

**Pension Risk and Risk Based Supervision in Defined Contribution
Pension Funds**

By

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I. Introduction

1. The main goal of any pension system is to ensure that members receive an adequate pension income when they retire. Whilst traditional defined benefit (DB) pension plans set out what that pension income will be in advance and then strive to deliver it, the growing number of defined contribution (DC) plans accumulate a sum of assets which can then be turned into a pension income on retirement. However, the amount of this retirement income is not set in advance. In the absence of a proper regulatory framework, feature n DC plans leads to a focus by not only pension providers, but also regulators and pension plan members themselves on the short-term accumulation of pension assets rather than the longer-term goal of securing an adequate retirement income.
2. Risk-based supervision (RBS) for pension funds is currently defined as an approach by which the supervisory authority directs its scarce resources towards the main risks posed to pension fund members - as opposed to rules or compliance-based supervision which involves rigorously checking compliance with a set of rules, irrespective of their relative importance to meeting the contributor's objective.
3. This paper first look at how the RBS approach was adopted from the banking and insurance sectors, but has had to be adapted for DC pension funds. The capital requirements which are at the core of RBS in the banking and insurance sectors are not appropriate for, and indeed can introduce misaligned incentives into DC pension systems.² In the absence of a capital adequacy tool in defined contribution systems, RBS faces limitations in helping to ensure adequate pensions for individuals.
4. The paper goes on to argue that, as a consequence, RBS for pensions has been defined as a much less specific way compared with banks and insurers- as a process for the allocation of supervisory resources towards the greatest potential risk. However, based on the examination of World Bank case studies from a number of countries,³ this paper argues that pension supervisors have not properly defined the objectives of DC pension systems. Ultimately they should be concerned with delivering adequate pensions, and therefore on the risk of individuals receiving pensions different than a target- which is termed 'pension risk'.
5. The paper discusses how, by focusing on processes rather than outcomes, operational rather than investment risk and the short-term accumulation of assets rather than the long-term delivery of an adequate retirement income, RBS has failed to fix many of the problems associated with DC pension systems, and indeed may even be contributing to them. A solution for realigning interests, and anchoring RBS to the outcome objectives and minimizing pension risk through the use of benchmarks is proposed. In this context, it is essential to reconnect the role of supervision with the replacement rate objectives of the pension system. The paper explores how the institutional design of the pension fund management industry and the use of market surveillance (basic package of regulation) are efficient in mitigating operational risks in most of the emerging economies with funded pension schemes.
6. Finally, the paper also acknowledges that RBS does not come without costs, and discusses, in the absence of a proper, outcome focused pension objective, whether the benefits of introducing RBS outweigh these costs and whether a slower path towards this more challenging supervisory approach is appropriate in some circumstances.

² The focus of the discussion on DC pension schemes is related to the accumulation phase. In the payout phase, many of these systems offer annuities, which have explicit liabilities, and consequently the most traditional concepts of RBS are applicable.

³ The analysis in this paper is built on the analysis of case studies in Chile, Colombia, Peru, Mexico, Kazakhstan, Hungary, Lithuania, Poland, Romania and the Russian Federation.

7. The paper is organized as follows: Chapter 2 discusses the origins of risks based supervision and discusses the role of capital in the alignment of incentives in financial institutions. Chapter 3 discusses the concept of risk based supervision for pension funds, and its limitations in the case of DC pension schemes. Chapter 4 discusses the effectiveness of RBS schemes in DC systems in emerging economies, and the last section provides some lessons learned.

II. Origins of RBS

8. In its original sense, RBS in a bank or an insurer is the process of the supervisor ensuring that the supervised entity has aligned its capital, risk management and mitigation to the risks that it faces, so that if a risk event occurs, the entity will be able to absorb the impact. The benefit from the perspective of the supervisor is the ability target attention and supervisory resources at those entities which, in the supervisor's assessment pose the greatest risk. This approach replaces so called rules or compliance-based supervision, with supervisors checking retrospectively that all institutions had complied with necessary rules and regulations (thereby treating all in the same way).
9. As a process, RBS requires the supervisor to be confident that the entity has identified its risks both in terms of probability of occurrence and outcome and has robust policies, procedures and systems to measure, monitor and mitigate those risks. One of the key roles of the supervisor is to assure itself that the entity has sufficient capital or access to capital that is consistent with its residual risk.
10. Before examining RBS as applied to the pension sector, it is helpful to consider the evolution of RBS for banks within the risk based capital requirements that have evolved and are evolving under the framework of the Basel Capital Accords and the Solvency II for the insurance sector.
11. RBS is traditionally based on three key elements: capital requirements, supervisory review, and market discipline.⁴ These elements reflect the three Pillars of the Basel II Capital Accord. The movement toward RBS approaches can be traced back to the development of early warning systems for banks, which subsequently put additional emphasis on risk management processes.
12. In 1999, the Basel Committee began the process of replacing the Basel I accord with a more sophisticated framework that required banks to improve risk management and corporate governance in conjunction with improved supervision and transparency. The revised framework, known as Basel II, was designed to encourage good risk management by tying regulatory capital requirements to the results of an assessment by supervisors of the adequacy of internal systems, processes and controls. Linking regulatory capital requirements to the adequacy of systems, processes and controls incentivized boards and management to improve their overall risk management. While creating the linkage between risk management and capital requirements was an important initiative, the

⁴ For a more complete discussion of the motivation for risk based supervision in the case of pension funds, see Brunner, Rocha and Hinz (2009).

- framework went further enhancing the role of supervisors and adding another pillar: market discipline. Basel II was therefore based on three pillars:⁵
13. Pillar one—regulatory capital —focuses on the relationship between capital and risk and reinforces that the responsibility for the proper management of both risk and capital belongs to the board and management of the bank. Pillar one requires the measurement of credit, market and operational risk using either prescribed methods or internal methods approved by the supervisor. Importantly, it requires the implementation of an effective and comprehensive risk management system that includes a proper organizational structure; policies; procedures; and limits for credit, market, and operational risk. Under the Pillar, banks need to assess formally their own capital requirements. Banks are required to have an integrated approach to risk management that covers the risks in particular business segments as well as the bank as a whole.
 14. Pillar two—supervisory review—requires supervisors to evaluate a bank’s assessment of its own risks and to assure themselves that the bank’s processes are robust. Supervisors have the opportunity to assess whether a bank understands its risk profile and is sufficiently capitalized to cover its risks. This pillar encourages the adoption of risk-focused internal audits, strengthened management information systems, and the development of risk management units.
 15. Pillar three—market discipline—ensures that the market is provided with sufficient information to allow it to undertake its own assessment of a bank’s risks. It is intended to strengthen incentives for improved risk management through greater transparency. This should allow market participants to understand better the risks inherent in each bank and ultimately support banks that are well managed at the expense of those that are poorly managed.
 16. The Basel III agreement builds on the three pillars scheme, putting greater emphasis on capital requirements associated with liquidity risk and the leverage of banks.
 17. With a few nuances, this three-pillar scheme was replicated in the insurance sector. At a regional level, Europe is expected to introduce, officially in 2014, the new rules on insurance sector regulation, known as Solvency II. Solvency II also revolves around a three-pillar process. Pillar 1; contains quantitative requirements - the quantification and modeling of risk and capital adequacy. Pillar 2 relates to supervisory review - governance and risk management requirements. Pillar 3 is concerned with market discipline – making disclosure to the public and regulators about the insurer’s capital, risk and management practices.
 18. For Pillar I there are two capital requirements, the Solvency Capital Requirement (SCR) and the Minimum Capital Requirement (MCR) that is a function of SCR. The SCR is to be calculated at least annually under either a standard European-wide formula or subject to regulatory approval, an internal or partially internally designed model. The capital position of the company must be monitored against SCR. This gives the supervisor additional supervisory tools – if the capital falls below the SCR, the supervisor can demand a remedial plan. If the capital position falls below the MCR, the supervisor can withdraw the licensee’s authority unless it is satisfied that a very rapid recovery will be

⁵ To avoid confusion, this note makes reference to pillars only in relation to risk based supervision, and not in the way of building multipillar pension systems.

made.

19. Pillar 2 mandates that companies must demonstrate to the supervisor that they have an adequate system of governance that includes effective risk management systems and risk identification. Each company must assess its risk profile, risk appetite and business strategy and ensure the three are aligned. Through the Supervisory Review Process, the supervisor will evaluate the system of governance and risk management and will have the power to require companies to remedy any deficiencies that it has identified.
20. Pillar 3 requires market disclosure under which insurers companies will be required to publish details of the risks facing them, the adequacy of their capital and their risk management practices.

Cost and Benefits of RBS

21. There are a number of benefits to employing RBS. RBS focuses the attention of an entity on managing its risks. It provides the supervisor of banks and insurance companies with another tool for incentivizing improvement, in addition to the conventional tools of fines, sanctions, directions and administration. A supervisor can focus more attention on those entities that pose the greatest risk and can require that shareholders subscribe additional capital, if it is of the view that the current capital is not aligned with the risks. It is forward looking in that it anticipates the possibility of one or more risk events occurring. It can be more flexible than compliance-based approaches. From the perspective of the supervisor, it enables supervisory efforts to be targeted at the areas of greatest perceived need and, in this way, assists the supervisor to ration its scarce resources, particularly important in countries with large numbers of supervised entities.
22. There are also a number of costs associated with RBS due to the subjectivity involved in assessing the probability and potential outcomes of the occurrence of risk events. On the one hand, entities need to have in place more sophisticated risk management systems, better data, better risk management frameworks and better control systems. On the other hand the costs to supervisors are touched on a detailed framework, better data and probably better trained staff. In addition, from the perspective of the supervisor, this form of supervision requires supervisors to form subjective views about the risk profile of an entity, and the efficacy of its risk management systems. It also requires supervisors themselves to be forward looking. By contrast, compliance based is objective. To be effective, RBS requires a detailed framework within which well-qualified and expert supervisors can make these assessments and which evolves as risks change. Any assessments made without such a framework may even become counterproductive. The migration from compliance to RBS could be long, and consequently the quality of the supervision could be weak during the transition period.⁶

III. RBS in the Pension Sector

23. The trend toward RBS in the pension sector mirrors an increased focus on risk management that occurred in both the banking and insurance sectors where RBS was introduced, but the expected outcomes of the supervision in terms of delivering an

⁶ The insurance sector has acknowledged the difficulties in migrating from one system to another and many countries are adopting multi-year programs to achieve it.

adequate retirement income were not well defined for all types of pension systems. This is especially the case of defined contribution pension systems, where the adequacy of future pensions is not explicitly defined as the main objective of funded pension schemes.⁷

24. In the absence of a direct link between capital and the efficiency of the portfolio, the earlier concept of RBS as applied by supervisors of banks and insurers becomes less relevant for the DC pension fund industry. For banks and insurers it is easy to establish a direct link between *risk-based capital* and *risk-based supervision* and the benefits of using RBS as a tool to ensure that the entities align their risks with their capital are powerful. Shareholders are faced with the tradeoff of improving the risk management or increasing capital requirements. The application of RBS to the pension sector has been the subject of much debate, particularly in defined contribution schemes (DC) where capital requirements have typically a negative effect on the expected value of the future pensions of individuals.

Capital

25. RBS is a useful tool for defined benefit pension funds. Solvency ratios, which indicate the extent to which the assets currently held in the fund cover the liabilities, are routinely calculated. Solvency ratios in DB funds are analogous to capital ratios for banks and insurers. Solvency ratios can be calculated for DB funds because there is a concrete promise that can be quantified. Ratios are an effective tool to motivate sponsors of DB funds to manage risks in the same way that capital motivates banks and insurers.
26. In the absence of capital requirements as a supervisory tool, the relevance of RBS in defined contribution funds is harder to find. The nature of a DC fund is that the investment risk is borne by the contributors, and consequently greater capital requirements on the pension fund management company (PFMC) do not ensure better pensions in the future. Capital requirements on DC pension funds may play a counterproductive role in the value of future pensions.⁸ In the absence of a long-term objective that can be translated into a quantifiable promise, the concept of solvency ratios becomes meaningless.
27. Within banks, insurers and defined benefit funds, capital requirements reduce the possibility of the entity not being able to meet its promises and RBS assists in this by ensuring that a nexus is created between risk management and capital. In these entities, capital is a key tool to ensure that the objectives of the management are aligned objectives of the business. Capital does not serve the same role in DC funds – it does not ensure that PFMCs are efficiently investing the resources of the pension funds that they manage. In other words, it is not evident that well-capitalized PFMCs will invest the pension assets any more efficiently than those companies with lower capital and, in fact, capital does not positively motivate the long-term decisions of PFMCs on how to invest pension fund assets.

⁷ Since their expected liabilities are explicit, defined benefit pension system do not face a dilemma on adequacy.

⁸ As explained below, the counterproductive effect is due to the fact that PFMCs would allocate pension fund assets with the objective of minimizing the risk of the shareholder's capital, instead of optimizing the value of future pensions.

28. While RBS still helps to identify the areas that pose the risks in terms of probability and impact, typically supervisors have focused in identifying operational risks, which are only loosely related the future adequacy of pensions. Reviewing the policies, procedures and processes is, for all intents and purposes, dealing with one aspect of operational risk. While some capital might be required to mitigate some non-investment risks, the amounts should be relatively modest. Alternatively insurance products could be purchased to lessen or eliminate the effects of these operational risks.
29. The Investment Company Institute (ICI)⁹ has maintained that it is inappropriate to impose bank style capital requirements on asset management companies, since the protection of investors, which is the main purpose of holding capital, is not relevant. Products are sold on a *caveat emptor* basis and investors are assumed to understand the risks and to have chosen to take them. Furthermore, according to ICI, capital requirements create anticompetitive effects. Given that PFMCs are specialized asset management companies, the ICI argument may be equally valid in the DC pension sector. The assumption about investors having the capacity to understand the risks is extremely questionable for most contributors to DC schemes, in particular in countries where contributions are mandatory..
30. In the United States and the European Union, capital requirements on defined contribution schemes tend to be modest, and tend to increase only as the asset management companies take counterparty and derivatives risk. Over the past decade the European Union has resisted several attempts to increase capital requirements on asset management companies, as it has recognized the lower risk profile of asset management companies compared with banks. Currently, capital requirements for investment companies that operate in the European Union are one quarter of previous year's fixed overhead. In other words, capital requirements are linked to operating associated risk. In the case of the United States, the Dodd-Frank Act enacted in 2010, imposes margin requirements for pension funds associated with the trading and holding of derivative products. This is related to the requirements for mandatory clearing and trade execution of certain derivative products.
31. The capital requirements for PFMCs in emerging economies are on average higher than those imposed in the United States and the European Union. While in a sector that manages the resources of future pensioners it is essential to ensure that pension fund managers have a minimum level of financial strength, the use of higher capital requirements has been mistakenly used, on occasion, as a way of simplifying the licensing process.¹⁰ Capital requirements have been used potentially to discriminate against small participants that might not be able to comply with the requirements needed for operating a PFMC. While discouraging participants based on capital requirements is simpler than by other means such as fit and proper tests, it has potential consequences on the risk behavior of pension fund managers . Reliance on capital should never be used as a substitute for proper licensing.
32. While many countries have been successful in attracting PFMCs with strong international reputation, the high capital requirements, among other regulatory restrictions, have been

⁹ http://www.ici.org/policy/comments/01_EU_CAPITAL_ADEQUACY_COM1

¹⁰ Table 1 provides information of capital requirements in DC schemes in emerging economies.

an impediment for them to act in the best interest of their clients. Paradoxically, in a DC system, the imposition of high capital requirements on a PFMC may not be in the best interests of contributors. Ultimately, the cost of servicing the capital is borne by contributors through fees and high capital requirements merely increase the level of fees without necessarily improving the performance of the funds under management. As discussed later in the paper, in the case that capital is used to support the provision of guarantees (as the minimum relative return guarantee), the management of PFMC focuses the asset allocation of pension funds in a way of reducing the risk on the capital of the pension fund management company.

33. Where pension funds are allowed to leverage or invest in derivative instruments or structured products that are heavily exposed to counterparty risks, an additional layer of protection might be necessary, and capital may start playing a role in risk management decisions of the PFMC. However, the large majority of emerging economies analyzed in this note do not invest in these types of instruments.
34. Some countries have built capital based requirements that create additional distortions in the asset allocation.¹¹ The case of Kazakhstan is one of the most dramatic extrapolations of the risk-weighted capital from the banking industry to the private pension fund industry. The regulation known as K2 has imposed capital requirements on the PFMCs that depend on the risk weighting of the assets held in the funds they manage. Thus, PFMCs are required to put up more capital if they are investing in equities, versus investing in bonds. As expected, portfolios have become concentrated in fixed income government instruments with the lowest risk weightings, which, in Kazakhstan, pay returns below the inflation rate. As the government guarantees the real value of the contributions at retirement age, the government has been paying the difference between inflation and returns to maintain the real value. In any case, because of the disincentives created by K2 and the resulting very conservative portfolios, the expected replacement rates are likely to be very low. In addition, PFMCs have transferred the higher costs of the system associated with the high levels of capital to the contributors through higher fees.¹²

RBS supervisory objectives and the pension objective

35. Given the link between risk-based supervision and risk-based capital is not always applicable in the pension sector, in its Risk-based Supervision Toolkit,¹³ the International Organisation of Pension Supervisors (IOPS) provides a less specific definition of RBS to that used in the banking and insurance sectors.
36. With all the weaknesses implied by the lack of relationship between capital and future pensions in the case of DC pension schemes, the IOPS definition focuses on optimizing the use of supervisory resources of the supervisory agency. According to IOPS, “*risk-based supervision is a structured approach that focuses on the identification of potential risks faced by pension plans or funds and the assessment of the financial and operational factors in place to manage and mitigate those risks. This process then allows the*

¹¹ The regulation of the pension system in Costa Rica has some similar features in terms of risk weighted capital requirements, which are related to the investment risk.

¹² The pension fund management industry of Kazakhstan was consolidated in a single company in 2013.

¹³ See www.iopstoolkit.org

*supervisory authority to direct its resources towards the issues and the institutions that pose the greatest threat”.*¹⁴

37. IOPS postulates that RBS is a method of rationing scarce supervisory resources and focusing supervisory attention towards the entities that, in the supervisor’s assessment, pose the greatest risk. As discussed, in the absence of the possibility of using risk based capital in DC pension schemes, this concept has only some of the elements of the original concept of RBS.
38. In place of allocating resources based on some indicators such as regulatory infractions or member complaints, IOPS suggests that resources should be allocated on the basis of the entities’ risk profiles in a formal way. IOPS suggests that the risk assessment of the supervisors should involve the assessment of emerging and possible future risks as well as current and past risks. IOPS’ work focuses on two of the benefits of RBS- a forward-looking approach and the allocation of supervisory resources.
39. The broader definition of RBS applied by IOPS highlights that pension supervisors should first identify their main objective, then identify the main risks to achieving that objective, before putting in place solutions, approaches and mechanisms for mitigating that risk.
40. The ultimate goal of any pension system is to provide adequate and secure pensions, and protecting these pensions should be therefore ultimately the objective of any pension supervisor. This is outlined in IOPS Working Paper No. 12,¹⁵ which provides a description of the different ways in which IOPS members supervise DC pension funds:

“With DC systems, the focus has to be on processes rather than outcomes as benefits are not guaranteed. The role of the supervisor is to ensure that the pension fund is managed in a secure way, as if the members themselves were undertaking the task.

The focus of the supervisor should be on risks which impact on the members of the fund themselves and could involve them losing money. As it is the member that bears the risk, it is the member outcomes that pension supervisors are seeking to protect and the focus in looking at risks is to reach these optimal member outcomes. These optimal outcomes would include appropriate contribution decisions, effective administration, appropriate investment decisions, security of assets, appropriate decumulation decisions and value for money.”

41. The IOPS definition notes that the benefits in DC schemes are not guaranteed. The larger issue is that future benefits are not currently routinely quantified, although some advanced countries have started to focus on outcomes. In other words, while the objective of a pension scheme should be to provide adequate and secure pensions, the concept of adequacy is not quantified. Consequently, retirees face the risk of having an inadequate pension.

¹⁴ IOPS Principles of Private Pension Supervision No. 5 states that: ‘*Pension supervisory authorities should adopt risk-based supervision*’ – see

<http://www.oecd.org/site/iops/principlesandguidelines/Revised%20IOPS%20Principles%2018.11.2010.pdf>

¹⁵ See Ashcroft and Stewart (2010)

42. The risk that is of most significance to contributors in DC schemes should be ‘*pension risk*’. Put simply, pension risk is the risk that on retirement, the actual pensions are different than a specific target, which could be related to a specific replacement rate, annuity or volume of assets. In a simple way, pension risk would measure whether the individual will have sufficient income to live in the manner that they want.¹⁶ By (a) defining explicit pension targets; (b) designing investment strategies to achieve those targets; and (c) finally measuring the deviations against those strategies, DC pension schemes might focus more explicitly on outcomes and not in processes may help to replicate strategies that minimize pension risk, and expectations of achieving such targets DC pension schemes may focus on outcomes rather than processes. Consequently, pension risk should be the prime concern of pension strategies in DC pension schemes.
43. However, this pension risk is not measured in DC pension schemes in emerging markets with funded pension schemes and therefore not explicitly made the objective of most DC pension systems. Although many of the best run pension funds in the world do indeed manage their investments with such explicit targets and pension risk in mind,¹⁷ it could be argued that this is a failure of DC systems in general.
44. In turn, RBS for DC pension systems fails to take ‘pension risk’ into account, explicitly. Many countries have introduced features of RBS into their pension system supervision. For example, countries that have included features of RBS in the sample considered in this paper include Chile, Colombia, Mexico, Peru, Lithuania, Poland, and Hungary. However, none of them has created explicit targets in terms of expected values of retirement income.

Box 1: Risks Outside Supervisors Remit

In most of the emerging markets with mandatory funded systems, the main risks faced by the funded pension schemes are outside the remit and control of the pension supervisory authority and therefore their RBS systems. These risks include:

1. Nationalization risks, or the probability that the mandatory funded schemes will be dismantled, as has happened in Poland, Hungary, Argentina, and Bolivia;
2. Fiscal risks, as in El Salvador, Latvia, Lithuania, Slovakia, Russian Federation and Romania, where the contribution rate is the variable for adjusting annual fiscal revenues;
3. Related party risks, as in Colombia, where the shareholder of one of the PFMCs is also the main shareholder of many of the large companies listed in the stock market into which pension fund monies are invested. PFMCs in some of these companies are managed by subsidiaries of large pension funds, where local supervisors have little capacity to influence on the investment and risk management decisions of these institutions.
4. Transition risks, with the exception of Chile, where the introduction of the basic pension in 2008 helped to smooth the transition, contributors to the funded pension systems at retirement age may find their pensions substantially lower than those of individuals that did not contribute to the system, as in Mexico and Colombia.

In order for pension reforms to be successful and for pension systems to run effectively, policy makers need to first focus on these macro-political issues. Without a supportive backdrop, no amount of or approach to supervision can save a pension system.

45. The failure to quantify the objective from the perspective of both the contributors and the DC schemes can actually contribute to rather than mitigate pension risk in DC systems. As DC pensions do not make explicit promises, supervisors generally focus on processes rather than outcomes – as the IOPS points out. The lack of an explicit objective is an important shortcoming of the supervisory framework, as the bulk of the RBS efforts focuses on processes rather than outcomes. This can actually introduce misaligned incentives into the system.
46. Minimizing pension risk in a DC scheme, that is minimizing the risk of having inadequate retirement income, is a function of three main factors:
- the level of contributions throughout the accumulation phase;
 - the security of the funds contributed; and
 - the earnings on those contributions net of fees.
- The level of contributions is a matter of public policy as are the earnings on contributions where there are very restrictive investment limits. Under these circumstances, the remit of the supervisor is limited to the security of the funds.
47. Given that contribution risk is outside the supervisors’ control and that in many cases investments are subject to tight controls, the focus of DC supervisors on processes rather than outcomes has arguably led pension supervisors to focus more on operational risks than on investment risk - i.e. the security of those funds rather than the earnings on them.¹⁸
48. The focus on process with respect to investment management places undue emphasis on operational risk to the detriment of emphasizing pension risk, which is the main concern of contributors.
49. The Investment Governance Guidelines recently issued by the Australian Prudential Regulatory Authority (APRA) highlight the emphasis that is being placed on process with respect to investment management in DC schemes. The focus of the Guidelines is on the investment process, with return and risk objectives mentioned, but the Guidelines do not include a discussion of outcome objectives.
50. This focus on processes rather than outcomes can mean that regulators and supervisors actually introduce misaligned incentives into the management of pension funds and can actually increase rather than mitigate the key pension risk which is what should be the main focus and objective.

¹⁸ In some cases processes and operational risks may well be important risks to focus. This could be in the case in some emerging markets where corruption and fraud within the financial sector are still major challenges. At the other end of the spectrum, this may also be appropriate where highly sophisticated, non-profit pension funds manage investment risk successfully, i.e. in the best interest of the members of the fund. Section IV discusses mechanisms for addressing these risks in an efficient manner.

51. This is most clearly seen in the way investment risk is managed, where the focus has been on generating short-term returns rather than long-term pension incomes.

Asset Class Restrictions

52. Pension investment regulation in most countries currently serves to reinforce this focus on the short-term generation of investment returns rather than the long-term generation of a pension income. Investment risk is generally controlled via limits on the amount of a portfolio which can be invested in certain (risky) assets.¹⁹ The main issue with these asset class restrictions is that they focus on short-term volatility without considering the ultimate risk to pension fund members – i.e. will they receive an adequate retirement income.²⁰
53. Indeed, it often leads to an overly conservative investment approach - which is initially supported by the members of the pension plan due to financial literacy and behavior economic biases reinforcing the focus on the short-term and the avoidance of risk.²¹ Consequently, though protecting against short-term portfolio losses, these investment approaches will not be sufficient to deliver an adequate retirement income over the long-term.
54. In most of the countries sampled during the study, investment limits were mandated in either the law or regulations that were beyond the control of the supervisory agency. The supervisors were concerned on two levels – did the PFMC have the systems and procedures in place to ensure that the limits were not breached (operational risk) and were the limits breached (compliance or legal risk). Where the approach to investment was more *laissez-faire*, the concerns of the supervisors were different. The supervisors' activities focused on: (1) did the PFMC disclose its investment strategy to members and potential members; and (2) did its actual strategy align with that which was disclosed;. Again, this approach resulted more in a measurement of operational and compliance (legal) risks than investment risk.

VaR as a Regulatory Tool

55. Some supervisory authorities have tried alternative measures for controlling investment risk as asset class restrictions have been removed. Yet these also control short-term volatility rather than pension risk.
56. Mexico introduced an investment regulatory framework based on quantitative measures traditionally used to measure short-term investment risks. Mexico introduced a maximum limit on the VaR (Value-at Risk) of the pension portfolio.²² While the VaR is a risk measure that is easy to quantify and can provide high frequency data to traders and investors, its relevance for risk management of long-term investors, such as pension funds, is questionable and creates incentives to manage the investments as short term

¹⁹ Details of investment restrictions around the world can be found in the regular OECD survey:

<http://www.oecd.org/daf/fin/private-pensions/2011SurveyOfInvestmentRegulationsOfPensionFunds.pdf>

²⁰ As described by Blake et al (2008) this is the equivalent of worrying about air turbulence on a flight without considering whether the plane is actually going to reach its destination.

²¹ See for example Benartzi and Thaler (2007).

²¹ Blake, Cairns, and Dowd (2008)

²² The use of the VaR as a regulatory measure was eliminated in 2013.

- portfolios. VaR is a measure of volatility and provides little information about the probability of reaching an adequate pension at retirement age (pension risk).
57. While the regulation should create the conditions for asset managers to invest pension fund assets strategically in order to optimize the future value of pensions, Mexico's VaR took a narrow approach on portfolio allocation and focused on maintaining volatility within a predefined range. However, short-term volatility is a poor predictor of the value of the benefits at retirement age. Using an inappropriate tool to try to measure performance against some ill-defined short-term objective (VaR) increases pension risk even further.

Guarantees

58. Other regulators have tried to move more towards controlling the outcomes which DC pension fund deliver via the introduction of guarantees. Yet the examples from the countries considered in this paper show that these too can introduce misaligned incentives into the pension system which actually increase rather than decrease the risks of achieving an adequate pension income.
59. Many countries have adopted measures by which the PFMCs have to guarantee the performance of the funds under their management. The introduction of guarantees not only increases the cost of the system and lowers returns to contributors, but also creates distortions in the asset allocation of the pension funds. These factors translate into lower pensions in the future.
60. The regulations in Russia, Romania and Slovakia, as well as other countries, require PFMCs to guarantee the nominal value of contributions, at different points in time. For example, in both Romania and Russia, the timing of any payment by the PFMC to meet its obligations under the guarantee is not explicitly stated in the law, and the supervisory agencies have not been able to clarify it. In this context, trustees and PFMCs have taken a conservative approach and have assumed that these guarantees can be executed at any point in time. This has resulted in conservative pension portfolios, with low volatility and potentially low pension benefits in the future. Consequently, the guarantees on the nominal value of the pension fund result in increases in pension risk, as managers invest the pension fund in inefficient portfolios that will be unable to deliver adequate benefits at retirement age, but will protect the capital the shareholders of the PFMC.
61. The regulations in most of the other countries sampled with mandatory funded schemes include the use of minimum relative return guarantees (MRRG). PFMCs are required to guarantee that the returns on their pension funds (over a certain period of time) do not deviate by more than a certain percentage from the average return of the industry. A company that reports a return below the minimum is required to subscribe the difference between its return and the relevant benchmark return from its own resources.
62. As pointed out by Rudolph and others (2010), while most of the literature highlights the herding effects of minimum guarantees, the problem is not one of herding but in the portfolio allocation resulting from the interactions in the market. Herding is in the nature of the fund management industry, and having common portfolio benchmarks helps to ensure comparability among portfolios.

63. The minimum relative return guarantees tend to drive investments into suboptimal portfolio allocations.²³ Instead of optimizing the expected value of the pension fund at retirement age, pension funds focus their attention in maximizing short-term returns. PFMCs are required to build a reserve requirement, equivalent to a figure of between 1 and 2 percent of the assets under management as illustrated in Table 1.

Table 1. Capital and reserve requirements in mandatory pension funds,^a 2012

	Basic Capital	Reserve Requirement		Basic Capital	Reserve Requirement
	(USD million)	(%AUM)		(USD million)	(%AUM)
Bulgaria	3.4	1.0	Chile	0.2 - 0.8	1.0
Poland	6.8	0.4-0.5	Mexico	2.1	0.8
Romania	5.4	1.0	Colombia	3.6	1.0
Croatia	7.1	na	Costa Rica	RW	na
Slovakia	9.7	0.0	El Salvador	3% AUM	0.3
Russia	2.5	0.0	Dominican R	0.5-0.6	1.0
Estonia		1.0-2.0	Peru	0.2	RW
Lithuania	0.4	na	Uruguay	1.6	0.5-2.0
Ukraine ^b	0.1	0.0			

a Participating PFMCs are required to comply with these requirements

b Voluntary funded system

Note. RW= risk weighted; na =not applicable; AUM= assets under management

64. The MRRG create significant distortions in the asset allocation of pension funds, as PFMCs move the investments of pension funds into portfolios that try to minimize the probability of triggering the guarantee. In other words, PFMCs guide their investments with the objective of protecting their own capital (reserve requirement), instead of ensuring that pension funds are invested in portfolios aimed at optimizing the expected value of the pensions of the current contributors at retirement age. It is not unusual to find personnel in the PFMCs whose job description includes estimating, guessing or spying on the portfolios of the competition.
65. In addition, with the existence of guarantees and/or the requirement for the investment of reserves to mirror the investments of the pension fund, there is an argument to suggest that the PFMCs are more concerned with measuring their capital at risk than they are measuring the investment risk in the fund.
66. The introduction of guarantees creates additional distortions in the duration of the fixed income portfolio of the pension funds. Since the liabilities are largely long term, the fixed income part of the portfolio should consist of investments in long-term inflation linked bonds. These instruments protect individuals from interest rate risk, associated with reinvestment risk, and also to the risk of unexpected changes in the rate of inflation. However, short-term competition, exacerbated by the MRRG, tends to incentivize fixed

²³ See Castaneda and Rudolph (2010)

income instruments of shorter durations being held. Measured from a short-term perspective, the value of long-term bonds is more volatile than those with shorter terms, so it is more rational for PFMCs intent on protecting their own capital--given the MRRG requirement—to invest in instruments with shorter duration.

67. Many countries require that the reserves be invested in the same way as the assets of the funds under the management of the respective PFMC. While the rationale of this approach was designed to align the interests of the PFMC with the interests of the contributors to the funds, the requirement appears to have a distortive effect on the asset allocation of pension funds. PFMCs are concerned with short-term investments with low volatility for their own capital and to comply with the requirement invest the pension fund assets in these types of investments. In other words, the requirement seems to align the interests of the contributors with those of the PFMC and not vice versa. As financial institutions, PFMCs are interested in maximizing profits in a shorter span than the pension fund, and the risk criteria might be totally different than the one of a pension fund.

Performance Measurement

68. Just as the way investment risk is controlled can introduce misalignments into pension fund management and actually end up increasing rather than mitigating pension risk, the way investment risk is measured can have the same effect.
69. In the absence of more innovative tools for measuring pension risk, the performance of pension funds is typically measured by rates of return (typically in short-term horizons), which are not only misleading, but they are also poor indicators of pension risk. While rates of return are useful tools for measuring short term performance, their relevance in mitigating pension risk is limited. In other words, answering the question of “will I have enough” does not exist.
70. If measured in absolute terms, rates of return say very little about the effectiveness of the pension fund managers. For example, when a contributor receives a report that says that last year his or her pension fund had a rate of return of 5 percent, the contributor does not have enough information to differentiate between a good and a bad performance. While in the United States, 2-year government bonds offer an annualized rate of approximately 0.34 percent (September 27, 2013), in the Dominican Republic similar government instruments offer an annualized rate of 12.6 percent. Consequently, a 5 percent rate would be a good return in the United States, but a very poor return in Dominican Republic. To follow the same example, a 5 percent return in US dollars in September 2007, when 20 year government bond rates were close to 5 percent, does not seem like a great investment compared with a 5 percent return at the end of September of 2013, when 20 year government bond rates are only 3.4 percent. In addition, comparisons of pension returns across countries, as among other factors, the reference rates are different, as shown in Table 2.

Table 2. Long-term nominal interest rates, December 2012^a
(annual returns)

Bulgaria	3.4	Chile	5.5
Croatia	4.5	Colombia	5.5
Latvia	3.2	Costa Rica ^b	14.0
Lithuania	4.0	Dominican R. ^c	9.8
Poland	3.9	Mexico	5.4
Slovakia	3.9	Peru	4.1
Romania	6.7		
United Kingdom	1.7	United States	1.86

a 10 year government bond rates, and convergence rates in the case of EU countries.

b interest rate of 2-year bond

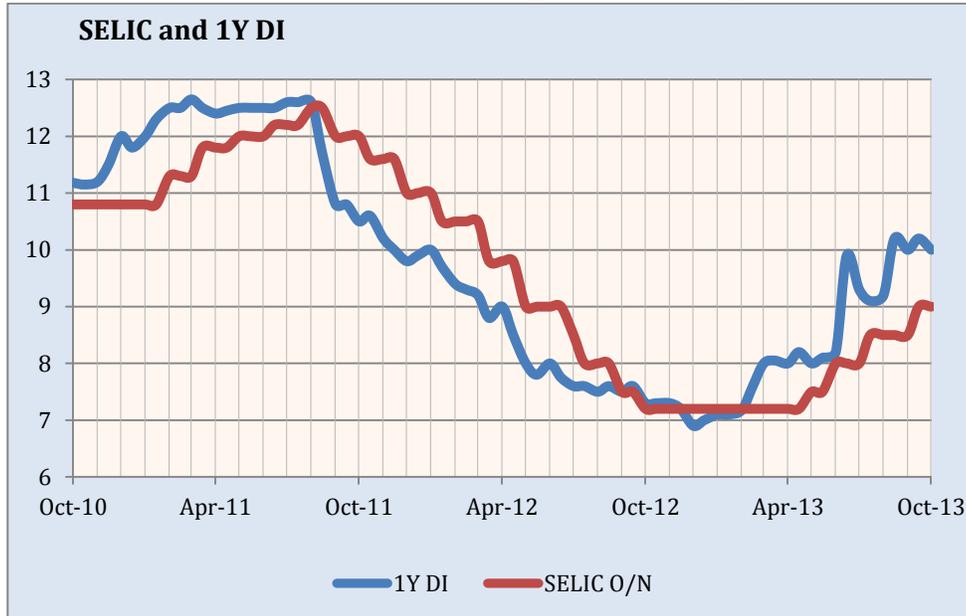
c average interest rate of bonds with maturity of 4-7 years

Source. European Central Bank and country sources

71. Short-term Treasury rates are not the proper benchmark for measuring performance of pension funds, as they do not take into consideration the reinvestment risk. Reinvestment risk is an important risk for pension funds because of the long-term nature of their liabilities. However, reinvestment risk is not measured when short rate returns are considered. For example, in the case of Brazil, open pension funds are heavily invested in short term rates (overnight). Between September 2010 and September 2012, interest rates have decreased by approximately 500 basis points (see Figure 1). During this period the returns of pension funds have decreased by the same amount. By contrast, having the pension funds invested in bonds with longer maturities,²⁴ contributors would have not suffered lower returns as short interest rates moved down, because of the absence of reinvestment risk. As shown in Figure 2, the yield curve in October 2010 would have allowed pension funds to lock in interest rates at levels above 11.8 percent.

²⁴ Yield curves are typically relatively flat in Brazil.

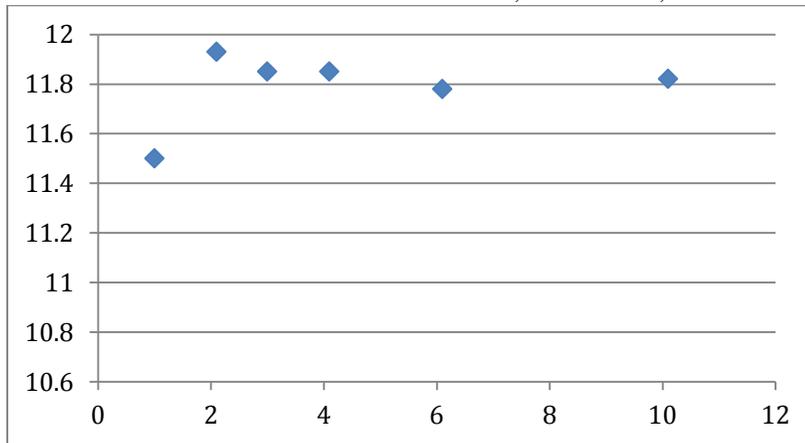
Figure 1. Brazil: Short-term interest rates, September 2010-September 2013^a



^a DI funds are indexed to one year CDI. Selic is the overnight rate targeted by the Central Bank for monetary policy purposes.

Source: Deutsche Bank

Figure 2. Brazil: Points of the Nominal Yield Curve, October 27, 2010^a



^a Points in the yield curve reflect prices of NTN-F

Source: Deutsche Bank

72. It could be argued that even if performance were measured properly (against long term benchmarks rather than short-term volatility) individuals would not be able to assess this properly due to low levels of financial literacy.
73. Given the complexity of the decisions that contributors are required to make, it becomes difficult for a funded pension system to function based purely on a competitive basis. Member disclosure has been predicated on the view that increasing disclosure will enhance competition between pension funds as members elect to join funds with superior returns. However, due to the limited ability of contributors to understand investment

- decisions and the complexity of the question, a large majority of individuals are unable to understand the risks of the investment alternatives, and typically information provided to the market is focused on misleading indicators of pension risk. In other words, contributors are provided with information that relates to the short-term performance of their pension asset but is irrelevant to the question of pension risk (“will I have enough”).
74. The concepts of risks that are sometimes presented to the public are more related to short term volatility rather than pension risk, which does not help to minimize the pension risk. For example, in the case of Chile, pension funds are classified into five categories: riskier, risky, balanced, conservative, and more conservative. These categories are simply based on the amount of equity as a proportion of the total assets in the portfolio. Consequently, for an individual who is closer to retirement age, the riskier portfolio, which can have up to 80 percent of the fund in equity instruments, might be a risky portfolio option as sudden drops in equity prices may severely affect his or her future pension without sufficient time to recover those losses. However, an individual who is joining the labor force, and has the objective of reaching a replacement rate of 75 percent of the last wage, should start investing in the riskier portfolio, as he or she has a long time to recover from potential short-term adjustments in equity prices and consequently to minimize his or her pension risk. For this young individual, it would be risky from the perspective of pension risk to invest in the conservative or more conservative portfolios, since investments in these portfolios are likely to provide low returns and consequently will result into low pensions in the future, with consequently high pension risk. In other words, this lifecycle approach to investing does actually help to manage pension risk, but the way in which they are described to individuals is more in terms of short-term volatility. If contributors understood and made rational decisions and if the performance measures were aligned with pension risk, such an approach would not be needed.
 75. Acknowledging the limitations of short-term performance measures, some pension supervisors have been trying to introduce other measures of performance, such as quality of service. However, it is not clear that such indicators reduce pension risk, and, given that, to use the old adage, ‘what gets measured gets managed’, it could be argued that they add little or indeed, as with the other performance measures, could actually introduce misalignments into the system.
 76. For example, competition on quality of service, as it was implemented in Chile, may serve to add additional noise in the efforts to build a Pillar 3 of RBS based on market oversight. Chile’s pension regulation requires that PFMCs compete on quality of service. This creates an additional source of cost for the management companies (an interesting piece of analysis would be to see if costs have actually risen since its introduction). Competition on quality of service, which is something more tangible to people, may distract the attention of individuals from the objective of minimizing pension risk. Individuals with limited financial literacy might be more incentivized to move to between PFMCs with better quality of service, regardless the financial performance of the fund.
 77. While any initiatives to improve the financial literacy and understanding of pension fund members are laudable, at best, they are long-term initiatives. This market failure calls for more attention in the provision of default options, such that individuals with limited financial education might be guided towards the right strategies.

Aligning Incentives – Use of Benchmarks

78. The failure to measure pension risk is a function of a lack of benchmarks, against which it can be measured, which, in turn, is due to the failure to quantify the pension objective. In other words, it is not possible to answer the question of “will I have enough?” unless there is a quantification of “enough”.
79. Can the attention of pension supervisors be focused back towards to core goal of delivering an adequate pension income and mitigating pension risk?
80. This paper argues that benchmarking portfolios of pension funds is the most strategic way of applying the pillar three concept to RBS of pension funds. In order to be meaningful, rates of returns need to be compared against something. Consequently, it is essential to measure performance against benchmarks built with the objective of optimizing the contributors’ pensions at retirement age.²⁵ In the absence of explicit targets related to the expected value of pensions at retirement age, the introduction of RBS does not guarantee that the expected value of pensions at retirement age will adequate. In other words, if RBS is to be more meaningful, it needs also to supervise investment risks, and assess those risks against benchmarks derived from quantifiable targets.
81. The proper approach to pension design, including for DC schemes, is to start calculating back from a desired/required pension level and setting a long term investment strategy adequate to reach this goal. Given, say, a 66 percent replacement rate target at the age of 65 and a contribution rate of 8 percent, one needs to calculate expected annuity prices based on mortality data and estimates about improvements, and then use asset return and wage curve modeling to see what sort of investment performance and portfolio may be necessary to reach the pension capital required. It may turn out that the set of replacement rate – retirement age – contribution rate does not allow for an investment performance which is realistic in which case one or more of those parameters may have to be adjusted or the expectations of a future replacement rate lowered.
82. This approach is fundamentally different from the standard one of ‘contributions are defined and benefits will be as much as investment strategies succeed in delivering’. From day one a long term investment strategy and portfolio must be utilized, whose only objective is to lead to adequate pensions.
83. Given this goal, an alternative approach to controlling investment risk is required. The best way to align regulation with the long-term goal of delivering adequate pension income is through the use of benchmarks or reference portfolios. These are designed to deliver a targeted pension income within the parameters of the greatest probability and the least risk. Large pension funds like NEST in the United Kingdom; Canada Pension Plan; Norway pension fund; and New Zealand’s Superannuation funds use benchmark portfolios to measure the performance of the fund, based on an objective target.
84. Supervisors could then work this analysis into their overall risk assessment via a ‘traffic light’ system. For example a green light would indicate a pension fund with a portfolio structure aligned with the benchmark and a good risk management system.

²⁵ The discussion of how to build benchmarks is beyond the scope of this paper. Rudolph and others (2010), Rudolph (2013) and Stewart (2014) provide some discussions on the topic.

Box 2: Portfolio Benchmarks in Lithuania

Lithuania is one country which partially adopted such a benchmarking approach, but without sufficient supervisory oversight and with misaligned incentives remaining within the system.

Among countries with mandatory, individual account pension schemes considered in this paper, Lithuania is the country with the most liberal investment policies. Pension funds are managed by licensed asset management companies, which are allowed to manage other funds as well. The investment regulation requires only a minimum level of diversification of the instruments under management. There are no restrictions on the number of portfolios that each of the asset management companies that manage pension funds are required to offer. While some companies offer two, others offer up to five. The number of funds and the investment strategy of these funds have been mostly guided by the capacity of the sales force to bring a minimum number of contributors to these funds. Each fund is guided by its own investment guidelines, which can change without much notice.

Pension funds are required to make available to the supervisor the benchmark portfolio that they are expecting to follow, but the regulation does not impose explicit requirements for following such a benchmark and there are no penalties for diverting from it. In the absence of a clear mandate, the supervisory agency was unable to do anything meaningful with the benchmarks, except making them available to the public on a webpage.

Under these circumstances, contributors faced a web of different portfolio strategies, with unknown risk profiles, and without the tools to compare them. The association of asset managers made an effort to group the strategies of the pension funds into three broad categories, but given the diversity of investments, it is possible to identify a fourth group within the alternatives being offered.

In summary, the Lithuanian experience offers a case of individual plans with multiple investment alternatives, with an undefined objective and with supervisors without sufficient powers to provide guidance on the pension risk faced by the contributors, where contributors with limited financial education are faced with multiple portfolio options and are unable to evaluate the impact of their decisions on their future retirement income.

IV. Is RBS for Pensions Cost Effective?

85. As has been recognized in the banking and insurance sectors, introducing risk-based supervision is not without costs. In the absence of explicit targets related to the expected value of pensions at retirement age and assigning the supervisor with the objective of assessing pension fund performance against those targets, the introduction of RBS, when compared with compliance-based supervision, does not address the main issue, which is to ensure that the expected value of pensions at retirement age will be adequate, other than in relation to the contributions already made. In other words, if RBS is to be meaningful and to outweigh the cost/ benefit of compliance-based supervision, it needs to supervise also pension risk.
86. Migrating from compliance to RBS models, without supervising pension risk will still provide some benefits, but these may not outweigh the costs. Justification might come from the perspective of efficiency of the state, better use of the public resources, and clearer objectives for the supervisory agency.
87. The small number of pension fund management companies in most of the emerging economies with funded pension schemes makes the argument for introducing RBS less forceful. While the justification for better focusing scarce supervisory resources may be pertinent in countries with hundreds of pension funds, such as Australia and the United Kingdom, the argument is less relevant in countries with open pension systems which have a small number of PFMCs. As shown in Table 3, in most of the emerging countries with open funded schemes, the number of pension funds is typically between two (El Salvador, Macedonia) and 14 (Poland – before recent changes). While some of these supervisory agencies may need to upgrade the skills of the personnel, the potential availability of supervisory resources for supervising a small number of pension funds might not be considered as the main driver for introducing RBS.

Table 3: Number of pension fund management companies, ^a 2012

Country	# of PFMCs	Country	# of PFMCs
ECA		LAC	
Poland	14	Bolivia	2
Latvia	8	Chile	6
Estonia	6	Colombia	6
Lithuania	10	El Salvador	2
Slovakia	6	Mexico	12
Bulgaria	9	Peru	4
Romania	9	Dominican R.	5
Croatia	4	Uruguay	4
Macedonia	2	Costa Rica	7

Source: country sources

a. countries with mandatory funded system

88. If the portfolio allocation of pension funds is driven by the investment regulation, the case for introducing RBS is limited. In countries that mandate, through regulation or law, the investment limits within which PFMCs can work, there may not always be a business case for adopting RBS. This is especially the case in countries with investment restrictions that by default force investments into certain type of assets. For example, small countries with underdeveloped bond and equity markets, where investment regulation requires pension fund to invest in liquid domestic assets, typically result in large investment in government bonds, which are typically the most liquid assets in the country.
89. The justification for introducing RBS would be stronger in cases where the supervisory agency is mandated to take a proactive role in supervising investment risk, with the aim of mitigating pension risk. The case for introducing RBS is even more relevant in cases where pension funds are allowed to leverage or invest in derivative instruments or structured products that are heavily exposed to counterparty risks. In these cases, an additional layer of protection might be necessary, and capital may start playing a role in risk management decisions of the pension fund management companies. However, the large majority of emerging economies analyzed in this note do not invest in these types of instruments.
90. Good institutional design and a basic package of pension regulation are efficient tools for addressing the operational risks of funded pension schemes in most of the emerging markets with funded pension schemes. In addition, the justification for introducing RBS simply to mitigate operational risks is weak. Under these circumstances, good institutional design and a basic package of regulation appears a viable alternative to RBS.

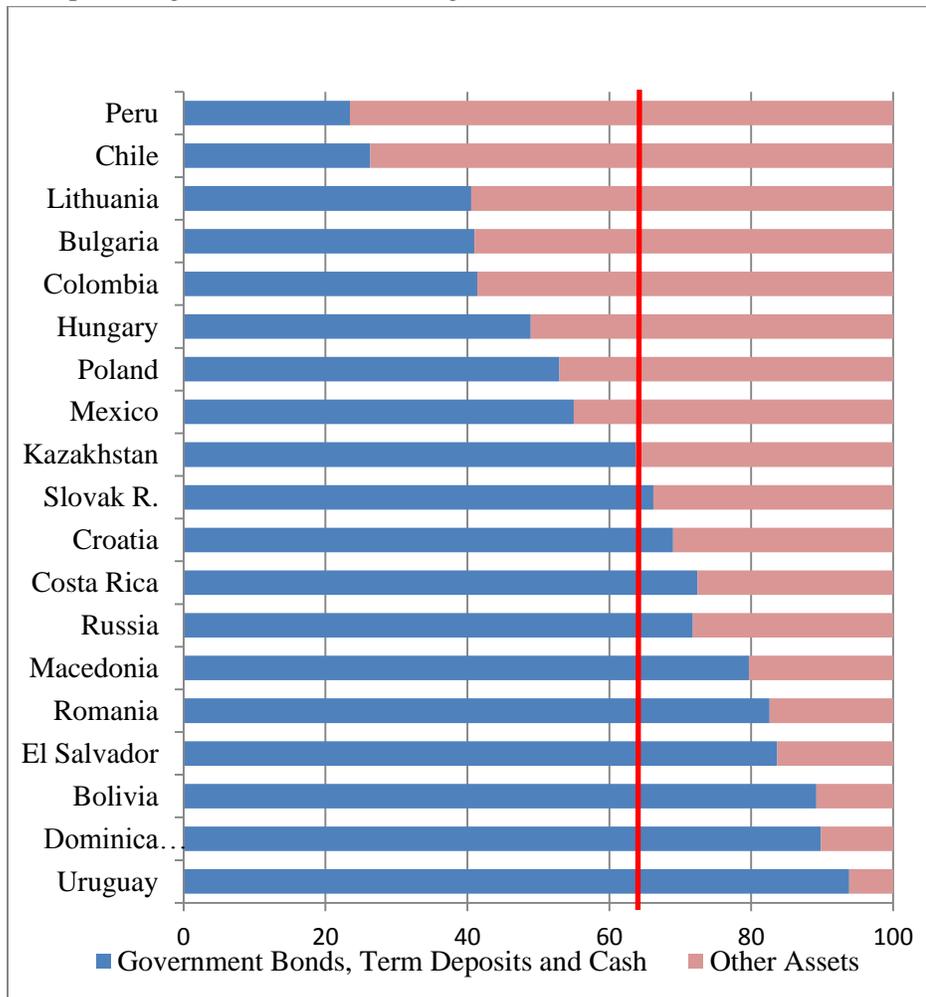
Table 4: Basic Package of Pension Regulation

Licensing	PFMCs require a license. After a process of fit and proper evaluation, and an assessment of resources and risk management capabilities of the PFMC, the supervisory entity, and in some cases other government entities, grant licenses to PFMCs to manage voluntary and mandatory pension funds. Typically, the PFMCs that have received a license are part of bigger financial groups. The fact that the local companies are part of a large financial group is important from a risk perspective as the risk management policies and processes are derived from the parent entity. The reputational risk of the parent entity becomes a major risk-mitigating factor for the local operation. The size of the local operation is very small relative to the group – this is significant from the perspective of the group supporting the local operation in order to minimize the possible reputational risk to the group arising from the local operation.
Capital	PFMCs are required to maintain a minimum level of capital commensurate with their proposed level of activities that fluctuates between approximately USD 100,000 (Ukraine) and USD 6.75 million (Poland).
Governance	Regulations typically require PFMCs to be constituted as share companies or as subsidiaries of international financial groups. They are required to have a board of directors, in some cases with independent directors. At the management level, the front office needs to be separated from the back office. These basic governance structures replicate the structure of asset management companies in more sophisticated markets.
Eligible Instruments	Open pension systems are typically allowed to invest in a restricted menu of options, which include cash, bonds, and equities. They are also allowed to invest in mutual funds and other collective undertakings, but each of these assets needs to be explicitly authorized by the supervisory agency (e.g. Peru), or by an independent institution, as the <i>Comision Clasificadora de Riesgo</i> in Chile. ¹ Pension funds are typically not allowed to leverage, and the use of derivatives is restricted to small notional amounts, which should be used exclusively to mitigate risks (Mexico is an exception).
Trading Platforms	Regulations typically require all transactions to be conducted on recognized exchanges or trading platforms that provide sufficient information to the market on volumes and prices. In some cases, pension funds are allowed to purchase government securities through banking platforms, in cases where this market is more liquid. The compulsory use of trading through qualified platforms helps to avoid basic problems of price manipulation and transfer of wealth to other parties through fictitious prices.
Mark-to-market Valuation	Independent agencies, the supervisory agency (Chile), a price vendor (Colombia, Mexico), or a custodian bank (Slovakia, Lithuania, Estonia) typically provide valuations of assets. Mark-to-market valuation by independent agencies avoids price manipulation and perverse market practices for transferring wealth from the pension fund managers to the shareholders of the

	companies or their associates.
Depository Functions	PFMCs are required to deposit the securities in a Central Depository, through a book entry transfer of financial instruments. The depository holds the titles of securities and allows only authorized individuals to transfer the instruments. The depository institution reduces operational risks and the risks of fraud that can occur if documents are stolen. Since titles are maintained in a separate institution, the compulsory use of depository functions helps to mitigate basic problems of theft and fraud.
Custodian Functions	Custodians employ accounting practices and safekeeping procedures that fully protect the assets of the pension fund, particularly against the creditors of pension fund managers. The legal framework requires separation of the assets of the pension funds from those of the PFMC and ensures that the assets of the fund are not available to pay claims against the PFMC.
External Auditors	External auditors, who are frequently approved by the supervisor for that purpose, audit financial statements of the funds and PFMCs on a regular basis. The auditors have an obligation under the Law and the regulation to report to the supervisor both routinely and in the event of any occurrence or likely occurrence which will jeopardize the financial position of either the funds or the PFMC.
Efficient Payment + Securities Settlement	Most of these countries have in place electronic signature and documents, validation of netting, and settlement finality. In addition, most of these countries have in place a plan to converge to Delivery versus Payment standards, which is one of the primary means by which a market can reduce the risk inherent in securities transactions.

91. If properly implemented, the “basic package” is mostly sufficient for mitigating non-investment risks for pension funds that operate with basic assets, such as equities, bonds and cash. In the presence of portfolios largely invested in basic instruments, and with a large concentration in cash, bank deposits and government securities, the “basic package” might be largely sufficient to mitigate most of the non-investment risks of the pension fund system.
92. As shown in Figure 3, approximately two thirds of the portfolios of the pension funds in the countries considered in this paper is invested in government securities and bank deposits, which gives a good idea of the relatively simple portfolio structures of pension funds in emerging economies.

Figure 3. Asset Allocation of Pension Funds in Selected Emerging Markets, 2012
(as a percentage of assets under management)



Source: National Sources, World Bank

V. Lessons Learned

97. DC pension systems faced criticism in the wake of the financial and economic crisis for not delivering adequate and sustainable pension incomes at retirement. Much of the problem has centered around the misalignment of PFMC and pension fund members' interests, with the focus on short-term volatility rather than delivering adequate pension income over the long-term.
98. Pension supervisors themselves have struggled to correct for these market failures. Part of the problem may be that many supervisory authorities themselves have not focused sufficiently on the ultimate long-term pension income objective. As DC pensions do not have an explicit target, the focus has been more on process than achieving adequate pension incomes. Yet the promise of adequate pension income is implicitly made and DC pensions (just like mutual funds or with-profit insurance contracts) come with non-contractual promises. Members join aspiring to get an adequate pension – not simply with the expectation that the supervisor will stop people running away with their funds. Supervisors therefore have to supervise for the protection of these non-contractual benefits.
99. Pension supervisors themselves may therefore need to focus more explicitly on the ultimate goal of any pension systems which is to provide an adequate and secure pension income. Indeed, this proposes a new definition of RBS to help pension supervisors focus better on this pension adequacy at retirement age.
100. In the absence of this appropriate pension objective, the three pillar system of risk based supervision is relatively ineffective in the case of DC pension funds. This is mostly because the objective of DC pension systems should not be the solvency of the asset management company, but the minimization of the pension risk of the contributors.
 - a. Pillar one. Regulatory capital, which is one of the tools available to supervisors for dealing with risks in RBS system, may create severe distortions in the optimal asset allocations of DC pension funds and may result in increases in the pension risk of the contributors.
 - b. Pillar two. Since the scope of supervision of DC pension funds is essentially on operational risks, the value added of the risk based supervisory review when it is in place compared with the basic package of regulation is relatively modest. The costs of introducing risk-based supervision may outweigh the benefits. Similar results could be achieved with a well- defined compliance based supervision approach. While this conclusion is valid in the case of pension funds in emerging countries with investments in relatively basic assets, the role of supervisory review becomes more relevant when pension portfolios are invested in more sophisticated instruments. Getting the right balance between compliance and risk-based supervision is key.
 - c. Pillar three. Market discipline is difficult to enforce when the levels of financial literacy required for having an informed demand are beyond the effective capacity of the governments to educate contributors in a reasonable period of time. In addition, competition based on short term performance is also an important adversary in minimizing pension risks. Unfortunately, the information

provided to the public typically reinforces the short-termism in the decision making

101. In order to have a meaningful impact on future pensions, the supervision of DC systems needs to take a more proactive role in minimizing pension risk. This objective would require ensuring that investment risks are aligned with the probability of achieving a target pension at retirement age. In other words, if RBS is to be more meaningful, it needs also to supervise investment risks, and assess those risks against benchmarks derived from quantifiable targets.
102. To the extent that regulation allows the introduction of exogenous portfolio benchmarks, pension supervisory agencies may start playing a more relevant role in reducing the pension risk for contributors. The introduction of exogenous portfolio benchmarks aimed at optimizing the expected value of the pensions at retirement age may help to guide better the investments of pension funds according to a specific objective. RBS models that have attempted to address the issue of investments beyond the pure compliance with investment limits have typically created additional distortions in the asset allocation. In addition, it is essential to phase out the schemes of absolute and relative guarantees provided by PFMCs, and if considered necessary replace them by less distortive ones.²⁶

²⁶ For a discussion of this topic see Viceira and Rudolph (2012).

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