Abstract
This paper provides motivation and chapters’ overview of the NDC anthology, and it offers key policy conclusions as well as suggestions for a policy research agenda. The key policy conclusions include: i) NDC schemes work well (as documented by the experience of Italy, Latvia, Poland and Sweden) but there is room to make them work even better; ii) Go for an immediate transition to avoid future problems; (iii) Identify and finance the transition costs as they will hit you otherwise soon; (iv) Adopt an explicit stabilizing mechanism to guarantee solvency; (v) Establish a reserve fund to guarantee liquidity; (vi) Elaborate an explicit mechanism to share the systemic longevity risk; and, last but not least; (vii) Address the gender implications of NDC with analysis and political discourse. The priority policy research agenda is suggested around four areas: (i) Assess the outcome of NDC schemes compared to the primary goals of pension systems, and compared to alternative scheme designs; (ii) Establish a measurement of assets and liabilities for the introduction, adjustment and sustainability of NDC schemes; (iii) Clarify the interaction of NDC (as central consumption smoothing pillar) with other pillars and benefits; and (iv) Address design and implementation issues of NDC schemes in low and middle income countries.

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1. Introduction

Nonfinancial Defined Contribution (NDC) schemes are now in their teens. The concept was born in the early 1990s and has been implemented from the mid-1990s in a number of countries. To date the most complete implementation has been in Italy, Latvia, Poland and Sweden, but since then some key components of NDC have also been implemented in a number of other countries. This innovative unfunded individual account scheme created high hopes at a time when the world seemed to have been locked into a stalemate between piecemeal reforms of ailing traditional defined benefit schemes and introducing pre-funded financial account schemes.

We have reviewed the childhood of NDC in a prior anthology (Holzmann and Palmer, 2006). Six years on, the time has come to review the lessons of NDC in its adolescence and take stock of the issues that need to be addressed for a successful adulthood. The first anthology emerged from a conference held on the island of Sandhamn outside Stockholm in September 2003 designed to bring the innovation of NDC to a world-wide audience. The aim of the conference was to scrutinize this new idea and the volume documented the content of the conversation among leading experts in the field.

The present anthology emerged from a second NDC conference, held in Stockholm in December 2009. The aims of the second conference and this volume are to offer a deeper and more comprehensive review of the experience of countries where NDC schemes have been in place for a decade or more, to take stock of the recent discussions of the place of NDCs in the world of pension reform and to address in detail important issues related to design and implementation to which the first volume devoted limited or no attention.

The importance of solvent pension system was highlighted during the financial crisis of 2008-2009, and the ensuing economic recession in much of the world. The fiscal dilemma of Greece, Portugal, Spain, and some Eastern and Central European countries and, potentially, other highly indebted countries has demonstrated how financially unsustainable pension systems can have undesirable repercussions. What we are now seeing is the market judging the creditworthiness of sovereign states, where a large percentage of future commitments is the pension debt. Moreover, financial markets are likely to react increasingly to the level of uncertainty of pension liabilities and the resultant question of solvency. Public finance consolidation is unlikely to succeed without pension reform, particularly in the developed economies where population aging has most progressed and where the survival rates of the retired population are increasing rapidly.

Developed countries are not alone in this picture. There are also fiscal concerns in middle and low income countries where the United Nations demographic projections for the coming half century show considerable population aging. Many of these countries are already burdened by pension systems that are financially unsustainable despite their short histories. Others need to learn from the now considerable international experience in building national pension schemes.
A further challenge in middle and low income countries is the fragmentation and low coverage of current pension systems. Badly designed DB systems often operate in parallel with weak provisions for the portability of benefits that affect labor mobility and can create inequalities. On average, less than 30 percent of the work force in middle and low income countries is covered by mandatory pensions. Increasing coverage under the current regimes is proving, however, to be difficult. Even where coverage is relative high and increasing, there may be no hope for long-term fiscal sustainability without systemic change.

It is against this background an NDC reform becomes attractive even in low and middle-income countries. It brings to the table a pension scheme with fully transparent liabilities and a built-in approach to ensure solvency and financial sustainability. NDC is neutral vis-à-vis individual labor supply decisions and has exactly the same potential to promote formality as financial (or pre-funded) defined contribution (FDC) schemes, as opposed to typical DB pay-as-you-go schemes. In addition, the design of NDC opens the door to integration or at least harmonization of parallel schemes and facilitates the portability of benefits. NDCs can also become the building block to design alternative arrangements to expand pension coverage to informal sector workers.

Another reason why countries are taking an even closer look at NDC is that confidence in what many economists considered being the preferred alternative for a national pension scheme, FDC, has been shaken by the repeated and severe financial crises of the 2000s. After this past decade of financial crises, FDC may now be less attractive for many. In addition, quite a few experts now expect the financial market to deliver lower rates of return in the future as populations age and move into the dissaving stage of their life cycles, with continued extreme fluctuations associated with other phenomena than economic fundamentals.

On top of this, the fiscal capacity and willingness to pay for the transition costs to pre-fund schemes is likely to be reduced in view of a higher explicit public debt in many countries. Downplaying transition costs and ignoring the fiscal impacts of large economics shocks has proven deadly for reformed pensions systems in a number of countries in Latin America, Central and Eastern Europe. Against these constraints, an NDC reform offers an attractive alternative for emerging economies. Even in cases where the end goal is to have a fully-funded pension system, NDCs can prepare the ground by setting an individual account system that is solvent but only partially funded by financial assets. As enabling conditions improve the level of funding of the system can increase.

The purpose of the end-2003 NDC conference and early 2006 publication was to bring to the attention of the world a new and promising approach to reform of traditional and non-financial (or “unfunded”) defined benefit (NDB) schemes. It presented and discussed the micro and macroeconomic foundations of the NDC concept, the approaches used by the initial reformers moving from NDB to NDC, the first lessons to be drawn and remaining key issues as then perceived. The publication had a major impact as witnessed by the inroads into the deliberations of pension reform commissions around the globe, the adoption of NDC in some countries, and the translation of the volume into Chinese, German and Spanish.
This 2012 publication is composed of two volumes due to the number of contributions and our unwillingness to discard any for publication. Volume 1 on Progress, Lessons, Implementation includes a detailed analysis of the experience and lessons in the pilot countries - Italy, Latvia, Poland and Sweden; a presentation of the new pilots following the NDC approach (Egypt and Norway); and general thoughts around the implementation of NDCs in other countries, including Chile (retrospectively), Greece and China. One of the chapters also discusses whether certain NDC features can be “copied” in the context of DB reforms as illustrated by several OECD countries. Volume 2 on Gender, Politics, Financial Stability includes deeper and new analyses of issues that received little or no attention in the 2006 publication. The gender perspective includes 5 chapters with, perhaps, the most complete discussion available in the field to date. Issues around financial stability are addressed in 6 chapters. These include the critical micro and macroeconomic aspects of NDC, such as the balancing mechanism, the use of a reserve fund, the handling of legacy costs, and technicalities related to the management of the longevity risk when designing annuities. While the two volumes of studies address many issues and in considerable depth, nevertheless, at the end a number of new questions emerge for which good answers are still not yet readily available. We return to these in the closing sections of this paper.

The remainder of this opening chapter is organized as follows: Section 2 provides an overview of the structure of the 2 volumes and its altogether 24 chapters. Section 3 sketches out the key policy lesson emerging from the papers. The remaining research agenda is outlined Section 4 while Section 5 draws conclusions.

2. The Structure of the Book and an Overview of the Contributions

The contents of this anthology are grouped and presented under five headings: Part I Vol 1 takes stock of country lessons and issues and Part II presents reforms under implementation, consideration, or contemplation. Part 1 in Vol. 2 addresses the gender dimension of pension reform with NDC; Part II discusses issues of political economy; Part III investigates issues related to the solvency, liquidity and stability of NDCs; and the final Part IV provides the reflections on four additional topics from a final panel.

Volume 1 - Part I: Taking Stock of Country Lessons and Issues

Chapter 1 begins with the motivation behind this anthology which is to take stock of issues and lessons emerging from the implementation of NDC and to bring to the forefront new conceptual discussion of that can influence the content of future implementation. This chapter provides an overview of the 24 individually authored chapters in both volumes that offer a rich set of information and ideas for consideration, including key policy conclusions as well as suggestions for a policy research agenda.

Chapter 2, by Agnieszka Chłoń-Domińczak, Daniele Franco and Edward Palmer offers a comprehensive overview and assessment of NDCs in the First Wave of NDC Countries Taking Stock Ten plus Years down the Road. It presents and analyzes the different paths to reform: the detailed design of the reforms, the process of implementation and the outcomes. Major challenges in the beginning of the reform
process were the “cashing-in” of special benefit privileges and increasing the pension age, especially for women – in all the countries but Sweden, where the public pension system was already truly universal and where the normal pension age at the time of the reform was already 65 for both men and women. In all four countries the full career worker with average earnings can expect a gross earnings replacement rate of around 65 percent. Sweden is particularly effective in providing non-contributory NDC pension rights to parents (in practice women) in conjunction with childbirth, avoiding a negative effect of labor force absence on pensions and replacement rates. All four countries lack rules for redistributing rights between partners in a couple, however. It is argued that the combination of early retirement (Poland), insufficient rights for time out of the formal labor force in conjunction with childbirth (Italy, Latvia and Poland) and the absence of a joint annuity at retirement (all four countries) increases the likelihood of relative poverty among women who survive their partners in old age.

The *sine qua non* of NDC is its claim of maintaining financial stability by design. The study examines the responses of Italy and Sweden to a permanent decline in labor productivity, an increase in longevity at retirement and a permanent decline in the size of the youngest cohort. Sweden’s balancing mechanism assures financial stability, albeit sometimes with a lag, whereas the Italian design does not provide an automatic giro that steers the system towards financial stability following a shock. The study shows that negative shocks lead to deficits over long periods of time. Because pensions in payment are only price-indexed in Latvia and Poland, the schemes will be in surplus in periods with positive real wage-sum growth (even without a reserve fund) and will run a deficit in periods when nominal wage-sum growth falls below the rate of inflation.

A conclusion of this paper is that the issues of indexation and financial balance need to be revisited in Italy, Latvia and Poland. Italy brings lessons on its own. To its credit, Italy is the only NDC country with an automatic adjustment of the minimum retirement age to increases in life expectancy, a mechanism that other countries may want to mimic. On the negative side, however, the country’s experience shows that the implementation of NDC for primarily new entrants to the labor force diluted the positive incentive effects of an NDC, since for most cohorts working at the time of the reform benefits have been based on the old system formula – not the NDC formula.

A final conclusion is that the economic crisis of 2008-2010 brought public debate in Latvia, Poland and Sweden, but that NDC survived this wave of public scrutiny a decade or more after implementation.

**Chapter 3**, by Edward Whitehouse on *Parallel Lines: Notional Defined-Contribution Pensions and the Direction of Pension Reform in OECD Countries* investigates to what extent recent reforms in OECD countries have adopted key elements of NDC systems design. To this end the paper compares notional accounts with two alternative designs of public, earnings-related pension schemes: points systems and defined-benefit plans. It examines in detail four economic advantages of notional accounts that deliver retirement incomes in an equitable and economically efficient manner.

First, benefits are based on lifetime average earnings, rather than a subset of “best” or “final” years’ pay. Second, an extra year’s contribution gives rise to an increase in the replacement rate. Third, benefits are reduced to reflect the longer expected duration of
payment for people who retire early and, similarly, increased for people who retire late. Finally, benefits are reduced as life expectancy increases, again to reflect the longer duration for which benefits would be paid.

Whitehouse concludes that during recent years many OECD countries have achieved many of the objectives innate to NDC schemes without explicitly adopting notional accounts. Not everybody will share this assessment.

Volume 1 - Part II: Reforms under Implementation, Consideration, or Contemplation

Following the implementation of NDC reforms in a number of European countries the approach has been touted for replication in a number of countries in and outside Europe; the process is still going on. This section offers papers that present two recently legislated NDC reforms (Egypt and Norway) and proposals for NDC-type reforms in China and Greece. For China 2 papers are included in view of the country’s interest in and for NDC, and the prominent place that has been given to the NDC approach by independent and prominent country advice (see, e.g. Barr and Diamond 2008). In addition, a paper on Chile investigates how this country would have fared if back in 1981 it had implemented a non-financial DC reform instead of a financial DC reform, based on historical data on contribution densities, wages, and rates of return on investment.

Chapter 4, Norway: Combining NDC and distributional goals by Arne Magnus Christensen, Ole Christian Lien, Nils Martin Stølen, and Dennis Fredriksen presents an overview of the recent Norwegian pension reform and its most important elements. The reform incorporates many, but not all the components of complete NDC. The main elements of the reform are: (i) Accumulation of entitlements are based on an imputed contribution rate on lifetime earnings that are the basis of individual accounts; (ii) Accumulation of entitlements for periods of childcare, unemployment, sickness and military conscription; (iii) A means-tested guarantee pension as a basic safety net and a ceiling on annual earnings for the accrual of pension entitlements; (iv) Flexible retirement from the age of 62 to 75 from 2011 onward and benefits that are based on account values at retirement, cohort life expectancy at retirement and a frontloading factor of 0.75 percent; and (v) Accounts of workers and benefits of pensioners are indexed by average wage growth. Since there is a frontloading factor of 0.75 percent, pensions in payments are in fact indexed by average wage growth minus the frontloading factor. The new model for accumulation of entitlements is being introduced with a transition, with the cohort born 1963 to be the first fully covered.

Compared with the pre-reform system, the new model for accumulating pension entitlements tightens the link between individuals’ labour income and pension benefits, and thereby improves incentives to work. However, these incentives are modified by redistributive elements such as the means-tested guarantee pension, accumulation of entitlements for unpaid child-care and the ceiling on annual earnings. More important for labour supply and sustainability is the fact that benefits based on account values and cohort life expectancy stimulate postponed retirement and counteract the effect from higher life expectancy on pension expenditures. The authors provide calculations of
replacement rates for typical cases and projections based on a micro-simulation model to compare the pension reform with the old system. The calculations illustrate how the reform can encourage people to postpone retirement and work longer, as well as effects on sustainability and distributional effects.

Norway has left its NDC look-alike pension system in the general government budget; there is no attempt to make the NDC scheme autonomous from the budget, as in Sweden. Although increasing life expectancy is counteracted in the formulation of the annuity, there is no balancing mechanism to deal with unexpected demographic events, notably a declining labor force, but also underestimated life expectancy projections. If this occurs the financial deficit created is absorbed in the general government finances. It is then up to politicians to decide how taxes and government expenditures should be adjusted to balance overall public finances in the long run. Thus, in the Norwegian model the general budget covers the demographic labour force risks. Because of the present low number of old-age pensioners compared to the labor force, the actual contribution rate needed to cover payments is presently much lower than the rate of 18.1 per cent that gives NDC pension entitlements. Increasing cohorts of pensioners will cause the contribution rate needed to finance the pension system to increase, and it is estimated to stabilize around 2040 at the rate consistent with that giving NDC account entitlements.

Chapter 5, by Gustavo Demarco and Mohamed Maait on Egypt: Introducing NDC in an Emerging Economy outlines the motivation and structure of the recently legislated NDC reform that Egypt will be implementing during the coming years. The reform has been driven by projections of chronically increasing financial deficits. The new system aims at creating a pension scheme that addresses problems of financial sustainability in response to future demographic trends, makes redistribution explicit and better targeted to respond to current social demands and improves incentives to contribute.

The Government of Egypt prepared a new law that was enacted by the Parliament in June 2010. Coverage in the new system will gradually become universal, reaching populations not previously covered such as members of syndicates, casual and seasonal workers, farmers, unskilled and skilled workers in the construction industry and many others. The new system also eliminates all the special privileges given to certain groups, treating all plan members equally. The core of the reform is a mandatory shift from an unfunded (DB) system to a combined NDC and FDC for new entrants and persons with no previous coverage record, and a voluntary shift for persons with a previous contribution history at the time of the introduction of these new schemes. The overall contribution rate for the NDC and FDC schemes will be 19.5 percent. Present plans are that 20-40 percent of total contributions will be directed to the FDC component. In addition, to the combined NDC/FDC contribution-based schemes there will be a universal basic pension that represents 18 percent of the after-tax national average salary. The basic pension will be financed by the treasury. The design of the NDC component has been completed, but the process of implementation and institutional capacity building will demand increasing efforts in the near future, a process that is delayed by the political changes in the country.

Chapter 6, by Bingwen Zheng on China: An Innovative NDC Design Proposal presents ideas for a comprehensive pension reform in China that has at its core in an NDC-FDC
approach. The author proposes to merge the current flat rate pension (“social pooling”) and individual accounts (introduced as funded pensions as of 1997 but only partially realized in a few provinces) in a single individual account that is split between notional and fully pre-funding. The paper illustrates with model calculations the financial sustainability of the proposal for different total contribution rates and funding splits. In the author’s view this policy proposal takes account of the specific Chinese institutional and cultural context and represents an innovation in pension design as it is different both from the Swedish NDC model and from the present pension system which still lacks a direct link between contributions and benefits. The paper claims that the reform will address the main challenges of the current system by: (i) allowing for the unification of fragmented programs at the county level, which improves redistribution, the portability of benefits and labor mobility; (ii) increasing the level of funding the current system; (iii) addressing the problem of financial sustainability; (iv) improving transparency and the incentive that individuals have to enroll and contribute; (v) creating the conditions to expand the coverage of pensions to the entire labor force.

Chapter 7, by Heikki Oksanen also presents a reform proposal for China: NDC for an Aging Economy. It discusses why China should think about an NDC-type reform. The aim of the chapter is to analyse options for reforming the fragmented Chinese pension system that covers only 55% of urban employees and only a few percent of the rural population. After a brief history of pensions in China, Oksanen discusses principles of pension reforms and presents recent reform proposals, with particular attention to reducing contribution rates so that compliance could improve and coverage increase. The Chinese population is ageing fast and Oksanen argues that a transition to a notional defined contribution (NDC) system is an efficient way to introduce pension rules that ensures financial sustainability in the presence of increasing longevity.

The chapter argues that transforming the accrued pension rights into NDC accounts and starting to apply the new NDC-inspired rules on indexation is not necessarily a jump into the unknown for the Chinese pensions system. Rather, it could be a useful and long-awaited clarification of present rules and a way to move towards a more uniform system nationwide. With the help of a simulation model using Chinese data Oksanen produces scenarios for a range of possible reform designs and assesses social and fiscal impacts. Assuming a lowered contribution rate of 20 and 16 percent, respectively (compared to the current rate of 28+ percent) to address incentive and coverage issues, the simulated three tiered scheme (flat rate, NDC and funded) would be only able to pay a 40 and 30 percent average replacement rate, respectively. This is the consequence of accelerated population aging during the next decade which leaves as options only an accelerated increase in retirement age (beyond the already assumed 64 and 67 of age for women and men, respectively) or a much higher contribution rate.

Chapter 8, by Milton Nektarios on Greece: NDC for a Sustainable Pension System provides his vision of an NDC-type pension reform against the background of the financial and economic crisis and the ad-hoc pension reform implemented in the summer of 2010. Prior to 2010, Greece was one of the few countries in the European Union that had not undertaken a full and effective reform of its pension system. The pre-2010 pension system was a representative case of the “Mediterranean welfare state”, which was characterized by extensive segmentation, very high payroll tax rates, and yet
inadequate pension benefits. Section 1 of the chapter attempts to explain this paradox. Section 2 presents an exposition of the successive attempts to reform the system, mainly by means of inadequate parametric measures, while Section 3 quantifies the long-term financial imbalance of the system. The reminder of the chapter presents a reform proposal for a major restructuring of the Greek pension system on the basis of the NDC model and discusses how the pension reform that took place in 2010 constitutes yet another missed opportunity to improve financial sustainability, incentives, and equity.

Chapter 9, by Eduardo Fajnzylber and David Robalino on Chile: Fiscal and Distributive Results of Shadowing FDC with NDC, offers interesting insights by comparing what would have happen if instead of the FDC reform in 1981 Chile had introduced an NDC. The paper is relevant for countries considering structural pension reforms to address problems of financial sustainability and improve economic incentives and that are weighing the pros and cons of the alternatives of moving either to FDC or NDC. Usually, comparisons regarding the performance of the two systems in terms of the pensions provided, transition costs, etc. are based on prospective actuarial modelling -- since it is impossible to perform an experiment where both are tested on a particular economic environment and history. This study takes advantage of the unique opportunity to use data accumulated during the FDC era to simulate what would have happened under an NDC reform.

Three results stand out: First, and not surprisingly, the transition costs under an FDC system are considerably higher than under NDC, in the Chilean context by around 50 percent of GDP for the first 45 years. However, under both reform types the inherited legacy is high due to the main reduction in the contribution rate from the unreformed system. Second, the cost of the minimum pension guarantee would have been higher under an NDC scheme that pays a benefit indexed to the growth rate of the covered wage bill. This is because during the first twenty years after the reform the rate of return on financial assets was higher than the growth rate of wages. The analysis suggests, however, that this does not always have to be the case. Last but not least, and depending on the assumptions regarding the stochastic process driving the dynamics of the rate of return paid by the FDC system relative to the NDC economic rate of return, expected replacement rates under the NDC are not necessarily lower.

Volume 2 - Part I: The Gender Dimension of Pension Reform with NDC

Gender considerations are receiving still limited attention in the pension reform discourse around the world. For this reason, encouraged and supported by the conference sponsor, the second NDC conference and the volume included five papers dedicated specifically to the gender dimension of NDC reforms. The papers cover a broad range of issues and the results bring to the forefront the importance of gender issues in pension reform. The anthology would have missed a critical dimension of pension policymaking had this section been left out.

Chapter 1, by Estelle James on Gender in the (N)DC World: Issues and Options, opens with an overview of concepts and gender issues in pension reform. Her paper focuses on key choices that must be made in NDC plans and that have gender implications:
retirement age, safety net provisions, payout terms and arrangements for survivors and the very old. Except for the earlier retirement age permitted for women in Poland, practically no gender-specific provisions remain in NDC countries. However, many provisions still have subtly different impacts on men and women. The same policies affect the two genders differently because of the more limited labor force attachment of women, their lower earnings when they work, their longer life expectancy and the likelihood that they will eventually become widows and live alone in very old age.

Because women live longer than men they face a greater risk of running out of money in very old age, so rules regarding annuitization, indexation, survivors’ benefits and joint pensions shape their standard of living over time. Compulsory annuitization and the required use of unisex tables in the NDC pillar, buttressed by minimum pensions in the safety net, have implicit distributional effects that favour women. However, the likely absence of an increase in real NDC pensions over the retirement period; the move toward price indexation of the safety net benefit; the shift from pure to phased-out flat pensions; and cutbacks in survivors’ benefits have negative consequences for women (and men). An earlier legal retirement age for women seems like a perk but contributes to lower pensions for women in DC plans if they take this offer as many do. For each design feature, James lays out some general analytic points and then describes the empirical situation—trying to distinguish between choices that are inherent versus discretionary (therefore amenable to fine-tuning) in NDC plans. Two discretionary effects are worth particular attention: the remnants of work disincentives for women stemming from the high implicit tax on contributory work in minimum pension and survivor benefit schemes available to women prior to reaching the retirement age. She points out the likely deteriorating position of very old women in some NDC countries due to the absence of either mandatory or voluntary sharing of pension rights or joint annuities, together with price rather than wage indexation of benefits.

Chapter 2, by Anna Klerby, Bo Larsson and Edward Palmer on *To Share or Not to Share – That’s the Question*, addresses the thorny question of whether and to what extent individual NDC accounts should be shared among couples/partners. The paper begins by exploring in a global perspective the structural reasons why women generally have lower pensions than men. In addition to the structural determinants of earnings differences the authors emphasize that in all cultures, including those which have come the farthest in terms of gender equality; women spend a larger portion of their time than men in informal work, caring for children and relatives. This leads to difference in the distribution of pension rights thereafter, which becomes especially blatant in DC schemes.

On top of this, even if there was absolute gender equality in the labor market in terms of participation and earnings and the earnings and pensions of spouses were exactly the same, nevertheless, the surviving partner in a couple will be forced to live on half of joint income whereas something like 60 percent may be needed to maintain the same per capita standard of living, due to the loss of “economies of scale” derived from joint consumption. The paper examines data for Sweden to determine what would happen if Swedes were mandated to contract joint annuities – whereas today there isn’t even the option to contract a joint NDC annuity. The authors show that using the same utility function for both genders this increases the utility of women by more than it decreases it.
for men. In addition, given the construction of the Swedish guarantee and tax system, it reduces the government’s tax revenues, because some men fall into a lower tax bracket after the redistribution (which is not compensated for by an increase in taxes on women) but also reduces the governments payments of guarantee benefits – because after the redistribution of partner benefits within partnerships. Indeed, women’s benefits after the death of their partner are higher and they qualify to a lesser extent for a guarantee supplement to their NDC benefit.

Chapter 3, by Anna Daddio on Gender and Pensions in OECD Countries, provides a comprehensive overview and analysis for gender policy, of the role of the minimum pension age and the non-contributory rights for women. Women who spend periods of time out of the labor market caring for children or other relatives typically qualify for lower pensions. However, most OECD countries award credits in the pension system for time spent out of paid employment in order to care for children or sick relatives, which helps to compensate women for their time spent in informal care work. Her paper takes a detailed look at how the credits granted to mothers with an interrupted career to care for their children affect their pension entitlements. In doing this, she explores to what extent caring credits offset the difference in pension outcomes of someone with an interrupted career compared to someone with a full work history in OECD and selected EU countries. It also reviews other aspects of pension systems, which have an impact on the pension entitlements of mothers with interrupted careers.

The results demonstrate that many of the countries analyzed grant favorable treatment to women who interrupt their careers to raise children. The compensation mechanisms and their impact vary with the rules of the pension scheme, funding sources and objectives. She finds, nonetheless, that childcare credit systems boost the pension entitlements of mothers, but not enough to fill the gaps caused by career breaks. She concludes that childcare credits are, and will remain, a valuable tool to supplement the low pension entitlements of women with children and in the long run contribute to reduce poverty rates among older female pensioners.

Chapter 4, by Eduardo Fajnzylber on Gender and Pensions in Chile addresses the same topic as Anna Daddio in the preceding chapter but in form of a case study for Chile. In his paper he analyzes the different ways through which the design of DC systems can affect pension entitlements for women in middle income countries. To do so, he uses labor and contribution histories of Chilean women to simulate the effect of alternative arrangements on women’s pensions and the pension gender gap. The use of Chilean data is interesting in at least three dimensions. First, it is the country with the longest history of a pension system mostly based on a financial DC scheme. Second, it is a middle income developing country with a medium-sized informal sector, a factor often overlooked in analysis of developed countries. And thirdly, in 2008 Chile implemented the most significant reform of the pension scheme since the 80s, which included a number of initiatives specifically aimed at reducing the gender gap in the pension benefits such as child credits to mothers and a new social pension.

Fajnzylber includes these recent improvements in his simulations together with minimum pension in the contributory scheme and increase in the minimum retirement age for women from 60 to 65. The results suggest that the introduction of a credit per child can significantly raise pensions for women in the lower part of the pension income
distribution. The new social pension (Solidarity Pillar) introduced in 2008 will also have a tremendous impact on all individuals with small pensions, especially women who are more likely to be eligible for these benefits. Finally, raising the retirement age for women to 65 would have an important benefit effect (an increase of 9% on average), but especially among women who are not eligible for the New Solidarity Pillar. This can be compared with the minimum pension within the main financial DC scheme that, due to its restrictive eligibility criterion, has a limited effect on raising women’s pensions or lowering the pension income gender gap.

Chapter 5, by Alvaro Forteza and Ianina Rossi on NDC vs NDB for Infrequent Contributors, investigates the effect of an NDC system on income replacement rates when contribution densities are sparse, due to sporadic formal employment that typically characterizes women. The analysis is based on actual employment history data for Uruguay. The authors findings contradict the usually accepted view that a pure (N)DC schemes are not adequate to protect individuals with sparse contribution histories against the risk of poverty in old age, because it does not incorporate any within-scheme redistribution. They show that in fact sparse contribution histories and weak social protection (for example child care credits) can be more serious issues in a DB scheme than in an NDC scheme. To do this, they simulate labor income, contributions, and pension rights of the cohort born in 1995, assuming that historical patterns remain unchanged in the future. They characterize the distribution of pension rights and calculate the pension cost for two regimes: the current DB + FDC regime, and a simulated NDC + FDC regime. They also consider a pure NDC scheme supplemented with a minimum pension and an NDC scheme supplemented with government contributions for child credits. They find that an NDC scheme would provide better social protection than an DB system, even without a minimum pension guarantee. This is because an improvement in the actuarial fairness of the scheme leads to an improvement in the welfare of low-income workers.

Volume 2 - Part II: Issues in the Political Economy of NDCs

While the NDC approach has promising and attractive features in reforms of unsustainable and unfunded DB schemes, it does not automatically follow that approach will be able to better garner political support for its application and implementation. In Part IV three papers address the political economy issues of NDC reform from different angles delivering cautioning as well as supporting arguments.

Chapter 6, by Tito Boeri and Vincenzo Galasso on Is Social Security Secure with NDC?, explores the political stability of NDC schemes in the pilot countries with respect to the alarming increase in the age of entrance of youth into the labor market. The introduction of NDC public pension scheme in Latvia, Sweden, Italy, and Poland in the nineties was motivated, inter alia, by the need to (i) ensure the long term financial sustainability of the public pension system by linking pension returns to a proxy of the internal rate of return; (ii) reduce the existing distortions in the labor market due to strong incentives to retire early in the existing systems; (iii) increase the intergenerational equity of the system, jeopardized by the different returns across generations in the systems they replaced; and (iv) reduce the systematic political
interference in public pension systems to address fiscal problems related to aging by introducing a sequence of automatic – non-discretionary – adjustments to key parameters.

The authors show that after more than ten years from their introduction, the “pilot” NDC schemes have performed reasonably well achieving their original objectives. However, some degree of political interference with the operations of the systems has continued (as in Italy), and new concerns have emerged. In particular, the combination of a pension system which strongly bases the benefit calculation on contributions (and thus on labor market participation) combined with a dual labor market in which young workers keep jobs without access to pensions for many years, create a new, potentially serious challenge to NDC schemes. Their simulations of future pension benefits for the current generation of young workers with a discontinuous working history in Italy and Sweden suggest that replacement rates will be low, unless these cohorts work significantly longer than earlier generations. This effect may end up jeopardizing the political sustainability of NDC systems in the future, unless important labor market reforms are introduced. They discuss the effects on the future generation of retirees in Italy and Sweden of a current labor market reform: the introduction of a unique labor market contract, aimed at reducing the dualism between temporary and permanent workers.

Chapter 7, by Andras Bodor and Michal Rutkowski on NDC as a Pathway towards Politically Feasible Pension Reform, probes the power of the key features NDCs relative to NDBs in constructing policy messages that policy makers can use to motivate and facilitate pension reform. The authors first review the theoretical literature on the political economy of pension reforms. They challenge the present paradigm because it assumes agent rationality and suggests that reforms driven by deteriorating demographic dependency ratios are equally (un)feasible through either DB parametric reforms or NDC, so-called paradigmatic, reforms. The authors argue that the more appropriate analytical paradigm is one that focuses on the role of “stories” and abandons the rationality assumption. This paradigm follows the path breaking writings of Kahneman and the more recent work of Akerlof and Shiller. It suggests that the right ‘stories’ can be the driving force in shaping behavior under bounded rationality and make technically desirable reforms politically feasible as well.

As an illustration of this general argument the paper develops the theme of the emergence of NDC pension schemes as the result of “collective intelligence”, i.e., “constructive” thinking generated at the national-actor level, which becomes collective as the actors interact. Through the specific example of the Polish NDC reform the paper describes the process of collective thinking in which the actors applied both their explicit and tacit knowledge, i.e., knowledge coming from “daily experience” that does not originate from a particular thought formula (theoretical concept). The authors argue that the paradigm of NDC framed in the country context can give rise to politically relevant ‘stories’ that convert reform “losers,” – for example groups with special privileges – into supporters. In fact, the power of the “stories” model may even win over the median voters who are those who swing the balance in the reigning rationality model.
Chapter 8, by Annika Sundén on The Challenge of Reaching Participants with the Message of NDC explores the information issues that emerge when reaching out to contributors and beneficiaries to explain pension schemes and their reforms. The focus is on the experience in Sweden following the introduction of a notional defined contribution plan and funded individual accounts. The defined contribution plan redefines the benefit promise and puts more risk and responsibility on participants to plan for retirement. Reliable projections of expected benefits and an understanding of how benefits vary with retirement age are crucial for participants. The broad investment choice in the funded individual account requires that participants be familiar with general principles of investing. Therefore, an instrumental component of the reform has been information and a large effort has been put into the development of the annual account statement, the Orange Envelope. The information efforts have paid off. Almost everyone knows about the Orange Envelope. Self-reported understanding about the pension system has increased since the envelope was introduced and in 2009 44 percent of respondents reported that they had a good understanding of the system.

Volume 2 - Part III: Solvency, Liquidity and Stability Issues of NDC schemes

A core promise of the NDC scheme is to deliver financial sustainability as it grants only a rate of return that is consistent with the fundamentals of an individual account scheme financed on pay-as-you-go basis within a country-specific context. In practice, however, there are challenges in delivering this result for many reasons. One is that prior and inherited commitments need to be acknowledged and accounted for in the reform design, which is easily neglected, and even if not neglected presents computational challenges. Another is to construct annuities that deal with the uncertainties associated with the systematic risk of underestimating longevity. Yet another is to calculate the NDC assets or to estimate the levels of reserves that are needed to manage temporary macroeconomic shocks or demographic bulges without abrupt changes in the notional rate of return on contributions. Furthermore, even if all this could be done with ease, having the mechanisms in place to make the appropriate adjustments and provisions in an uncertain world represents an additional challenge. The five papers in this section address these challenges conceptually and empirically.

Chapter 9, by Robert Holzmann and Alain Jfouton on Addressing the Legacy Costs in an NDC Reform: Conceptualization, Measurement, and Financing, provides a policy framework to manage the legacy costs that need to be addressed when moving from an DB to an NDC scheme. As the new contribution rate is fixed and, perhaps, reduced, "hangover" of the accrued-to-date liabilities not directly covered by the creation of commensurate assets in the NDC scheme leaves a financing gap. It is important to identify this gap and to assign it a source of financing.

The paper comes to the following key conclusions: (i) to render an NDC reform credible and fully effective in its desired results, it is crucial to determine the legacy costs of the reformed system – no matter how these costs will be financed; (ii) for a shift from an DB scheme to a full NDC scheme with a fixed and long-term-sustainable contribution rate the legacy costs simply amounts to the actuarial deficit (or financing gap) at the time of reform and is finite; (iii) different sources of the legacy deficit may be differentiated, in particular inherited legacy costs reflecting prior reforms and benefits above the steady-
state under the old scheme; and reform-induced new legacy costs due to the shift toward a lower sustainable contribution rate; (iv) to estimate legacy costs, actuarially and macro-economically based projection models have advantages over pure actuarial studies, as they are less dependent on very technical parameter assumptions that may not be consistent with general equilibrium considerations; (v) distributive effects come in both at the intergenerational and intra-generational levels, as benefits and costs of the reform are borne unequally by different subgroups of the current and future population; (vi) in the developing world, one promising way to finance the legacy costs is to rely on the expansion of coverage that would increase the value of future PAYG assets; (vii) for developed countries, theoretical models show that tax financing in particular via indirect taxes such as VAT is an interesting tool, but empirical limitations make it difficult to assess its real-world usefulness.

Chapter 10, by Edward Palmer on Generic NDC: Equilibrium, Valuation and Risk Sharing strives to present in a consistent manner the generic features of an NDC system. As NDC is a recent innovation, these generic features have not been previously explored in a coherent context. This paper derives and analyzes the demographic, economic and distributional properties of NDC. The residual (systematic) longevity risk creates a special problem, which can be managed with the creation of an NDC bond, which then becomes the asset that closes the system financially, transferring any residual risk (which is expected to be small) to the government (taxpayers). The NDC bond is tantamount to a financial longevity bond, where the government guarantees payment for all levels of residual risk. This guarantees a fixed NDC contribution rate and, thus, an intergenerational commitment, with transparent distributional policy assigned to the remaining residual risk(s).

Chapter 11, by Robert Holzmann, Edward Palmer, and David Robalino on The Economics of Reserve Funds in NDC investigate economic rationale as well as potential size of a reserve fund when implementing an NDC reform in countries. While an NDC scheme promises to deliver solvency even under adverse circumstances, it cannot promise liquidity at all times. In order to avoid shock-related, revenue-dependent fluctuations of benefits, an NDC scheme requires a predictable and transparent liquidity mechanism that guarantees a pre-announced indexation which is consistent with long-term solvency. The alternatives are ad-hoc mechanisms such as government transfers or unexpected benefit adjustments that risk damaging the credibility of the NDC scheme and reform. The paper reviews the liquidity policy options (borrowing, NDC bonds, and reserve funds) and the size and issues of reserve funds to address two critical shocks—macroeconomic and demographic. It concludes that V type macroeconomic shocks can and should be handled with a reserve fund, but large and protracted economic and demographic shocks will require additional adjustments in account and benefit indexation for economic and political reasons. It also stresses that country circumstances matter for the determination of size and use of reserve funds as their main differences between NDC schemes as a start-up or reform approach.

Chapter 12, by Ole Settegren on A Decade of Actuarial Accounting for NDC in Sweden presents a critical but not undisputed innovation in NDC design and innovation. As part of the Swedish 1994/1998 NDC reform special accounting rules were introduced. The accounting rules were developed to secure full and automatic financial
balance of the new scheme. The accounting method developed is an example of a legislated form of evaluation of the scheme’s ability to finance the accrued pension liability with a point measure of the ability of the flow of contributions to finance (amortize) the pension liability. Traditional actuarial evaluations of public pay-as-you-go pension schemes evaluate the scheme’s ability to finance both accrued and estimated future pension liabilities by projecting future flows of benefits and contributions.

This paper explains the accounting method used in the Swedish NDC pension system. It presents the accounting method, illustrating it with the actual development of the system’s income statement and balance sheet for the nine years from 2002-2010. The accounting results determine a solvency ratio for the NDC scheme. According to the Swedish NDC legislation, if the solvency ratio falls below unity indexation is triggered that reduces growth of liabilities (rights) until balance is once again achieved. This occurred as a result of the 2008-2009 economic recession and fall in equity prices. The paper describes the adjustment process and policy responses to the ensuing negative impact on pension benefits in 2010 and 2011. The bottom line is that Sweden’s balancing mechanism withstood its first political stress test, with only minor alteration.

Chapter 13, by Juha Alho, Jorge Miguel Bravo, and Edward Palmer, Intergenerational Equity, Annuities and Life Expectancy in NDC, investigate the efficacy of current state-of-the-art life expectancy modeling in projecting life expectancy at “the” pension age, that is, the age at which a life annuity must be granted according to the current practice in NDC (and FDC) schemes. The paper provides an overview of the current modeling philosophy. The present genre of projection models has been inspired by the work of Ronald Lee and Lawrence Carter. The paper demonstrates that models in this genre, which essentially distribute an aggregate trend among the birth cohorts covered, will systematically underestimate life expectancy in an environment characterized by declining rates of mortality – which is a rather typical scenario. This has certainly been the case in Japan, but also in other countries such as Finland, Norway and Sweden. The paper provides suggestions for better modeling under these circumstances, but acknowledges that regardless of the proficiency in modeling, systematic errors may continue to be part of the landscape for many decades.

The paper asks the question if is it possible to devise annuity models that fairly distribute the residual risk between the insured and the insurer? Simple variable annuity models, where the annuity is re-estimated at yearly and five year intervals, based on continuously revised life expectancy estimates, are examined for the Scandinavian countries. Compared with an annuity that uses the correct value of life expectancy from the outset, the variable annuity reduces the risk for the insurer, i.e., either other cohorts in a mutual insurance setting, or the government (taxpayers) but at the relative expense of older members of the birth cohort. This is clearly not a fair outcome, which suggests that other distributional models are needed, including transferring the residual risk to the government (taxpayers) through an NDC bond as discussed in Palmer’s chapter 10 on Generic NDC: Equilibrium, Valuation and Risk Sharing.

Chapter 14, by María del Carmen Boado-Penas and Carlos Vidal-Melià on The Actuarial Balance of Pay-As-You-Go Pension Systems: the Swedish NDC versus the US NDB Approach, explores the pros of computing and keeping track of an actuarial balance in NDC and NDB pension schemes in order to improve their transparency,
credibility and solvency. The paper focuses on the two main methods used by
government social security departments, in Sweden and the US, to construct an
actuarial balance for non-financial pension schemes. The paper discusses
methodological and actuarial issues and the main differences and similarities of the two
approaches. In addition, the paper provides a brief examination of the Japanese NDB
model as it includes certain features of both methods. Three main suggestions emerge
from the author’s investigation: (i) Countries that have not yet done so are well advised
to estimate and report actuarial balances as they improve transparency, motivate
responses to address financial imbalances, and thus strengthen the credibility of the
pay-as-you-go system; (ii) Countries that have already elements of an actuarial balance
are encouraged to formalize and enhance the frequency of the exercise, which includes
establishing an independent expert panel to provide or approve assumptions and
procedures; and (iii) Social security institutions and researchers are encouraged to
investigate key questions regarding in the estimation of the actuarial balance, in
particular the applicability of market-based evaluation methods and issues specific to
old age, survivorship and disability benefits.

Volume 2 - Part IV: Panel Discussion

Chapter 15, presents the write-ups from the closing panel discussion that brought
together representatives from academia, politics, and research.

David Blake, in his contribution *NDC v FDC: Pros, Cons and Replication* examines the
advantages and disadvantages of non-financial defined contribution (NDC) pension
schemes relative to financial defined contribution (FDC) pension schemes.

For him an NDC pension plan is a PAYG pension plan with greater inter- and intra-
generational equity than a standard PAYG plan. The rate of return to plan members is
linked to the wage growth of the economy in which the plan sits over the accumulation
phase and to the realized post-retirement life times of each cohort of members.

However, NDC plans cannot be considered as offering a well-diversified investment.
Further, given the long-run dynamic efficiency of economies, for him NDC plans fail the
Aaron test (i.e. offering a higher rate of return than a funded scheme) and so will
generate lower average pensions compared with FDC plans.

He claims that NDC outcomes could be replicated using an FDC framework if the
government:

- Issued wage-indexed or GPD-indexed bonds for the accumulation phase
- Issued indexed-linked longevity bonds for the decumulation phase.

However, while these bonds would help to deal with the poor international portability of
NDC plans, they would not address the issue of poor international diversification of
investment risks nor the failure of NDC plans to pass the Aaron test.

Lans Bovenberg, in his contribution *NDC Schemes: Strengths and Weaknesses*
highlights the strong and weak sides of the NDC approach from a pure economic-
analytical level and largely abstracting from any implementation issues. The strong
sides emerge largely from a comparison with traditional unfunded DB scheme. The
weak sides are measured against potentially welfare economically desirable individual
features but not against any alternative fully conceptualized or even less implemented pension system.

As regards the strength of NDC schemes he notes, in particular, that the approach improves labor-market incentives by making the retirement decision more actuarially fair and by linking the accumulation of new pension rights to contributions over the entire life cycle. Moreover, automatic longevity adjustment of annuities contributes to the financial stability of the pension system. Finally, the provision of wage-related pension benefits helps to share wage risk between generations.

All of these benefits, however, he claims, can in principle be reaped also in other pension schemes. Moreover, NDC schemes do not address all of the problems associated with PAYG systems. Specifically, there is also room for better designs in terms of covering intergenerational risk sharing and inter-temporal consumption smoothing. Indeed, the NDC system can be seen as a transitional arrangement on the way to better pension arrangements that optimally distribute financial-market and human capital risks across generations in countries with advanced financial markets and well-functioning private and public institutions.

Harry Flam, in his contribution NDC reserve funds: The Swedish reserve funds after ten years, addresses the issue of the efficiency of having more than one reserve fund in an NDC scheme, based on an analysis of the experience of Sweden, which from the outset had four separate funds to manage reserves. The conclusion of his analysis is that a single reserve fund is better than many concurrent reserve funds.

To begin with, he notes that the primary reason for introducing four funds in Sweden was to reduce administration costs through competition. To date, all four funds have been managed actively in order to maximize their returns. Yet, the analysis shows that the cost of active management of the four funds outweighs what would have been the cost for a single passive fund managing all the assets and that this extra cost is not counterbalanced by the small marginal difference in the return compared with an external benchmark index. In addition, the political fear that these funds, which together constitute the twentieth largest pension fund in the world, would dominate the Swedish market was unfounded due to the size of the Swedish equity market, but also to the large international investment component in the funds’ portfolios. Flam notes also that portfolio management has remained independent from political intervention of any kind.

Mohamed Ahmed Maait, in his contribution Reflections on Introducing NDC in Egypt and other Emerging Economies retraces the motivation for and structure of the legislated multi-pillar reform of 2010 in Egypt that comprises a zero pillar plus an NDC plus an FDC pillar (as part of broader social security reform). He stressed that the Egyptian government has motivated to embrace an NDC pillar because of the promised 3 key qualities - solvency, transparency, and incentive compatibility.

Based on deliberation process around the NDC pension reform, the development of a homegrown multi-pillar structure and the current struggle to move from legislation to implementation he offers three important lessons for other emerging economies: First, an NDC plus FDC approach as the core of the mandated consumption smoothing pillars is not only feasible but also advantages for emerging economies if the enabling conditions are met. Second, however great, appropriate and homegrown the reform
concept is, it needs the broader political support beyond parliament majority, and a process to achieve this. Last but not least, from the unfinished implementation process: start to think about implementation as early as possible; give it much more attention that you think is needed; and be prepared for delays and implement only when you are ready.

3. Key Policy Lessons

The chapters across the two volumes offer many policy lessons derived from the review of country experiences, the progress in conceptual and empirical work, and the analysis of so far under-scrutinized topics. Seven key policy lessons are highlighted that – when taken account off - should facilitate the road to adulthood of NDC schemes: (i) NDC works well but there is room for improvement; (ii) Go for an immediate transition to avoid future problems; (iii) Identify and finance the transition costs as they will hit you sooner or later; (iv) Adopt an explicit stabilizing mechanism to guarantee solvency; (v) Establish a reserve fund to assure liquidity; (vi) Elaborate an explicit mechanism to share the systemic longevity risk; and, last but not least; (vii) Address the gender implications of NDC with analysis and political discourse.

(i) NDC schemes work well but there is room to make them even better

The operation of the NDC schemes in Italy, Latvia, Poland and Sweden over the first 10 plus years is going well. While all these countries adopted different approaches in terms of design and implementation both for the transition and steady state, the approaches share key features: the direct link between contributions and benefits; the existence of a notional interest for indexing the liabilities; and the determination of the initial pension based on remaining life expectancy. In all these countries the NDC pension scheme weathered the 2008-2009 financial crisis and ensuing recession. However, both Latvia and Poland, with large pre-reform commitments retrenched as the transition costs proved to be too heavy a strain on the public budget. The lesson of over extension due to the transition costs is a clear lesson for other countries.

The available data suggest that the outcomes are broadly in line with expectations; the retirement age has been successfully increased and replacement rates are generally in line with expectations, but more data and analysis are needed. Although generally successful, the review of country experiences and conceptual considerations also indicate that there is room for and need for improvement. The main lessons are discussed below.

(ii) Go for immediate transition to avoid future problems

When moving from conventional pay-as-you-go defined benefit (NDB) to an NDC scheme, there are multiple options for coverage in the transition. The three basic cases are: Only new entrants are required to join the new scheme, only individuals with less than x years in the old scheme are required to join or all are required to join the scheme from the first day with acquired rights under the old scheme translated into initial capital in the NDC system and credited to the individual’s personal account. Only one country adopted the full, immediate transition (Latvia). At the other extreme, in Italy only
workers with less than 18 years of contribution were mandated to join the new scheme, with Poland and Sweden somewhere in the middle.

In addition to the long transition period, Italy was reluctant to dispose of early retirement mechanisms from the previous DB regimes. What’s more Italy’s choice of indexation does not guarantee financial stability. Italy’s soft transition is what has come back to haunt the country in 2011, over a decade and a half after its move to NDC, as the financial market lost faith in the country’s capacity to manage its long-term liabilities. The experience in these countries and conceptual insights strongly suggest that new reforms should follow the example of Latvia and opt for the cold turkey: it can be achieved technically and it offers many advantages for the performance and credibility of the scheme. If adopted, as of day one all workers are subject to the same rules and incentives, and politically difficult comparisons between the old and new schemes are avoided. In addition, this approach does not necessarily make the workers with acquired rights worse-off as these are all transformed into individual capital and hence future benefits, the value of which will depend on the internal rate of return in the NDC scheme. Of course, an unsustainable internal rate of return under an unreformed NDB scheme, which is in essence the reason to begin with for reform, cannot be matched.

(iii) Identify and finance the transition costs as they will hit you sooner or later
A major advantage of introducing NDC compared to FDC is that not all the accrued to date liabilities will become explicit and need to be financed. Nevertheless, the move towards a scheme with a fixed contribution rate below what would have been required to finance benefits under the old system requires explicit decisions about the financing of rights already acquired. These are inherited legacy costs that needed to be financed anyway, also under the old scheme.

So far the reform countries have shied away from clearly identifying the legacy costs and the way they are to be financed. Instead they opted for non-transparent mechanisms such as contribution financing (with the idea of decreasing the rate as the legacy costs get repaid), curtailed notional rates of return to achieve cash surpluses, and an optimistic growth path that excluded any hint of future shocks. The financial crisis of 2008-2009 highlighted the problem with this approach, as evidenced in Latvia and Poland (which adopted an NDC & FDC approach) and Hungary (which adopted an NDB & FDC approach). In all three countries this led to a downsizing of the FDC scheme as a repercussion of the economic crisis and falling revenues since 2008 which more realistic assessment and political acceptance of the legacy could have avoided.

(iv) Establish a thought-through stabilizing mechanism to guarantee solvency
The cornerstone of NDC is the fixed contribution rate. The approach to achieve solvency under a fixed contribution rate is the choice of the notional interest rate as it is the mechanism that links the permissible growth of the liabilities to the expected growth in contribution assets. Conceptually, there are various mechanisms to achieve this that would include one or more of the following interventions: (i) having a correct measure of the growth of the contribution base or pay-as-you-go asset to which the notional interest rate is linked; (ii) choosing a good proxy for the notional interest rate; (iii) defining the NDC assets and establishing a solvency ratio of assets to liabilities and criteria that triggers an adjustment in the notional interest rate toward solvency in case of deviation
(i.e. a balancing mechanism); (iv) having the government issue NDC bonds with a return equal to the rate of change in the covered wage base (the country’s wage sum); and (v) picking up all other residual risk, specifically, the longevity risk inherent in the creation of annuities based on life expectancy estimates. These potential stabilization mechanisms are for the time being essentially all work in progress. There is a big step from the theoretical drawing board to practical implementation and to date there is no long-term experience of the either the comparative political or technical viability of approaches.

For the time being, only Sweden has established a balancing mechanism. The Swedish balancing mechanism does not distribute surpluses, other than what is needed to adjust liabilities upwards to the initial indexation path that would have occurred in the absence of balancing following a downward adjustment. Ideally, a balancing mechanism should be symmetric. In addition, the economic crisis raised questions in Sweden about the valuation of the Swedish NDC schemes substantial reserve funds and the smoothing method employed to construct the indices used in practice, which can result in potentially strong upward adjustments of pensions due to previous strong economic growth when contributions drop as the economy turn into recession and thereafter downward adjustments of pensions as the economy once again gains growth momentum.

The NDC schemes in Latvia and Poland rely on indexation features that have been expected to create surpluses in the transition to a state with balanced FDC and NDC schemes, and Italy’s scheme still has unbalancing features implying a faith that the government will pick-up the bill/change the laws when the selected internal rate of return proves to be unsustainable. These approaches are not conducive to fostering confidence in and building credibility.

(v) Establish a reserve fund to cushion temporary shocks

While an NDC system with a good stabilization mechanism can guarantee solvency, it cannot guarantee that resources are there all the time to pay the promised benefits – the system is can have liquidity problems. As an NDC scheme remains unfunded with current contributions used to pay current benefits, a downward shock on revenues, due to a the sort of temporary decrease in the number of contributors relative to the number of retirees or a fall in wages, which characterize recessions, requires adjustments on the benefit side, access to borrowing, or government transfers. All three ad-hoc measures can be prevented by having a reserve fund that can be used to address (unpredictable) short-term macroeconomic shocks and (predictable) transitory demographic stress. A reserve-financed mechanism to smooth consumption at the individual level (by avoiding cuts in benefits) can claim to have welfare enhancing effects for the individual, constitute an automatic stabilizer at the macro level, and increase confidence in and the credibility of the scheme.

To date none of the NDC countries has built up a reserve to cushion either the effect on pension payments of temporary declines in contributions or a specific demographic reserve fund to smooth fertility bulges. This said, Sweden has a large reserve fund that was inherited from the NDB scheme preceding NDC, which was built up from 1960 with the baby-boomer generation of the 1940s. The retention of part of the then existing
fund with the transition to NDC was an explicit measure to cover the legacy cost of the baby-boomer generation’s pensions. Nevertheless, the need for a short-term contingency reserve became apparent in Sweden when the solvency ratio fell below unity with the economic recession in 2008-2009. These events triggered the Swedish “brake” on indexation, leading to a reduction in workers’ account values and pensions in payment. The principle of a reserve fund is to cushion the potential need to decrease pensions in recessionary times with the help of ear-marked funds set aside during preceding strong growth years. It is important to note that similar but ad-hoc breaks on benefit levels were also introduced in other NDC (and NDB) countries to cope with the fall in revenues, increase in expenditure and overall deterioration in the fiscal situation.

(vi) Have a mechanism to share systemic longevity risk

The second main mechanism needed to guarantee the solvency of an NDC scheme involves applying the correct (future) remaining cohort life expectancy to the individual account value at the time of retirement and the calculation of the initial pension. Doing so requires having a statistical model that takes proper account of the uncertainty in the evolution of survival rates and that is not at hand. All known approaches underestimate the decline of mortality rates, in particular at higher ages and across countries.

One can imagine different ways of approaching the problem but all imply different risk sharing features between and across generations and hence are prone to different political views and objections. For example, one approach would consist in overestimating the improvement in life expectancy (to be on the safe side) which would imply paying benefits which are too low. Another approach would have pensioned cohorts bear the risk, meaning adjusting pensions in payment when life expectancy increases by more than that used to compute the annuity. Yet another approach would correct for under-estimations of life expectancy through a balancing mechanism which distributes the correction to pensioners and workers; implicitly, a downward adjustment in the notional interest rate triggered by the need to balance would tax the active generation. A more novel and equitable alternative would be to let the government (all taxpayers across generations) bear the residual risk, through the issuance of an NDC bond, which would be linked to changes in longevity.

For the time being, none of the NDC countries have an explicit mechanism to address the longevity risk. Some countries, e.g., Italy, postponed the political decision to periodically update life expectancy for the calculation of initial pensions, as specified in law. There is a clear need of a broader analysis and political discussion about the different risk sharing options, and, perhaps, attention must be given to how to better insolate selected mechanisms from ad-hoc political intervention.
(vi) Address the gender implications of NDC with analysis and political discourse

The gender implications of NDC reforms have so far not been in the forefront of the analytical work and have remained on the sidelines of the political debate. The gender issues inherent in NDC are also present in FDC as well as financial and non-financial (N)DB schemes. What makes NDC schemes a bit different compared with NDB is that gender issues and their redistributive implications can be more easily identified -- and the options more clearly spelled out.

The key elements of discussion concern the application of uniform mortality rates, differences in minimum retirement ages, the design of survivors’ pensions, splitting of pension rights in case of divorce, and individual versus joint annuities. It is too early to come forward with well informed policy proposals that, in any case, will need to be adapted to the cultural norms within each country. Too little research as well as too little discussion has hitherto taken place. But what can be advocated as of now is to change the status-quo and spend more resources in better understanding the challenges and potential solutions.

4. The Policy Research Agenda Ahead

The chapters in both volumes offer many key insights into the operation of NDC schemes as well as into the conceptual and empirical issues surrounding their rationale, design, and implementation. They signal also very clearly many areas where more research is needed to better understand the construction and outcomes of NDCs in order to improve the design and operation of schemes. In our view, the priority policy research agenda is centered around four areas: (i) The outcome of NDC schemes compared to the primary goals of pension systems, and compared to alternative scheme designs (in particular NDB and FDC, but also scheme’s with components of matching defined contributing, so-called MDC schemes); (ii) Further work with measurement of assets and liabilities for the introduction, adjustment and sustainability of NDC schemes; (iii) The interaction of NDC (as central consumption smoothing pillar for old age) with other pillars and benefits; and (iv) Application and implementation issues of NDC schemes in low and middle income countries. We sketch the key policy research questions for each of these areas.

(i) Measuring and Evaluating the Outcome of NDC Schemes

The attraction of an NDC scheme designed by the rule book is its promise to deliver on the primary goals of public pension schemes in a consistent and integrated manner. The suggested primary goals of all pension systems are to provide adequate, affordable, sustainable and robust old-age income (see Holzmann and Hinz, 2005):

- Adequate refers to both access to (coverage) and benefit level (absolute and relative, i.e. poverty alleviation and income replacement)
- Affordable refers to the financing capacity of individuals and the society
- Sustainable refers to the financial soundness of the scheme, now and in the future
- Robust refers to the capacity to withstand major shocks, including those coming from economic, demographic and political risks

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Conceptually, NDC schemes are able to make this happen by their design characteristics. At the design level, the primary goals fall in the first instance in place through the tight relationship between the contribution rate and benefit levels. A country begins by fixing the contribution rate at an affordable level, which makes the benefit level become an endogenous variable. In determining the level of the contribution rate the policy maker must also check the resultant average benefit, given this rate and the expected (or targeted) number of years of work and contributions and years of retirement. Given this calibration, the adequacy of benefit levels is determined by work history and the individual’s choice of retirement beyond a publicly fixed minimum retirement age (that can be made dependent on individually available resources). Indexing the individual account value with the sustainable internal rate of return and linking the initial pension to cohort life expectancy at retirement guarantees solvency. Operating a well thought through and sufficient reserve fund provides liquidity and makes it robust in the face of major economic and demographic shocks.

A critical assumption concerns the ability of individuals to make sound decisions about their labor supply and the capability of the economy to offer these jobs. If individuals are willing and able to adjust their labor supply and retirement age according to assumed inter-temporal welfare optimization all the pieces will fall into place. But is this happening and are the primary goals being achieved? We do not really know this yet as time span for the few NDC schemes in operation is still too short to provide the full empirical support. The performance of NDCs in Italy, Latvia, Poland and Sweden assessed in Volume 1 - Chapter 2 is broadly consistent with the goals but no proof. Generally, a major task over the next years should be to develop a comprehensive results framework of pension reforms of all kinds. This should be a major focus of pension research in general and research on NDC specifically. The World Bank and other international organizations can play an important role here by gathering, organizing and analyzing country data.

Relevant research, however, can and should also be undertaken by the international research community, and a priority area is labor supply reaction by individuals to NDC design characteristics: The pseudo-actuarial decrements and increments for earlier/later retirement, and the calculation of the initial pension based on remaining cohort life-expectancy. Are individuals reacting, as expected, to these design features? Is individual behavior responsive to the communication and information strategy employed by NDC countries, by individual “financial” capacity and capability? As experimental design is impractical, how can one model and analyze the labor supply reactions to introduction of NDC? Etc, etc, etc.

(ii) Measuring NDC Assets and Liabilities

Critical for the introduction, balancing, sustainability and liquidity of NDC schemes is the correct measurement of assets and liabilities – of the new scheme as well as the inherited one. This may sound like a relatively easy and, perhaps, already solved task, but a few chapters in this volume document that there is still much territory to explore. The chapters on legacy costs, the reserve fund, intergenerational equity, actuarial balance, generic NDC, etc provide an appreciation of the difficulty of the task. And the
task is not only to come forward with a conceptually clean approach, but with one that is operationally feasible.

To appreciate the difficulties and to raise interest in reading the related chapters of this volume, a few research challenges are highlighted.

**Liabilities:** The liabilities in an NDC scheme should be largely if not completely known, depending on how meticulous a country is in gathering and documenting information. They are the account values of the insured population. For steady state considerations, this would be sufficient. If a former NDB system is, however, folded into an NDC scheme, the legacy costs will need to be identified as a separate financing will be required. How to best identify and measure such costs remains an open question.

Liabilities in an NDC scheme depend in part on the present value of benefits in disbursement, which depend critically on the remaining life expectancy. This requires the correct projection and application of the retirement cohort life expectancy at the time of pension calculation. How best to do this we do not know – neither technically nor politically.

**Assets:** The assets of an NDC scheme are to the largest part composed of the PAYG or contribution asset, i.e., an estimate of future contributions. Conceptually, the pension system is a dynamic process where both liabilities and assets evolve in response to economic and demographic events. This conceptually sound construct, however, needs to be made operational. At the moment there are only two alternatives on the table that estimate assets in terms of a discrete snapshot in time, each with issues of their own. The Swedish approach was fine under more or less steady state conditions but showed its limitations under the shock. The proposed theoretical alternative (Bodor and Robalino, 2009) may read convincingly on paper but model simulations may not reflect operational reality.

These approaches define the value of assets in discrete time using the structure of current contributions (new liabilities) and pension payments. Palmer (in Chapter 10) shows that this approach does not yield a unique definition of assets for a given steady state flow of contributions. Because of this deficiency Palmer purposes introducing an NDC bond as the NDC “asset,” given that the internal rate of the asset is based on the rate of growth of the covered wage base. This creates a government longevity bond where the government covers the residual longevity risk, as well as other small design deficiencies that inevitably arise in practical applications.

In view of the challenging research agenda on measuring assets and liabilities for an NDC reform one may be inclined to think that traditional NDB reforms may actually be a better or at least easier choice. Well, the reality is that also these alternative schemes or reform approaches are fraught with much the same or worse conceptual and operational problems to establish solvency and liquidity. Yet, the questions do not emerge in such a clean manner as NDB schemes are much less transparent and hence tend to be much more deceptive.

(iii) **The Interaction of NDC Schemes with other Pension Benefits and Pillars**

The key objective of an NDC scheme is to provide adequate consumption smoothing for most but not all of the population in old-age. The policy maker that is interested in
mixing the pension portfolio between components with economic and financial based returns will cap the coverage of the NDC scheme at a desired level in order to include an FDC component. In addition, for the lowest income groups, which will consist of persons with short and substantially interrupted earnings histories special measures will be required to support their consumption smoothing and to avoid poverty. Also, NDC schemes are focused on old-age income which raises the question how they interact with disability and how survivor benefits should enter into the picture. For some of these interactions no good answers are yet out, and two research issues are flagged:

How should low income at old age be addressed? Some of the participants in NDC schemes will have a low contribution density throughout their active life, perhaps aggravated by low wages, and as a result will receive low benefits even if retiring late. Others may never have contributed to formal pension scheme. Should they both have access to some minimum retirement income, say in the form of an (pension, income or asset) means-tested social pension? Or would it be better to replace (at least partially) these ex-post transfers with ex-ante transfers and matching contributions for low-wage participants (see Palacios and Robalino, 2009)? This may reduce government outlays in present value terms by providing an incentive for formal participation than would otherwise have been the case. How should such matching contributions be financed? Fully externally by budgetary resources or within the system by allocating some number of percentage points of the average contribution base to all accounts? And what are the objectives and how should the results be estimated?

How should disability benefits be provided in an NDC world? In the traditional NDB schemes are old-age and disability benefits historically closely linked, and old-age pensions was initially a kind of generalized disability pension that few achieved. As with increasing life expectancy the relevant risks for both contingencies became separated and could be independently priced, suggesting that this might also be a path forward for the disability benefits. This was not a feature of NDB schemes. It has been done with success in a few new FDC schemes (such as Chile). An NDC scheme offers the same opening, however, it has not yet been used and because of this we lack guidance for how to do it.

(iv) NDC schemes in Middle (and Low) Income Countries

For the time being the implementation of NDC schemes has been limited to high income countries, with a few middle income countries adopting some of the NDC features, but scant assessment of outcomes (e.g. Russia, Kyrgyz Republic and Mongolia). Implementing an NDC scheme in a middle income country environment is bound to raise a number of new conceptual and operational issues for which we currently have very limited understanding and even less sound knowledge. Once we have progressed on this knowledge agenda we will be able to make a first assessment if and how the approach can be pursued in a low income country environment.

A critical element for an implementation is bound to be the administrative capacity, with efficient collection and registration of contributions and creation of individual accounts. Data issues will emerge for the estimation of life expectancy at retirement in order to calculate the initial pension; most middle income countries do not have reliable data upon which to base such important calculations. And conceptual design issues will emerge for the identification of the sustainable notional interest rate in settings with
decade-long coverage expansion and wage growth per capita in excess of the financial interest rate.

In view of these and many other policy research questions in mind – enjoy this anthology of papers on NDC and stay tuned for the next one!

5. References

