maximum diversification portfolio and instead only benchmark the actual portfolio with the partially and fully diversified equity and world portfolios, while preserving the debt–equity mix.

Table 5.18 Portfolio asset allocations for Bulgarian UPFs and PPFs (%)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio	60:40	EEA index	60:40	World index
Total equity	11.9	11.9	11.9	11.9	11.9
Domestic equity	11.9	7.1	0.0	7.1	0.0
European equity	0.0	4.8	11.9	0.0	0.0
World equity	0.0	0.0	0.0	4.8	11.9
Total debt	88.1	88.1	88.1	88.1	88.1
Domestic debt	87.4	52.9	0.0	52.9	0.0
European debt	0.7	35.2	88.1	0.0	0.0
World debt	0.0	0.0	0.0	35.2	88.1

Notes: Only the equity and government debt allocations of the actual UPF and PPF portfolios (combined) are considered, and the equity–debt mix is fixed in all portfolio scenarios. The maximum diversification scenarios are omitted because, in principle, since 2006, investments can be fully diversified at least with respect to investments denominated in euros. The indices for the EEA and world represent the fully diversified portfolios in equity and government debt. Partially diversified portfolios are also considered, with 60% in the Bulgarian index and 40% in the EEA or world index.
Source: Oxera analysis.

Tables 5.19 and 5.20 compare the risk–return performance of the portfolio based on the actual asset allocation with the performance of portfolios that are partially or fully diversified within Europe and globally.

Greater diversification results in significant reductions in portfolio volatility, but returns on Bulgarian securities exceed those earned on a market-value-weighted European or world portfolio. Improvements in the risk–return trade-off, as measured by the variance coefficient, are therefore small or non-existent, and cease for international investment beyond 40% of the portfolio. These conclusions apply irrespective of whether the returns are measured on a nominal or real basis.

The difference in returns between the Bulgarian index and the EEA and world indices is particularly pronounced for equity investments and is largely due to the estimation period. The period from 1999 to 2006 covers years of very high annual returns on Bulgarian equity, but sharp stock market corrections and overall underperformance on the main European and world markets.

As with other results presented in this section, drawing firm conclusions is made difficult by insufficient data, meaning that noise in the data prevents the estimation of robust risk–return parameters.

Table 5.19 Comparison of risk–return performance for Bulgarian UPFs and PPFs (nominal)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1999–June 2006)					
Portfolio returns (%)	28.170	18.631	5.538	18.097	4.342
Portfolio volatility (%)	41.493	26.261	15.761	25.976	13.768
Variance coefficient	1.473	1.410	2.846	1.435	3.171
Debt portfolio (Feb 1999–June 2006)					
Portfolio returns (%)	11.237	8.519	4.471	8.222	3.757
Portfolio volatility (%)	9.618	5.994	3.293	5.948	2.781
Variance coefficient	0.856	0.704	0.736	0.723	0.740
Whole portfolio (Feb 1999–June 2006)					
Portfolio returns (%)	13.656	9.971	4.575	9.637	3.777
Portfolio volatility (%)	9.546	6.103	2.862	6.025	2.399
Variance coefficient	0.699	0.612	0.626	0.625	0.635

Notes: The asset allocations for the different portfolios are those set out in Table 5.18. Returns are modelled using the relevant MSCI and CGBI for the Bulgarian, EEA and world market in equity and government bonds.
Source: Oxera analysis.

Table 5.20 Comparison of risk–return performance for Bulgarian UPFs and PPFs (real)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1999–June 2006)					
Portfolio returns (%)	20.590	13.317	3.157	12.721	1.478
Portfolio volatility (%)	41.997	26.583	15.865	26.298	13.832
Variance coefficient	2.040	1.996	5.025	2.067	9.360
Debt portfolio (Feb 1999–June 2006)					
Portfolio returns (%)	5.094	3.930	2.169	3.506	1.129
Portfolio volatility (%)	10.283	6.458	3.394	6.413	3.044
Variance coefficient	2.019	1.643	1.565	1.829	2.696
Whole portfolio (Feb 1999–June 2006)					
Portfolio returns (%)	7.387	5.322	2.261	4.852	1.120
Portfolio volatility (%)	10.298	6.619	3.013	6.537	2.676
Variance coefficient	1.394	1.244	1.333	1.347	2.389

Notes: See note to Table 5.19. However, returns are adjusted in this table to account for inflation using CPI data.
Source: Oxera analysis.

5.3.5 Illustration 5: Mandatory Pension Funds in Hungary

The second illustration for statutory funded private pensions relates to the Mandatory Pension Funds (MPFs) in Hungary. MPFs are not subject to stringent cross-border

investment limits when it comes to international investment in public equity and government bonds. There is a 20% limit to investment outside the OECD, a 30% currency risk exposure limit (that can be hedged), and additional restrictions on foreign corporate and municipality bonds, foreign non-listed equity and real estate outside the EEA. Thus, as long as the investment is within the OECD area, and as long as the risk is properly hedged, the equity and government debt portfolios could be fully invested internationally.

Table 5.21 shows the actual portfolio allocations for the two asset classes as at end-2005, as well as the diversified benchmark portfolios. Given the absence of explicitly binding limits on foreign equity and government bonds, the maximum diversification scenario is omitted and the benchmarks are the partially or fully diversified European and world portfolios only.

Holdings in public equity make up only a small proportion of the total portfolio of MPFs, but the equity part of the portfolio is already diversified, with a third invested in non-domestic European equity. The debt portfolio is mainly invested in domestic government bonds.

Table 5.21 Portfolio asset allocations for Hungarian MPFs (%)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio	60:40	EEA index	60:40	World index
Total equity	9.4	9.4	9.4	9.4	9.4
Domestic equity	6.3	5.7	0.0	5.7	0.0
European equity	3.1	3.8	9.4	0.0	0.0
World equity	0.0	0.0	0.0	3.8	9.4
Total debt	90.6	90.6	90.6	90.6	90.6
Domestic debt	90.2	54.3	0.0	54.3	0.0
European debt	0.4	36.2	90.6	0.0	0.0
World debt	0.0	0.0	0.0	36.2	90.6

Notes: Only the equity and government debt allocations of the actual MPF portfolios are considered, and the equity–debt mix is fixed in all portfolio scenarios. The maximum diversification scenarios are omitted because, subject to appropriate currency hedging, the funds can in principle be fully diversified. The indices for the EEA and world represent the fully diversified portfolios in equity and government debt. Partially diversified portfolios are also considered, with 60% in the Hungarian index and 40% in the EEA or world index.
Source: Oxera analysis.

The estimation of risks and returns of the actual and benchmark portfolios was impeded by the fact that no suitable government bond index was available to obtain results for the debt portfolio. Hence, the results reported in Tables 5.22 and 5.23 apply to the equity part of the portfolio only.

As noted above, the equity portfolio is on aggregate already diversified, with over 30% invested in European equity, which explains why there is little difference with the partially diversified (60:40) European portfolio. Measured on both a nominal and real basis, further diversification would not have paid off over the period of analysis (1995–2006). The fully diversified European portfolio displays lower volatility, but returns on Hungarian equity over the period were considerably higher than average returns in Europe, such that a 100% investment in the EEA index would not have paid off in terms of reducing the variance coefficient. The same applies to global diversification.

These findings correspond to those discussed in relation to Tables 5.5 and 5.6 above. The market conditions were favourable in Hungary over the period considered, and data covering a longer time period would be required to estimate the benefits of diversification over the long run.

Table 5.22 Comparison of risk–return performance for Hungarian MPFs (nominal)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1995–June 2006)					
Portfolio returns (%)	27.716	26.105	12.331	25.060	9.995
Portfolio volatility (%)	26.872	25.285	15.751	24.671	13.754
Variance coefficient	0.970	0.969	1.277	0.984	1.376

Notes: The asset allocations for the different portfolios are those set out in Table 5.21. Returns are modelled using the relevant MSCI for the Hungarian, EEA and world market in equity. No suitable index could be identified for Hungarian government bonds, so the results for the debt portfolio and combined equity and debt portfolio are omitted.
Source: Oxera analysis.

Table 5.23 Comparison of risk–return performance for Hungarian MPFs (real)

		European diversified portfolio		World diversified portfolio	
	Actual portfolio	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1995–June 2006)					
Portfolio returns (%)	18.311	17.437	9.778	16.252	6.774
Portfolio volatility (%)	26.579	25.028	15.827	24.377	13.810
Variance coefficient	1.452	1.435	1.619	1.500	2.039

Notes: See note to Table 5.22. However, in this table, returns are adjusted to account for inflation using CPI data.
Source: Oxera analysis.

5.3.6 Illustration 6: Open Pension Funds in Poland

Among the statutory private-funded pension schemes, OPFs in Poland were identified as being subject to the strictest quantitative cross-border investment limit—by law, investment in non-domestic assets is restricted to 5% of the total portfolio. For similar schemes in other countries, the investment limits have been relaxed or have always been (broadly speaking) in line with, or less stringent than, the limits allowed under the IORP or Life Directives.[26]

Polish OPFs are invested in equity, government bonds and other assets, but the allocation to foreign assets is low—even lower than the allowed 5%. Focusing on the equity and government bond portfolios only, Table 5.24 summarises the actual portfolio allocation of OPFs.[27]

Table 5.24 also reports the asset allocations of the portfolios modelled to examine the impact of increased international diversification on the risk–return performance compared with the actual portfolio.

[26] Data limitations were a further reason for not reporting the results for other countries. For example, Slovakia has implemented the requirement that 30% of scheme assets must be invested domestically, but insufficient debt index data was available to undertake the modelling. In general, the time series of data available for the new Member States (seven of nine countries with statutory private pension schemes are in the new Member States) is too short to draw robust conclusions about the risk–return characteristics of the domestic portfolio, as noted in section 5.2.

[27] The more detailed allocations, as well as a description of the applicable cross-border investment restrictions, are set out in section A2.20 in Appendix 2.

Table 5.24 Portfolio asset allocations for Polish OPFs (%)

		Maximum diversification portfolio		European diversified portfolio		World diversified portfolio	
	Actual portfolio	Europe	World	60:40	EEA index	60:40	World index
Total equity	**35.7**	**35.7**	**35.7**	**35.7**	**35.7**	**35.7**	**35.7**
Domestic equity	34.9	30.7	30.7	21.4	0.0	21.4	21.4
European equity	0.7	5.0	0.0	14.3	35.7	0.0	0.0
World equity	0.0	0.0	5.0	0.0	0.0	14.3	14.3
Total debt	**64.3**	**64.3**	**64.3**	**64.3**	**64.3**	**64.3**	**64.3**
Domestic debt	64.3	64.3	64.3	38.6	0.0	38.6	0.0
European debt	0.0	0.0	0.0	25.7	64.3	0.0	0.0
World debt	0.0	0.0	0.0	0.0	0.0	25.7	64.3

Notes: Only the equity and government debt allocations of the actual OPF portfolios are considered, and the equity–debt mix is fixed in all portfolio scenarios. The maximum diversification scenarios consider diversification (assumed to be via equity only) up to the allowed limit within Europe (case 1) or globally (case 2). The indices for the EEA and world represent the fully diversified portfolios in equity and government debt. Partially diversified portfolios are also considered, with 60% in the Polish index and 40% in the EEA or world index.
Source: Oxera analysis.

The results of the simulations, reported in Tables 5.25 and 5.26, are similar to those reported above for the reserve fund in Poland, the only difference being that OPFs have a greater allocation to equity investment and some, albeit very modest, exposure to foreign equities. For the reserve fund, the cross-border investment restriction is fully binding (ie, only Polish investments are permitted). For the OPFs, the exposure to foreign assets is limited to 5%, and the tables show what diversification benefits could be obtained if the actual portfolio allocation were adjusted to increase foreign equity up the allowed limit (ie, the maximum diversification portfolio). The benefits are observable but small, given the limited scope for increasing investment in international equity.

The more relevant comparison is with the partially or fully diversified international portfolios—ie, what improvements in the risk–return performance could have been obtained if there had been no quantitative limits, if other barriers to international investment (including other regulations) had been negligible, and if the asset allocation had been adjusted to include international equity and government bonds?

As discussed for the reserve fund, based on the historical data available, greater international investment would have resulted in a significant reduction in portfolio volatility. It would also imply lower returns—returns in Polish equity over the period of analysis (1993 to 2006) stand out as being high by international standards. Nonetheless, the reductions in the variance coefficient show that a shift in the portfolios towards international equity (European or worldwide) would more than compensate for the lower returns by reducing portfolio risk.

Due to data limitations, the period of analysis for the debt portfolio, and consequently for the whole portfolio that combines equity and debt, is short—just over five years of monthly data. The estimates suggest some diversification benefits for the debt portfolio; however, the results for the whole portfolio do not. This is largely because, for the shorter period of analysis, the average returns on the equity part of the whole portfolio capture a period of underperformance in the European and world stock markets. A longer time series of data would be required to smooth out market fluctuations. Even the 1993 to 2006 time series available for Polish equity only may not be long enough, especially to reduce the noise in the data during the early years.

Thus, although consistent with diversification benefits overall, the illustration is of limited use for drawing inferences about the benefits of international diversification or the cost of investment restrictions. More emphasis should be placed on the estimations based on the longer time series of data—ie, the 30-year estimates of risks and returns reported in Tables 5.3 and 5.4. These estimates provide the relevant evidence of the potential costs of restricting investment to domestic assets and of the corresponding improvements in the risk–return performance that can be obtained by allowing the portfolio to be invested internationally.

Table 5.25 Comparison of risk–return performance for Polish OPFs (nominal)

		Maximum diversification portfolio		European diversified portfolio		World diversified portfolio	
	Actual portfolio	Europe	World	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1993–June 2006)							
Portfolio returns (%)	40.823	37.090	36.486	29.242	12.673	28.067	10.099
Portfolio volatility (%)	51.888	46.308	46.179	34.456	15.406	34.092	13.350
Variance coefficient	1.271	1.249	1.266	1.178	1.216	1.215	1.322
Debt portfolio (Feb 2001–June 2006)							
Portfolio returns (%)	6.442	6.442	6.442	5.994	5.324	5.420	3.905
Portfolio volatility (%)	6.156	6.156	6.156	4.753	3.388	4.644	2.894
Variance coefficient	0.956	0.956	0.956	0.793	0.636	0.857	0.741
Whole portfolio (Feb 2001–June 2006)							
Portfolio returns (%)	9.162	8.644	8.647	7.229	4.256	6.863	3.367
Portfolio volatility (%)	9.828	9.182	9.102	7.520	5.332	7.257	4.463
Variance coefficient	1.073	1.062	1.053	1.040	1.253	1.057	1.326

Notes: The asset allocations for the different portfolios are those set out in Table 5.24. Returns are modelled using the relevant MSCI and CGBI for the Polish, EEA and world market in equity and government bonds. The time series of the CGBI is shorter than that of the MSCI, so the calculation period for the debt and whole portfolio differs from that for the equity portfolio.
Source: Oxera analysis.

Table 5.26 Comparison of risk–return performance for Polish OPFs (real)

		Maximum diversification portfolio		European diversified portfolio		World diversified portfolio	
	Actual portfolio	Europe	World	60:40	EEA index	60:40	World index
Equity portfolio (Jan 1993–June 2006)							
Portfolio returns (%)	26.727	24.584	23.899	20.013	10.043	18.550	6.694
Portfolio volatility (%)	51.419	45.884	45.779	34.142	15.489	33.835	13.439
Variance coefficient	1.924	1.866	1.916	1.706	1.542	1.824	2.008
Debt portfolio (Feb 2001–June 2006)							
Portfolio returns (%)	4.278	4.278	4.278	3.752	2.969	2.979	1.058
Portfolio volatility (%)	6.381	6.381	6.381	4.970	3.562	4.900	3.271
Variance coefficient	1.492	1.492	1.492	1.325	1.200	1.645	3.092
Whole portfolio (Feb 2001–June 2006)							
Portfolio returns (%)	6.944	6.424	6.401	4.951	1.892	4.384	0.516
Portfolio volatility (%)	9.936	9.293	9.215	7.641	5.531	7.419	4.818
Variance coefficient	1.431	1.447	1.440	1.543	2.924	1.692	9.331

Notes: See note to Table 5.25. However, in this table, returns are adjusted to account for inflation using CPI data.
Source: Oxera analysis.

5.4 Other costs and risks associated with international investment

The above analysis has focused on the benefits of international diversification that arise from a reduction in the market risk facing investors. Consistent with the approach taken in other studies in the literature, the analysis and the conclusions therefore assume that there are no other risks or costs associated with international investment. However, as discussed in sections 3 and 4, factors other than market risk might have an impact on the benefits of international diversification.

– **Currency risk**. The currency risk that investors face in cross-border investments potentially reduces the benefits of diversification, but the analysis has assumed away any currency fluctuations by modelling returns in local currencies. The issue of currency risk in modern portfolio theory has been extensively discussed in the academic literature (see section 3.2 for a discussion and references). In the context of international portfolio diversification of the European pension schemes, however, the impact of currency risk is somewhat limited, especially with the introduction of the euro, which means that a large proportion of the European diversified portfolio will be free from currency risk in many countries. Also, as discussed in the literature, institutional investors are generally able to mitigate currency risk exposures by hedging through various financial instruments. Moreover, it has been shown that currency exposure, through appropriate management, can enhance rather than offset the benefits of international investment in terms of both returns and diversification of risk, notably for equities.

– **Liquidity risk**. There are two aspects of liquidity risk that are directly relevant for the trade-off between costs and benefits of international diversification.

– First, indirect trading costs facing investors in markets with less liquidity are likely to be higher than indirect trading costs in more liquid markets. Liquidity risk is not captured in the empirical analysis. Therefore, the benefits of international diversification of investors in below-average liquidity countries (in general, less mature, smaller markets) are likely to be greater than those reported in the analysis. The benefits of diversification of investors from above-average liquidity countries (in general, more mature, larger markets) are likely to be somewhat lower than those estimated in the analysis.

– Second, re-allocation of portfolios towards higher international diversification might, in the short run, increase indirect trading costs associated with liquidity risk. In particular, the sale or purchase of a large amount (relative to total size of the given market) of securities might result in a significant market impact (ie, adverse price movements), thereby increasing costs associated with rebalancing of portfolios. Since EU pension funds often own a large proportion of domestic equity and bond markets, these costs are likely to be relevant when considering the trade-off between different levels of international portfolio diversification. It is, however, important to note that the costs associated with liquidity risk do not alter the long-run benefits of international diversification; they only introduce additional costs associated with achieving a more optimal allocation in the short run. Notably, in the shorter term, these costs can be mitigated if the shift towards higher international portfolio allocation is carried out gradually over time.

In addition to currency and liquidity risks, there may be differences in taxes or transaction costs between domestic and cross-border transactions, as well as costs associated with asymmetry of information that may also reduce the benefits of international diversification. These have not been taken into account in the empirical analysis because all returns are measured on a before-tax and transaction costs basis, although these costs are discussed in the literature review in section 3 as well as in the analysis in section 4. As a result of various changes in European financial markets, many of these additional costs or risks are likely to decrease in importance in the coming years.

5.5 Forward-looking assessment

The above empirical analysis has looked at the potential benefits of diversification based on historical data. In general, this historical approach can provide a robust representation of the level of benefits that can be achieved from international portfolio diversification. However, there are a number of factors that might affect the degree to which the benefits of diversification estimated using historical data diverge from the expected benefits going forward (and thus the costs of any investment restrictions).

The first factor affecting the interpretation of the historical-based results relates to the representativeness of returns over the measurement period. In other words, equity investment that, as a long-run average, returns 12% annually might produce very different returns in any given year or over any given shorter time period. In other words, equity returns and volatility estimated over a short period of time (eg, five years) might not be representative of average returns and risk that investors are likely to face going forward. The estimates of risks and returns can therefore depend on the chosen time period—a problem that is mitigated through estimation using longer time periods, whereby any noise in the data is averaged over a large number of observations.

There is no consensus among academics and practitioners about what period provides the best estimates, although it is generally accepted that return characteristics estimated over longer time periods are more representative of the forward-looking characteristics than those estimated over shorter periods. For example, in the context of estimating robust forward-looking estimates of the return premium that investors require for investing in equities,

academic studies have generally employed time periods in excess of 50 years. The reason for using such long periods is high volatility of annual returns, which introduces a significant component of inaccuracy (noise) in the estimates that are based on shorter time periods. Examples of such analysis of the equity risk premiums include Dimson, Marsh and Staunton (2003), Diamond (1999), and Siegel (1998).

In addition, in the context of estimating the risk–return trade-off of different asset allocations for pension schemes, academic studies have generally used historical returns in excess of 20 years—for example, Davis (1995), Davis (2002b), and Bernstein and Chumacero (2006). The length of the period used in these empirical studies is often also determined by data availability, and does not necessarily represent the best possible estimates, which may require even longer time periods.

Put differently, with respect to this analysis, estimates obtained using longer time periods are more representative of the actual risk–return characteristics of investments. In particular, estimations of average equity returns, return volatility and variance coefficients using 30-year data (Tables 5.3 and 5.4) are more representative of forward-looking risk–return characteristics than estimates using ten-year data (Tables 5.5 and 5.6). Similar conclusions apply for the debt analyses.

Second, it is possible that the risk–return characteristics of different assets are changing over time. In other words, average expected returns, volatility and correlations between assets may be changing as a result of variations in economic and financial fundamentals. For example, deeper financial integration of European equity markets would be likely to increase correlations between asset returns and therefore reduce the benefits of diversification.

This issue is likely to have the strongest effect on the new Member States because of the significant changes in both economic conditions and financial markets that have taken place over recent years. The risks and returns that were observed in those countries—particularly, in the early years following liberalisation of markets, and the attractive returns from the privatisation of formerly state-owned enterprises—are not likely to be representative of long-term expected returns and risks in the foreseeable future. In addition, the level of risk now facing investors in these markets is likely to be considerably lower than that faced in the 1990s because the markets are becoming more mature and more integrated with other EU markets.

Moreover, with respect to the less-mature markets in the Member States, only shorter time series of data are available—in some cases, this short period is one of temporarily high domestic returns that coincides with temporary underperformance of the European and world stock markets (eg, the sharp stock price corrections in the early 2000s). Therefore, the historical results for these countries are affected by the noise in estimations as well as by potential changes in the risk–return characteristics of investment in these countries. In those instances, it is helpful to draw inferences using evidence obtained from the estimations over longer time periods for the EU 15. In particular, estimates of diversification benefits achieved by the smaller of the EU 15 countries that are obtained using longer time periods may provide a good indication of the likely forward-looking benefits that would be achieved in the new Member States.

Overall, forward-looking estimates of the benefits of diversification should therefore take into account potential measurement (or noise) issues and likely changes in the risk–return characteristics of assets in different countries. The best estimates of the benefits that would be likely to be achieved by increased international diversification are therefore arguably provided by the analysis based on the longer data time series in section 5.2 above (30 years for equity and 15 years for debt).

5.6 Summary

The benefits of international portfolio diversification have been well documented in the literature. The empirical results presented in this section confirm these findings, showing that, in general, investors in European countries can improve the risk–reward profiles of their portfolios by increasing international investment.

– Analysis of 30-year nominal equity returns of ten Member States suggests that, in most cases, the volatility and variance coefficient of portfolios is improved by diversifying beyond domestic markets. On average, for this sample of countries, changing the portfolio allocation from fully domestic to fully EEA-diversified reduces both volatility and the variance coefficient. The same conclusions hold if equity returns are measured on a real basis after adjusting for inflation.

– Analysis of 15-year nominal government debt returns of nine Member States suggests that diversification can improve the risk–reward characteristics of portfolios. This also applies to returns measured on a real basis. However, the benefits appear somewhat smaller than in the case of equity.

– The results for shorter time periods (ten years for equities, and five years for government debt) provide more mixed results, confirming that any conclusions based on the analysis of short time periods are not necessarily representative of the average benefits that investors can expect from international diversification.

The case study analysis conducted using a sample of relevant pension schemes that are subject to cross-border investment restrictions produces results that are broadly consistent with the findings on the impact of diversification described above. International diversification beyond the maximum diversification allowed by regulation tends to show an improvement of the risk–reward characteristics of the investment portfolios. However, the results are more mixed, and inferences are impeded by the fact that data is too limited for the relevant countries to allow estimation over a longer time period.

The results provide only an illustration of the impact, and the forward-looking benefits of international diversification (and hence costs of investment restrictions) can be more effectively interpreted based on the estimates obtained using longer time periods of data and a large number of countries. Those estimates suggest that international diversification has benefits in terms of improving the risk–return performance of investment portfolios, and that investment restrictions that impede efficient diversification impose a corresponding cost.

6 Summary and conclusions

Cross-border investment restrictions can have a negative impact on the performance of funded pension schemes, reducing the resources available for scheme members to finance their retirement. The objective of this study has been to identify the restrictions applying to certain pension schemes in the 27 Member States and then examine their economic impact in terms of investment performance. The study focuses on two types of funded Pillar 1 scheme: (demographic) reserve funds and statutory funded private pension schemes.

The study identified relevant schemes in 18 countries as falling within the scope of the study. Eleven countries have a reserve fund, and nine have statutory funded private pension schemes. Reserve funds are concentrated in the EU 15 (nine countries), while statutory private schemes are concentrated in the new Member States (seven countries).

The total assets of the schemes analysed amounted to €455.3 billion in 2005 (see Table 6.1)–corresponding to around 4.2% of total EU GDP. The assets managed by reserve funds are around four times greater than those managed by statutory private schemes. The largest reserve funds are in Finland (€102 billion), Sweden (€84 billion) and France (€76 billion). Statutory funded private schemes have accumulated large funds in Denmark (€49 billion), Poland (€21 billion) and Sweden (€20 billion).

Several schemes have been introduced recently and have been growing at a rapid pace due to regular contributions (eg, the reserve fund in Ireland, and the statutory funded private schemes in the new Members States), suggesting that the economic importance of these schemes is likely to increase further in the near future.

Table 6.1 Size of reserve funds and statutory funded private schemes

	Total value of assets (€ billion)	% of EU 27 GDP	% of gross public pension expenditure (EU 25)
Reserve funds	358.3	3.3	27.5
Statutory funded private schemes	97.0	0.9	7.4
Total	**455.3**	**4.2**	**34.9**

Notes: In general, the volume of funds is measured as of end 2005, as is GDP. Data on gross public expenditure refers to 2004.
Sources: Economic Policy Committee (2006), 'Age-related Public Expenditure Projections for the EU 25 Member States up to 2050', European Economy, Special Reports; Eurostat; and Oxera calculations.

Restrictions on the investment of pension fund portfolios take many forms. This study has focused on quantitative investment limits that act as an explicit barrier to cross-border investment and that are specified by the relevant national laws or regulations.

Among the schemes considered, only a few do not have any legal or regulatory quantitative limits on foreign investment. Examples of the unconstrained schemes are the Lithuanian statutory pension schemes, the Swedish Premium Pension system and the Irish NPRF.

There are a limited number of cases where the investment rules for the relevant schemes are significantly stricter than those set out in the EU Directives that apply to other pension schemes—ie, the allowed currency risk exposure limits of 30% and 20% in the IORP and Life Directives, respectively. Among the reserve funds, this includes the funds that are required to invest all or half of their assets in domestic assets, usually in government bonds (ie, Belgium, Poland, Portugal and Spain). Among the statutory private pension schemes, the requirement

to invest in domestic assets is strictest in Poland (foreign investment is limited to 5%), but also applies in Slovakia (at least 30% must be invested domestically). It was also strict for the UPFs and PPFs in Bulgaria until the law was changed in 2006.

In other cases, existing restrictions do not refer to all foreign investments, but limit only currency risk exposure or investments outside a certain area—the Eurozone (eg, the reserves of Agirc–Arrco in France), the EEA or the EU (eg, the Finnish TEL funds), or the OECD area (eg, the Danish ATP funds). The observed limits are in most cases not stricter than the limits permitted under the EU Directives.

The economic impact of the observed cross-border investment limits depends on whether the restrictions influence actual asset allocation decisions of the pension scheme managers. A restriction is considered to be 'binding' if it has an impact on the asset allocation process of the pension scheme. Put differently, if the legal or regulatory provision were repealed, scheme managers would increase the allocation to foreign investments.

With the exception of the reserve funds that are subject to a fully binding constraint of investing the entire portfolio in domestic assets, the actual portfolio allocation generally falls short of the statutory limits to foreign investment—schemes are less internationally diversified than would be permitted under existing laws or regulations.

Nonetheless, schemes subject to the stricter limits tend to invest less abroad. Among the reserve funds, the most diversified is the fund without cross-border limits to investment (the Irish NPRF invests more than 90% abroad)—sharply contrasting with funds that are required to invest only or mainly in domestic assets (government bonds). The same observation applies to the statutory private schemes. Among the top three schemes in terms of foreign investment (all invest more than 70–80% abroad), two face no legal constraints when it comes to international investment decisions (Lithuania and Sweden), and one is subject to a limit that constrains only investment outside the EEA and OECD area (Estonia). In contrast, at the bottom of the list are Polish OPFs, which are subject to a 5% limit to foreign investment and invest only 1% of assets abroad.

Importantly, given the limits in place, the schemes with strict limits would not be able to attain the degree of international diversification observed for comparable schemes that are subject to no or weaker restrictions.

There is also evidence to suggest significant shifts in portfolio allocations where cross-border investment limits are relaxed (eg, changes in law applying to the statutory private schemes in Latvia and Bulgaria). This suggests that cross-border investment limits can present, and indeed have presented, a binding constraint on international asset allocation.

There are other factors that influence investment decisions in conjunction with, or over and above, the quantitative restrictions. These include provisions in laws and regulations that have an indirect impact on cross-border investment (eg, limits on asset classes, rules on fees and minimum guaranteed returns), institutional practices, and market conditions. Thus, although they cannot fully explain the international asset allocation patterns observed for the relevant schemes, cross-border investment limits matter if they are strictly defined.

The academic literature provides a strong basis for arguing that quantitative limits restricting cross-border investment have a negative impact on portfolio performance. The main reason is that such restrictions prevent funds from holding an internationally diversified portfolio, which in turn prevents them from taking advantage of the opportunity to diversify away non-systematic risks associated with their domestic economies. A number of academic studies examine the costs of such investment restrictions and show that the resulting reduction in the risk–return performance of pension funds can be significant.

The new empirical results presented in this report support these findings. They show that investors in the EU can improve the risk–return performance of their portfolios by increasing

the exposure to international investment. On average, changing portfolio allocations from a fully domestic portfolio to one that is diversified internationally allows reductions in the risk of the portfolio without forgoing returns, in particular when it comes to diversification across equity markets.

The study also conducted case study analysis of relevant pension schemes that are subject to comparatively tight cross-border investment limits in order to examine the extent to which the risk–return characteristics of the schemes' portfolios would improve if the actual asset allocation were adjusted to increase international investment up to and beyond the levels permitted under existing regulations. These simulations generated results that are broadly consistent with the conclusion that international diversification beyond the maximum diversification allowed improves the risk–return performance. However, for the relevant schemes and countries, the time series of data is often too limited to allow robust estimation of the relevant parameters.

The estimates obtained using longer time periods of data suggest that international diversification has benefits in terms of improving the risk–return characteristics of investment portfolios. In other words, any restrictions to cross-border investment that impede efficient diversification impose a corresponding cost since they prevent investments that would allow higher returns for the same level of risk or lower risks for the same level of returns.

Asset managers operating under restrictive regulation confirmed that tight investment restrictions can impede the ability to invest assets in a way that is in the best interests of pension scheme members. Where strict limits continue to apply going forward, their impact is likely to become more significant as other barriers to international investment fall and the size of pension assets to be invested increases. This can present a particular problem where domestic capital markets are not appropriate in terms of size, quality, liquidity and availability of asset classes to meet the increasing demand arising from the growth of pension assets.

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Appendix 1 Data and methodology used in the simulations

This section provides a summary of the main data used and the methodology adopted to obtain the simulation results in section 5.

A1.1 Summary of data sources

A1.1.1 Information on investment restrictions

The information on the relevant restrictions has been gathered from supervisory authorities and scheme managers, as well as from inspection of the relevant laws. Section 2.4 provides an overview of the main cross-border quantitative limits for the identified reserve funds and statutory funded private pension schemes, with further details provided in Appendix 2.

A1.1.2 Data on actual asset allocation

Asset allocation data for the relevant schemes considered has also been gathered from supervisory authorities and scheme managers, and in some cases from published documentation. For statutory funded private pension schemes that include several funds and asset managers, aggregated asset allocation data is used. The data includes information on allocation by asset class, location and currency of denomination, and in general refers to the portfolio at year-end 2005.

The asset allocation varies widely, from schemes that buy exclusively domestic government bonds to those that focus on foreign equities. Section 2.5 provides an overview of the asset allocation of the different schemes, with further information provided in Appendix 2.

This data is used to construct the actual investment portfolios that are benchmarked in terms of their risk and returns against the maximum diversification portfolios and the well-diversified portfolios.

A1.1.3 Returns

The simulation analysis is based on monthly equity and government bond returns for the relevant schemes. The analysis requires monthly nominal and real returns for both equity and bond indices for each of the relevant countries. It also requires monthly nominal and real returns for different European and world indices, for both equities and bonds. All data was downloaded from Thomson Financial Datastream.

Tables A1.1 and A1.2 show the nominal (annualised) returns for equity and bond indices for all 27 Member States (ie, not only the countries with relevant schemes) and the six European or world indices that have been considered in the calculations to proxy for the well-diversified portfolios. The tables present a summary of these indices, including their source, currency and start date, and the average returns and volatility for the maximum period and the most recent ten-year periods.

Some indices are missing (as indicated by the gaps in the tables). Moreover, the time periods are not consistent across countries and indices. As regards data provision, the debt indices were sourced from CGBI. The equity data was mainly sourced from MSCI, but complemented data from other providers where MSCI data could not be identified.

Table A1.1 Nominal annualised equity returns in local currencies (%)

				Maximum period		10-year period	
Country	Source	Currency	Start date	Annualised returns	Annualised volatility	Annualised returns	Annualised volatility
Austria	MSCI	Eur	Jan 1970	11.369	18.564	15.325	17.777
Belgium	MSCI	Eur	Jan 1970	14.424	16.834	12.944	17.460
Bulgaria	S&P	BGN	Jan 1996	28.170	41.493	–	–
Cyprus	MSCI	CYP	Jan 1993	26.839	41.032	26.375	45.459
Czech Republic	MSCI	CZK	Jan 1995	18.811	26.521	21.153	27.073
Denmark	MSCI	DKK	Jan 1970	14.981	17.559	16.826	19.051
Estonia	S&P	EEK	Feb 1998	19.122	33.135	–	–
Finland	MSCI	Eur	Jan 1988	20.059	33.427	27.885	37.696
France	MSCI	Eur	Jan 1970	14.053	20.515	13.408	19.682
Germany	MSCI	Eur	Jan 1970	10.347	19.556	11.897	23.885
Greece	DJTM	Eur	Feb 1992	15.812	31.050	19.396	33.955
Hungary	MSCI	HUF	Jan 1995	36.129	35.481	31.443	32.997
Ireland	MSCI	Eur	Jan 1988	13.247	19.680	10.288	18.883
Italy	MSCI	Eur	Jan 1970	13.475	23.932	14.628	21.542
Latvia	S&P	LVL	Feb 1998	13.951	35.009	–	–
Lithuania	S&P	LTL	Jan 1996	15.227	24.770	15.479	25.213
Luxembourg	DS	Eur	Feb 1992	15.034	19.951	10.979	21.576
Malta	DJTM	M£	Feb 2005	54.406	24.901	–	–
Netherlands	MSCI	Eur	Jan 1970	13.421	17.761	10.303	20.151
Poland	MSCI	PLN	Jan 1993	41.498	52.887	14.469	30.244
Portugal	MSCI	Eur	Jan 1988	8.949	21.094	12.332	20.583
Romania	DS	ROL	Jan 1997	64.976	55.899	–	–
Slovakia	S&P	SKK	Feb 1997	16.159	28.144	–	–
Slovenia	S&P	SIT	Jan 1996	28.137	28.453	32.441	28.173
Spain	MSCI	Eur	Jan 1970	14.835	20.697	17.866	22.095
Sweden	MSCI	SEK	Jan 1970	19.133	22.908	17.323	25.949
UK	MSCI	£	Jan 1970	14.973	20.475	8.747	13.727
Eurozone (EMU)	MSCI	Local	Jan 1988	13.328	17.747	13.055	19.787
Europe (EEA)	MSCI	Local	Jan 1970	12.599	15.152	11.521	16.673
World exc. EMU	MSCI	Local	Jan 1988	9.223	13.288	7.704	14.013
World exc. EEA	MSCI	Local	Jan 1970	10.288	14.160	7.309	14.411
World	MSCI	Local	Jan 1970	10.739	13.630	8.504	14.491

Notes: Average returns and volatility (standard deviation) are calculated using monthly returns but then annualised for presentation purposes. Missing entries indicate that the data was unavailable.
Source: Thomson Financial Datastream and Oxera calculations.

Table A1.2 Nominal annualised debt returns in local currencies (%)

				Maximum period		10-year period	
Country	Source	Currency	Start date	Annualised returns	Annualised volatility	Annualised returns	Annualised volatility
Austria	CGBI	Eur	Oct 1992	6.800	3.252	5.799	3.183
Belgium	CGBI	Eur	Jan 1991	7.737	3.406	6.166	3.240
Bulgaria	CGBI	$[1]	Feb 1996	15.080	18.398	16.367	18.310
Cyprus	–	–	–	–	–	–	–
Czech Republic	–	–	–	–	–	–	–
Denmark	CGBI	DK	Apr 1989	8.054	3.941	6.271	2.994
Estonia	–	–	–	–	–	–	–
Finland	CGBI	Eur	Jan 1995	7.346	3.352	6.128	3.067
France	CGBI	Eur	Jan 1985	8.644	4.188	6.014	3.359
Germany	CGBI	Eur	Jan 1985	6.681	3.384	5.643	3.099
Greece	CGBI	Eur	Apr 2000	6.407	3.267		
Hungary	–	–					
Ireland	CGBI	Eur	Oct 1992	8.607	4.907	7.163	3.964
Italy	CGBI	Eur	Jan 1985	10.736	3.877	7.146	3.566
Latvia	–	–	–	–	–	–	–
Lithuania	–	–	–	–	–	–	–
Luxembourg	–	–	–	–	–	–	–
Malta	–	–	–	–	–	–	–
Netherlands	CGBI	Eur	Jan 1985	6.959	3.432	5.798	3.141
Poland	CGBI	$[1]	Feb 1996	9.020	7.082	8.869	7.045
Portugal	CGBI	Eur	Jan 1995	8.158	3.398	6.561	3.258
Romania	–	–	–	–	–	–	–
Slovakia	–	–	–	–	–	–	–
Slovenia	–	–	–	–	–	–	–
Spain	CGBI	Eur	Jan 1991	9.445	4.318	7.015	3.564
Sweden	CGBI	SK	Jan 1991	9.143	4.486	6.884	3.489
UK	CGBI	£	Jan 1985	9.578	6.069	7.469	4.449
EMU	CGBI	Local	Feb 1999	4.425	3.285	–	–
EEA	CGBI	Local	Jan 1985	8.295	3.855	6.430	3.255
Non-EMU	CGBI	Local	Jan 1994	4.950	5.811	4.851	5.819
Non-EEA	CGBI	Local	Jan 1994	4.461	5.915	4.387	5.901
World	CGBI	Local	Jan 1985	7.584	3.547	5.333	2.826

Notes: Average returns and volatility (standard deviation) are calculated using monthly returns but then annualised for presentation purposes. Missing entries indicate that the data was unavailable. [1] The CGBI index for Bulgaria and Poland includes government bonds denominated in US$.
Source: Thomson Financial Datastream and Oxera calculations.

These nominal returns can then be converted into real returns using CPI data. The CPI data, measured as monthly and annual inflation, is reported in Table A1.3. In order to adjust the European and world indices, inflation rates were constructed using the underlying national CPI data. The constructed inflation rates present average inflation rates, weighted by the

underlying countries' market capitalisation for equity and government debt respectively. The market capitalisation data is sourced from Datastream for equity and Citigroup for debt.

Table A1.3 CPI data (%)

			Maximum period		10-year period	
Country	Currency	Start date	Average monthly inflation	Annualised inflation	Average monthly inflation	Annualised inflation
Austria	Eur	Jan 1975	0.263	3.202	0.142	1.718
Belgium	Eur	Jan 1975	0.302	3.688	0.159	1.925
Bulgaria	BGN	Mar 1997	0.636	7.907	–	–
Cyprus	CYP	Jan 1975	0.375	4.596	0.237	2.877
Czech Republic	CZK	Jan 1992	0.520	6.418	0.322	3.932
Denmark	DKK	Feb 1980	0.304	3.712	0.179	2.166
Estonia	EEK	Jan 1993	0.924	11.675	0.386	4.727
Finland	Eur	Jan 1975	0.406	4.983	0.117	1.418
France	Eur	Jan 1975	0.385	4.714	0.128	1.543
Germany	Eur	Jan 1975	0.221	2.683	0.121	1.467
Greece	Eur	Jan 1980	0.943	11.923	0.298	3.638
Hungary	HUF	Jan 1992	1.042	13.239	0.674	8.398
Ireland	Eur	Jan 1975	0.534	6.595	0.270	3.292
Italy	Eur	Jan 1975	0.596	7.396	0.183	2.220
Latvia	LV	Feb 1995	0.513	6.327	0.361	4.423
Lithuania[1]	–	–	–	–	–	–
Luxembourg	Eur	Feb 1995	0.166	2.005	0.176	2.134
Malta	M£	Jan 2003	0.240	2.923		
Netherlands	Eur	Jan 1975	0.255	3.103	0.187	2.273
Poland	PLN	Jan 1992	1.056	13.439	0.472	5.808
Portugal	Eur	Jan 1975	0.915	11.556	0.244	2.962
Romania[1]	–	–	–	–	–	–
Slovakia	KK	Jan 1994	0.588	7.284	0.568	7.039
Slovenia	SIT	Jan 1993	0.698	8.705	0.495	6.101
Spain	Eur	Jan 1975	0.639	7.938	0.247	3.004
Sweden	SEK	Jan 1975	0.425	5.218	0.088	1.065
UK	£	Jan 1975	0.507	6.251	0.218	2.644

Notes: Missing entries indicate that the data was unavailable. [1] Inflation data for Lithuania and Romania was available, but the index data produced zero or negative rates of inflation; other data sources suggested that this is a data error, and the estimates are therefore omitted; the two countries are not included in the analysis in this report.
Source: Thomson Financial Datastream and Oxera calculations.

A1.2 Methodology

The following sets out the methodology used to undertake the analysis in section 5. The purpose of the analysis is to examine the benefits of international diversification in European

countries and to illustrate the impact of investment restrictions on the performance of the relevant schemes.

The analysis comprises two parts: The first part provides a generic illustration of the potential benefits available, in terms of a portfolio's risk–return performance, through holding an internationally diversified as opposed to purely domestic portfolio. The second part is a more focused case study analysis comparing the actual (restricted) investment portfolios with more internationally diversified portfolios for the relevant pension schemes.

The analysis focuses on two main asset classes.

– **Equity investments**. These include all ordinary and preferred shares issued by publicly listed companies. In general, ownership of private companies, as well as any indirect ownership of equities, (eg, through equity derivatives) is not included in this category.

– **Bond investments**. These include all government bonds; other debt securities such as corporate bonds and deposits are not included in this category.

These tend to be the two largest asset classes in the portfolios of the schemes covered in this study. Although additional benefits could potentially be achieved through diversification in other asset classes, given the constraint of data availability, these have not been included in the portfolio analysis.

For the purposes of the portfolio analysis, the allocation between these two asset classes is kept constant. Although the asset allocation between debt and equity will materially affect the performance of the portfolios, the asset allocation between debt and equity is kept constant in order to focus on the changes in the risk–return performance of investment portfolios that stem from changing only the geographic scope of the portfolios.

A1.2.1 Analysis of generic benefits of international diversification

The first part of the analysis is to compare the risk–return performance of portfolios that are invested domestically with those that are more internationally diversified (section 5.2). The portfolios are represented by the domestic market indices and the corresponding indices that cover a wider geographic region (see A1.1 for a summary of the indices).

The objective of this analysis is to determine the relative performance of the individual market indices, the regional market indices, and a portfolio of the individual and regional market indices. This provides an indication, from a general point of view and not specific to the relevant pensions schemes, of the benefits of international diversification for both equity and debt and for each country.

This generic analysis assumes that there are two assets: holdings of the individual market index and the regional market index. There are three scenarios of portfolio weights reflecting different degrees of international diversification:

– the portfolio that is invested only in the individual market index,
– the portfolio that is invested to a ratio of 60:40 in both the individual and regional market indices;
– the portfolio that is invested exclusively in the regional market index.

A1.2.2 Case studies using relevant pension schemes

The second part of the analysis (section 5.3) presents illustrative case studies to assess the impact of investment restrictions on the relevant schemes examined in sections 2 to 4 of the report. The objective of this approach is to illustrate the risk–return performance of specific schemes under different scenarios of international portfolio allocations.

– **Actual portfolio**. The actual portfolio allocation represents the current asset allocation observed in the relevant schemes (usually as of end 2005), as summarised in section 2 and the country descriptions in Appendix 2. As explained above, the actual asset allocation includes only public equity and government debt; allocation to other asset classes is excluded.

– **Maximum diversification portfolio implied by the regulations**. This is the portfolio that is implied by the cross-border investment limits as summarised in section 2 and the country descriptions in Appendix 2. The maximum diversification portfolio is that which would just meet the existing quantitative limits on cross-border investment.

– **Unconstrained fully diversified portfolio**. The well-diversified portfolios are those that represent the portfolios that investors could have held in the absence of investment restrictions. The portfolios are represented by the European market index or, assuming global diversification, the world market index.

These portfolios are constructed using the relevant market indices (see section A1.1 for the data sources). For each of the two asset classes (equity and government debt), the allocation to which remains fixed, there are three market indices, representing the individual domestic markets, the diversified European markets, and the diversified world markets for public equity and government debt. Where the scenarios involve investment in both European and world market indices, the world market indices exclude European securities, while in those scenarios for which investment is in either European or world market indices, the world market indices include European securities.

As such there are six market indices within the portfolios:

– domestic public equity market index;
– domestic government debt market index;
– European public equity market index (depending on the nature of the restriction or the data in which the asset allocation data was provided, either EEA or EMU);
– European (again either EEA or EMU) government debt market index;
– world public equity market index (either including or excluding Europe);
– world government debt market index (either including or excluding Europe).

A1.2.3 Estimation of returns and risks

For both the generic analysis and the case studies, the basis for the comparison of the different portfolios is the returns and risks of these portfolios. Each portfolio contains sub-portfolios that comprise different asset classes (equity and debt) from different locations (eg, domestic, Europe, world).

The overall portfolio is defined in terms of the investment weights given to different assets or sub-portfolios:

$$W = [w_1 \dots w_n] \qquad \text{Equation A1.1}$$

where w_i is the fraction of the portfolio invested in the respective asset (or sub-portfolio), and i=1,…,n, where n is the total number of assets.

Formally, the average returns are defined as:

$$M = \begin{bmatrix} \mu_1 \\ \dots \\ \mu_n \end{bmatrix} \qquad \text{Equation A1.2}$$

where μ_i is the average return of asset (sub-portfolio) i , and I = 1,…,n, where n is the total number of assets.

The estimations also require volatility and correlations between returns, which can be summarised in the variance–covariance matrix:

$$VarCov = \begin{bmatrix} \sigma_{11}^2 & \sigma_{12}^2 & \cdots & \sigma_{1n}^2 \\ \sigma_{21}^2 & \sigma_{22}^2 & & \sigma_{2n}^2 \\ \vdots & & \ddots & \\ \sigma_{n1}^2 & \sigma_{11}^2 & \cdots & \sigma_{nn}^2 \end{bmatrix}$$ Equation A1.3

where σ_{ij}^2 is covariance of returns in sub-portfolios i and j, and n is the total number of assets.

A1.2.4 Estimation of portfolio characteristics

The estimates of these input return parameters are then used to obtain the overall risk–return characteristics of the portfolios. Based on the parameters of returns in different countries, the portfolio analysis estimates the performance characteristics (μ_p and σ_p) for each portfolio scenario.

The average return of the portfolio is estimated as:

$$\mu_p = W \times M$$ Equation A1.4

The variance of the portfolio returns is estimated as:

$$\sigma_p^2 = W \times VarCov \times W'$$ Equation A1.5

Instead of reporting the variance, the volatility measure reported is the standard deviation of the returns:

$$\sigma_p = \sqrt{\sigma_p^2}$$ Equation A1.6

This approach therefore allows the estimation of the relevant risk–return characteristics, depending on the asset allocation and international investment diversification, as reflected by different portfolio weights.

A1.2.5 Annualised results

Although the portfolio analysis uses monthly data, the final results are presented in annualised terms. As such, the returns are annualised using Equation A1.7, and volatilities are annualised using Equation A1.8.

$$r_{annual} = \left(1 + r_{monthly}\right)^{12} - 1$$ Equation A1.7

The volatility of the portfolio returns is estimated as:

$$\sigma_{annual} = \frac{\sigma_{monthly}}{\sqrt{1/12}}$$ Equation A1.8

A1.2.6 Estimation of the risk–return trade-off

The underlying principle is to compare the risk–return performance of the portfolios. In the simplest terms, this implies the comparative assessment of the average returns and the volatility of returns. However, the comparison of average returns and volatility of returns of different portfolios does not yield a framework for a comprehensive comparison of the risk–return performance of different portfolios.

One approach to comparing the risk–return characteristics is to use the Sharpe ratio for the different portfolios. As discussed in Bodie (1999), among others, this measure captures the return-variability trade-off, and investors should aim to *maximise* this measure. In other words, given a choice, investors would prefer to invest in portfolios with a higher Sharpe's ratio. Correspondingly, any changes in the asset allocation that result in an increased Sharpe's ratio for the relevant pension schemes (ie, through greater international diversification) increase the attractiveness of these portfolios from the perspective of the scheme members.

Sharpe's ratio is defined as excess returns as a proportion of standard deviation, and therefore captures both elements (returns and risks) in one metric:

$$\text{Sharpe's ratio} = (\mu_i - rf_i) / \sigma_i, \qquad \text{Equation A1.9}$$

where μ_i is the average return of the portfolio i over the period; rf_i is the average risk-free return over the period; and σ_i is volatility of returns of portfolio i over the period.

An alternative comparison of the risk-return characteristics is the coefficient of variation, and this is the measure chosen in much of the analysis.[28] The variance coefficient is defined as the ratio of volatility to average returns:

$$\text{Coefficient of variation} = \frac{\sqrt{\sigma^2}}{\overline{\mu}} = \frac{\sigma}{\overline{\mu}} \qquad \text{Equation A1.10}$$

As with the Sharpe ratio, the variance coefficient measures the trade-off between average returns and volatility. However, it is a simplification of the Sharpe ratio, since it does not consider investment in a risk-free asset. Moreover, due to the way in which the variance coefficient is specified, investors should aim to *minimise* it.

A1.2.7 Currency and inflation risk

International investment presents a number of issues that make assessment of the risk–return performance of internationally diversified portfolios more complicated than for domestic portfolios. In particular, international portfolios are characterised by currency risk and inflation risk. Currency risk is the exposure of portfolios to movements between the currency of the securities and that of the investor. As such, the returns on international investment are dependent not just on the returns of the actual assets held, but also on the movements between the currency of the investment and the currency of the investor.

Inflation risk is the risk faced by the investor that the returns on the investment will be diminished, in real terms, by inflation. Inflation risk affects the real returns that the investor would receive on the investment. It is important to note that currency risk and inflation risk are related, such that the differential between inflation rates will affect the exchange rates between two countries.

[28] Estimation of Sharpe's ratio involves an estimation of the risk-free rate, which requires the selection of an international risk-free asset. While short-term domestic government debt could provide a proxy, adjustments would be required, for example, to account for differences in sovereign risk.

Currency risk is not dealt with in the portfolio analysis, since all returns are measured in local currencies—the reason being that investors can in principle hedge away this risk. Put differently, it is assumed that the international investor is able to hedge at the spot rate and receive the returns in local currencies.

The results are presented in nominal terms using local (ie, place of investment) currencies, and then adjusted by the local inflation rate to show real returns.

The measurement of returns on a real basis and in local currencies is consistent with the approach used in studies in the literature (eg, Davis, 2002b).

Appendix 2 Country descriptions

This appendix presents the country-specific descriptions of the relevant schemes and investment restrictions. Covering the EU 27, the descriptions provide the basis for the overview and classification in section 2 of the main report.

The descriptions begin with an overview of the country's pension system. This sets out the key features of the Pillar 1 and occupational schemes in Pillar 2, in order to identify which schemes, if any, are within the scope of this study.

The schemes identified are then summarised. A short explanation is provided for countries with no schemes falling within the scope of the study. In general, the reasons for exclusion are that the country does not have a funded element in the First Pillar, and/or that potentially the relevant funded schemes in the Second Pillar are covered by the IORP or Life Directives, not significant in terms of coverage, or not subject to quantitative cross-border investment limits. These countries are not considered further in the study. This applies to seven of the 27 countries:

– Austria (section A2.1);
– Czech Republic (section A2.5);
– Germany (section A2.10);
– Greece (section A2.11);
– Italy (section A2.14);
– Malta (section A2.18);
– Romania (section A2.22);
– Slovenia (section A2.24);
– UK (section A2.27).

For the relevant countries, the descriptions continue with a focus on the relevant schemes, providing a summary of:

– the size and structure;
– governance arrangements—in particular, operation and asset management;
– investment restrictions, focusing on quantitative limits to cross-border investment; and
– actual international asset allocation patterns (in general, the data applies to the end of 2005).

Countries with reserve funds to support the PAYG-financed First Pillar include:

– Belgium (section A2.2);
– Cyprus (section A2.4);
– Finland (section A2.8);
– France (section A2.9);
– Ireland (section A2.13);
– Luxembourg (section A2.17);
– Netherlands (section A2.19);
– Poland (section A2.20);
– Portugal (section A2.21);
– Spain (section A2.25); and
– Sweden (section A2.26).

Countries with statutory private funded pension schemes (Pillar 1 bis) include:

– Bulgaria (section A2.3);

– Denmark (section A2.6);
– Estonia (section A2.7);
– Hungary (section A2.12);
– Latvia (section A2.15);
– Lithuania (section A2.16);
– Slovakia (section A2.23); and
– Sweden (section A2.26).

A2.1 Austria

A2.1.1 Overview of pension system

The Pillar 1 state pension system in Austria is a PAYG scheme, without reserves. The system covers (separately) blue-collar workers, white-collar workers, small businesses, farmers, and civil servants. Contribution rates amount to 22.8% in total, paid for by the employer and the employee. In recent reforms, steps have been taken to change the generous state pension system and gradually reduce benefit levels. This has given impetus to pension provision through occupational and private pension schemes.

For occupational schemes in the Second Pillar, Austrian legislation identifies three main types of funding vehicle.

– **Pensionskassen**—the largest funding vehicle, with a share of around 60% of occupational schemes. Pensionskassen are set up as legal entities that hold pension assets segregated from the sponsoring employer(s). The relevant law (Pensionskassengesetz), which sets out quantitative investment regulations, has been amended to implement the provisions of the IORP Directive.

– **Direct insurance**—in these schemes, which constitute about 20% of the market, employers pay premiums to life insurance companies, with the benefits accruing to employees under the contract. Insurance schemes are covered by the Life Directive.

– **Book reserves**—the employer guarantees to pay pension benefits on retirement and backs the liabilities with assets. Book reserves constitute another 20% of the market. These are not covered by the IORP Directive, but the investment of the assets must take account of the investment regulations that govern Pensionskassen (as specified in Article 25 of the Pensionskassengesetz).

The fourth funding vehicle—**support funds** (Unterstützungskassen)—are separate legal entities set up by employers which do not grant legally enforceable rights to beneficiaries. However, support funds no longer have any significance in the Austrian pension market.

A2.1.2 Relevant schemes

There is no funded element in the Austrian First Pillar. The Second Pillar is funded, but the relevant occupational schemes do not fall within the scope of this study. In other words, Pensionskassen and insurance schemes are covered by the Directives; book reserves and support funds are not covered by the IORP Directive, but the former are not subject to specific investment regulations (and adhere to IORP principles) and the latter are insignificant. Austria is therefore not analysed further in this study.

A2.2 Belgium

A2.2.1 Overview of pension system

The First Pillar in Belgium comprises statutory pension schemes, which cover employees in the private sector, the self-employed and civil servants. Benefits are income-related, although the Belgian state guarantees a minimum income for elderly people. The statutory pension is funded on a PAYG basis. However, in 2001 a law established a demographic reserve fund—Ageing Fund or Silver Fund (Zilverfonds/Fonds de vieillissement)—to build up reserves in order to facilitate the funding for the additional expenditure expected during the period 2010–30.[29] By the end of 2005, the Fund had reserves of €12.4 billion.

In the Second Pillar, the introduction of an occupational pension scheme can be decided for employees:

- at the *industry level*, in which case a collective labour agreement sets out the details of a pension scheme for employers and employees in that industry;
- at the *company* level, in which case it is usually the employer that takes the initiative of providing a pension scheme for all or part of the employees; or
- at the *individual* level, in which case the employer makes a pension promise to a single employee.

Separate arrangements apply for the self-employed or civil servants.

An occupational pension scheme can be operated as a pension fund or through a group insurance policy. In practice, the market is dominated by insurance schemes that account for around 80% of the market. Pension funds are subject to the IORP Directive, while insured schemes are covered by the Life Directive.

Pension provision available from Pillar 1 and Pillar 2 schemes can be complemented by individual retirement arrangements, taking the form of life insurance endowment contracts and pension savings programmes offered by other financial institutions.

A2.2.2 Relevant schemes

Since the Second Pillar is covered by either the IORP Directive or the Life Directive, the following description focuses on the Ageing Fund as the funded element of the Belgian First Pillar.

The Ageing Fund

Although initially set up in 2001 for the purpose of pension provision, the Ageing Fund is intended to finance not only pension benefits but other public expenditures (eg, health-related costs) that can broadly be attributed to the 'ageing population'.

Ageing Fund resources can be used to absorb the increase in expenditure on the statutory pension schemes during the period 2010–30, starting in 2010, on the condition that the general government debt ratio is less than 60% of GDP, which is expected to be the case by 2015 at the latest.

The Law of September 5th 2001 provides for the Fund to be financed through budget surpluses, social security surpluses, and non-recurring, non-fiscal revenues.[30] Given the Belgian budget position, the contributions from budget surpluses have been negligible. Up to

[29] Loi du 5 septembre 2001 portant garantie d'une réduction continue de la dette publique et creation d'un Fonds de viellissement.
[30] Ibid.

now, the Fund has been financed primarily through non-recurring revenues (in particular, the sale of UMTS licences and revenues from the privatisation of Belgacom) and income on invested balances.

At the end of 2005, the Ageing Fund reserves totalled €12,391.5m. Table A2.1 shows the growth in fund balances since 2001.

Table A2.1 Accumulated reserves of the Ageing Fund

	Total funds (€m)
2001	624
2002	1,056
2003	4,153
2004	11,949
2005	12,392

Source: http://treasury.fgov.be/interstaben/Stab6.htm.

A transfer to the Ageing Fund totalling 0.2% of GDP (€616m) was planned for 2006. From 2007, the non-recurring funding will be replaced by structural funding.

Investment restrictions and asset allocation

According to the 2001 law that established the Fund, investment of the Fund is restricted exclusively to Belgian government bonds. All assets are therefore invested in government bonds that are specifically issued for purchase only by the Ageing Fund (Schatkistbons-Zilverfonds or bons du Trésor-Fonds de viellissement).

A2.3 Bulgaria

A2.3.1 Overview of pension system

Following reforms over the past decade, Bulgaria's pension system is dominated by a PAYG scheme (Pillar 1), and statutory private pension funds (Pillar 1 bis). There is also a small voluntary pillar, consisting of both occupational and private pension schemes.

The PAYG scheme is not supported by a demographic reserve fund, although there have been discussions about introducing such a fund. The coverage of the Pillar 1 bis scheme is twofold: all employees born in 1960 and since; and all employees engaged in 'risky' labour. Assets are managed by licensed pension insurance companies.

A2.3.2 Relevant schemes

The study focuses on the statutory private pension funds.

A2.3.3 Description of statutory private pension funds (Pillar 1 bis)

Structure and size of funds

Established in 2000,[31] the Pillar 1 bis scheme provides DC pensions based on contributions while earning. There are two categories of funds: universal pension funds (UPFs), providing coverage for all employees born in 1960 and since; and professional funds (PPFs), providing

[31] UPFs were established in 2002, and PPFs in 2000.

coverage for those employed in 'risky' labour. Both schemes require mandatory contributions for the employees covered.

The UPFs covered around 2.2m employees in 2005. Total annual contributions were around €70m in 2004, and around €85m in 2005. Total funds had reached BGN441m (€225m) by the end of 2005. The standard retirement age is 63 for men and 58½ for women.

In 2006 contributions to UPFs totalled 4% of an employee's earnings shared between the employee and employer (currently 65% is contributed by the employer, although this is set to fall to 50% by 2009). This is carved out from the contributions collected for the First Pillar PAYG scheme. The total contribution for pensions to social security and UPFs was 23% of the employee's earnings in 2006. Contributions to UPFs are set to increase to 5% in 2007. Additional contributions from either employers or employees are not permitted.

Table A2.2 Size of the UPF funds

2001	2002	2003	2004	2005
BGN0m	BGN41.71m	BGN114.06m	BGN261.13m	BGN440.84m
€0m	€21.32m	€58.32m	€133.51m	€225.40m

Note: Converted from euros at average annual exchange rates from Datastream.
Source: Financial Supervision Commission.

The PPFs covered around 180,000 employees in 2005. Total annual contributions were around €25m in both 2004 and 2005, and total funds exceeded BGN253m (€130m) by the end of 2005. The PPFs cover individuals in labour categories one or two (miners, steelworkers, etc), and allow workers in these professions to retire eight or three years (for categories 1 and 2 respectively) earlier than the standard retirement age as stated in the Social Insurance Code.

Contributions to the PPFs are 12% (for category 1) or 7% (for category 2) of an employee's earnings, paid entirely by the employer. Additional contributions from employers or employees are not permitted.

Table A2.3 Size of the PPF funds

2001	2002	2003	2004	2005
BGN51.54m	BGN95.24 m	BGN143.82m	BGN200.83m	BGN253.3m
€26.35 m	€48.69m	€73.53m	€102.68m	€129.52m

Source: Financial Supervision Commission.

Governance arrangements and supervision

Contributions are collected by the National Revenue Agency, and paid into the fund of the pension insurance company of the individual's choice. The Pillar 1 bis pension funds are organised and administered privately by licensed pension insurance companies. There are eight firms licensed by the State Agency for Insurance Supervision, which, in 2003, together with the Insurance Supervision Agency, and the State Securities Commission, merged into an integrated supervisory body—the Financial Supervision Commission (FSC). Each pension insurance company manages three pension funds (a UPF, a PPF, and a voluntary fund). The individual can choose which pension insurance company will manage their funds through individual accounts. The accrued funds are wholly inheritable by the individual's spouse, children or parents. The private pension insurance companies are required to maintain reserve funds and to guarantee a specific rate of return.

Individuals can choose between the eight UPFs and PPFs. When a fund has been chosen, the individual must remain with the same fund for two years, after which they can switch funds every year. If an individual does not make a choice, or makes more than one choice, they are assigned a fund by a lottery, which is weighted according to the sales of funds by the companies in the last quarter (33%), the companies' service fees (33%) and the investment returns of the companies' funds (34%).

For both UPFs and PPFs, pensions are provided on a DC basis. However, there are guaranteed rates of return required from the fund management companies: the higher of either 60% of the weighted average returns over the past 24 months, or annual returns of 3%.[32]

The FSC receives information on a daily basis about the activity of pension funds, and supervises the investment activity to ensure compliance with the legal provisions. The Bulgarian National Bank is involved in the control and regulation of depository banks holding pension fund assets, and requires depository banks to hold pension fund assets in separate accounts.

The FSC carries out its regulatory duties by requiring regular reports from the companies. Each must provide daily reports, detailing investments, asset allocation and asset valuation. There are also detailed monthly and annual reports, and the FSC can request a full audit of the investment company's accounts.

Investment restrictions

Investment restrictions for UPFs and PPFs are outlined in the Social Insurance Code 2003. The Code has been subject to several revisions, the latest of which (April 2006) led to the removal of cross-border investment restrictions—namely the requirement that 50% of the portfolio be invested in domestic government bonds, and that no more than 10% be held in cross-border investments. Following these changes, the only remaining cross-border restriction is the requirement that 80% of the assets be invested in assets denominated in either Bulgarian lev or euros (see Table A2.4).

[32] These arrangements are to be reviewed.

Table A2.4 Investment restrictions applicable to the pension insurance companies

Asset class	Restriction	Other comments	Social Insurance Code
Securities from a single issuer	Max. 5% of funds	Excludes domestic or European government securities	Art 178 (1)
Equity securities	Max. 20% of fund assets in shares	Applies to shares listed on European regulated exchanges (excluding special investment purpose companies and collective investment companies)	Art 178 (2)
	Max. 5% of fund assets in shares of special investment purpose companies	Special investment purpose companies are regulated under the Special Investment Purpose Companies Act	Art 178 (3)
Collective Investment companies	Max. 15% of fund assets in collective investment schemes (max. 5% in any single management company)	Applies to both domestic and European companies	Art 178 (9)
Municipal debt securities	Max. 15% of fund assets in municipal debt	Applies to both domestic municipal debt and municipal debt traded on European regulated exchanges	Art 178 (4)
Mortgage debt securities	Max. 30% of fund assets in mortgage bonds	Applies to domestic debt issued according to the Mortgage Bonds Act	Art 178 (6)
Corporate debt securities	Max. 25% of fund assets in corporate bonds	Applies to debt traded on both domestic and European regulated exchanges	Art 178 (7)
	Max. 5% of fund assets in secured corporate bonds	Applies to debt not traded on regulated exchanges	Art 178 (8)
Bank deposits	Max. 25% of fund assets in bank deposits (Max. 5% in any single bank)	Applies to deposits in banks licensed in Bulgaria or the EEA and countries specified in an ordinance of the FSC	Art 178 (5)
Investment property	Max. 5% of fund assets in investment property	Applies to investment property in Bulgaria, the EU or the EEA	Art 178 (11)
Currency restriction	Max. 20% of fund assets in investments denominated in a currency other than BGN or euros	–	Art 178 (10)

Source: Social Insurance Code (amended 2006)—Articles 175–180a.

Asset allocation

Tables A2.5 and A2.6 show the asset allocation for the UPFs and PPFs at the end of 2005, distinguishing by type of asset, currency of issue and geography of issuer.

Table A2.5 Asset allocation by location: UPFs, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	54.9	19.0	7.2	17.5	98.5
EEA	0.5	0.9	–	–	1.5
US	–	–	–	–	–
Rest of the world	–	–	–	–	–
Total	**55.4**	**19.9**	**7.2**	**17.5**	**100.0**

Source: FSC.

Table A2.6 Asset allocation by location: PPFs, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	56.0	18.0	8.1	16.6	98.8
EEA	0.3	0.9	–	–	1.2
US	–	–	–	–	–
Rest of the world	–	–	–	–	–
Total	**56.3**	**18.9**	**8.1**	**16.6**	**100.0**

Source: FSC.

This data shows that the investment companies, on aggregate, have invested only 1.5% and 1.2% of their UPF and PPF assets in cross-border investments.

This portfolio allocation has changed significantly since 2005, partly as a result of the changes to the Social Security Code in April 2006 described above. By the end of September 2006, the proportion of funds invested in domestic government bonds had fallen to 39%. The proportion of cross-border investment had doubled, but remains low at 3.3%.

A2.4 Cyprus

A2.4.1 Overview of pension system

The pension system in Cyprus is made up almost entirely of the First Pillar. The General Social Insurance Scheme is a PAYG DB scheme, supported by a reserve fund. Contributions to the First Pillar amount to 16.6% of an employee's salary (6.3% paid by employees, 6.3% by employers, and 4% by the state). There are also social insurance schemes, which include some means-tested pensions.

There is a small Second Pillar made up of occupational pension funds and provident funds. This pillar is dominated by a mandatory occupational scheme for public sector employees, which is entirely funded by the state on a PAYG basis, from taxation. There are also similar semi-government employee schemes, which are operated within a special legal framework for employees in local or quasi-government bodies. However, these are primarily funded schemes, with employer contributions of around 26% of the employee's earnings. There are further occupational schemes, or voluntary provident funds, operated by industries, trade unions, or, more commonly, individual employers. Such schemes cover an estimated 30% of the Cypriot workforce. The provident funds pay out a lump sum at the end of an employee's

contract (whether voluntary, redundancy or retirement), and are not converted into annuities. These schemes will be covered by the IORP Directive when it is implemented in Cyprus in the fourth quarter of 2006. Furthermore, a small Third Pillar, primarily provided by insurance companies, has also been developed recently.

A2.4.2 Relevant schemes

The study focuses on Cyprus's First Pillar reserve fund.

A2.4.3 Description of reserve fund

Structure and size of funds

The reserve fund was established in 1980, when the funding of the PAYG scheme was changed to an earnings-related scheme. Before this, the reserve fund had only been an operational fund. Upon revision, the contribution levels were set such that the scheme was anticipated to be in surplus until 2025–30. These reserves are legally owned and managed as a single fund by the Ministry of Labour and Social Insurance. Investment decisions are made by the Minister of Finance in consultation with the Minister of Labour and Social Insurance, and the Social Insurance Advisory Board.

Table A2.7 Size of funds

2001	2002	2003	2004	2005
CY£2,194.9m	CY£2,360.0m	CY£2,520.8m	CY£2,717.2m	CY£2,919.2m
€3,803.8m	€4,090.0m	€4,368.6m	€4,709.0m	€5,059.1m

Note: Converted from euros at average annual exchange rates from Datastream.
Source: Cypriot Finance Ministry Questionnaire, August 2006.

Investment restrictions and asset allocation

The reserve funds' assets are predominantly invested in Cypriot treasury bills; a small proportion is held as either cash or in deposits, as shown in Table A2.8. There are no cross-border investments, although this is not due to regulation of the investments of the reserve fund. As the fund's assets are invested by the Ministry of Finance, a precedent has been established such that they are invested only in Cypriot treasury bills.

Table A2.8 Asset allocation by location, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	97.89	–	–	2.11	**100**
EEA	–	–	–	–	**–**
USA	–	–	–	–	**–**
Rest of the world	–	–	–	–	**–**
Total	**97.89**	**–**	**–**	**2.11**	**100**

Source: Cypriot Finance Ministry Questionnaire, August 2006.

A2.5 Czech Republic

A2.5.1 Overview of pension system

The Czech Republic completed its pension system reform in 1996. This led to the creation of two pillars: a statutory social security scheme and voluntary pension funds. Pillar 1 is entirely PAYG-financed, without designated demographic reserve funds, although there is an operating fund, whereby any surpluses in pension contributions are earmarked for pension payouts. The scheme is financed from contributions of 26% of employees' earnings (6.5% paid by employees, 19.5% by employers), and managed by the Czech Social Security Administration. This operates within the Czech Ministry of Finance, such that all contributions and payments are incorporated into the national budget.

The voluntary pillar is dominated by supplementary pension funds, with 2.5m participants in 2003, representing 50% of the labour force.[33] Other voluntary private schemes include life and pension insurance.

A2.5.2 Relevant schemes

The Czech Republic is not considered in this study since:

– the First Pillar is fully financed on a PAYG basis, with operating reserves being of little significance to date, and without demographic reserve funds;
– there are no funded statutory schemes or Pillar 2 schemes that are not covered by the IORP Directive.

A2.6 Denmark

A2.6.1 Overview of pension system

The basic level of the Danish pension system is represented by the Folkpensions, a mandatory PAYG scheme financed by taxation. The Folkpensions have both flat-rate and means-tested components.

The PAYG pension is supplemented by a funded public scheme, which is also mandatory—the Compulsory Occupational Scheme (Arbejdsmarkedets Tillægspension, ATP). An additional mandatory scheme, the Special Pension Savings Scheme (SP), was introduced in 1999, but contributions were suspended in both 2004 and 2005.

In addition to the universal schemes, 90% of full-time employees contribute to labour market pension schemes.[34] The schemes are based on either collective agreements or company-level agreements. In the former case, they are negotiated between employer organisations and trade unions, and compulsory for all companies covered by the agreement. Labour market pensions are managed as group insurance schemes and are covered by the Life Insurance Directive.

Funded occupational schemes, both mandatory and voluntary, represent the bulk of the assets of the pensions market. The Third Pillar is relatively small, although individual pension schemes have increased recently due to tax incentives. Individual schemes can be set up with banks, pension funds or insurance companies.

[33] Lisicky, M. (2003), 'Pension Reform in the Czech Republic: A Gradual Approach', *Focus on Transition*, **1**, Oesterreichische Nationalbank, pp. 174–88.
[34] ATP and SP can be considered labour market schemes, but are also universal schemes.

A2.6.2 Relevant schemes

The study focuses on the ATP scheme, which is a statutory pension scheme and does not fall within the scope of the IORP Directive. The SP has not been considered because of its marginal role in the Danish pension system. Second Pillar schemes have not been considered because they are covered by EU Directives.

A2.6.3 Description of the ATP

Structure and size of funds

Introduced in 1964, the ATP fund covered 4.4m members (of a population of 5.4m) by the end of 2005. It began as a labour market pension scheme for wage earners, but over the last decade has been extended to cover non-employed groups (including those on unemployment, maternity, sickness, and other forms of benefit).

For the employed, the ATP contribution is split between employers (one-third) and employees (two-thirds). The actual contribution is determined by the ATP board and corresponds to around 1% of the average wage.

At the end of 2005, the total assets of ATP were DKK365.1 billion (€48.9 billion)—almost 50% higher than in 2001 (see Table A2.9).

Table A2.9 ATP total assets

	2001	2002	2003	2004	2005
Total assets (DKK billion)	248.5	243.5	263.3	307.2	365.1
Total assets (€ billion)	33.3	32.6	35.2	41.2	48.9

Note: Converted from euros at average annual exchange rates from Datastream.
Source: ATP (2005) Annual Report.

Governance arrangements and supervision

ATP members do not have individual accounts, nor do they own the assets. Members cannot choose how their contributions are invested. However, ATP is a DC scheme: on retirement, the members' benefits are calculated on the basis of the performance of the ATP portfolio.

The ATP scheme is managed by an independent agency, the supervisory board of which is nominated by the state, employer confederations and trade unions. This board defines strategic asset allocation and the relevant benchmarks. Its guidelines also contain limitations on cross-border investments. In 2005, the following limits were specified:

– 20% in non-Eurozone assets;
– 60% in foreign assets;
– 10% non-Zone A countries;
– 10% in the USA;
– 10% in the UK.

Investment activities are carried out mainly in-house, with additional mandates for external managers.

ATP is regulated by the Danish Financial Services Authority. The purpose and governance of ATP are defined in the 2004 Consolidated Act on Arbejdsmarkedets Tillægspension (Consolidated Act no. 887 of August 24th 2004).

Investment restrictions

Article 26b of the Consolidated Act on ATP defines the categories of assets in which ATP's funds can be invested, and Article 26e defines the limits for those asset categories. Table A2.10 summarises the allowed assets and limits. Additional limits apply to investments in individual undertakings (Article 26d), although these are omitted from the table.

ATP can invest any portion of its portfolio in countries included in Zone A—which approximately corresponds to EU and OECD countries. Only up to 10% of the portfolio can be invested outside Zone A countries. ATP can invest up to 70% of its portfolio in equity.

Table A2.10 Investment limits in the Consolidated Act on the ATP

Limit	Asset categories
No limit	1. Government bonds of Zone A countries[1]
	2. Bonds of international organisations (with membership of at least one Member State)
	3. Bonds issued in a Member State or a country with which the Community has entered into an agreement for the financial area
	4. Amounts receivable from credit institutions and insurance companies under public supervision in countries within Zone A, although not amounts receivable that are subordinated to other creditors
	5. Real estate and other property
	6. Loans secured by registered mortgaged property
No more than 70% of the assets	7. UCITS and other investment funds
	8. Other bonds and loans listed on a stock exchange in countries within Zone A
	9. Holdings listed on a public stock exchange in countries within Zone A
	10. Other property and property-backed loans
No more than 20% of the assets	11. Unlisted holdings, including holdings traded on an authorised marketplace or another regulated markets, as well as other loans and securities not covered in the other asset categories
No more than 10% of the assets	12. Holdings and other securities listed on a stock exchange in countries outside Zone A
	13. Other loans and securities which are not traded on an authorised marketplace or a regulated market
No more than 2% of the assets	Loans under point 11

Note: [1] Definition of Zone A: EU Member States, other countries with full membership of the OECD, and other countries that have entered into special loan agreements with the IMF, and are affiliated with the General Arrangements to Borrow (GAB). Any country that restructures its foreign national debt due to inability to pay is excluded from Zone A for a period of five years.

Asset allocation

Table A2.11 below shows the asset allocation of the ATP. At the end of 2005, over 70% of the portfolio was invested in government and corporate bonds. The government bond portfolio is invested predominantly abroad (in Europe and the USA). The corporate bond and equity portfolios are invested half in Denmark and half abroad.

Table A2.11 ATP asset allocation by location, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	2.9	17.4	11.2	7.5	**39.0**
EEA	21.1	12.4	7.0	0.0	**40.4**
USA	6.9	5.8	1.8	0.0	**14.4**
Rest of the world	1.3	2.5	2.4	0.0	**6.2**
Total	**32.2**	**38.0**	**22.3**	**7.5**	**100.0**

Note: Figures do not sum due to rounding.
Source: ATP.

A2.7 Estonia

A2.7.1 Overview of pension system

The Estonian pension system was reformed over the period 1998–2002. The bulk of the system is represented by the First Pillar, which comprises a PAYG scheme (state pension insurance system), complemented by statutory funded private schemes (mandatory pension funds). The PAYG scheme was reformed in 1999, when pension benefits were linked to contributions made over the working life.

The mandatory pension funds were introduced in 2002 (Pillar 1 bis). Employers contribute 16% of an employee's salary to the PAYG scheme and another 4% to the mandatory pension funds. Employees contribute 2% of their salary to mandatory pension funds. There is no demographic reserve fund within the First Pillar.

Individual supplementary funded pensions (Third Pillar), introduced in 1998, comprise voluntary pension funds and insurance schemes. Supplementary pension schemes are offered through voluntary pension funds and life insurance companies. The state encourages participation through the use of tax incentives. At the end of 2005, the net assets of voluntary pension funds were around 10% of those of mandatory pension funds (€28.9m and €297.5m, respectively).

A2.7.2 Relevant schemes

The analysis focuses on mandatory pension funds, which are funded schemes that partly substitute the social security schemes, and are not covered by the IORP Directive.

A2.7.3 Description of mandatory pension funds

Structure and size of funds

Participation in the funds is mandatory for all workers born after 1983 and all new labour market entrants. Workers born before 1983 can choose whether to participate.

Each member has an individual account. Benefits are calculated according to a DC structure. On retirement, scheme members must use the total value of the mandatory pension fund units to purchase a life annuity from a life insurance company. Benefits are paid when the retirement age, according to the PAYG social security scheme, is reached (63 years for men, 59½ for women).

There are 15 mandatory pension funds, managed by five providers. Pension management companies can establish several funds, but must offer at least one conservative fund (which

invests in fixed-income securities only). There are three basic types of fund, classified according to their investment strategy: conservative (0% invested in equity); balanced (up to 25% in equity); and aggressive (up to 50% in equity). Members can change funds once a year.

Members failing to make an explicit choice about which mandatory pension fund they wish to join are assigned to a fund by lottery.

At the end of 2005, the net assets of mandatory pension funds were EEK4,655m (€297.5m), an 87% increase compared with the end of 2004.

Table A2.12 Net asset value of mandatory pension funds (€m)

2002	2003	2004	2005
11.0	63.5	158.8	297.5

Source: Finantsinspektsioon.

Governance arrangements and supervision

The legal structure of Estonian mandatory pension funds is similar to that of other statutory funded schemes introduced in the new Member States. The employees are the legal owners of the funds, which are managed by private financial institutions. The assets of a mandatory pension fund must be kept separate from those of the pension company and from the assets of other funds under its management. Fund assets must be kept by a custodian.

Finantsinspektsioon, the supervisory authority for financial service providers, including pension management companies, can revoke the operating licence of a pension management company, issue orders and undertake on-site inspections.

The Estonian Register of Securities opens pension accounts for every mandatory pension fund member. The Registrar receives the contributions and purchases units of the respective mandatory pension funds on behalf of the members.

A Guarantee Fund compensates mandatory pension fund members for any losses due to violations of legal requirements, fraud or mismanagement that cannot be covered by the assets of pension management companies.

The Investment Funds Act 2004[35] regulates the activities of pension fund management companies and pension funds (establishment, investment restrictions, reporting and supervision). The Funded Pensions Act 2004[36] regulates the coverage, contributions and benefits of mandatory pension funds.[37] Other relevant Acts are the Guarantee Fund Act 2002 and the Estonian Central Register of Securities Act 2000.

Investment restrictions

Mandatory pension funds are permitted to invest a maximum of 30% of their assets in securities issued in non-EU or non-OECD states. This provision represents the main restriction to cross-border investments. No restriction applies to investments within the EU.

Investment restrictions are specified in Articles 269–75 of the Investment Funds Act 2004, see Table A2.13 below.

[35] Entered into force on April 14th 2004 (RT 2 I 2004, 37, 252).

[36] Entered into force on April 14th 2004 (RT 2 I 2004, 36, 251).

[37] Previous forms of both Acts were passed in 2001 (Funded Pensions Act) and 1997 (Investment Funds Act).

Mandatory pension funds are allowed to use derivates (Art. 274). There is no minimum guaranteed return.

Table A2.13 Investment restrictions for Estonian mandatory pension funds (%)

Asset type	Limit (maximum)
Securities issued in non-EU or non-OECD states (Art. 257 (4))	30
Equity or investment funds invested in equity (Art. 271 (1))	50
Securities issued by companies of the same group (Art. 258 (3))	20
in a single investment fund (Art. 273 (3))	10
Investment funds of the pension management company (Art. 273 (4))	10
Investment funds of companies belonging to the same group as the pension management company (Art. 273 (5)).	50
Securities issued and guaranteed by the Republic of Estonia, an EU Member State, or another state issuing securities with equal or lower risk (Art. 272 (2))	35
Deposits of credit institutions registered in Estonia or another state specified in the pension fund rules (Art. 270 (1))	35
Deposits of a single credit institution or credit institutions belonging to the same group (Art. 270 (2))	5
Fixed assets located in countries specified in the pension fund rules (Art. 275 (1))	10

Source: Investment Funds Act 2004.

Asset allocation

In 2005, over 80% of the portfolio of Estonian mandatory pension funds was invested abroad. Investments in foreign equity (including equity funds) and foreign bonds represented 28% and 18% of their assets, respectively. The total allocation to publicly listed equity was 32% of the portfolio; the total allocation to bonds was 57%.

Table A2.14 Asset allocation of Estonian mandatory pension funds, 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	0	5	3	6	15
EEA	24	13	25	9	70
USA	0	0	4	0	4
Rest of the world	2	3	5	0	11
Total	**26**	**21**	**37**	**15**	**100**

Source: Finantsinspektsioon.

Table A2.15 shows the performance of Estonian mandatory pension funds over 2003–06. Progressive funds, with a high allocation to equity, have generated the highest performance, both in 2006 (9.6% on average) and from 2003 to 2006 (12.4%).

Table A2.15 Average returns of Estonian mandatory pension funds 2003–06

	Number of funds	2003–06 (%)	2006 (%)
Conservative	6	3.2	1.6
Balanced	3	6.9	5.3
Progressive	6	12.4	9.6
Total/average	**15**	**7.5**	**5.5**

Note: Figures do not sum due to rounding.
Source: http://www.pensionikeskus.ee/?id=631.

A2.8 Finland

A2.8.1 Overview of pension system

The Finnish First Pillar comprises a residence-based national pension scheme and several employment-based earnings-related schemes. The latter are based on different pension Acts covering several sectors. The main schemes are the TEL, which covers the majority of private sector employees; the KuEL, which covers local government employees; and the VEL, which covers state employees (see Table A2.16).[38]

Table A2.16 Number of employees who have earned their pensions under different employee pensions acts, 2003

TEL Employees Pensions Act	1,199,000
KuEL Local Government Employees Pensions Act	478,000
VEL State Employees Pensions Act	183,000
YEL Self-Employed Persons Pensions Act	168,000
LEL Temporary Employees Pensions Act	98,000
MYEL Farmers Pensions Act	94,000
TaEL Freelance Employees Pensions Act	57,000
MEL Seamen's Pensions Act	7,000

Source: Finnish Centre for Pensions.

The national pension guarantees a minimum income, but the main element of the Finnish pensions system is the earnings-related scheme, which has both a PAYG and a funded component. For private sector employees, private pensions providers manage both the funded and the PAYG components of the earnings-related scheme. For public sector employees, the schemes are managed by public institutions. Funding for TEL began in the 1962, while that for the public sector pensions began only in 1988 (for the local government scheme) and 1990 (for the central government scheme).

At the end of 2005, the funded component of the Finnish First Pillar (including public sector schemes) was €104 billion (corresponding to around 66% of GDP). Private sector schemes represented 72% of the assets (managed by pension insurance companies, pension funds and pension foundations); public sector institutions managed the remaining 28%.

The earnings-related scheme covers all forms of employment, and the target level for pension benefits is high—60% of previous earnings. Moreover, there is no upper limit for

[38] At the beginning of 2007, the TEL, LEL and TaEL schemes were united under one single scheme (TyEL).

contributions to the scheme, limiting the need for Second and Third Pillar schemes to supplement the pension income. Voluntary occupational schemes cover only 15% of the workforce. There are three funding methods—pension funds, pension foundations and insured schemes—all of which are covered by the IORP or Life Insurance Directives. Approximately 20% of the workforce has invested in the Third Pillar pension plans, but the assets per capita are relatively small (corresponding in total to around 5% of GDP).

A2.8.2 Relevant schemes

The study focuses on the funded element of the three main earnings-related schemes: TEL (private sector employees), KuEL (local government employees) and VEL (central government employees). Together, these three represent over 98% of the total assets of the earnings-related schemes. The funded element of the earnings-related pensions represents a reserve fund that operates in parallel with the PAYG component.

The funded components of the earnings-related schemes (both for the private and public sector) are classified in this study as reserve funds because they are not separate schemes with independent pension rights from the PAYG component.

Pillar 2 schemes are not included because they are covered by either the IORP Directive or Life Insurance Directive.

A2.8.3 Description of the TEL

Structure and size of funds

Established in 1962, TEL covers most private sector employees, with a few exceptions (self-employed, seamen, farmers, and short-term workers). Participation is mandatory for all employees.

TEL is a DB scheme, with benefits based on annual earnings and the accrual rate. The accrual rate is 1.5% per annum for workers aged between 18 and 53. It increases to 1.9% per annum after the age of 53, and to 4.5% after the age of 63.

Members have individual accounts, but the choice of pension provider is made by the employer. There are three types of pension provider: pension insurance companies, company pension foundations, and industry-wide pension funds. Pension insurance companies, which cover about 85% of the workers, are specialised institutions that are not allowed to undertake any other form of business. Their structure is more comparable to that of a multi-employer pension fund than to an insurance company.

TEL is financed by both employer and employee contributions, although until 1993, it was financed by employers only. Employer contributions are 16.8% of wages, with employees contributing 4.6%. However, for large firms, the contribution rate varies depending on the age of the employee, and the cost of disability and unemployment pensions granted by the employer.

The contributions are used to finance PAYG and funded components. In aggregate, around three-quarters of the benefits are financed on a PAYG basis, and around one-quarter by the funded element.

At the end of 2005, the total assets of the TEL were €66.6 billion.

Governance arrangements and supervision

Members have no influence on who manages the funds and how they are invested. Since the schemes are DB, investment decisions have no impact on the pension benefits.

In 2004, there were 54 private sector statutory pension providers: six insurance companies, 36 company pension funds, eight industry-wide funds and four specialised funds.

Pension providers are regulated by the Insurance Supervisory Authority, which is in turn regulated by the Ministry of Social Affairs and Health. The Finnish Centre for Pensions (ETK) functions as a clearing house between the providers in the First Pillar pension system.

If a pension provider goes into bankruptcy, all other providers are collectively liable for the pension benefits.

Pension insurance companies are covered by the Insurance Company Act and a Decree on how assets can cover liabilities. There are special Acts relating to how assets can cover liabilities in industry-wide pension funds and company pension funds. In addition, the Insurance Supervisory Authority has specified some detailed binding regulations on these issues.

Investment restrictions

Foreign investments are restricted by the following provisions.

– No more than 20% of the liabilities can be covered with assets in currencies other than the euro. The fund may use protective hedging, but has to be linked with a specific investment.

– Up to 10% of the liabilities can be invested outside the EEA. In addition, pension insurance companies can invest indirectly outside the EEA, by using mutual funds that reside in the EEA.

Moreover, there are limits on the proportion of equity (maximum 50%) and corporate and other non-government bonds (maximum 50%).

The Insurance Supervisory Authority also issues a number of regulations.

Asset allocation

Table A2.17 shows the aggregate asset allocation of the three main schemes (TEL, KuEL and VEL). Domestic investments represent only one-third of the overall portfolio. The government bond portfolio is concentrated in the Eurozone. The corporate bond portfolio and the equity portfolio have a higher proportion of non-euro investments.

The shares of equity and of all types of foreign investment have risen since 1997, when the regulation on solvency margins was relaxed to make funds more risk-tolerant.

Table A2.17 Asset allocation of TEL, KuEL and VEL by location, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other (incl. cash)	Total
Domestic	4	5	8	17	**34**
Euro area (excl. Finland)	22	4	5	12	**44**
Rest of the world (non-euro area)	1	3	9	9	**22**
Total	**28**	**12**	**22**	**38**	**100**

Note: Figures do not sum due to rounding.
Source: TELA Finnish Pension Alliance.

Over the period 2001–05, TEL pension insurance companies generated an average investment income of 6.3%. Equities generated the highest income (8.3%). Public sector pension institutions such as VEL and KuEL generated a slightly lower result over the same period (5.8%)—see Table A2.18.

Table A2.18 Average investment income 2001–05 (%)

	Fixed income	Equities	Real estate	Total
Pension insurance companies (TEL)	5.7	8.2	5.9	**6.3**
Public sector pension institutions (KuEL, VEL)	5.7	5.8	6.7	**5.8**

Note: Figures do not sum due to rounding.
Source: TELA Finnish Pension Alliance.

A2.8.4 Description of the state pension scheme and State Pension Fund

Structure and size of funds

The State Pension Fund is a buffer fund for the state pension scheme (VEL). As such, it is not a pension scheme in its own right and has no members. Responsibility for paying future pension liabilities remains with the state. The state's pension liability in 2005 was €57.6 billion, of which the fund covered €8.2 billion.

The state pension scheme covers state employees and other groups, the largest of which comprises schoolteachers who entered service before 1999. The scheme also covers some employees of private state-aided institutions.

The Treasury, which operates state pensions, determines the pension contribution percentages for state institutions and collects pension contributions for the State Pension Fund. The State Pension Fund Act 2004 sets a target level of assets at 25% of the state's full pension liability. At the end of 2005, the funding level was 14%. The Act also sets the annual transfer from the State Pension Fund to the state budget at 40% of annual pension expenditure. In 2005 the sum transferred was €1.2 billion.

At the end of 2005, the State Pension Fund had an investment portfolio of €8.2 billion, indicating significant growth since 2000, when it had assets of around €3 billion.

Governance arrangements and supervision

The State Pension Fund is an independent state agency. Since 2000 its employees have been employed by the Fund, rather than the state.

The Ministry of Finance appoints the board of directors for three years, and can dismiss its members. The board determines the Fund's investment principles and prepares an investment plan. It also oversees adherence to these principles and to investment restrictions and the implementation of the investment plan. Official external supervision is undertaken by the Insurance Supervisory Authority.

The objectives and functions of the State Pension Fund are set out in the State Pension Fund Act 2004.

Investment restrictions

There are no investment restrictions for public sector schemes (VEL and KuEL).

Asset allocation

The State Pension Fund was started as a 'fund for accounting purposes', with its assets managed by the Treasury. In 1995 it began to invest actively in fixed income, and in equities in 2000.

In 2005, 60% of the State Pension Fund was invested in fixed income and 40% in equity. The fixed-income portfolio is invested mainly in bonds issued by governments within the European Monetary Union. In 2004, 8% of the assets were invested in Finnish government bonds. The equity portfolio is distributed evenly between Nordic countries, other European countries and non-European countries.

A2.8.5 Description of funded element for local government pensions (KuEL)

The Local Government Pensions Institution is a statutory pensions institution responsible for the pension cover of municipal employees. It is an institution under public law, providing pension coverage in accordance with the Local Government Pensions Act (KuEL).

Launched in 1988, the fund is expected to grow at a rate of €1–€1.2 billion annually. It is not tied to individual pension liabilities, but rather forms a buffer used at the sole discretion of the Institution's Council.

By law, a majority of those employed by joint municipal boards and local authorities come under the local government pension scheme. Limited-liability companies and associations owned by local government bodies can also provide their employees with pension coverage in accordance with KuEL. The number of member organisations in the Institution is 930.

Local government pensions are financed with contributions from both employers and employees. In 2005, the average contribution rate was 28.3% of wages, of which the employee's contribution is 4.6%. The wages-based employer contribution is 17.1%, with the remainder made up of a pension-expenditure-based contribution and additional employer contributions for unemployment and disability pensions.

Financial planning and investing activities are supervised by the Insurance Supervision Authority.

Investment restrictions

There are no investment restrictions for the public sector schemes (VEL and KuEL).

A2.9 France

A2.9.1 Overview of pension system

The First Pillar of the French pension system comprises a compulsory social security system providing basic pension benefits. It is essentially financed on a PAYG basis, but to cushion the high burden on the pension system forecast for the period 2020–40, a demographic reserve fund (Fonds de réserves pour les retraites, FRR) was set up in 1999. The capital stock of the FRR reached €26.6 billion at the end of 2005, and is expected to reach €150 billion by 2020.

The basic state pensions available to private sector employees are supplemented by pensions paid out by compulsory complementary occupational schemes, administered on a parity basis by the social partners.[39] The compulsory schemes in the private sector are known as the Agirc (for executives) and Arrco (for non-executives), although they merged in 2003. The schemes offer DB plans that are essentially financed on a PAYG basis, based on

[39] Public sector employees and the self-employed have their own pension schemes.

contributions from both the employer and the employee. For the Arrco scheme, the contribution is 7.5% of the salary for employees earning less than €29,712, and 17.5% for those earning more. For the Agirc scheme, the contribution increases to 20% of salary. Although funded on a PAYG basis, Agirc and Arrco have technical reserves to facilitate the operation of the system, with combined funds amounting to €50 billion in 2005.

Since retirement income comes primarily from compulsory systems, voluntary occupational schemes that provide supplementary pensions in the Second Pillar still form only a small part of the market. There are, however, company savings plans set up by employers to allow tax-efficient savings for their employees. In particular, the 2004 reform of the French pension system introduced a new long-term savings plan—the Plan d'Epargne Retraite Collectif (PERCO)—offering employees the opportunity to invest in mutual funds and shares until retirement, with optional supplementary contributions from employers. PERCOs, like other supplementary occupational schemes, are covered by the IORP Directive.

The 2004 reform also introduced a new pension product in the Third Pillar—the Plan d'Epargne Retraite Personnel (PERP), which is an individual retirement savings plan, managed by insurers and banks.

A2.9.2 Relevant schemes

The following description focuses on the demographic reserve fund, FRR, in the First Pillar, as well as the technical reserve funds that support the compulsory occupational schemes in the private sector, Agirc–Arrco.

A2.9.3 Description of Fonds de réserve pour les retraites

Structure and size of funds

The FRR was enacted by legislation in 2001 (Law No. 2001-624 of July 17th 2001 as amended) to help meet the long-term financing needs of France's general PAYG retirement system. It was set up to manage the sums that are allocated to it, setting them aside in a trust until 2020, after which the funds will be used to contribute to basic pension payments. Contributions to the FRR come from various sources, including the proceeds from the sale of state-owned assets.

The FRR effectively began its operations in 2003, and by the end of that year, had accumulated funds of €16.45 billion. By the end of 2005, it had further increased to €26.65 billion (see Table A2.19).

Table A2.19 Accumulated funds of the FRR (€ billion)

2003	2004	2005
16.45	19.26	26.65

Source: FRR annual reports.

Governance arrangements

The FRR is a publicly owned, state-funded administrative agency, operating under the dual auspices of the minister in charge of social security and the minister in charge of the economy and budget. It has a Supervisory Board, including actual legislators, labour/management stakeholders, representatives of the ministries, and an Executive Board responsible for directing the FRR and ensuring its smooth operation. The Executive Board executes the FRR's investment policy guidelines, ensuring compliance, and reports back to the Supervisory Board.

The FRR is exclusively managed by external fund managers, selected by the Executive Board. In its first year of operation, an international request for proposals was rolled out, and 38 mandates were awarded to fund management firms.

Investment restrictions

The amended Decree No. 2001-1214 of December 19th 2001 sets out the investment constraints to which the FRR is subject. In terms of constraints on international investment, the FRR cannot:

– invest more than 25% of its assets in stock or securities with a claim to the equity capital of companies with headquarters outside the EEA, or not traded on a regulated market of a party to the EEA, or on a regularly operating market of a third country that is an OECD member. The jurisdictional authorities of this third country must have specified the conditions of operation, access, and admission to trading, and ensure compliance with disclosure and transparency requirements;
– take foreign currency exposure of more than 20% of total assets.

As regards other investment restrictions, the 2001 Decree specifies that the FRR cannot invest more than 3% in shares or equity issued by a single issuer, and 5% in other financial instruments issued by a single issuer (with some exceptions).

The strategic asset allocation, which is proposed by the Executive Board and approved by the Supervisory Board, is set out in investment guidelines. The first set of guidelines, issued on April 2nd 2003, sets out the allocation among the principal asset classes as follows:

– 55% in equity—38% within the Eurozone and 17% outside;
– 46% in bonds—38% within the Eurozone and 8% outside.

In May 2006, the FRR investment guidelines were reviewed, and the Supervisory Board approved a new strategic target for the FRR's investment policy. In particular, the Board expressed the desire to increase portfolio diversification in order to enhance returns while diminishing the global risk. It reclassified and expanded the list of assets in which the FRR may invest beyond equities and bonds, to encompass private equity, real estate, infrastructure financing and commodity indices (up to a total of 10%). In addition, the Board decided to increase the diversification of the geographic structure of investments in both equities and bonds. This will be done by 'reducing the relative weight of the Euro Areas, which *was* overweighed in the Fund's asset portfolio, and by enlarging the investment universe to include new economies in transition' (FRR Supervisory Board Resolution, May 2006). Hence, the strategic allocation for 2006 includes equities and bonds from international (non-Eurozone) issuers up to around 36% of total assets.

Asset allocation

Table A2.20 reports the actual asset allocation of the FRR. At the end of 2005, more than half of the €26.6 billion was invested in equities. The only geographical breakdown available refers to Eurozone and non-Eurozone investments—around one-third of the equity portfolio is invested outside the Eurozone; the non-Eurozone share of the fixed-income portfolio is somewhat lower.

Table A2.20 Asset allocation of FRR by location, end 2005 (%)

	Listed equity	Fixed income securities	Monetary instruments	Total
Eurozone	39.2	13.6	–	**52.8**
Non-Eurozone	17.2	3	–	**20.2**
Total	**56.4**	**16.6**	**27**	**100.0**

Source: FRR Annual Report (2005).

Since mid-2004 when the first mandates were invested, and up until the end of 2005, the FRR's global net performance was 15.7%; in 2005, returns amounted to 12.4% on the total portfolio, including monetary instruments, with returns on marketable securities amounting to 19.2%.

A2.9.4 Description of Agirc–Arrco

Structure and size of funds

Agirc–Arrco was established in 2003 by merging the two schemes, Agirc and Arrco. Created in 1961, Arrco covers salaried workers, while the Agirc scheme, created in 1972, covers managers. Participation in the schemes is compulsory, and they are financed through a PAYG system. The contribution rate to the Arrco scheme is 7.5% of salary for employees earning below €29,712 per year, rising to 17.5% for employees with a higher salary. Under the Agirc scheme, contributions reach 20%. The employer contributes 60% of the amount, while the employee pays for 40%.

While offering defined benefits that are funded on a PAYG basis, Agirc–Arrco is supported by technical reserve funds that provide working capital to support the operations of the schemes, but that are also intended to provide complementary financing in the long term in order to smooth fluctuations between contributions and defined-retirement benefits. Table A2.21 shows that, by the end of 2005, Agirc had accumulated reserves of €11 billion, while those of Arrco were €38 billion.

Table A2.21 Amount of technical reserves of Agirc–Arrco (€m)

	Agirc	Arrco
2003	7,282	26,044
2004	9,153	29,276
2005	11,112	38,184

Source: Questionnaire completed by Agirc–Arrco.

Governance arrangements and supervision

Agirc and Arrco are schemes set up under private law, although they are not-for-profit schemes. They are largely decentralised between different participating institutions, administered on a parity basis by the social partners (major employer organisations and employee representatives). Although decentralised, there is a central administration board and a central finance directorate that coordinates and monitors the institutions' activities and issues guidelines regarding the investment of the reserves.

While there is no legislation governing Agirc–Arroc, the social partners sign binding agreements. There are also rules that set out the management and control of the technical reserves, including investment regulations ('reglement financier').

The rules allow the technical reserves to be managed either internally by the institutions (or the groups to which the institutions belong), or externally through asset management mandates. By the end of 2005, 62.1% of total assets were managed externally.

Investment restrictions

The reglement financier sets out how the technical reserves should be managed and specifies binding limits for the investment of the accumulated funds. The main limits on cross-border investment include the following:

– investment is restricted to securities issued within the OECD area;
– investment in equities outside the Eurozone cannot exceed 10% of the total portfolio;
– investment in debt instruments outside the Eurozone cannot exceed 5% of the total portfolio.

The financial regulation sets out further limits that restrict investment in different asset classes. For example, total equity investment cannot exceed 40%, with at least 60% to be invested in debt instruments. The financial regulation also defines the specific types of instrument in which the technical reserves can be invested.

Asset allocation

Table A2.22 presents the allocation of the technical reserves to different asset classes. As at 2005, equity investments were 33% of the total invested reserves for Agirc, and 31% for Arrco.

Table A2.22 Asset allocation by asset class, end 2005 (%)

Type of instrument	Agirc	Arrco
Cash, deposits or similar	1	0
Fixed income securities	66	69
Equity	33	31
Total	**100**	**100**

Source: Questionnaire completed by Agirc–Arrco.

No detailed geographic breakdown was available, but Table A2.23 reports how the combined Agirc–Arrco reserves are invested between instruments issued in countries in the Eurozone and those outside.

Table A2.23 Asset allocation by geography, end 2005 (%)

	Fixed income	Equity	Total
Eurozone	66.5	27	**93.5**
Non-Eurozone	1.5	5	**6.5**
Total	**68.0**	**32**	**100.0**

Source: Questionnaire completed by Agirc–Arrco.

A2.10 Germany

A2.10.1 Overview of pension system

Germany has a comprehensive system of statutory social insurance, which is funded on a PAYG basis. No reserve fund is being built up to finance future pension obligations, although there is a marginal reserve to smooth out temporary surpluses and deficits.

Due to the still-generous First Pillar pension provision, supplementary occupational and private schemes have been of little significance in terms of overall pension provision. In 2005, around 85% of total benefits stemmed from social insurance, 5% from occupational schemes, and 10% from private schemes.[40] However, the pension reform in 2001 ('Riester Reform'), followed by the 'Rürup Reform' of 2004, has started to revitalise growth in Second and Third Pillar schemes, in particular by introducing new tax incentives. Occupational and private schemes are expected to grow in order to cushion the gradual reduction of benefits provided by the First Pillar.

There are now five funding vehicles for occupational schemes.

– **Book reserves**. Book-reserved accruals remain the most popular funding vehicle in Germany, although other schemes are gaining significance, especially since the 2001 reform. Book reserves are not covered by the IORP Directive. No investment regulations apply, and there is no tax regulation that requires book reserves to be backed by earmarked pension assets. While backed through the general assets of the company in the past, employers are increasingly setting aside specific assets for pension purposes and investing them externally. By segregating pension assets and transferring them to a trustee, pension liabilities are removed from companies' balance sheets, in accordance with international accounting principles. Book-reserved pension liabilities can also be reinsured with a private insurer, in which case the value of the policy is shown as a company asset in the balance sheet.

– **Support funds**. These (Unterstützungskassen) constitute the oldest form of occupational pension provision in Germany. They are separate legal entities set up by a single employer, or as group support funds used by several companies. Employees have no legal claim against the support fund—instead, they have legal claim directly against the sponsoring employer. Support funds are not covered by the IORP Directive. There are no restrictions on the investment of the funds. Favourable tax treatments apply for support funds that cover their pension obligations with insurance contracts.

– **Pensionskassen**. These special insurance companies serve to meet the pension obligations of one or several employers. Pensionskassen qualify as a tax-advantaged type of scheme under the 2001 reform, and have since seen increased membership. Subject to the supervision of the Bundesanstalt für Finanzdienstleistungsaufsicht (BAFin), Pensionskassen must meet most of the requirements laid down in the Insurance Supervisory Act 1999, including stringent investment regulations. Pensionskassen are covered by the IORP Directive, and regulation has been introduced to amend the Act accordingly.

– **Direct insurance schemes**. Employers can take out life insurance policies on behalf of their employees and pay contributions into the contract. Employees have a direct entitlement against the insurance company regarding the benefits accrued under the contract. Like Pensionskassen, they are subject to supervision by BAFin and are regulated under the provisions of the Insurance Supervision Act.

[40] ABA (2005), 'Mit der Betriebsrente in eine sichere Zukunft', Arbeitsgemeinschaft für betriebliche Altersversorgung e.V. (ABA).

– **Pension funds**. Since the 2001 reform, these can be set up by a single company, a financial services provider, or an industry-wide pension scheme sponsored by the employers' association and the unions. Supervised by BAFin, pension funds are subject to less-stringent regulations, particularly on asset investments. Like Pensionskassen, pension funds are covered by the IORP Directive.

A2.10.2 Relevant schemes

Germany is not considered in the analysis since there are no pension schemes that fall within the scope of this study. The First Pillar is financed on a PAYG basis rather than funded. The occupational schemes are funded, but are covered by the IORP or the Life Directives (Pensionskassen, direct insurance schemes and pension funds), or are not subject to any investment regulations that could be analysed as part of this study (book reserves and support funds).

A2.11 Greece

A2.11.2 Overview of pension system

The Greek First Pillar is exclusively of the DB type, financed on a PAYG basis. It consists of around 170 schemes depending on occupation. The most important fund for private sector employees is IKA. With a contribution rate of 20% of gross wages, the fund provides generous benefits (at a replacement rate of around 80–100%). Other First Pillar schemes are TEBE, which provides insurance for the self-employed, and OGA, providing social insurance for farmers.

For the public sector, the schemes are divided into tiers, and all are PAYG and DB. The first tier, also known as the Primary Pension Funds, offers a replacement rate of around 80%. The second, the Auxiliary Funds, comprises complementary funds to add more coverage to the first tier. At the beginning of 2000, they provided a replacement rate of around 20%. The third tier is represented by the Welfare Funds, which consists primarily of lump-sum benefits.

Several reforms of social security have aimed to restructure the traditionally fragmented system and to secure the financing of the social security system. Although financed on a PAYG basis, any surplus funds of the above state pension funds have traditionally been invested—normally in Greek state securities—by the Bank of Greece as part of the Common Capital of public law entities and insurance funds. These funds appear to constitute a pool of funds of state-related entities, rather than a particular reserve fund designated for pensions. Put differently, no special reserve fund has been created thus far to assist the funding of pensions in the longer term.

Since 1999, insurance funds have been permitted to invest part of their surplus assets separately (23% as of 2001). This part may be invested in securities and immovable property according to Article 40 of Law 2679/1999, which means that investment is in principle limited to Greek assets: a) to immovable property; b) to shares and other securities of companies listed in the Athens Stock exchange; c) to shares of investment funds which invest their assets in fixed income securities and in shares listed on the Athens Stock exchange; d) to shares of unit trusts of immovable property; and e) to future contracts on the Athens Derivatives Market Products Exchange.

The financial problems of the First Pillar system led the government to introduce Second Pillar occupational pension funds in 2002. The legislation established that the new pension funds must be set up as separate legal entities, whether a single-employer scheme or a profession-wide pension fund. Occupational schemes are covered by the IORP Directive.

Companies can also offer their employees participation in additional Third Pillar pension schemes, based on group insurance policies. Most of these are based on the DC approach,

and participation is entirely voluntary. In 2003, total contributions paid to all insurance companies with respect to group insurance policies were around €232m. Individuals can also take out insurance policies on an entirely private basis.

A2.11.3 Relevant schemes

The Greek First Pillar is financed on a PAYG basis and has no reserve fund or statutory funded schemes. Second Pillar schemes have been introduced only recently and are covered by the IORP Directive. Hence, no schemes fall within the scope of this study.

A2.12 Hungary

A2.12.1 Overview of pension system

In 1998, Hungary was the first country in central eastern Europe to introduce a system of statutory funded private pension schemes to support the PAYG-financed social security system. As a result, the social security system comprises a publicly managed, earnings-related PAYG scheme and fully funded, DC mandatory pension funds. Hungarian mandatory pension funds are self-governed, not-for-profit institutions.

In 2004, total contributions to the pension system amounted to 26.5% of wages, of which 18.5% was paid into the PAYG scheme and 8.0% to the mandatory pension funds (see Table A2.24). Between 2007 and 2009, the rate of contribution to the PAYG scheme will be reduced by 2 percentage points, while the contribution to mandatory pension funds will remain unchanged.

Table A2.24 Contribution rates to the First Pillar for participants in the mandatory pension funds (as % of salary)

	Employer	Employee	Total
PAYG	18.0	0.5	18.5
Mandatory pension funds	–	8.0	8.0
Total	**18.0**	**8.5**	**26.5**

Source: Ministry of Finance.

At present, there are no occupational pension schemes in Hungary that fall under the IORP Directive. However, there are voluntary pension funds, introduced in 1994, which offer individual retirement provision. Employers can pay contributions on behalf of their employees and quite frequently do so.

Investments of pension funds (both mandatory and voluntary) represented 6.8% of GDP in 2004. In contrast to other countries that have introduced mandatory pension funds, in Hungary voluntary pension funds represent a substantial part of the market—while mandatory pension funds cover 2.4m members (total asset €3 billion), voluntary pension funds cover 1.25m (total assets €2 billion).

A2.12.2 Relevant schemes

Mandatory pension funds fall within the scope of this study as they constitute a funded element of the social security system and are not covered by the IORP Directive.

A2.12.3 Mandatory pension funds

Structure and size of funds

Introduced by the Act on Private Pensions and Private Pension Funds 1997 (Act LXXXII of 1997), the first mandatory pension funds were established in 1998, and by 2005 there were 18 such funds.

Mandatory pension funds cover the employed and self-employed, as well as recipients of unemployment and childcare benefits. All new labour market entrants are automatically covered by the scheme. For those who had already acquired pension rights in 1998, participation was voluntary (around 50% of the employees joined). Currently, around 62% of the labour force are members of mandatory pension funds.

Mandatory pension funds are DC schemes, with members accumulating contributions (8% of gross wages) in individual accounts in funds of their choice. On retirement, the account balance can be used to buy an annuity from an insurance company or (with restrictive conditions) for a lump-sum payment.

Membership in the mandatory pension funds reduces an individual's entitlements to benefits paid by the state PAYG system by 25%, with the forgone benefits to be made up by accumulation of funds in the mandatory pension funds. Recently, employees have been given the option to leave the mandatory pension funds system and move back to the full state PAYG system, provided they join less than ten years before retirement and their benefits from the mandatory pension funds amount to less than 25% of their PAYG.

By 2005, mandatory pension funds had accumulated funds of HUF1,221 billion (€4.8 billion).

Table A2.25 Total assets of mandatory pension funds

Year	Total amount of assets (HUF billion)	Total amount of assets (€ billion)
2001	283.5	1.1
2002	413.6	1.6
2003	564.6	2.2
2004	876.1	3.5
2005	1,220.8	4.8

Source: Hungarian FSA.

Governance arrangements and supervision

Mandatory pension funds are non-profit entities, managed by their members. They can be set up by employers, chambers of commerce, professional associations, employees and employers' interest representation organisations, voluntary pension funds and the local government.

The largest mandatory pension funds belong to financial services groups, which outsource their asset management and bookkeeping activities to service providers of the same group.

Mandatory pension funds are regulated by the Hungarian Financial Supervision Authority, which oversees the functioning of the different elements of the financial markets. A Pension Guarantee Fund assures the payment of a normative (minimum) pension for mandatory pension fund members.

The establishment and management of mandatory pension funds is set out in the Act on Private Pensions and Private Pension Funds 1997.

Investment restrictions

The main investment regulations are stipulated in a governmental decree issued in 2001 (282/2001). The rules that apply to cross-border investment include the following:

- the upper limit of investments made in non-OECD countries is 20% of non-domestic assets;
- the upper limit of foreign corporate bonds is 10% of total assets;
- the upper limit of foreign municipality bonds is 10% of total assets;
- the upper limit of non-listed foreign equity is 10% of total assets;
- real estate investments can be made in Hungary or the EEA only.

Section 67 of the 1997 Act contains further investment regulations. In particular, it limits currency risk exposure by stipulating that investment in assets denominated in a currency other than that in which the liabilities are denominated should be restricted to 30%.

Other limitations refer to the asset class—investment limits include a 10% limit for securities in a single issuer and 20% for bank deposits. In addition, investment in securities of firms related to the mandatory pension fund, as well as speculative hedge deals, are not permitted.

Asset allocation

The asset allocation of Hungarian mandatory pension funds is concentrated in domestic government bonds, which represented 74% of the portfolio value at the end of 2005.

Foreign investments account for only 5% of the assets, although this may somewhat underestimate total exposure to foreign investments, as it does not include foreign assets that may underlie Hungarian mutual funds.

Table A2.26 Asset allocation of Hungarian mandatory pension funds, as at end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Equity	Other	Total
Domestic	74	7	5	8	**95**
Foreign	0	1	3	2	**5**
Total	**74**	**8**	**8**	**10**	**100**

Source: Questionnaire completed by HFSA.

A2.13 Ireland

A2.13.1 Overview of pension system

In 2001–02, the Irish Government established a demographic reserve fund (the National Pensions Reserve Fund, NPRF) and introduced a new vehicle for occupational and individual pensions (the Personal Retirement Savings Account, or PRSA).

In the First Pillar, the flat-rate, PAYG scheme (Retirement Pension and Old Age Contributory Pension) is supported by a means-tested, tax-financed pension (Old Age Non-contributory Pension). The NPRF will finance part of the state pension spending from 2025.

The contribution rate to the PAYG scheme varies depending on salary. Employee contributions vary between 0% and 6%, and employer contributions between 8.5% and 10.75%.

Second Pillar occupational pensions can be funded via three schemes.

– **Pension funds** are set up and sponsored by employers. Usually, both employer and employee contribute to financing the fund. Occupational pension funds fall within the scope of the IORP Directive.

– **Retirement Annuity Contracts** are insurance contracts that can be taken out by the self-employed and employees not covered by an occupational pension scheme. These contracts fall within the scope of the Life Insurance Directive.

– **Personal Retirement Savings Accounts** can be offered by insurance companies, banks or other approved providers. Since 2003, employers that do not already sponsor a pension fund are obliged to offer access to a group PRSA arrangement. PRSA providers are covered by the Life Insurance Directive.

Individual pension plans (Third Pillar) can be taken out through PRSAs.

A2.13.2 Relevant schemes

The study focuses on the NPRF. The Second Pillar schemes are all covered by the IORP or Life Insurance Directives.

A2.13.3 Description of National Pensions Reserve Fund

Structure and size of funds

Established in April 2001 under the National Pensions Reserve Fund Act 2000, the objective of the NPRF is, as far as possible, to meet the costs to the Irish Exchequer of social welfare pensions (First Pillar) and public service pensions to be paid from 2025 until at least 2055. The NPRF Act commits to the Fund 1% of national GNP annually from 2001 to 2055. Contributions are paid by the Ministry of Finance and financed by general taxation. On its establishment in 2001, the Fund also received the net proceeds of the flotation of the state-owned telecoms company in 1999, as well as 1% of GNP contributions for 1999 and 2000. By the end of 2005, the NPRF had accumulated assets of over €15 billion (11.4% of GNP) (see Table A2.27).

Table A2.27 Net assets of NAPF (€m)

2001	2002	2003	2004	2005
7,715	7,416	9,561	11,689	15,419

Source: NPRF Commission annual reports.

Governance arrangements and supervision

The NPRF is controlled and managed by the National Pensions Reserve Fund Commission, a body corporate consisting of seven commissioners appointed by the Minister of Finance. The Commission's functions include the determination and implementation of the Fund's investment strategy in accordance with its statutory investment mandate as set out in the National Pensions Reserve Fund Act 2000. This mandate requires the Fund to operate on a commercial basis so as to secure the best possible financial return subject to prudent risk management. The Commission sets the Fund's asset allocation strategy and the parameters within which Fund assets may be invested, and reviews Fund performance and strategy implementation.

The National Treasury Management Agency is the statutory manager of the Fund for the period to April 2011, and the Commission is required to perform its functions through the manager. Without prejudice to its own responsibility for its function, the Commission may also delegate to the manager as many of its functions as it considers appropriate.

The assets of the NPRF are managed according to a 'buy-not-make' approach; the majority of the Fund's assets are invested by third-party investment managers, rather than by the National Treasury Management Agency. The Agency's role includes advising the Commission on policy issues; implementing the Fund's investment strategy; selection and performance review of investment managers and investment vehicles; development and operation of Fund controls; preparation of the Fund's financial statements; and monitoring of the Fund's global custodian.

The NPRF and the Commission are governed by the National Pensions Reserve Fund Act 2000 (Act 33 of 2000).

Investment restrictions

The NPRF Act states that the fund's assets should be invested 'so as to secure the optimal total financial return, as both capital and income.'[41] There are no explicit restrictions, with the exception of a prohibition on investment in Irish government securities.

Asset allocation

At the end of 2005, the portfolio of the NPRF mainly comprised publicly listed equities, which represented 79% of the assets. The allocation to investments in Ireland is 8.4%, mostly invested in cash (the large cash holding is primarily due to the Fund's decision not to commit additional cash to bonds at the very low yields that prevailed through 2005). The 1% allocated to Irish equity roughly reflects the relative international weight of its stock market: the Fund does not make a specific allocation to Irish equities. The core of the equity portfolio comprises investments in Europe and the USA (44% and 23%, respectively). Government bond investments account for 12% of the portfolio and are all concentrated in the Eurozone.

Table A2.28 NPRF asset allocation, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	0	0	1.0	7.4[1]	8.4
EEA	11.7	0	43.5	0.5	55.7
USA	0	0	23.0	1.6	24.6
Rest of the world	0	0	11.2	0.1	11.3
Total	**11.7**	**0**	**78.7**	**9.6**	**100.0**

Note: [1] Cash.
Source: NPRF.

Over the period from 2001 to 2005, the NPRF generated an annualised return of 5.3%. In 2005, the NPRF achieved a return of 19.6%—the highest since its inception (see Table A2.29). Performance in 2005 was driven by the fund's large allocation to equities, which returned 26.9%.

Table A2.29 NPRF returns 2001–05 (%)

	2001	2002	2003	2004	2005
Returns	3.3	–16.1	12.8	9.3	19.6

Source: NPRF annual reports.

[41] National Pensions Reserve Fund Act 2000, Section 19 (1).

A2.14 Italy

A2.14.1 Overview of pension system

The Italian pension system is composed of a large First Pillar and small, but growing, Second and Third Pillars.

The First Pillar is exclusively PAYG, divided into several branches, including separate schemes for employees, the self-employed and civil servants. The 1995 Dini reform linked the amount of pension benefits to the contributions made, rather than salary level. The pension benefit is now calculated using a notional capital stock and the recipient's remaining life expectancy at the time of retirement. This structure is supported by means-tested social assistance pensions and by other supplements to guarantee a minimum income level beyond 65 years of age. Further reform in 2004 led to a gradual increase in the age at which an employee can draw seniority pension.

There are four types of Second Pillar scheme.

– **Termination Indemnity Payment (TFR)**. An indemnity paid by employers to employees on termination of employment. This is similar to a book reserve scheme, and, although not strictly a pension scheme (indemnity is also paid in a case of a change of employer), it represents the bulk of the Second Pillar. With the new 2004 pension reform, from 2008 the TFR will have to be transferred to an open or closed pension fund, unless the employee explicitly forbids it.

– **Open pension funds**. These can be set up by banks, insurance companies or investment management companies for a generic group of participants. The funds operate on a DC basis, and are externally managed. In 2004, assets for open pension funds amounted to €2.2 billion. These funds fall within the scope of the IORP Directive and are regulated by COVIP (the pensions funds supervisory authority).

– **Closed pension funds**. Negotiated pension funds implemented either as company pension funds or as industry-wide pension funds set up by the employers' associations and trade unions for specific groups of employees. Closed pension funds fall within the scope of the IORP Directive and are regulated by COVIP. In 2004, assets for closed pension funds amounted to €5.9 billion.

– **Pre-existing funds**. Schemes established until 1992, usually by banks and insurance companies. Typically, the funds are not separate entities from the employer. These schemes do not fall within the scope of IORP, and, in most cases, have no specific assets to cover the pension liabilities. No investment restrictions apply to such schemes, which are regulated by the supervisory authorities for the banking and insurance sectors (Bank of Italy and Agency of Surveillance of Insurances, respectively). The remaining schemes, which represent the majority of pre-existing funds, are separate entities from the employer and fall under the scope of the IORP.

The Third Pillar comprises individual life insurance contracts of €277 billion at the end of 2003. The main pension product is the Forme Individuali di Previdenza, an individual pension plan based on individual life insurance products.

A2.14.2 Relevant schemes

Italy is not considered in this study. Pillar 1 schemes do not have a funded component. Pillar 2 schemes are either covered by the IORP Directive (the large majority of pension funds), or are not set up as funds with separate assets from the employer and no investment regulation applies (TFR and banking and insurance pension funds).

A2.15 Latvia

A2.15.1 Overview of pension system

The Latvian pension system was reformed in the latter half of the 1990s. The First Pillar has two tiers: a PAYG scheme based on notional defined contributions, and a fully funded statutory scheme (state-funded pension schemes). The notional DC system was introduced in 1995 and amended several times until 2001. The state-funded pensions schemes were introduced in 2001 along the lines of the World Bank model (Pillar 1 bis). There is no demographic reserve fund.

Up to 2006, employers have contributed 18% of the employee wages to the PAYG system and 2% to state-funded pension schemes. From 2007, contributions will be increasingly shifted towards the state-funded pension schemes. After 2010, contributions will be split evenly between the two tiers of the First Pillar (10% to each). The total contribution will remain stable at 20% of wages.

Introduced in 1998, the voluntary pension schemes are all structured as pension funds, based on collective agreements (Second Pillar) or individual plans (Third Pillar). The IORP Directive was implemented in December 2005, and covers all occupational schemes (state-funded pension schemes were exempted). As at December 2005, the net assets of voluntary pension funds were 45% of the net assets of mandatory pension funds (€52.7m and €118.5m, respectively).

A2.15.2 Relevant schemes

The state-funded pension schemes fall within the scope of the study. The Second Pillar funds are covered by the IORP Directive. There are no reserve funds.

A2.15.3 State-funded pension schemes

Structure and size of funds

The state-funded pension schemes are similar to mandatory pension funds in other Member States. The Law on State Funded Pensions, which established the state-funded pension schemes, was adopted in 2000 and came into force on July 1st 2001.

In 2001, all members of the social insurance system under 30 years of age were required to join the state-funded pension scheme system. Participation was voluntary for those aged 30–49, while those over 50 were required to remain in the PAYG scheme. The state-funded pension schemes are expected to become fully mandatory by around 2035, as cohorts of voluntary participants exit the workforce.

State-funded pension schemes are fully funded DC schemes. Members have individual accounts and can choose among 22 investment plans, provided by nine asset managers (including the state treasury). Contributions are paid by the employer, with current rates at 2% of wages, increasing to 4% in 2007, 8% in 2008, 9% 2009 and 10% in 2010. The number of members and the net assets of state-funded pension schemes have been growing rapidly; between 2001 and 2003, the compounded average growth rate was 132% in terms of assets and 30% in terms of members (see Table A2.30).

On retirement, members can either add the capital accumulated in their account to the amount nominally accumulated in the PAYG system, or purchase an annuity.

Table A2.30 Net assets of state-funded pension schemes

	2001	2002	2003	2004	2005
Net assets (lats m)	2.9	12.3	25.5	48.1	82.4
Net assets (€m)	4.1	17.7	36.7	69.2	118.5

Note: Converted from euros at average annual exchange rates from Datastream.
Source: Financial and Capital Market Commission.

Governance arrangements and supervision

The administration of the state-funded pension schemes remains in the hands of the State Social Insurance Agency, which collects the contributions, monitors the accounts and contracts the fund managers on behalf of the members. Until 2003, the only asset manager was the state treasury. As at December 2005, there were eight private fund management companies, offering 21 different plans. The Treasury is expected to wind down its fund management operations in 2007; its assets will be distributed among the private managers.

The Financial and Capital Market Commission (FKTK) is the national financial services authority in charge of the supervision of mandatory (with the exception of the fund managed by the Treasury) as well as voluntary pension funds.

The state-funded pension schemes are regulated according to the Law on State Funded Pensions, adopted in February 2000.

Investment restrictions

State-funded pension schemes can invest a maximum of 30% of their assets in currencies other than lats and euros (currency-matching restriction). Additional limits refer to the location of the issuer of government bonds and the stock exchange on which the securities are traded. State-funded pension schemes can invest only in government bonds issued by a government in the EEA or the OECD. Corporate securities (including equities and corporate bonds) must be listed on a stock exchange in the EEA or the OECD. Investment funds must be registered in EU Member States or the EEA.

Investment restrictions have been progressively relaxed since the introduction of state-funded pension schemes. In 2005, following the introduction of a fixed exchange rate with the euro, the currency-matching restriction was relaxed through amendment of the Law on State Funded Pensions to refer to euros as well as lats.

Table A2.31 provides an overview of the investment regulation for state-funded pension schemes. A number of changes are expected to be implemented over the next year, including a relaxation of the limit for equity (from 30% to 50%) and the inclusion of risk capital among the allowed instruments.

Table A2.31 Assets in which state-funded pension schemes are permitted to invest

Asset type	Description of assets	Quantitative limit
Foreign currency	Assets may be invested in the same currency in which the pension payments are made (since May 18th 2005, requirement refers to euros, not lats)	Up to 30% of the assets may be invested in currencies unmatched to the obligations of the plan Up to 10% in a single currency
Government bonds (including bonds issued by international financial organisations)	Issuer: EU, EEA, OECD (investment rating) International financial authority	Securities issued by one state may not exceed 35% of the funds[1]
Local government bonds	Issuer: Latvia, Estonia, Lithuania EU, EEA, OECD (investment rating) International financial authority	Securities issued by one state may not exceed 5% of the funds
Equities and corporate bonds (capital securities)	Listed on a stock exchange in: Latvia, Estonia, Lithuania EU, EEA, OECD (stock exchange member of the International Stock Exchange Federation) Not listed, but will be within one year	Investments in capital securities and funds investing in capital securities may not exceed 30% of the assets Investments in equities of one issuer may not exceed 5% of the assets of the plan and concurrently 5% of the equity of the issuer Investments in corporate bonds issued by one issuer may not exceed 10% of the assets of the plan and concurrently 10% of the debt securities of the issuer Unlisted securities may not exceed 20% of the assets Investments in one company or group of companies may not exceed 10% of the assets of the plan Investments in companies linked to the manager of the plan may not exceed 2% of the assets of the plan
Credit institution	Licence to operate in: Latvia, Estonia, Lithuania EU, EEA	Deposits in one credit institution may not exceed 10% of the assets The sum of deposits and investment in securities of the same credit institution may not exceed 15% of the assets of the plan
Investment funds	Registered in: Latvia, Estonia, Lithuania EU, EEA	Investments in one investment fund may not exceed 5% of the assets of a plan and 10% of the net assets of the investment fund
Derivatives	Listed on a stock exchange in: Latvia, Estonia, Lithuania EU, EEA, OECD (stock exchange member of the International Stock Exchange Federation) Counterpart is a credit institution in Latvia, Estonia, Lithuania EU, EEA	
Immovable property, loans, investments in the manager of pension fund	Not allowed	

Notes: [1] The limit may be exceeded if the assets include six or more different issues, all representing no more than 20% of the assets of the plan, or if the plan is less than 100,000 lats and only for the first six months of operations.
Source: Law on State Funded Pensions, Section 12.

Asset allocation

At the end of 2005, Latvian state-funded pension schemes invested over 70% of their assets in the domestic market. More than 80% of their portfolio was invested in fixed-income instruments—bonds (50%) and deposits (30%).

Table A2.32 Asset allocation of Latvian state-funded pension schemes, December 31st 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	33.0	7.6	0.4	30.6	71.6
EEA	3.9	3.0	4.8	12.5	24.2
USA	0.0	0.5	0.0	0.0	0.5
Rest of the world	0.1	2.2	1.4	0.0	3.7
Total	**37.0**	**13.3**	**6.6**	**43.1**	**100.0**

Source: FKTK.

A2.16 Lithuania

A2.16.1 Overview of pension system

The Lithuanian pension system was reformed in two steps, in 1995 and 2003–04. The 1995 reform linked pension benefits more closely to contributions to the social insurance system and increased the retirement age. The reform implemented in 2004 introduced funded pension schemes within the First Pillar (Pillar 1 bis). As a result, the First Pillar is now composed of a PAYG and a funded element. In addition, the 'state pensions' provide special benefits that are financed directly from the government budget. The state pensions function independently from the PAYG scheme and cover only special categories (officials, judges, scientists) and social assistance pensions.

The social insurance system is administrated by the Board of the State Social Insurance Fund (Sodra).

The PAYG scheme (the State Social Insurance Pension System) comprises a basic and a supplementary pension. The basic pension is calculated according to the social insurance period only, while the supplementary pension is calculated on the basis of both the social insurance period and the wages.

In contrast to other countries that have introduced similar schemes, participation in the Lithuanian Pillar 1 bis scheme (accumulation pension schemes) is voluntary. At the end of 2005, 50% of the working population was participating in the Pillar 1 bis. Pillar 1 bis schemes can be provided by investment management companies and life insurance companies.

The contribution to the funded pensions is being progressively increased from 2.5% of salary in 2004 to 5.5% in 2007.

Occupational schemes (Pillar 2) are not operational in Lithuania, although implementation of the IORP Directive is currently being debated in parliament.

Individual (Third Pillar) pension schemes cover 0.9% of the working population. Their assets amount to one-tenth of the assets of Pillar 1 bis funds (€10.6m and €117.6m, respectively).

A2.16.2 Relevant schemes

The study will focus on Pillar 1 bis (the pension funds accumulating part of the state social insurance contributions). These statutory funded schemes do not fall within the scope of the IORP or Life Insurance Directives.

A2.16.2 Description of accumulation pension schemes

Structure and size of funds

The accumulation pension schemes, introduced in 2004, are open to all employees paying state social security premiums. However, some categories are not required to participate in the social insurance systems or are not fully covered by it (in 2003 around 20% of the employed were not fully insured by the social insurance system). At the end of 2005, 686,000 employees participated in the accumulation pension schemes, corresponding to around 50% of the employed workforce.

The Lithuanian accumulation pension schemes are fully voluntary. However, it is not possible to exit the scheme once a member, although it is possible to switch provider.

The contribution rate has been increased in steps of 1% since 2004. Starting in 2007, the contribution rate will remain stable at 5.5% of gross wages. On retirement, all participants receive an annuity,[42] or will be able to buy one from an insurance company.

In 2005, the number of members participating in the funds had increased by around 20%, while the assets under management had tripled. By the end of 2005, the assets of accumulation pension funds amounted to €117.6m (Table A2.33).

Table A2.33 Growth of accumulation pension schemes, assets in 2004–05 (€m)

2004	2005
36.9	117.6

Source: Lithuanian Securities Commission, Lithuanian Insurance Supervisory Commission.

Governance arrangements and supervision

Members accumulate contributions on individual accounts, which are collected by the State Social Insurance Fund and channelled to the pension funds.

The accumulation pension funds are managed by both special management companies and insurance companies. At the end of 2005, there were 30 funds, managed by six management companies and five insurance companies.

Individuals are free to choose funds with different investment strategies. According to their investment strategy, pension funds are divided into four groups:

– government bonds;
– small equity part (up to 30% in equity);
– medium equity part (30–70% in equity);
– equity (71–100% in equity).

The Lithuanian Securities Commission and the Lithuanian Insurance Supervisory Commission supervise the operation of accumulation pension funds. The Securities Commission is also in charge of Third Pillar pension funds.

[42] When the accumulated amount is very large or very small, the participants can choose to receive a lump sum.

The accumulation pension schemes are subject to the Law on the Pension System Reform (December 3rd 2002, No. IX-1215) and the Law on Pension Accumulation (July 4th 2003, No. IX-1691).

Investment restrictions

Pillar 1 bis funds are entitled to invest up to 100% of their assets into foreign investment instruments. There are no restrictions on investing in instruments denominated in other currencies.

The quantitative limits on asset allocation are set out in Articles 46–50 of the Law on Supplementary Voluntary Pension Accumulation of the Republic of Lithuania (Articles 12 and 13 of the Law on Pension Accumulation). The regulation focuses on the definitions of the assets in which funds are permitted to invest and on risk-diversification measures.

Table A2.34 Investment restrictions for accumulation pension schemes

Definition of asset classes
– Securities or money market instruments dealt on markets regarded as regulated markets (or securities that are not yet listed, but whose terms of issues set out the obligation of listing on a regulated market)
– Deposits with credit institutions with maturity of up to 12 months in the EU (or another country subject to prudential rules that are no less stringent than those effective in the EU)
– Money market instruments
– Investment units or shares of the entities of collective investment
– Pension assets may not be invested in real estate, precious metals, or certificates representing them
Requirements for investment portfolio diversification
– No more than 5% of net pension assets may be invested in securities or money market instruments issued by the same issuer
– More than 5% but no more than 10% of the net assets may be invested in securities or money market instruments issued by the same issuer, provided that the amount of such investments does not exceed 40% of the net assets (this limit does not apply to deposits)
– Investments in deposits with one credit institution may not exceed 20% of net pension assets
– The total amount of investments in securities and money market instruments issued by the same issuing body or deposits may not exceed 20% of net pension assets
– Investments in securities or money market instruments of the Republic of Lithuania, EU Member State or their local authorities, any other state or an international body to which at least one EU Member State belongs, issued or guaranteed by a single body, may not exceed 35% of net pension assets
– Investments in securities and money market instruments issued by companies included in the same group for the purposes of consolidated accounts may not exceed 20% of the net assets

Source: Lithuanian Securities Commission.

Asset allocation

At the end of 2005, domestic assets represented less than 20% of the portfolio. Almost 80% of the funds were invested in Europe. Sovereign bonds accounted for 56% of the portfolio (see Table A2.35).

Table A2.35 Asset allocation by location, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	10	3	2	4	19
EEA	45	2	6	25	78
Rest of the world	2	0	0	0	2
Total	**56**	**6**	**9**	**29**	**100**

Note: Figures do not sum due to rounding.
Source: Lithuanian Securities Commission, Lithuanian Insurance Supervisory Commission.

A2.17 Luxembourg

A2.17.1 Overview of pension system

The Luxembourg social security system provides a substantial level of pension benefits, being one of the few countries where benefit levels under the First Pillar have risen rather than fallen. The general First Pillar pension scheme comprises a flat-rate component and an earnings-related component based on contributions paid. The general scheme is partly financed on a PAYG basis and partly funded. The funded part takes the form of a reserve fund that seeks to improve the financial sustainability of the system. The reserve fund must cover 150% of the annual amount of total benefits paid, but current funding levels (€6.6 billion in 2005) exceed this minimum.

While the majority of pension benefits are paid under the First Pillar, there are supplementary funded pensions that constitute the Second and Third Pillars of the Luxembourg pension system. Occupational schemes in the Second Pillar have traditionally been funded through book reserves, with pension funds and direct insurance being the other funding vehicles. Direct insurance is increasing in prominence after a law in 1999 introduced a level playing field between the tax treatments of different financing methods, and most of the new schemes are financed by direct insurance. Occupational pension funds are covered by the IORP Directive, and direct insurance schemes are subject to the Life Directive. Book reserves are beyond the scope of these Directives, but are not considered as part of this study since no investment regulations apply that restrict the assets backing the reserves.

A2.17.2 Relevant schemes

Given that the Second Pillar schemes are covered by the relevant Directives and hence fall outside the scope of this study, the following description focuses on the funded element of the general pension scheme in the First Pillar.

A2.17.3 The reserve fund of the First Pillar general pension scheme

The funding of the First Pillar general pension scheme is based on a system of seven-year coverage periods, with mandatory formation of a reserve fund to support the PAYG structure. Contributions, representing 24% of gross pay, are payable in equal parts by employees, employers and the state.

The total reserve fund accumulates the reserves of four sub-schemes within the general scheme.

The reserves must exceed 1.5 times the total amount of annual expenditure on benefits, but surpluses over the past few years have made it possible to increase the reserve fund to three times the amount of annual expenditure.

At the end of 2005, the fund was around €6.6 billion, growing from €4.1 billion over the preceding six years (see Table A2.36).

Table A2.36 Accumulated reserves

	Total funds (€m)
2000	4,149
2001	4,769
2002	5,176
2003	5,661
2004	6,060
2005	6,594

Source: Annual reports of the Ministry of Social Security, and information provided by the Inspection générale de la sécurité sociale (IGSS).

The structure and management of the reserve fund is in the process of change. In particular, legislation in 2004[43] paved the way for a new policy on the investment of reserves. The law created a new Pension Reserve Fund (Fonds de compensation commun au régime général de pension), to manage the total reserves, taking over the investment function formerly performed by the four schemes.

The Pension Reserve Fund is a public institution. It is empowered to create one or more collective investment undertaking for the purpose of managing the assets. The shift to strategic portfolio management will be made in stages, with mandates being awarded to external asset managers. Regulation issued in 2005 established the volume of reserves to be invested through collective investment undertakings, specifying in particular that, by 2007, €1.9 billion of the reserves must be invested through collective investment undertakings.[44]

Investment restrictions and asset allocation

Until the creation of the Pension Reserve Fund, each of the four schemes within the general pension scheme was responsible for asset allocation of its reserves. In 2004, around 70% was held in deposits or other liquid assets, with the remainder being held in bonds, equities, property or other assets.

The creation of the Pension Reserve Fund means that a strategic asset allocation will be pursued. According to the 2004 law, assets should be invested with a view to guaranteeing the sustainability of the general pension scheme, following the principle of risk diversification, with available resources to be assigned to various types of investment and to several sectors of the economy and geographical areas. The law does not contain any specific investment limits.

The 2005 regulation, which provides for €1.9 billion of the new Fund to be invested through collective investment undertakings by 2007, specifies that up to €949m (50%) should be invested in fixed-income securities denominated in euros, €316m (17%) in non-euro fixed-income securities, and €633m (33%) in equities. The regulation does not contain any limits that depend on the geographic location of the issuer.

In 2006, the Fund issued a public tender for the choice of the fund/sub-fund managers to implement the asset allocation strategy as well as a tender for the depositary bank. Awaiting the selection, the Fund held most reserves in bank deposits (around 73% at the end of

[43] La loi du 6 mai 2004 sur l'administration du patrimoine du régime général de pension.

[44] Règlement grand-ducal du 1er juillet 2005 déterminant les valeurs de la réserve de compensation du régime général d'assurance pension pouvant être investies à travers un organisme de placement collectif.

2005). The first investments under the new asset allocation strategy started in 2006, but the full diversification envisaged in the 2005 regulation is unlikely until 2007, depending on the outcome of the public tender.

A2.18 Malta

A2.18.1 Overview of pension system

The pensions system in Malta comprises almost entirely by a single PAYG First Pillar. This public and mandatory scheme operates on a DB basis, without demographic reserve funds. The only Second Pillar schemes are those operated by the government for civil servants, police officers, prison guards and members of the armed forces. These are not funded, but operated on a PAYG basis by the Maltese government. There are no Third Pillar pension schemes. The closest financial contracts in Malta are linked long-term contracts of insurance, but these are not classified as pension plans.

Although the pensions system is dominated by the First Pillar, the Maltese government is currently considering pension reform. In mid-2005, the final report of the Pensions Working Group outlined recommendations to the Maltese government.[45] In their current form, the main proposal is the creation of funded Second Pillar schemes, with both mandatory (ie, Pillar 1 bis) and voluntary (Second Pillar 2) elements and funded Third Pillar schemes. These schemes would be managed privately and regulated by the Malta Financial Services Authority.

The IORP Directive was implemented in Malta in early 2006, and the implementing framework provides for the cross-border operation of Second Pillar pension schemes. However, it is unclear whether the Directive, as implemented in Malta, will cover the mandatory elements of these schemes.

A2.18.2 Relevant schemes

At present, since there are no demographic reserve funds, statutory private pension schemes, or funded supplementary occupational schemes, Malta is not considered in this study.

A2.19 The Netherlands

A2.19.1 Overview of pension system

The Dutch pension system comprises a basic old-age pension under the statutory insurance scheme (First Pillar), Second Pillar occupational schemes and, in the Third Pillar, personal annuities offered by insurance providers.

The First Pillar is a compulsory insurance plan, financed on a PAYG basis. The contribution is levied in the form of a tax on income, with a contribution rate limit of 18.25%. In 1998, the special Public Old Age Benefit Savings Fund (AOW Spaarfonds) was established by law to help meet pension benefits after 2020.[46] The fund does not invest in any assets and only exists in the books of the Dutch government, being part of a strategy to help reduce government debt and pay for pension benefits after 2020. As such, the First Pillar remains financed on a PAYG basis, only supported by a notional reserve.

[45] Pensions Working Group (2005), 'Final Report', June 30th, available at: http://www.mfss.gov.mt/pensions/documents/frpensions.pdf.
[46] Staatsblad 1998, 262.

Occupational pension plans cover more than 90% of the employees in the Netherlands, partly because the Dutch social security system only provides for a basic level of retirement benefits. Industry-wide pension funds are the predominant financing vehicle. Companies can also set up company-specific plans, in the form of a company pension fund or an insurance scheme. Industry-wide and company-specific pension funds, as well as the insured occupational schemes, are covered by the IORP and Life Directives.

A2.19.2 Relevant schemes

Since all occupational schemes are covered by the EU Directives, these do not fall under the scope of this study. The First Pillar scheme is also outside the study's scope to the extent that it is PAYG-financed, and only supported by a notional reserve. Nonetheless, the following provides some further information on the Public Old Age Benefit Savings Fund.

A2.19.3 The Savings Fund in the First Pillar

The Fund was established in 1998 as part of a wider strategy to address the ageing population problem by reducing the public debt, so that future public pension expenditure could be financed in part by lower interest payments. The Fund does not invest in assets, but since it mainly exists in the books of the Dutch government, it can be described as a notional reserve. It is effectively a credit position to the Dutch treasury, aimed at increasing the sustainability of Dutch public finances and mitigating the financial burden for future generations.

By law, the Savings Fund receives annual deposits from general tax revenue. In 2005/06, the Fund was around €23 billion, and is expected to reach approximately €135 billion by 2020. From that point, the fund can be used to finance part of public pension expenditure. Forecasts suggest that when demographic ageing reaches its peak by around 2030, the Fund will be cover around 12% of the expenditure.

A2.20 Poland

A2.20.1 Overview of pension system

Poland reformed its pensions system in 1999, introducing three pillars of provision. Most pensions are provided through the First Pillar, which consists of a mandatory PAYG social security scheme (First Pillar) and a statutory funded private scheme (First Pillar bis). Both are financed through social security contributions collected by the Social Insurance Institution (ZUS). Total contributions are 19.52% of an employee's gross income, of which 9.76% is paid by the employee, and 9.76% by the employer.

The first scheme, a universal PAYG scheme, receives 12.22% of the employee's gross income, made up of the entirety of the employer's 9.76% contribution and 2.46% of the employee's contribution. The scheme is supported by a small DRF. The PAYG scheme, including the reserve fund, is managed by the ZUS.

The statutory private funded scheme comprises mandatory Open Pension Funds (OPFs), managed privately by common pension societies (PTEs). Contributions, which are paid to, and distributed by, the ZUS amount to 7.3% of the employee's gross income, which is paid into the employee's account with a PTE. To date, the take-up of voluntary schemes in the Second and Third Pillars has been limited. Occupational pension funds, or Employee Pension Programmes (PPEs), are DC schemes that can be operated by investment funds (including for investment companies) corporate pension funds or life insurers. These funds fall under the scope of the IORP Directive. The Third Pillar is dominated by individual retirement accounts (IKEs), run by investment companies, banks and life insurers. These provide tax-free saving for retirement (withdrawal is limited until the account holder is 60 years of age).

A2.20.2 Relevant schemes

The study focuses on both the First Pillar DRF and the Open Pension Funds that constitute the First Pillar bis (statutory funded private schemes).

A2.20.2 The Demographic Reserve Fund

Structure and size of funds

The DRF was created in 2002, but had been provided for by an earlier bill on the Social Insurance System (October 13th 1998, Article 58) as part of the Polish pension system reform in 1999. Operating under the regulations from the Ministry of Labour and Social Policy,[47] the Fund was established to augment the financial resources available to the PAYG tier of the social security system. The DRF's resources cannot be used before 2009.

The DRF is financed from social security contributions to the First Pillar collected by the ZUS (0.1% in 2002 and 2003, increasing by 0.05% per year from 2004 onwards). The Fund can also be financed by revenues from privatisation (although, in practice, it has not received any funding from this source), as well as from interest and returns on investments.

By the end of 2005, the DRF had accumulated funds of PLN1,542.5m (€385.6m) (see Table A2.37). The fund is expected to accumulate around PLN4.5 billion (€1 billion) by the end of 2008.

Table A2.37 Size of the Polish DRF

2004	2005	June 2006
PLN897.7m	PLN1,542.5m	PLN1,937.0
€204.0m	€385.6m	€440.2

Note: Converted to euros at average annual exchange rates from Datastream.
Source: based on information provided by ZUS.

Governance arrangements and supervision

The DRF is a separate legal entity under Polish law, and is managed and represented by the ZUS. The ZUS may outsource management of funds to private fund managers, with a restriction that no more than 15% of funds may be managed by a single fund manager. Currently, no funds are managed externally.

The ZUS Finance Department is responsible for asset allocation and investment decisions, subject to supervision by ZUS's Financial Assets Committee, the Management Board and the Supervisory Board. The DRF accounts are audited annually by an external auditor and are subject to Supreme Chamber of Control inspections.

Investment restrictions

The bill on the Social Insurance System 1998 restricts the DRF to making investments in Poland only. The exact restrictions are set out in the 2003 Ordinance of the Minister of Economy, Labour and Social Policy concerning the investment of DRF resources. This sets out additional maximum limits for asset classes (see Table A2.38).

[47] There are two relevant ordinances: the Ordinance of the Minister of Labour and Social Policy granting the statute to DRF (February 15th 2002) and the Ordinance of the Minister of Economy, Labour and Social Policy concerning the investment of DRF resources (January 24th 2003).

Table A2.38 Asset class investment restrictions for the DRF

Asset class	Restriction
Securities issued by the state treasury (government bonds)	Max. 100%
Securities issued by the City of Warsaw or other local administration communities (municipal bonds)	Max. 20%
Debt securities guaranteed by the state treasury	Max. 80%
Public listed equity[1]	Max. 30%
Secured listed bonds[1]	Max. 20%
Bonds issued by public companies[1]	Max. 5%

Note: [1] Combined maximum of 40%.
Source: Ordinance of the Minister of Economy, Labour and Social Policy concerning the investment of DRF resources (January 24th 2003).

Asset allocation

As required by law, the DRF invests in Polish assets only (see Table A2.39). At the end of 2005, almost 80% of the Fund was invested in treasury bonds issued by the Polish government. However, equity investments have grown rapidly from only 2% in 2004 to 20% in 2005, and are expected to reach a target allocation of around 30%.

Table A2.39 Asset allocation of the Polish DRF (%)

Asset class	End 2004	End 2005	June 30th 2006
Polish treasury bonds	97.9	79.8	61.0
Polish equities	2.1	20.1	25.8
Bank deposits, cash	0.0	0.1	13.3
Total	**100.0**	**100.0**	**100.0**

Note: Converted to euros at average annual exchange rates from Datastream. Figures do not sum due to rounding.
Source: Based on information provided by ZUS.

A2.20.3 Description of the Open Pension Funds

Structure and size of funds

Introduced on January 1st 1999, the statutory funded private pension scheme is designed to provide supplementary publicly funded, but privately managed and owned, pensions. Coverage of the scheme is universal. Participation is mandatory for those born after 1969.

Operating on a DC basis, contributions of 7.3% of the employee's gross income are collected by the ZUS and paid to the employee's chosen OPF, which is managed by a Common Pension Society (PTE). There were originally 21 PTEs, but the number had fallen to 15 by 2005. The total size of the funds held by the OPFs between 2002 and 2005 is presented in Table A2.40.

Table A2.40 Polish OPFs

2001	2002	2003	2004	2005	2006
PLN 19,358.1m	PLN31,199.01m	PLN44,977.04m	PLN62,396.40m	PLN85,934.51m	PLN116,563m
€5,278.67m	€8,091.00m	€10,222.64m	€13,783.82m	€21,368.54m	€26,488.6m

Note: Converted to euros at average annual exchange rates from Datastream.
Source: Questionnaire completed by the Insurance and Pension Funds Supervisory Commission.

Governance arrangements and supervision

The PTEs make all the decisions about asset allocation of the OPFs—they are not permitted to delegate these responsibilities. Individuals choose among the 15 OPFs and decide which PTE will hold their individual accounts and manage the funds. Switching between funds is allowed, subject to a penalty charge for switching more than once in the first two years. In practice, there is little switching between PTEs. Where individuals do not choose a fund, they are allocated one by lottery from among those OPFs that meet certain requirements regarding performance and size (the largest funds are excluded from the lottery).

The relevant supervisory authority is the Financial Supervision Commission (FSC), which assumed the functions of its predecessor, the Insurance and Pension Funds Supervisory Commission (KNUiFE), in September 2006. The FSC receives daily information on the PTEs' trading and asset allocation, and can demand further information. This data is primarily used to monitor portfolio risk and compliance with investment limits.

Investment restrictions

The Law on the Organisation and Operation of Pension Funds (August 1997) outlines investment restrictions. This legislation has been implemented by several supplementary ordinances from government ministries and the supervisory authority. The main quantitative limits, set out in Table A2.41, are principally derived from the 1997 law and the Ordinance of the Government on investment restrictions (February 2004).

Investment outside Poland is restricted to 5% (Article 143, para. 2 of the 1997 law). This restriction is supplemented by the Ordinance of the Finance Minister on the General Permission to Invest Pension Funds' Assets Abroad (December 2003), which specifies that foreign assets include securities issued by companies listed on the regulated stock exchanges, government securities or units in open-ended investment companies or funds domiciled in OECD countries (or other countries with which the Republic of Poland has agreements on the mutual protection of investments).

Table A2.41 Investment limits on OPFs

Asset class	Restriction	Article
Foreign assets	Max. 5%	Article 143 of the Law
Bank deposits and securities	Max. 20% of fund assets in either bank deposits or bank securities	Article 1.1 of the Ordinance
Fixed-income securities		
Government debt securities	Max. 40% of fund assets in government fixed-income securities	Article 1.8 of the Ordinance
	Max. 20% of fund assets in non-traded government fixed-income securities	Article 1.9 of the Ordinance
Corporate debt securities	Max. 40% of fund assets in secured corporate fixed-income securities	Articles 1.10 and 2 of the Ordinance
	Max. 10% of fund assets in secured non-traded corporate fixed-income securities	Articles 1.11 and 2 of the Ordinance
	Max. 10% of fund assets in unsecured corporate fixed-income securities of public companies	Article 1.13 of the Ordinance
	Max. 5% of fund assets in unsecured corporate fixed-income securities of non-public companies	Article 1.14 of the Ordinance
Mortgage securities	Max. of 40% of fund assets in mortgage securities	Article 1.2 of the Ordinance
Income bonds	Max. of 20% in fund assets in income bonds	Article 1.12 of the Ordinance
Equity securities	Combined maximum of 70% of fund assets in equity securities	Article 3 of the Ordinance
Listed equity	Max. 40% of fund assets in listed equity securities, including warrants and convertibles	Article 1.3 of the Ordinance
Parallel market equity	Max. 10% of fund assets in parallel market listed equity securities	Article 1.4 of the Ordinance
Global depositary receipts (GDRs) and American depositary receipts (ADRs)	Max. 10% of fund assets in GDRs and ADRs admitted to Polish regulated stock exchanges	Article 1.5 of the Ordinance
Investment companies	Max. 10% of fund assets in certificates issued by closed investment funds	Article 1.6 of the Ordinance
	Max. 15% of fund assets in units of open investment funds	Article 1.7 of the Ordinance

Source: Law on Organisation and Operation of Pension Funds, August 1997; Ordinance of the Government on specifying the maximum fraction of open pensions funds' assets that can be invested in the individual investment categories and on further limitations on pension funds' investment activity.

In addition to the direct quantitative limit on cross-border investment, other indirect statutory restrictions have been identified as providing a barrier to foreign investment.

– **Cross-border transaction costs**—the PTEs are not permitted to charge the OPFs the excess of transaction costs (eg, clearing and settlement costs) on international transactions above the costs that apply to domestic transactions (Article 136a of the Law). As such, the PTEs must cover the excess transaction costs of trading in foreign assets, which, according to the PTEs consulted as part of this study, discourages them from making international investments.

– One of the easiest means by which PTEs can invest in foreign assets is to gain indirect exposure by investing in open-ended investment funds. However, as specified in the

Law (Article 136, para. 3), for the amount of funds invested through open-ended investment funds, the PTEs are not permitted to charge a management fee. As such, according to the PTEs interviewed, they are discouraged from pursuing this means of investing in foreign assets.

– The PTEs are prohibited from hedging currency risks. Given that, from 2009, pensions will principally be paid in PLN, investments in foreign assets could expose the funds to currency risks. Without the ability to hedge these risks, PTEs may be discouraged from investing in foreign assets.

Asset allocation

Table A2.42 shows the asset allocation for the OPFs at the end of 2005, distinguishing by location of issuer and type of asset. Overall, close to 99% of assets are invested domestically, mainly in domestic government bonds (57%) and publicly listed equity (31%).

Table A2.42 Asset allocation by location of issuer, end 2005 (%)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Poland	57.10	0.32	31.03	10.34	98.79
EEA	0.00	0.11	0.66	0.35	1.12
Other	0.01	0.07	0.01	0.00	0.09
Total	**57.11**	**0.50**	**31.71**	**10.68**	**100.00**

Note: Figures do not sum due to rounding.
Source: Based on questionnaire completed by KNUiFE (now the FSC).

From inception in 1999 to 2005, OPFs have generated an average rate of return of 10.8%. Over the past two years for which data is available (2004 and 2005), performance has been above average, with average rates of returns of 13.1% and 15%, respectively.

Table A2.43 Rate of return for Polish OPFs (%)

	2003	2004	2005	1999–2005 (annualised)
Rate of return (weighted average)	10.9	13.1	15.0	10.9

Source: KNUiFE annual reports.

A2.21 Portugal

A2.21.1 Overview of pension system

Portugal has a strong First Pillar PAYG system that provides in excess of 90% of pensions payouts. The First Pillar pensions scheme is entirely PAYG-financed. It is both public and mandatory, and fits within a wider social insurance scheme. The scheme is funded by contributions from both employees (11% of earnings) and employers (23.75% of employees' earnings). A DRF—the Fundo de Estabilização Financeira da Segurança Social (FEFSS), established in 1989, had grown to €5.8 billion by the end of 2004.

The Second Pillar is small and primarily limited to an industry-wide scheme for employees in the banking sector and the pension schemes of multinational corporations operating in Portugal. Such schemes cover 7% of the 7m-strong workforce. These funds are managed by private institutions, and fall within the scope of the implementation of the IORP Directive.

The Third Pillar is also small, despite tax incentives to encourage the development of this sector, and includes both insurance schemes and personal pension plans.

A2.21.2 Relevant schemes

The FEFSS is the only funded element of the Portuguese First Pillar social security system. Occupational schemes are not considered because they fall within the scope of the IORP Directive. The study focuses on the FEFSS.

A2.21.3 Description of the demographic reserve fund

Structure and size of funds

The FEFSS was established in 1989 to fund shortfalls in contributions for pensions in the Portuguese First Pillar. Initially funded from the equivalent of €200m of unclaimed tax refunds, further investments were made of between 2 and 4 percentage points of the 11% of employee's earnings paid in social security contributions by the employee, plus any further surpluses from the social security system and the sale of social security properties, together with the reinvestment of investment income.

Table A2.44 Size of the FEFSS (€m)

2001	2002	2003	2004	2005
3,798.6	4,699.4	5,428.3	5,779.1	6,176.2

Source: FEFSS Questionnaire, July 28th 2006.

Governance arrangements and supervision

The FEFSS is legally owned by the government and managed by the Instituto de Gestão de Fundos de Capitalizaçao da Segurança Social (IGFCSS). This entity manages the two social security funds: the FEFSS and the War Veterans' Fund. As such, it is a public institution, within the scope of the Ministry for Labour and Social Security.

Investment restrictions

The FEFSS is subject to investment restrictions set out in Portaria 1273/2004 (October 2004), described in Table A2.45.

The main restriction with relevance to cross-border investment decisions is the currency-matching requirement, such that the fund can face unhedged currency exposure of up to 15% of the fund's assets. Furthermore, the FEFSS is required to invest a minimum of 50% of the fund's assets in Portuguese government debt. It is also restricted to investing only in securities issued in countries within the OECD or EU, where the securities are denominated in the currencies of those countries.

Table A2.45 Investment restrictions applicable to the pension insurance companies

Asset class	Restriction
Public debt	Min. of 50% (no maximum) of fund's assets invested in Portuguese public debt
Corporate debt	Max. of 40% of fund's assets in investment-grade corporate debt
Equities	Max. of 25% of fund's assets in equities
Mutual funds	Max. of 10% of fund's assets invested in mixed mutual fund shares
Real estate	Max. of 10% of fund's assets invested in real estate
Strategic reserve	Max. of 5% of fund's assets in a strategic reserve dedicated to the equity of companies owned by the Portuguese state
Derivatives	Can only be used for hedging purposes or for the efficient management of the portfolio
Location	Only in assets denominated in local currency of OECD countries by issuers located in OECD countries
Currencies	Max. 15% of fund's assets in unhedged currency exposure
Diversification	Max. 5% of fund's assets invested in single fund

Note: These restrictions are set out in Portaria 1273/2004, October 7th 2004.
Source: Cruz, H. (2005), 'Strategic Asset Allocation—the experience of the FEFSS', September; and Instituto de Gestão de Fundos (2004), 'Facts and Figures 2004'. FEFSS Questionnaire—July 28th 2006.

Asset allocation

Tables A2.46 and A2.47 show the change in asset allocation between 2004 and 2005 for the FEFSS funds, and asset allocation by location at the end of 2005. Table A2.46 shows that the asset allocation to equities increased from 12% to 21% between 2004 and 2005, and that the requirements for a minimum investment of 50% of assets in Portuguese government debt were binding in both 2004 and 2005.

Table A2.46 Change in asset allocation, 2004–05 (%)

Asset class	2004	2005
Portuguese government debt	50	50
Other debt	33	25
Publicly listed equity	12	21
Other	5	4
Total	**100**	**100**

Source: FEFSS Questionnaire—July 28th 2006.

Table A2.47 Asset allocation by location, end 2005 (€m)

	Government fixed-income securities	Corporate fixed-income securities	Publicly listed equity	Other	Total
Domestic	49	2	3	2	56
EEA	13	5	8	1	27
USA	–	–	13	–	13
Rest of the world	–	–	3	2	5
Total	**62**	**6**	**27**	**5**	**100**

Note: Figures do not sum due to rounding.
Source: FEFSS Questionnaire—July 28th 2006.

A2.22 Romania

A2.22.1 Overview of pension system

The pensions system in Romania is in a state of reform. At present, the only pensions provision is a First Pillar PAYG scheme funded by contributions to state social security, for which there is no reserve fund.

However, in 2006, parliament passed legislation on the structure and supervisory arrangements for voluntary pension funds. These schemes can be operated by assurance companies, investment companies or new pension fund companies, with maximum contributions of 15% of an employee's income, paid either by employees or employers. These funds are expected to start operating from the first quarter of 2007, and will be covered by the IORP Directive, which is being transposed as part of the same legislation.

In December 2006, the parliament passed legislation on the structure and supervisory arrangements for First Pillar bis pension funds (statutory schemes). Participation in these schemes will be compulsory up to the age of 35, and voluntary between the ages of 35 and 45 years. The schemes will be privately managed and funded from contributions to the state social security system, which will initially represent 2% of the individual's income. The contributions to the fund were increased by 0.5% per year, up to 6% in 2006. Only dedicated pension fund companies will be permitted to operate the funds, and it is expected that 10–12 companies will participate. Individuals will be able to choose between firms—or will be randomly allocated—and will be able to change fund every other year. The funds, which are not expected to start operating until the end of 2007, will be subject to separate investment restrictions. It is anticipated that there will be no restrictions on investments within the EU, but investments outside the EU are expected to be restricted to 10–15%.

A2.22.2 Relevant schemes

At present, since there are no demographic reserve funds, statutory private pension schemes, or Second Pillar schemes, Romania is not considered in this study.

A2.23 Slovakia

A2.23.1 Overview of pension system

In 2003 Slovakia embarked on a two-year process to reform its pensions system, introducing a Three Pillar system. In September 2003, the Act on Social Insurance reformed the First Pillar PAYG scheme, changing the DB formula and increasing the retirement age from which benefits are paid. The scheme is administered by the Social Insurance Agency, and financed by contributions paid by both the employee and the employer.

In January 2004, the Act on Old-age Pensions Savings introduced statutory private pension funds. As with the First Pillar PAYG scheme, contributions are collected by the Social Insurance Agency, and are allocated, according to individuals' choices, to private pension companies. These schemes are financed by contributions of 9% of gross income from employers, the self-employed, the voluntarily insured, the Social Insurance Agency (for the armed forces and those taking care of children) or the state (for disabled pensioners).

To help cover the high transition costs of the introduction of the statutory pension funds, a Solidarity Reserve Fund was established in 2003. The transition costs are expected to last several decades as a consequence of diverting contributions away from the PAYG scheme while there are still pension beneficiaries from the original system. The fund is part of the government budget and does not have invested assets.

Furthermore, in October 2004, the Act on Supplementary Pension Savings developed a system of supplementary pension savings open not only to employees, but also to everybody over 18 years of age. Incentives have been provided to encourage take-up of these supplementary pensions, including tax deductions and less severe regulatory regimes.

A2.23.2 Relevant schemes

The study focuses on statutory private pension savings. The Solidarity Reserve Fund is part of the government budget and is used to finance ongoing costs of the PAYG scheme, rather than investments to finance future commitments—it is therefore not considered in this study.

A2.23.3 Description of the First Pillar bis scheme

Structure and size of funds

The First Pillar bis scheme became active in 2005 and has universal coverage. The obligation to participate in old-age pension savings arises when an individual was covered by the pension insurance before January 1st 2005 and, between January 1st 2005 and June 30th 2006, had voluntarily decided to participate in old-age pension savings.

Individuals are also obliged to participate in old-age pension savings if they were not covered by pension insurance before January 1st 2005.

There are currently six licensed companies—down from eight in 2005. Individuals can choose among three funds offered by each investment company: conservative, balanced or growth. However, to avoid unexpected fluctuations of fund values shortly before retirement age, all the accumulated assets must be shifted to the balanced or conservative fund at least 15 years before the statutory pension age, and all the assets must be shifted to the conservative fund seven years before the statutory pension age.

As of June 2006, the total assets managed by statutory pension funds amounted to SKK17,265m (€477m)—see Table A2.48.

Table A2.48 Statutory pension funds total assets, June 2006

	June 2006
Total assets (SKKm)	17,265
Total assets (€m)	477

Note: Converted to euros at average annual exchange rates from Datastream.
Source: National Bank of Slovakia.

Governance arrangements and supervision

Private pension companies are subject to supervision by the National Bank of Slovakia. The assets in the fund are legally owned by the individual who made the contributions.

The government provides insurance against the insolvency of pension fund management companies. Moreover, a benchmarking system guarantees the minimum relative performance of pension funds. If the performance of their fund falls below the benchmark by more than a certain percentage (below 70% of the benchmark for growth funds, below 80% for balanced funds and below 90% for conservative funds), fund management companies must cover the difference with their own assets.

Investment restrictions

The investment restrictions for statutory private pension schemes are set out in the 2004 Act on Old-age Pensions Savings (see Table A2.49). Where cross-border restrictions are concerned, the Act specifies that 30% of the portfolio must be invested in Slovakia.

There are also specific regulations for the three types of fund managed by investment companies—shown in Table A2.49. Different restrictions on currency risk apply to conservative funds (no currency risk allowed), balanced funds (up to 50% of the assets can be exposed to currency risk), and growth funds (up to 80% exposed to currency risk). The specific regulations do not directly limit the scope for international investment.

Table A2.49 Investment restrictions

Asset class	Restriction	Section: Article
Assets		
Foreign	At least 30% in securities or money market instruments issued by an issuer established in Slovakia or in deposits in Slovakia	82: 5
Domestic	Consist of at least six issues of securities. Each issue must be a maximum of 30% of the fund	82: 4
General (significant influence on the management of the issuer)	Max. 5% of fund assets issued by a sole issuer	82:6
Securities		
Issued by a single Member State	Max. 20% of fund	82: 2
Issued by Slovak Republic	Max. 80% of fund	82: 4
New issue securities	Max. 5% of fund assets	81: 3
Securities and financial market instruments	Max. 3% of fund assets in securities or financial market instruments issued by a single issuer	82: 1
Monetary loans and credit	Max. 5% of fund assets	86
Mortgage securities	Max. value of the sum of all mortgage bonds is 50%. Max. value of bonds with one single provider is 10%	82: 3
Equity securities		81:
Mutual funds and foreign entities of collective investment	Max. 50% of fund	81: 6
Value of receivables and liabilities resulting from trade to restrict currency risk	Max. 5% of fund	81: 5
Shares in joint-stock companies owning more than a 5% stake in the share capital of the pension company	Not allowed	81: 7
Shares in the pension company's depository	Not allowed	81: 7
Shares in mutual funds managed by the pension company	Not allowed	81: 7
Precious metals	Not allowed	81: 8

Table A2.50 Investment restrictions for different types of fund

	Equities	Bonds	Assets unsecured from currency risk
Growth fund	Up to 80%	No limit	Up to 80%
Balanced fund	Up to 50%	At least 50%	Up to 50%
Conservative fund	None	100%	None

Source: Act of 20 January 2004 on Old-age Pensions Savings, Sections 88–90.

Asset allocations

The portfolio of statutory pension funds is concentrated in deposits, representing two-thirds of the asset allocation. Fixed-income securities account for 23% of the assets, equities for 11% (Table A2.51).

Over half of the portfolio is invested abroad. The allocation to equities is almost exclusively international while the allocation to fixed-income instruments is concentrated in Slovakia (Table A2.52).

Table A2.51 Asset allocation by asset class, June 30th 2006 (%)

	Value (SKK, m)	%
Cash, deposits or similar	11,395	66
Fixed-income securities	4,041	23
Equity	1,819	11
Other	167	1
Liabilities	–157	–1
Total	**17,265**	**100**

Source: National Bank of Slovakia.

Table A2.52 Asset allocation by location, June 30th 2006 (%)

	Fixed-income securities	Publicly listed equity	Cash, deposits or similar	Total
Domestic	23	0	66	89
Eurozone	0	6	0	6
Non-Eurozone	0	5	0	5
Total	**23**	**11**	**66**	**100**

Source: National Bank of Slovakia.

A2.24 Slovenia

A2.24.1 Overview of pension system

The Slovenian pension system is primarily made up of the First Pillar social security scheme. This PAYG scheme is operated by the Institute for Pension and Disability Insurance (IPDI), with contributions from employees (15.5% of gross income) and employers (8.85% of employee's gross income).

A statutory funded scheme for employees in hazardous professions, SODPZ, was introduced in 2004 to provide funds to enable employees in hazardous occupations to retire earlier. The scheme is organised by the IPDI, but managed by Kapitalska Druzba (KAD). As stipulated in the Pension and Invalidity Insurance Act (ZPIZ-1), this is a mutual pension fund, with contributions paid by employers. The scheme is covered by the IORP Directive, which was implemented in June 2006 under the Pension and Invalidity Insurance Act (ZPIZ-1). Before this, the scheme was covered by the Insurance Law, which had implemented the Life Insurance Directive.

KAD is a joint-stock investment company, established and owned by the Republic of Slovenia. It is designed to supplement the resources of the IPDI, and so makes a contribution to the IPDI each year; in 2006 this was €39.9m. The investment company manages four separate mutual pension funds: an open-end investment trust (KVPS); a closed-end investment trust for public employees (ZVSPJU); the statutory pension fund for those in hazardous professions (SODPZ); and the privatisation coupon fund (PPS). The relative sizes of the KAD funds at the end of 2005 are shown in Table A2.53. All these schemes are covered by the IORP Directive.

Table A2.53 KAD funds (€m)

KVPS	ZVPSJU	SODPZ	PPS
85.1	127.5	122.5	107.7

Source: Response from Kapitalska Druzba.

Supplementary occupational schemes in the Second Pillar were established in 1992 and managed by IPDI. However, take-up was limited, and in 2000, occupational schemes were re-established as both fully private and voluntary schemes managed by pension fund management companies. The Second Pillar provides coverage for 82,000 persons. There is also a small Third Pillar offering voluntary private pensions.

A2.24.2 Relevant schemes

Although there is a statutory private pension scheme for certain occupations, this is covered by the IORP Directive. Furthermore, there are no demographic reserve funds in the First Pillar PAYG scheme and no Second Pillar schemes that are not covered by either the IORP Directive or the Life Insurance Directive. As such, Slovenia is not considered in this study.

A2.25 Spain

A2.25.1 Overview of pension system

The majority of pensions in Spain have traditionally been provided through the First Pillar. This pension system has been reformed twice in the last decade—in 1997 and 2001.

The First Pillar incorporates a universal and mandatory PAYG scheme. This is financed from contributions, which total 28.3% of an employee's gross income, of which 4.7% is paid by employers and 23.6% by employees. In 1997, the First Pillar was reformed to separate financing resources for different types of expense, and through the creation of a demographic reserve fund, the Social Security Reserve Fund. Financed from the operational surplus of the contributory pension scheme, the Fund is designed to support the PAYG scheme. The first contributions were in 2000.

The 2001 reforms redeveloped the Second and Third Pillars, but these continue to be small, with 1.8m members in the former and 7.7m members in the latter in 2005. Both the Second and Third Pillars are covered by the Real Decreto Legislativo 1/2002, which was amended in May 2006 to implement the IORP Directive.

A2.25.2 Relevant schemes

The study focuses on the Social Security Reserve Fund.

A2.25.3 Description of the reserve fund

Structure and size of funds

The Social Security Reserve Fund was legally established through Law 24/1997 as part of the social security reforms of 1997, and became operational in 2000. The Fund is financed through the year-end surplus of the First Pillar schemes, combined with returns on investments. The fund resources can only be used if the PAYG system has been in operational deficit for three years, and only up to 3% of the annual operational expenses.

The contributions from the PAYG system are shown in Table A2.54.

Table A2.54 Contributions of the PAYG system to the Social Security Reserve Fund (€m)

2000	2001	2002	2003	2004	2005
601	1,803	3,575	5,494	6,700	7,000

Source: Annual report presented by the Reserve Fund to Congress in 2006.

The size of the Social Security Reserve Fund between 2000 and 2005 is shown in Table A2.52. At the end of 2005 the Fund was equivalent to 3.25% of GDP and could pay for six months of the pension system's obligations.

Table A2.55 Size of the Social Security Reserve Fund (€m)

2000	2001	2002	2003	2004	2005	2006
603.9	2,433.0	6,168.7	12,024.9	19,330.4	27,185.0	35,221.5

Source: Annual report presented by the Reserve Fund to Congress in 2006; Spanish Reserve Fund Questionnaire July 2006.

Governance arrangements and supervision

The Social Security Reserve Fund operates under the regulations of the General Treasury of the Social Security System. The Social Security Reserve Fund Management Committee is responsible for asset allocation and investment decisions. This Committee is allowed to outsource financial advice, but no financial services are outsourced at present. The Committee is subject to supervision by the Social Security Reserve Fund Monitoring Committee, the Advisory Committee, and the General Treasury of the Social Security System. The Monitoring Committee has four representatives from the main trade unions and four representatives from the main chambers of commerce. The chairman of the Monitoring Committee is the Secretary of the State for Social Security, who is also the chairman of the Management Committee. The Management Committee and the Secretary of State are also subject to supervision by members of Congress and by the Social Security's (internal) and the General Accounts' (external) auditing bodies.

Investment restrictions

Law 28/2003 restricts the Social Security Reserve Fund to invest in public debt only. The Real Decreto 337/2004 established additional restrictions, stipulating only public debt with the highest rating and from regulated markets. In addition, each year the Management Committee establishes the investment guidelines. There has only been investment in foreign assets since 2004.

For 2006 the investment guidelines established that investment in foreign debt should be no more than 50% of total investments (in 2004, foreign investment was restricted to 20%), and that it should be in euros.[48] It was also established that the Fund should invest only in public debt from Spain, Germany, France and the Netherlands.

Table A2.56 Investment guidelines

Asset class	Restriction
Securities issued by the Spanish Treasury	50% minimum
Foreign government bonds in euros	50% maximum

Source: Social Security Reserve Fund's Investment Guidelines, 2006.

Asset allocation

Table A2.57 shows the asset allocation for the Reserve Fund. According to this, almost 80% of the fund's assets are invested in domestic government debt, while just over 20% of the assets are invested in foreign government debt.

Table A2.57 Asset allocation by location, end 2005

	Government fixed-income securities (€m)	%
Domestic	21,268.6	79.44
EEA	5,504.2	20.56
France	1,854.7	6.93
Germany	1,819.8	6.80
Netherlands	1,829.7	6.83
Total	**26,772.8**	**100.00**

Source: Social Security Reserve Fund Questionnaire—July 2006.

A2.26 Sweden

A2.26.1 Outline of pension system

The Swedish public pension system was reformed over the 1999–2003 period. The former system combined a flat-rate pension and an earnings-related PAYG system. The reform transformed the PAYG system into a notional DC scheme, complemented by a fully funded DC scheme. In addition, a guaranteed minimum pension benefit is financed by general taxation. Transition rules apply to workers born between 1938 and 1953, whose benefits are calculated using a combination of the old and new mechanisms.

– **PAYG/notional DC system**. All workers pay 16% of their earnings in the PAYG/ notional DC system. As in traditional PAYG systems, current contributions are used to pay current pensions. However, members have an individual account that represents a claim on future benefits. The accounts are not funded, and the rate of return is calculated on the basis of average wage growth, rather than a market rate.

– **Reserve funds**. Since the 1960s, a National Pension Fund (AP Fund) has been maintained as a buffer to ensure the financial viability of the PAYG system. In 2000, the National Pension Fund was restructured into four separate funds (AP1 to AP4), which

[48] Investment Guidelines for 2006, www.seg-soc.es.

are completely separate, but perform the same function. The reform created two additional funds: AP6, still part of the buffer system but specialising in private equity investments, and AP7 the default fund of the premium system.[49]

– **Premium pensions**. Employees pay an additional 2.5% of their earnings in the fully funded premium pension system. Individuals can choose from many private sector providers. If they fail to make a choice, their contributions are managed by a public default fund—AP7. The system is supervised by the Premium Pensions Authority (PPM). From 2007, Eurostat is reclassifying the premium pension as a private sector scheme.

Most employees in Sweden are covered by Second Pillar occupational schemes based on nationwide agreements between the employers' confederations and the trade unions. There are four main types of occupational plan: for blue-collar workers in the private sector (SAF-LO plan), white-collar workers in the private sector (ITP plan), central government employees, and local government employees. These schemes have shifted from DB to DC. However, only the blue-collar scheme is fully funded.

Some industries (eg, banking and insurance) have separate pension schemes, but tend to follow the same rules as the ITP. Employers not covered by collective agreements can offer pension plans on a voluntary basis, and employees above a certain salary can opt out of collective agreements.

Companies can finance their pension plans via pension funds, insurance contracts or book reserves.

– **Pension funds** are used to finance ITP plans and DB plans. They are separate entities from the sponsoring company, and fall within the scope of the IORP Directive.

– **Group insurance contracts** can be used to finance different types of plan. However, for collectively negotiated contracts (ITP, SAF-LO), there is no choice of provider. ITP plans are insured by Alecta; SAF-LO plans by AMF. Group insurance contracts also fall within the scope of the IORP Directive.

– **Book reserves** are used to finance DB schemes. Companies using book reserves must participate in the pension protection scheme. Moreover, a special institution (PRI) administers payments and calculates pension liabilities. Book reserves do not fall within the scope of the IORP Directive.

A2.26.2 Relevant schemes

The study will focus on the AP Funds and the Premium Pensions scheme. AP Funds 1–4 and 6 constitute a system of public reserve funds. The Premium Pensions scheme is a funded mandatory pension scheme (First Pillar bis).

The only Second Pillar schemes that do not fall within the scope of the IORP Directive are book reserves (which have no separate assets and are not subject to specific investment regulation). Hence, no Second Pillar schemes are covered in this study.

A2.26.3 Description of AP Funds 1–4 and 6

Structure and size of funds

The five reserve funds (AP1–4 and AP6) manage the assets of the earnings-related pensions. The role of AP1–4 is to even out temporary imbalances between contributions and

[49] Following the reform in 1999, the fifth fund no longer exists.

payments in the earnings-related scheme. AP1–4 are of similar asset size (around €20 billion). AP6 is not required to make annual payments to balance the earnings-related scheme. It is significantly smaller than the other AP Funds (€1.6 billion) (see Table A2.58). AP7 is not a reserve fund, but is the default fund in the Premium Pensions system.

Table A2.58 Net assets of AP funds, 2005 (€ billion)

AP1	20.4
AP2	20.8
AP3	20.9
AP4	19.6
AP6	1.6
AP7	6.3
Total	**89.8**

Note: Figures do not sum due to rounding.
Source: Ministry of Welfare.

Governance arrangements and supervision

There are no pension rights directly linked to the reserve funds. The funds are managed by independent agencies. The board of each fund comprises nine members appointed by the government, two of whom are nominated by employers and two by employee organisations.

At least 10% of each AP fund's assets must be outsourced to external fund managers.

The relevant laws are the Swedish National Pension Funds (AP Funds) Act (SFS 2000:192) and the Law on the Sixth AP Fund (SFS 2000:193).

Investment restrictions

The 1999/2000 reform of the AP Funds led to a relaxation in investment restrictions. The limit on foreign investment was changed from 10% of the fund's assets to a 40% limit to currency risk exposure. AP Funds 1–4 are allowed to invest more than 40% of their assets in securities denominated in foreign currency, but have to use derivatives to hedge exposure over 40%. The currency risk limit was phased in gradually—starting at 5% and increasing by 5% each year—in order to limit the impact of hedging activity by the AP Funds on the foreign exchange market.

AP6 has different rules from the other funds: it invests exclusively in the Swedish private equity market (both directly and through external managers).

Table A2.59 Investment restrictions for AP Funds 1–4

Currency risk	No more than 40% of a fund's assets may be exposed to currency risk
Type of security	Investments may be made in all types of listed and negotiable instruments in the capital market
Unlisted securities	A smaller portion, or no more than 5% of the assets in each fund, may be invested in unlisted securities Investment in unlisted shares may only take place indirectly via shares in mutual funds or venture capital companies
Minimum allocation to fixed income	At least 30% of each fund's assets shall be invested in interest-bearing securities with low credit and liquidity risk
Ownership rules	Each fund's holding of shares in listed Swedish companies may not exceed the equivalent of 2% of the total value of Swedish shares on an authorised Swedish stock exchange or marketplace Each fund may own no more than 10% of the votes in a single listed company. The limit for unlisted venture capital companies is set at 30%
Concentration rules	No more than 10% of a fund's assets may be exposed to one issuer or one group of issuers with mutual ties
External fund managers	At least 10% of the assets of each fund shall be managed by outside managers by purchase of mutual fund shares or discretionary management
Loans	Each buffer fund is entitled to raise loans if it has been drained of assets

Source: Swedish National Pension Funds (AP Funds) Act (SFS 2000:192).

Asset allocation

AP1–4 have an allocation to foreign assets between 59% (AP2) and 81% (AP4). The foreign allocation is evenly balanced between equities and fixed-income instruments. In terms of overall asset classes, all four funds have an allocation of around 60% equity and 40% fixed income. AP6 invests exclusively in Swedish private equity.

Table A2.60 Asset allocation by location, end 2005 for AP1 fund (%)

	Fixed-income securities	Publicly listed equity	Other	Total
Domestic	14.3	12.9	–	**27.2**
EEA	10	11.8	–	**21.8**
USA	11.2	22.4	–	**33.6**
Rest of the world	4.4	11.8	–	**16.2**
Total	**39.9**	**58.9**	**1.2**	**100.0**

Note: The row totals in this table and the three tables below do not add up to 100% because no geographical split for the 'Other' category is available.
Source: AP1 Report.

Table A2.61 Asset allocation by location, end 2005 for AP2 fund (%)

	Fixed-income securities	Publicly listed equity	Other	Total
Domestic	21	20	–	**41**
Developed	14	37	–	**37**
Emerging	0	3	–	**3**
Total	**36**	**60**	**4**	**100**

Note: Figures do not sum due to rounding.
Source: AP2 Report.

Table A2.62 Asset allocation by location, end 2005 for AP3 fund (%)-

	Fixed-income securities	Publicly listed equity	Other	Total
Domestic	12.6	16.0	–	**28.6**
EEA	17.9	17.5	–	**35.4**
USA	6.5	14.7	–	**21.2**
Rest of the world	0	6.3	–	**6.3**
Total	**37**	**54.5**	**8.5**	**100.0**

Source: AP3 Report.

Table A2.63 Asset allocation by location, end 2005 for AP4 fund (%)

	Fixed-income securities	Publicly listed equity	Other	Total
Domestic	17	19	–	**36**
Global developed market	20	42	–	**62**
Total	**37**	**61**	**2**	**100**

Source: AP4 Report.

A2.26.4 Description of the Premium Pensions system

Structure and size of funds

In 1998, Sweden introduced the Premium Pension plan, a second tier of mandatory individual accounts within the public system. Each individual covered by the public pension system contributes 2.5% of their income to a funded individual account, and can invest in an array of domestic and international funds. At the end of 2004, 84 private asset managers offered a total of 697 Premium Pension funds. Members failing to make an active choice are enrolled in the default fund, managed by AP7.

Benefits in the Premium Pension plan can be withdrawn from the age of 61 and annuisation is mandatory.

The total assets of the funds in the Premium Pension system at the end of 2005 were SEK192.4 billion (€20.5 billion).

Governance arrangements and supervision

Each individual owns an account and chooses how to invest their funds. The PPM collects contributions and manages the accounts. Any fund company licensed to do business in

Sweden is permitted to participate in the system, provided it signs a contract with the PPM specifying the reporting requirements and the fee structure.

The total fee in the Premium Pension consists of two parts: a money management fee and a fixed administrative fee charged by the PPM. Fund managers can charge the same fee for participants in the PPM as they do in the private savings markets. However, since the administration is handled by the PPM, fund managers rebate to the PPM a share of the fees, which the PPM then passes on to participants. In 2003, the average fee after the rebate was 0.43%.

The government has also established two funds, managed by AP7. The first was set up for participants who wanted to make an active choice, but who also wanted the government to be involved in the management (Premium Choice Fund). The second is the default fund, for participants who do not wish to make an active investment choice (Premium Savings Fund). The default fund's investment strategy was formulated to mirror the asset allocation of an average investor in the system.

The PPM system was established by the Income-based Retirement Pension Act (SFS 1998:674). The operations of the funds and of the publicly managed AP7 fund are regulated by the Mutual Funds Act (SFS 1990:1114) and the Swedish National Pension Funds (AP Funds) Act (SFS 2000:192).

Investment restrictions

All funds registered with the Swedish Financial Supervisory Authority that meet the requirements of the UCITS Directive can participate. In addition, an administrator who wishes to participate in the system has to accept the conditions for participation stated by the PPM in the 'cooperation agreement'.

There are no quantitative restrictions for funds participating in the Premium Pensions system.

Asset allocation

Table A2.64 shows the investment focus (in terms of asset class and geography) of the funds participating in the Premium Pensions systems at the end of 2004. Around 17% of the funds had an exclusively domestic focus, and around 9.5% of the assets were managed by funds with a specific geographic focus outside Sweden (eg, in North America or the Far East). Around one-third of the funds did not have a specific geographic focus.

Table A2.64 Asset class and geographic focus of funds in the PPM system, end 2004

	Fixed-income funds	Equity funds	Mixed funds	Total
Domestic	2.5	14.2	0.1	**16.8**
Europe	7.7	0.1	–	**7.8**
US and North America	–	1.5	–	**1.5**
Other	0.4	7.9	–	**8.3**
Not specified	–	17.3	16.1	**33.4**
Default fund	–	–	32.2	**32.2**
Total	**10.6**	**41**	**48.4**	**100.0**

Source: PPM.

Table A2.65 shows the asset allocation of the default fund, which accounts for around one third of all assets invested in the Premium Pensions system. At the end of 2005, 65% of the fund's assets were invested in foreign equity. In contrast, the bond portfolio comprised Swedish securities exclusively. More than 80% of the portfolio was invested abroad.

Table A2.65 Asset allocation by location for AP7 fund, end 2005 (%)

	Fixed income securities	Publicly listed equity	Other	Total
Domestic	10	17		**27**
Foreign	0	65		**65**
Total	**10**	**82**	**8**	**100**

Source: AP7 report, p. 1.

A2.27 UK

A2.27.1 Overview of pension system

The First Pillar comprises three schemes: the Basic State Pension, the State Second Pension, and the Pension Credit.

The Basic State Pension is a flat-rate payment. The only condition to receive this payment is a minimum of 44 years of National Insurance Contributions. The State Second Pension is an earnings-related scheme introduced in 2002 to replace the State Earnings-related Pension Scheme (SERPS). The Pension Credit is a means-tested scheme.

The UK does not have a demographic reserve fund. The National Insurance Fund is used to cover a period of six months ahead of the PAYG scheme, with the objective of smoothing fluctuations. However, it is an accounting instrument, with few investments. If it has a positive balance, it must be invested in gilts. It is managed by HM Revenue & Customs.

Second Pillar occupational schemes are set up as trusts (which in turn can be divided into pension funds and insurance schemes), and are covered by the implementation of the IORP Directive. Schemes with Crown Guarantee are exempted under Article 5 of the IORP Directive. These are schemes guaranteed by a public authority, mainly related to privatised companies; however, the exemption does not include Article 18 on investment rules.

Personal Pension Plans and Stakeholder Pensions are individual, voluntary schemes. Since 2001, employers with more than five employees have to offer a Stakeholder Pension scheme, although the employees are not obliged to participate.

A2.27.2 Relevant schemes

The UK does not have a funded First Pillar scheme. Occupational schemes in the Second Pillar fall within the scope of the IORP or Life Directives. Moreover, the relevant laws or regulations in the UK follow the prudent person principle. The UK is therefore not considered further.

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