1 The Taxation of Pensions under Review: Motivation, Issues, and Directions

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1.1 Motivation and Background

The quest for better-designed pension schemes and effective pension system reforms has preoccupied policy makers and academic researchers for the last several decades. The debate has swept across the globe, at times generating strong theoretical and policy arguments and creating reform leaders and followers. The notions of systemic and parametric pension reform that emerged with the debate suggest the depth of proposed reforms and the willingness to explore new ones.

By contrast, the topic of taxation of pensions, and retirement income provision more broadly, has been much more limited. Taxation of pensions did receive some country-specific attention within much broader tax reform discussions and sporadic interest from the research community, but no new paradigms were proposed; changes in pension tax regulations happened mostly at the margin; and apart from some modeling efforts, academic research was very sparse. The relative neglect of this topic is surprising, as a number of developments came to the forefront during recent decades that impact the taxation of pensions, and public finance more generally. The most important of these trends call for a broader policy and research response:

1. Population aging has advanced worldwide and commands ever greater attention from policy makers, international organizations, and researchers. Population aging makes the tax base(s) of retirement income even more important. Individuals' expected delays in retiring combined with continued increases in life expectancy postretirement lengthen the span between pension contribution payments and receipt of benefits and make the timing of tax revenues more sensitive to front- or back-loaded arrangements for taxing pensions. The trend toward

replacing public and private annuities during the drawdown stage with phased withdrawals or individual portfolio management renders choices among retirement savings instruments more sensitive to taxation regimes and their changes.

2. Globalization now encompasses not only the movement of goods and services but also the flow between countries of people, both as workers and as retirees, and of capital. This makes tax revenues more sensitive to the way pension contributions, and retirement savings more generally, and their returns are treated by work and residence countries during the saving, accumulation, and withdrawal phases.

3. The tax treatment of retirement income provision is highly complex, variable over time, and highly diverse across savings alternatives within and between countries. This creates potential distortions and invites arbitrage activities on retirement income programs that by themselves are already complex; arbitrage activities on the selection of countries of work, investment, and retirement residence; and greater rent seeking on the part of the tax advice industry.

4. The aforementioned developments affect the distribution of tax expenditures and tax revenues of retirement income schemes along individuals' life cycles, but the increasing mobility of the labor force and retirees also affects the distribution of tax expenditures and revenues between countries. Existing double-taxation treaties do not address interpersonal or intercountry inequities, and little consensus exists among policy makers and researchers about how to coordinate the taxation of retirement income provision across the World Bank's "five pension pillars" (discussed below) and between countries.

5. Most of the discussion on approaches to taxing pensions still centers heavily on the type and scope of tax preferences and the timing of taxation. However, developments in the academic literature over recent decades provide an analytical base suggesting that taxing wage and capital income at the same rate may not be welfare-optimal; lower capital income tax rates may lead to long-run welfare improvements; age-based taxes may have the potential to significantly improve welfare; and the design of pension systems and tax systems should be better coordinated.

This volume aims to shed some light on these issues by doing three things: (1) documenting how pension systems are subject to various forms of taxation, (2) analyzing how economic theory can explain what

is observed both qualitatively and quantitatively, and (3) asking the normative question of whether the observed interactions of taxation and pensions may or may not be efficient. The goal is to provide a platform for further research; this volume is not intended to deliver a unified vision of pension taxation in the twenty-first century.

This publication is the result of cooperation between CEPAR (ARC Centre of Excellence in Population Ageing Research, based at the University of New South Wales, Sydney) and CESifo (Center for Economic Studies & Ifo Institute, based in Munich), and demonstrates the power of this kind of international institutional cooperation. These organizations held two consecutive workshops, in Sydney in late 2014 and in Munich in late 2015, to begin the discussion. The workshop papers were then developed, reviewed internally and externally, and revised into the chapters of this volume. Some of the papers were invited after the workshops to augment content and depth.

The rest of this chapter is organized as follows. Section 1.2 offers a selective view of some of the research questions and policy issues raised in the volume. Section 1.3 provides an overview of the chapters and their results, and how they fit together. Finally, section 1.4 outlines key research questions on topics suggested for priority attention going forward.

1.2 Framing of Research Questions and Policy Issues

This section aims to frame key questions and highlight selective answers on the topic of taxing pensions. Its purpose is to provide alternative perspectives on the topic against the assessment that economic theory currently offers some limited specific guidance for policy makers, while the country realities are very complex and difficult to reconcile with such guidance. To this end, the following questions and issues were selected: (1) How can the tremendous diversity of tax treatment of pensions within and across countries and time be explained? (2) What does recent academic literature imply for the direction of pension taxation? (3) What conceptual guidance is available for taxing the different pillars of retirement income policy? (4) What possible directions exist for incremental or major reforms by key country groups? (5) Should and can taxation and pensions be treated jointly or separately from a policy viewpoint? (6) What are the implications for analysis when moving from a closed economy to an open one, taking into account population aging?

1.2.1 Explaining the Complexity and Diversity of Pension Taxation

Taxation of pensions differs substantially within and between countries and over time. Several chapters in this volume offer deeper country-specific insights on both the rationales and reforms. Reasons for this diversity include differentiated legal structures and the differences between wage-based contributions to an unfunded scheme as withheld earnings and funded contributions as financial savings; the lack of policy coordination between agencies in charge of pensions and those in charge of taxation policy at the national and international levels; the fiscal policy cycles that expand and curtail tax advantages accorded to pension saving; and the incomplete establishment of income taxation oriented toward personal consumption (see Genser and Holzmann, chapter 15, this volume). Here, the focus is on the last point.

While the Schanz-Haig-Simons (SHS)[1] concept of comprehensive income taxation was the intellectual bedrock of personal income taxation for almost 100 years, it has rarely been applied to organized retirement saving. The administrative advantages generated by the comprehensive definition of income have mostly been waived in the pension domain, with little articulation of the reasons why but with notable consistency. Among possible reasons that might be offered *ex post* for this policy position are: (1) under a progressive schedule, it penalizes individuals with highly fluctuating annual incomes over their life cycle; and (2) the taxation of saving distorts intertemporal consumption decisions, as income spent on savings is subject to double taxation—once when income is saved and again when these savings earn returns. When saving for retirement is considered, compound interest makes this distortion large, but even as the actual treatment of pension savings approximated the consumption tax base, public accounting of these tax arrangements typically espoused a comprehensive income tax basis. Arguments for a general consumption-oriented income taxation structure (Fisher 1930; Kaldor 1955) were ignored or rejected by tax policy makers and their advisers, so pension saving (and to a lesser extent owner-occupied housing) was treated as an income tax concession in many countries.

From an academic perspective, consumption-type tax treatment became more established with the development of the theory of optimal tax policy in the 1970s, which rejected the optimality of equal tax rates for capital and labor. The approach gained political traction when its

operational feasibility was enabled by exempting normal returns on capital (Atkinson and Stiglitz 1976; Institute for Fiscal Studies 1978; US Department of Treasury 1977). The advantages of consumption-oriented income taxation were stressed again recently by the two volumes of the Mirrlees Review (Mirrlees et al. 2010, 2011), but no industrialized country has yet implemented a fully consumption-oriented personal income tax (Auerbach 2009). Instead, this kind of treatment is reserved for life cycle saving in many but not all countries, for most but not all pension pillars, and often but not always for owner-occupied housing. The variation in these tax arrangements has not yet stabilized, nor have the contributions from economic theory provided new and stabilizing conceptual benchmarks.

1.2.2 Implications of Recent Developments in the Academic Literature

As indicated, it would be fair to say that in the last half century, the academic literature has established that there is no reason why labor income and capital income should be taxed at the same rate. This is the first and most important of several developments in the relevant literature. Early on, Pigou (1928) argued for the efficiency of a personal expenditure tax over an income tax in a two-period model recognizing only current and future consumption. Later work on optimal taxation in the 1970s developed this idea by including an untaxed good (leisure) in such models, leading to results that were less clear-cut. Atkinson and Stiglitz (1976), however, showed that a zero capital income tax was optimal when certain separability properties of utility functions were met—that is, that an income tax with a saving deduction remained optimal under these conditions.

The idea of the desirability of a zero capital income tax also received support from analysis using a different modeling framework. In the 1980s, a number of papers (Judd 1985; Chamley 1986) adopted a Ramsey-type growth framework to argue that it is inefficient to tax capital in the long run. In the Ramsey model, agents in the economy choose consumption and investment to maximize their overall welfare. Two mechanisms account for this result. First, the additional investment financed by the extra saving induced by removing capital taxation would eventually increase wages, and thus the labor income tax base, to a point where a labor tax would raise the same revenue without increasing the tax rate. Second, in a dynastic model, the price distortion

between present and future consumption eventually becomes extreme. The zero capital income tax result thus comes from alternative modeling frameworks.[2]

However, this result was qualified in subsequent literature that used life cycle or incomplete market models. First, if a life cycle framework is used rather than the dynastic infinite horizon framework adopted by Chamley and Judd, and age-specific taxation is not available, some capital income taxation may be a second-best solution. In particular, Erosa and Gervais (2002), using a standard life cycle model, show that it is optimal for a government to tax or subsidize interest income, at least when age-dependent tax schedules are not available. This is because individuals' optimal consumption and work plans are not constant over the life cycle. As a result, it would be efficient for government to use age-varying capital and income tax rates. If it is not possible to condition tax rates on age, a nonzero capital income tax rate can be a substitute. Second, literature beginning with Hubbard and Judd (1986) showed that if incomplete credit or insurance markets are present, so that individuals are liquidity constrained or face uninsurable idiosyncratic income risk, then the optimal capital tax rate will not typically be zero, since substituting capital taxes for labor taxes will reduce the impact of these constraints.

An important paper by Conesa, Kitao, and Krueger (2009) quantitatively characterized the optimal capital and labor income taxes using an overlapping-generations model in which individuals face uninsurable idiosyncratic income shocks and permanent productivity differences. The authors found that the optimal capital income tax rate is significantly positive, at 36 percent, which is surprisingly high.

Commentary on Conesa, Kitao, and Krueger (2009) shows how sensitive their capital tax result is to generalizations of the model. Nakajima (2010) extended the Conesa, Kitao, and Krueger work by adding housing into the model to compare whether and how the optimal capital tax rate differs between models with and without housing. He showed that the optimal capital tax rate in the model with tax-exempt owner-occupied housing is 1 percent. This result stems primarily from the interasset distortion introduced between housing and nonhousing capital when one is taxed and the other is not, a recasting of the Hamilton and Whalley (1985) result discussed later. Peterman (2013) changed two critical assumptions in a canonical model of the Conesa type to demonstrate the sensitivity of the optimal capital tax rate to model assumptions. He modified the utility function such that it implies an

agent's Frisch labor supply elasticity is constant, as opposed to increasing, over the agent's lifetime, and he allowed the government to tax accidental bequests at a separate rate from ordinary capital income. These two changes led the optimal tax on capital to drop by almost half. Kuklik (2011) extended the Conesa, Kitao, and Krueger (2009) model by adding two additional elements—a nonlinear mapping between hours worked and wages and *inter-vivos* transfers—and showed that the optimal capital income tax rate in the United States is 7.4 percent. Fehr and Kindermann (2015) found that adding transitional dynamics reduced the tax rate so that it was close to zero, while Peterman (2016) found that different approaches to modeling human capital accumulation had different impacts on the optimal capital tax rate. Kumru and Piggott (2017) found that combining social security and tax regimes reduced the optimal capital income tax rate.

This volume's judgment is that, on balance, while the literature since the 1980s has qualified the zero capital income tax result, the desirability of lower capital income tax rates, relative to labor income tax rates, is probably the most important conclusion from the academic literature as it currently stands (Mankiw, Weinzierl, and Yagan 2009).

A second important development relates to age-based taxation. The idea that tax rates on both capital income and labor income should depend on age was developed in recent decades (Alvarez et al. 1992 is the earliest reference found, although the most influential is Erosa and Gervais 2002). As in the case of traditional optimal tax literature, clear policy implications are hard to find. The additional flexibility introduced by allowing tax instruments to be conditioned on age does lead to welfare improvements, however, and numerical analysis suggests that these can be substantial.

While age-based programs do exist—the US Medicare program is one example—the literature on age-based taxes has not been developed in a policy setting. Woodland (2016) discussed the literature on age-based taxes in some detail, and Bateman (chapter 7, this volume) offers specifics on motivation and policy changes.

A third recent development is a series of papers that treat the income tax system and the pension system as an integrated whole, consistent with the suggestion by Cremer and Pestieau (chapter 2, this volume). These use a range of theoretical approaches and sometimes deal explicitly with retirement age as a policy instrument. Examples include Cremer, Lozachmeur, and Pestieau (2004), Shourideh and Troshkin (2013), and Kumru and Piggott (2017).

Finally, the "new dynamic public finance" (NDPF) literature embodies recent developments in public finance analysis that offer new guidance on how the taxation of savings and labor supply should differ from the traditional Ramsey-type approach. This literature builds on Mirrlees (1971), but in a dynamic incarnation with heterogeneity of agents (e.g., by skill) and private information. The NDPF approach considers the form of fully optimal taxes given the informational structure in the system. In this modeling framework, new results of NDPF include (1) that it is optimal to introduce positive distortions in savings that implicitly discourage saving, (2) perfect labor tax smoothing as in typical Ramsey models may not be optimal with uncertain and evolving skills, and (3) the time consistency problem is very different, as capital is not directly at the root of the problem. The NDPF result arises essentially through learning and using acquired information rather than taxing sunk capital (Golosov, Tsyvinski, and Werning 2007). Kocherlakota, the coiner of the notion of NDPF, states that "the ultimate goal of the NDPF is to provide relatively precise recommendations as to what taxes should be … and not be side-tracked or irritated how [*sic*] the current provisions actually look like and how they are motivated" (Kocherlakota 2010, 15). The NDPF approach is probably best seen as a complement to the alternative approaches already discussed.

These recent strands in the academic literature bear directly on pension taxation. Prefunded pensions involve accumulations of capital—in most economies, pensions represent the largest personally held pool of assets, along with owner-occupied housing. Pensions are by their nature age based. The taxation of labor and skills is relevant for labor supply decisions, which in many countries include formal versus informal participation and thus the presence or absence of acquired rights to future benefits. However, the lack of clear-cut policy guidance and potential operationalization that emerges from the age-based literature makes age-based considerations only a useful reference for *ex post* rationalization of design decisions, not an intellectual benchmark to inspire new taxation approaches. In addition, the NDPF initiative has not yet been broadly embraced or matured to a point where its insights may be translated into implementable policy proposals. All these strands, however, provide a rich foundation for future research on retirement income.

Last but not least, two major gaps remain in the analytical public finance literature as it relates to pension taxation. First, as Cremer and Pestieau (chapter 2, this volume) point out, behavior may not reflect

rational life cycle expectations, and considerable evidence suggests that most people do not respond rationally to price changes in this context (Chetty et al. 2014). Subsection 1.2.3 expands on this. Second, it is worth noting that very little research undertaken to date models taxation policy explicitly in the presence of changing demographics. This is surely an area for future research, since much current interest in pension policy and pension taxation is generated by the aging population.

1.2.3 Academic Guidance on the Different Components of Retirement Income Policy

Throughout this volume, "pensions" should be thought of as encompassing not only occupational or personal pensions but also basic provision financed by general revenues (i.e., social pensions) and contributory social security schemes (i.e., public pensions). The rather disparate literature on the impacts of all these policies on behavior, especially labor market and saving choices, is thus relevant.

All these interventions bring with them price distortions that impact consumer choice. They do so at multiple points in an individual's life cycle—at the very least, when the benefit is received and when the tax required to finance it is levied. Furthermore, the overall effects of these interventions are mediated through government-provided or regulated programs for health, long-term care, and related services.

To see how policy and practice relate to this literature, it is convenient to revert to the World Bank's "five-pillar" system of retirement policy (Holzmann and Hinz 2005). The "zero" pillar encapsulates social pensions: noncontributory instruments for which eligibility is based on age, perhaps other income or assets, and some residency criterion. The first pillar captures schemes such as social security, either traditional pay-as-you-go-financed defined benefit schemes or more recent nonfinancial defined contribution schemes. The second and third pillars refer to pension saving that is prefunded, either occupational or personal, and either mandated or voluntary, respectively. The fourth pillar refers to nonpension assets and entitlements, including cohabitation of the elderly, owner-occupied housing, and access to public health and long-term care programs.

1.2.3.1 The zero pillar Most zero-pillar systems are means tested. Targeted or means-tested programs, also referred to as social pensions, base eligibility and the level of benefits on individual or family resources. By their nature, means-tested programs have a redistributive

role and are funded from general taxation. Means testing provides an inexpensive way of ensuring a minimum level of retirement income. The means test is often criticized for creating disincentives to work and save, but such distortions are dwarfed by disincentives from much larger earnings-related pensions with associated payroll taxes or social insurance premiums (Chomik et al. 2015; Kumru and Piggott 2017).

While some form of targeting exists in most countries, it is rarely exploited to its full potential. Often, means testing is deployed in programs that address destitution, such as the US Supplemental Security Income program. Such policies can, however, also be used to reduce the liability of large publicly financed pension or social security promises by excluding the affluent. Comprehensive policies of this kind are in place in only a few developed economies (e.g., Australia, Canada, Chile, and Denmark) but have recently been advocated to address both fiscal pressure and inequality issues, notably by the International Monetary Fund (2014).

A common concern about means testing is how it affects incentives and distorts economic activity. Yet recent analytical insights reveal that means-tested programs can enhance economic efficiency because they cost less and distort fewer decisions than alternative arrangements. Furthermore, means-tested retirement programs, in particular, may be interpreted as an age-based capital income tax (Kumru and Piggott 2017). While little is known about the relative merits of alternative withdrawal schedules, the interpretation of the means test as an age-based tax should ameliorate concerns about very high effective marginal tax rates that are frequently brought to bear. The "effective" taxation introduced by means testing requires much more analysis.

1.2.3.2 The first pillar In most countries, mandated and unfunded public schemes from the very beginning had an expenditure tax treatment of a consumption-oriented income tax—deferred taxation whereby no taxes are levied at the stages of contributions and returns on assets, while full income taxation takes place at the stage of benefit disbursement (EET: exempt, exempt, taxed).[3] This consumption-type tax treatment had little to do with theoretical guidance but instead was driven by operational considerations: under the then-universal nonfinancial defined benefit schemes, the implicit rate of return was impossible to calculate and thus to tax. Perhaps more importantly, however, in the past, wage-based contributions were considered withheld wages to be taxed when disbursed. While the original consumption neutrality of

taxing public pensions thus arose more by accident than by design, today it is the guiding principle for reforms, including the guidance for neutrality between alternative retirement arrangements. The 2005 retirement income tax reform in Germany falls into this category (see Börsch-Supan and Quinn, chapter 8, this volume).

Yet the neutrality of unfunded systems is violated (as in the zero pillar) by distributive considerations, in particular the earnings test under traditional nonfinancial defined benefit schemes, which often continue to include strong redistributive components. An earnings test is motivated by a desire to prevent "double dipping" by workers—drawing a pension at an early age while continuing to receive wage earnings. In its extreme form, an earnings test amounts to a tax on the supply of mature labor.

It is the redistributive structure of a nonfinancial defined benefit scheme that creates the very rationale of an earnings test. Under a nonfinancial defined contribution scheme, individuals get out only what they pay in, as this mimics an actuarially fair scheme (up to the difference between the financial interest rate and the notional rate of return, which is germane to the natural rate of growth). This pseudo-actuarial structure renders an earnings test unnecessary and allows any combination of benefit receipt and continued wage earnings, as is done in Sweden. Redistributive interventions then take place in a separate and transparent manner.[4]

1.2.3.3 The second and third pillars A recent authoritative policy document covering this issue, the Mirrlees Review, recommended a consumption-oriented income tax treatment of all saving, citing both the legal complexity of differentiating different forms of saving and the need to encourage pension saving (Mirrlees et al. 2011). While the Mirrlees Review suggests a broader consumption tax implementation via rate-of-return allowances, thus taxing capital returns and profit above a risk-free rate, it is open to other consumption tax approaches for retirement saving (i.e., immediate payment and thus the earnings tax variant TEE, meaning taxed, exempt, exempt, or deferred payment and thus the expenditure tax variant EET). This flexibility and self-selected combinations should smooth the effects of a progressive tax schedule. A consumption tax basis is appealing from an economic efficiency perspective because it eliminates both intertemporal and interasset price distortions. This latter effect is given less attention in the literature but is potentially equally important (Hamilton and Whalley 1985).

Here, owner-occupied housing is crucial, especially in those countries with high owner-occupancy rates, as is human capital investment. We return to this topic in subsection 1.2.3.4, when we discuss the fourth pillar.

Strong relevant evidence shows that households react to pension tax breaks in different ways. Chetty et al. (2014) analyzed some 41 million observations in Denmark over a 15-year period and concluded that pension tax breaks did not have a large impact on aggregate household saving. They split the sample into "active" and "passive" savers and found that only active savers (around 15 percent of the population) responded to variations in the pension tax breaks. However, they did so mainly by shifting savings between different saving vehicles. The remaining, "passive" savers (85 percent of the population) appeared not to alter their behavior. It is also possible that tax incentives may induce firms to offer workplace pensions. This leads back to the notion discussed earlier in this chapter that workplace-linked pension institutions can (1) provide affordable access to the capital market for households that otherwise would not participate, (2) operate in an environment where peer effects can be influential, and (3) act as a commitment device for long-term saving.

This evidence, if supported by other studies, raises the question of the efficacy of removing the intertemporal price distortion, particularly if these efforts go beyond what is called for by consumption taxation. If households do not react to expensive tax incentives, why provide them? Perhaps one response is that pension plans within these pillars operate as a commitment device. People save within them because they are there, and people around them do the same. It is unlikely that employers would offer such plans in the absence of a tax advantage (Mitchell and Piggott 2016). Nevertheless, other cheaper devices may achieve voluntary retirement saving, as the burgeoning literature on behavioral finance suggests (Mitchell and Utkus 2004; Benartzi and Thaler 2007, 2013). However, portfolio distortions created by different treatments of retirement saving instruments (including housing) may still call for neutrality.

Consumption tax treatment of these pillars returns the discussion to Pigou's (1928) analysis of "neutrality" between consumption in working life and in retirement. Pragmatically, a good deal can be said for such a position. Combined with the judgment that the weight of modern public finance analysis still indicates a lower rate of taxation for capital income than for labor income, the considerations raised here suggest

that a pension tax structure generating neutrality between present and future consumption, and among alternative saving vehicles, is a good tax design to aspire to.

1.2.3.4 The fourth pillar Optimal financial retirement saving is also determined by the scope, pricing, and taxation of services highly relevant in old age, in particular cohabitation (i.e., living with children and family), owner-occupied housing, health care, and long-term care. The availability or absence of these services substantially changes the value of retirement income required to smooth lifetime consumption, as does their pricing and taxation. For this reason, these provisions are summarized as a memorandum under the fourth pension pillar.

For example, the availability of free health care at old age, or health care financed during active life and actually or notionally presaved through premiums above period expenditures when younger, has a bearing on how much cash income and precautionary saving are needed in retirement. The same applies to long-term care, a topic where guidance for good financing arrangements is still missing (CEPAR 2014). Consistent and preferably neutral taxation of those publicly and privately provided services may be called for to avoid costly arbitrage games or confusion.

Consumption tax treatment and thus consumption neutrality eliminate an important interasset price distortion between the two major life cycle assets—pensions and owner-occupied housing. Owner-occupied homes in many countries receive (approximate) expenditure tax treatment (OECD 2010). Treating housing and pensions very differently leads to asset misallocations. Estimates of efficiency costs associated with this distortion are somewhat dated but are substantial (Hamilton and Whalley 1985).

1.2.4 Possible Directions for Tax Reform by Country Groupings

Despite the heterogeneity of the taxation of retirement income provision across countries, four groups of country approaches can be broadly distinguished. Their path dependency with regard to both pension and taxation arrangements suggests both constraints and options and offers some limited perspectives for smaller- and larger-scale improvements.

1. In the first group of countries, such as Australia, the United Kingdom, and the United States, unfunded public retirement provision is more limited while broadly offering consumption-oriented income taxation

to funded retirement income provision (within limits), mostly in the form of EET, as well as to savings in residential housing, mostly in the form of TEE. With retirement income accumulations (for social security, occupational, and personal retirement provision) and housing property, these countries cover most long-term individual savings under a consumption-type tax provision that is, however, complex and often inconsistent. Simplicity and consistency could be achieved by a full move toward a consumption-oriented income taxation approach. The Mirrlees Review suggested (a) establishing neutrality for all saving efforts and (b) completing the move toward consumption taxation of income (in addition to a single-rate value-added tax). The latter would allow for a mixture of front- and back-loaded consumption taxation but is essentially based on a rate-of-return allowance approach that keeps the normal rate of return (as well as the normal rate of profits) untaxed (see Mirrlees et al. 2012 for a summary). As life cycle saving becomes tax-free and the border to other savings becomes porous, this approach may require taxation of intergenerational transfers of bequests received or donated to avoid intergenerational inequities.

2. Many countries with very large unfunded schemes and limited supplementary funded provision (such as in Central and Southern Europe) offer some limited consumption-oriented treatment of income taxation for their funded pillar, with no intention of a complete move toward such a taxation approach. Their most important tax structure remains the personal income tax. As various country chapters in this volume document, these exceptions included new tax preferences to incentivize personal retirement saving given reduced public and occupational pension payments. These were often reversed to address the budgetary fallout of the 2008–2009 global financial crisis. Such selective tax preferences for retirement saving would profit from more consistency of exemptions among retirement income provisions and clearer differentiation from other forms of nonretirement savings. To this end, it is important to work out very clearly the objectives for deviation from the standard income taxation approach and whether the expected effects on savings and other outcome variables can be or have been achieved. A crucial empirical question is the effect of tax preferences on the individual and aggregate retirement saving volume and the net effect on national saving once the tax expenditure over the life cycle is taken into account. Chomik and Piggott (chapter 11, this volume) critically review the concept of tax expenditures as applied to pension taxation.

3. A number of countries have recognized that critical economic arguments exist for taxing labor earnings and capital income differently, and thus they have established a dual income tax (DIT) regime. The DIT is a particular form of schedular tax that applies a separate (generally lower) tax rate to capital income and applies a progressive tax schedule to the sum of the taxpayer's income from other sources (e.g., labor and pension income), with the lower capital tax rate typically set equal to the entry rate of the progressive tax schedule. Tax credits and deductions are used to enhance horizontal and vertical equity. This approach is at times considered a compromise between the comprehensive income tax and the consumption-oriented income tax approaches. The DIT is often linked with the Nordic tax approach, having originated in Scandinavia (Sørensen 1994). Schedular taxation of a share of capital income (such as from dividends and savings accounts) also advanced in a number of OECD countries without moving toward a full DIT, albeit no Nordic country has introduced a DIT in its pure form.[5] While the DIT offers a compromise for issues of capital and labor taxation and in principle taxes all savings the same way, this approach harbors no consistent approach to the tax treatment of retirement income and other savings, or more generally between life cycle and non–life cycle saving (Bravo, chapter 6, this volume). As a result, DIT systems typically have a variety of tax preferences toward retirement income provision that are country specific and ad hoc. Thus, as in the case of the comprehensive income tax system, a move toward a more equitable and efficient design of pension taxation requires clear objectives and rigorous evaluation of deviations from the standard approach.

4. Finally, about 50 countries worldwide have introduced a low-rate income tax at a single rate above an exemption—a so-called flat tax. Various former transition economies in Central, Southern, and Eastern Europe have done so, as have many developing and emerging economies.[6] The flat-tax proposal is or has been under discussion in developed countries such as the United Kingdom and the United States; a flat tax has in fact been enacted in some US states. Having chosen such an approach, these countries voted for a lower rate to encourage entrepreneurial activities and induce lower labor tax distortions at the expense of permanent sizable distortions in intertemporal consumption prices. Thus, little room remains for special preferences for retirement income provision under a flat personal income tax approach

except to move toward a flat consumption tax (Hall and Rabushka 2007) or a multirate version that Bradford (1986) called the "X tax" (Auerbach 2013). Both are based on a subtraction-method value-added tax but with labor income taxed at the individual level to facilitate a progressive rate structure (one positive rate above a threshold under the flat tax, three under the X tax). Thus far, neither of these options has been implemented anywhere.

1.2.5 Establishing Consistency between Taxation and Pension Policy

The formulation of government policies on taxation and on retirement income provision is happening largely as parallel processes, with very limited coordination. This contrasts with the view of many economists who strive for a theoretically underpinned and unified conceptualization of both government programs. Theoretical economists argue that the policy instruments of taxation and public (i.e., social security–type) pension provision cannot actually be separated (Diamond 2009; Cremer, Lozachmeur, and Pestieau 2008). Cremer and Pestieau (chapter 2, this volume) claim that "the desirable approach consists of combining the optimal design of [public] pensions and taxes in a single model." This view of (nonlinear) income tax policy and pension policy as complementary instruments that can be or need to be productively combined to achieve minimum distortions and envisaged distributive outcomes also underpins the work by Bastani, Blomquist, and Micheletto (chapter 3, this volume).

An alternative welfare-based approach is to view public (or social insurance) pensions as an instrument to substitute for incomplete financial markets of intertemporal resource exchange and annuity provision (Holzmann 1990). The contribution and benefit design of a public scheme should thus imitate the ideal private sector scheme with regard to work and retirement incentives, as promised by nonfinancial (or notional) defined contribution schemes (Holzmann and Palmer 2006; Holzmann, Palmer, and Robalino 2012, 2013). Income redistribution and social policy objectives would be handled outside a nonfinancial defined contribution scheme and be financed by general revenue. Adding a social wing (i.e., social pensions) to address poverty issues and a funded wing (i.e., occupational and/or voluntary individual provision) to supplement the mandated public provision for the higher income strata creates a sound retirement income system in which pension taxation and pension provision are connected but remain separate instru-

ments. Nevertheless, these would profit from a coordinated but not integrated approach. Areas of overlap and joint interest between these two policy areas are explored by Feher and Jousten (chapter 4, this volume). Which of these approaches ultimately offers higher social welfare through fewer distortions on skills acquisition, labor supply, and savings decisions and better-targeted redistribution has not yet been fully explored.

Regarding the coordination of taxation and pension policy, the limited experience available on this deeply understudied topic is not encouraging. The Swedish tax reform of the early 1990s, part of a major reform effort in the aftermath of the country's economic and financial crisis, contained some relevant changes in taxing retirement income provision (Agell, Englund, and Södersten 1995), but there was no direct coordination with the major pension reform that followed in the mid-1990s, which introduced the nonfinancial defined contribution scheme plus an additional and mandated financial defined contribution pillar. The tax reform's main contribution to pension reform was the message that major reforms supported by all key political parties in the country were possible.

The experience from other countries where major tax and pension reforms have taken place—such as Australia—also suggests that little direct coordination has occurred. Participants in these reforms believe that trying to coordinate across two already very complex policy fields may be too ambitious.[7] At the same time, however, pensions as an institution would be unlikely to exist without income tax preferences. Thus, a natural question is, which tax treatments best facilitate this under alternative general income tax designs?

1.2.6 Expanding the Analysis toward International Labor Mobility and Aging Populations

Even the most recent analytical and policy work in the area of the taxation of pensions was conducted essentially under traditional assumptions reflecting a closed economy and stable demography. Nevertheless, despite some current pushback on globalization and lip service regarding the aging population, these phenomena are important pieces of today's economic reality. This requires the review and adjustment of traditional concepts and the exploration of new ideas on the topic of taxing pensions.

Population aging is driven both by birthrates below the replacement rate and ever-increasing life expectancies for all ages, from lower infant

mortality to longer life spans for the aged. These trends are projected to continue for at least several more decades. This has implications for pension design across all pension pillars and for the design of retirement income taxation schemes—at both the analytical and policy levels. Conceptually, population aging and later retirement increase the gap between the points at which contributions are paid and benefits are received. Similarly, the uncertainty of future gains in life expectancy across socioeconomic groups and the currently observable increase in heterogeneity across cohorts further scatter the equivalence of front- and back-loaded taxation, with implications for both equity and government revenues.

Globalization is moving well beyond capital, goods, and services and increasingly affects individual workers across their life cycle, including where they retire. While in 2015 only about 3.3 percent of the world's population resided outside their home country, a much larger and increasing share will spend at least part of their working life in other countries in the future, often acquiring rights to public and private pensions that will be consumed in a different jurisdiction upon retirement.[8] This raises the seldom-explored issue of how best to tax internationally portable pensions and what international guidelines on the taxation of cross-border pension payments need to be revisited or newly established. These issues question the equivalence of front- and back-loaded consumption taxation, put into doubt the current dominant residency principle of income taxation, and stress additional differences between defined benefit and defined contribution schemes (Genser and Holzmann, chapter 15, this volume).

1.3 Volume Structure and Overview of Chapters

1.3.1 Overview of Part I: Setting the Stage—Chapters 2–4

Part I sets the stage for the rest of the volume. In addition to this opening chapter, three more contributions offer specific theoretical and broader policy perspectives on the topic of pensions and taxation. These chapters do not claim to cover the full range of theoretical and policy perspectives on the topic, but the theoretical angles explored are claimed to be the most developed tax guidance on pensions.

Chapter 2, by Helmuth Cremer (Toulouse School of Economics) and Pierre Pestieau (University of Liege), reviews key issues regarding the taxation of pensions and uses an elegant, simple, two-period model to analyze various policies. A critical aspect of their approach is the clear

distinction between the tax treatment of private retirement savings (via pension funds) and of public (i.e., social security–type) pensions. The first set of issues concerns the taxation approaches of a comprehensive income tax (taxed, taxed, exempt: TTE), which implies double taxation of savings, versus a front-loaded consumption-oriented income tax (TEE), which does not tax capital income. The latter prescription for private pension fund savings emerges under a set of assumptions where the only source of heterogeneity is labor productivity. If this assumption is dropped, then the optimal tax on retirement capital is not zero. However, while the authors refute the zero taxation of capital in general, they offer a number of arguments, including behavioral restrictions, for why back-loaded consumption taxation (EET) may prove welfare-enhancing. The second set of issues turns to the taxation of public pensions, for which the authors propose an integrated approach that builds on the recent literature on age-related (optimal) taxation. Based on their own and other recent work, the authors suggest that the desirable approach for taxing public pensions is to combine the optimal design of pensions and taxes in a single model. They illustrate the approach and implications for varying income tax rates across active and retirement periods, again using a two-period model.

Chapter 3, by Spencer Bastani (Linnaeus University), Sören Blomquist (Uppsala University), and Luca Micheletto (University of Milan), provides an innovative approach to integrating taxation and pensions, advocated, inter alia, by Cremer, Lozachmeur, and Pestieau (2008), Diamond (2009), and Choné and Laroque (2014). The authors use an overlapping-generations model with skill uncertainty and private savings to investigate whether an optimally designed set of public pension transfers can usefully supplement a nonlinear labor income tax as a welfare-enhancing policy instrument. They consider a Mirrleesian setting where agents' skills are private information, and they highlight that even though pensions adversely affect achievement of the golden rule (i.e., the savings rate which maximizes steady state level or growth of consumption) by crowding out private savings, they can be used as a mimicking-deterring device that makes it easier for the government to achieve its desired redistributive goals.

Chapter 4, by Csaba Feher (International Monetary Fund) and Alain Jousten (University of Liege), provides an overview of the factors influencing the interplay of pension and tax policies from a fiscal and welfare perspective, and identifies areas where both topics can materially impact one another. The authors find that while strong arguments

arise for coordinating tax (especially income tax) policy and pension policy, these areas are still rarely treated as components of the same interpersonal and intertemporal distributional framework. Policy makers are therefore urged to harmonize the objectives and instruments of tax policy and pension policy. While the efficiency of both tax policy and pension policy can be improved by synergies between these areas, and may result in more adequate and equitable pensions, the authors question whether the current tax treatment of contributions and prospective tax treatment of pension payouts can materially influence behavior in terms of coverage, compliance, and labor mobility. For reasons of equity and efficiency, the authors argue for taxing pensions similarly to all other income, while making sure that income streams are not taxed more than once. They also support reforms that downscale or eliminate the preferential tax treatment of mandatory pensions. Given the fiscal and welfare impacts of aging, the authors advise that tax and pension reforms that jointly improve pension systems' fiscal sustainability, adequacy, and equity be introduced before the progression of electoral demographics makes these reforms even more politically costly.

1.3.2 Overview of Part II: Country Issues and Research Questions—Chapters 5–11

Part II offers individual country chapters on how the complex taxation of retirement income provision across the key pillars is actually done, and it embeds the information in select historical, empirical, and policy analyses for the country under review. This type of information typically is not easily available, and rarely in a broadly comparable structure. The countries reviewed include Australia, Denmark, Germany, Portugal, Sweden, the United Kingdom, and the United States. These chapters exhibit some cross-country commonality in the search for a consistent and well-funded policy approach to the taxation of pensions. However, they indicate quite different and country-specific policy concerns regarding the topic of tax preferences, their size, and their effects on saving, equity, and efficiency. Consumption-type tax treatment considerations play a mostly limited role, and more recent theoretical developments do not seem to have made a mark on actual policy considerations.

In chapter 5, Torben Andersen (Aarhus University) discusses conceptual questions within the context of two Scandinavian countries (Denmark and Sweden). These include: How should pensions be taxed

(in many cases, pension savings are taxed more leniently than other forms of savings)? What is the rationale for this? Are those concerns best targeted via taxation or mandatory pension savings? Denmark and Sweden provide interesting case studies because, on the one hand, both have extended welfare states but quite different pension systems, and, on the other hand, both (mainly) pursue an ETT taxation regime regarding pensions. It is argued that the incentive structure related to pension savings and retirement cannot be seen independently from how private pensions (and savings more generally) affect public pensions via means testing. The effective rates of taxation may thus differ significantly from the nominal rates. For Denmark and Sweden, Andersen shows that the effective tax rates on pension savings can be rather high—for low- and medium-income groups, close to 100 percent.

In chapter 6, Jorge Bravo (Universidade Nova de Lisboa) evaluates the potential for a semidual income tax for taxation of pensions in Portugal. Such a tax typically combines a progressive tax schedule for labor and pension income with low and often flat and differentiated nominal tax rates on some forms of capital (personal or corporate) income. The Nordic countries took the lead in implementing a dual income tax system in the early 1990s, but in reality it is hard to find a country that uses a pure comprehensive, expenditure, or dual income tax system. This chapter motivates and reviews the current tax treatment of Portuguese pensions and other retirement income, highlights its particularities, and discusses whether it can contribute to creating an adequate, affordable, sustainable, equitable, and efficient pension system. The arguments for and against adoption of a semidual income tax for the taxation of occupational and private pensions and other retirement income are assessed, with particular emphasis on the effects of pension taxation on the level and composition of saving, horizontal and vertical equity, intergenerational risk sharing, economic growth, and labor market outcomes.

In chapter 7, Hazel Bateman (University of New South Wales) presents the Australian experience with taxation of pensions and explores the conceptual and political issues of recent decades. While most countries exempt contributions and pension fund earnings, and tax benefits at personal marginal tax rates under a postpaid expenditure tax regime, Australia imposes flat-rate taxes on contributions and pension fund earnings, and exempts retirement benefits for most people under a comprehensive income tax regime. To address equity issues and emulate progressivity of pension taxation, governments across the world

introduce time-varying floors and ceilings, rebates, deductions, co-contributions, and other measures. This chapter describes and critically assesses the Australian approach, which differs from international practice. Benefits include the bringing forward of tax revenue and protecting the tax base in the face of international labor mobility. Reforms legislated in 2016 will improve the targeting of superannuation tax concessions. However, in the absence of a direct link with personal marginal tax rates, the author predicts that taxation of superannuation will remain vulnerable to policy instability, which will continue to increase the complexity of life cycle decisions, challenge public confidence in retirement income arrangements, and increase political risk.

Chapter 8, by Axel Börsch-Supan (Max-Planck-Institute for Social Law and Social Policy, Munich) and Christopher Quinn (University of Bayreuth), motivates and describes the tax treatment of German retirement benefits and pensions after the 2005 reform initiated by the German Federal Constitutional Court. The 2005 reform responded to the unequal and complex tax treatment within and across mandated, occupational, and personal pension provision in existence at that time. It led to a broadly, but not fully, uniform consumption-oriented deferred income taxation approach. The main question is whether this reform will produce a "level playing field" among the many providers of retirement income in Germany by the time it is fully implemented in 2040 and during the transition period. To this end, the chapter briefly outlines principles for the taxation of retirement benefits and pensions, explores the principles of neutrality, and compares these with the current (reformed) practice in Germany. Based on their own stylized calculations, the authors conclude that the 2005 reform flattened the playing field somewhat, but it is still not completely level. Moreover, substantial transition costs are imposed on retirement income savers in the form of double taxation.

Chapter 9, by Carl Emmerson and Paul Johnson (both of the Institute for Fiscal Studies), explores the taxation of pensions in the United Kingdom. Private pension saving is hugely important in the United Kingdom, and the taxation of pensions has traditionally been relatively stable and rather generous, beyond the treatment offered by an expenditure tax regime. Recently, though, substantial changes were made. Annual and lifetime allowances were cut dramatically, largely as a way of increasing tax revenues. At the same time, the requirement to annuitize defined contribution pension wealth was abolished, boosting revenues in the near term

and making saving in these pensions look much more similar to other forms of saving. Meanwhile, the tax treatment of other important forms of saving was made more generous. The motivation for many of the reforms enacted was largely one of increasing tax revenues. The authors argue that the recent changes were encouraged by a misunderstanding of the purpose, and cost, of the current system. The changes do not deal with elements that are overgenerous, while limiting opportunities for receiving "neutral" treatment of savings. Consequently, the chapter argues that the United Kingdom now faces great uncertainty about the future tax treatment of pensions.

Chapter 10, by Gary Burtless and Eric Koepcke (both of the Brookings Institution), offers an overview of taxation of the main pension pillar in the United States before digging into the intricacies of tax expenditures for private pensions in this country. To encourage workers to save privately for retirement, the US government offers favorable tax treatment on money withheld from wages and saved inside a pension plan. The private retirement system built around this tax preference has accumulated assets amounting to 1.33 times gross domestic product, a fivefold increase since the mid-1970s. The chapter offers a brief description of the workplace retirement system and the regulatory and cost considerations that led to a shift away from defined benefit pensions and toward defined contribution ones. The authors show how the value of the tax preference for pension savings can be modeled and measured, and how it varies among workers. The chapter demonstrates that the value of the preference varied widely in recent decades not because of a change in the pension tax preference but because of changes in tax preferences conferred on equity investments held outside a pension account. The chapter concludes with a brief analysis of the most glaring shortcomings of the system, including the wildly unequal accumulations of retirement savings in the tax-preferred system.

Chapter 11, by Rafal Chomik and John Piggott (both of CEPAR, University of New South Wales), investigates the concept of tax expenditures on pensions, both the concerns such expenditures raise and the misconceptions produced by the concept. Pension savings commonly attract lower taxes to encourage self-provision or to maintain neutrality between current and future consumption. As a result, in countries where funded pensions are prominent, tax costs appear large and poorly targeted, while benefits of such treatment seem unsubstantiated. Nevertheless, the authors argue that much of the criticism of tax arrangements is misconceived. The chapter explains the basic concepts,

tackles concerns related to the scale and fairness of tax expenditures, and presents policy reform proposals. The authors provide illustrative examples of saving over the life cycle and across the earnings distribution based on the Australian retirement income system. This yields an instructive case, since it has significant prefunding and high levels of measured tax expenditures that, in turn, have attracted considerable political interest.

1.3.3 Overview of Part III: Country-Calibrated OLG/CGE Models—Chapters 12–14

Part III explores issues of pension taxation through the application of country-calibrated computational general equilibrium (CGE) models for Switzerland, Finland, and Australia. All CGE models have an unquestioned consumption-type treatment of retirement income programs as the core approach of pension taxation. Each chapter has a special focus, but interesting differences and commonalities emerge regarding the topic of front- and back-loaded pension taxation.

In chapter 12, Christian Keuschnigg (University of St. Gallen) raises the issue of demographic shifts in Switzerland, which include a doubling of the old-age dependency ratio until 2050. To quantify the effects of this trend on pensions, taxes, and social contributions, the author uses an overlapping-generations model with five aspects of labor supply: labor market participation, hours worked, job search, retirement, and on-the-job training. The chapter highlights that a passive fiscal strategy that merely adjusts labor taxes and contribution rates to balance budgets would be very costly. Total labor taxes would rise by 21 percent, and per capita income would fall by roughly 20 percent. In contrast, comprehensive reform, including an increase in the effective retirement age to 68 years, may limit the tax increases to 4 percent of the value-added tax and reduce the decline in per capita income to less than 6 percent. The author argues that the present rules of deferred taxation of pension income support social security and labor market reform by shifting tax revenue to the future, when it is needed most in an aging society.

Chapter 13, by Jukka Lassila and Tarmo Valkonen (both of the Research Institute of the Finnish Economy), investigates the implications of a revised timing of pension taxation on government finances and economic outcomes. This is motivated by the observation that while problems of fiscal sustainability led many countries to consider ways to cut expenditures and increase tax revenues, one policy option

is rarely used—changing the timing of the taxation of pensions. Currently, taxation typically follows an EET regime, and longer lifetimes reduce current tax revenues and increase future ones, but not enough to be revenue-neutral. Switching from an EET regime to a TEE one would increase current tax revenues and, despite reducing them in the future, could enhance public finances. The authors simulate this transition under a defined benefit pension scheme with a numerical overlapping-generations model, using stochastic mortality projections as inputs. Under a traditional pension scheme with no automatic longevity rules, such as life expectancy adjustment of pensions or a link between life expectancy and retirement age, the tax regime shift can be used to improve public finances. Under an automatically adjusting pension scheme, the tax regime shift is not as efficient, but neither is it that necessary. An important element in sustainability effects comes from lower public wage costs. Diminished private savings and weaker labor supply incentives are among the downsides. The latter especially makes the reform welfare-reducing if the improvement in state finances is not used to relieve the taxation of labor.

Chapter 14, by George Kudrna and Alan Woodland (both of CEPAR, University of New South Wales), provides a quantitative analysis of hypothetical replacements of existing tax arrangements applied to superannuation (Australia's term for private pensions) with traditional EET and TEE regimes. These taxation regimes exempt pension fund earnings from any taxation and tax either benefits or contributions progressively as regular income. By contrast, superannuation taxation features concessional flat tax rates on contributions and pension fund earnings, with benefits generally tax-free. Using an overlapping-generations model calibrated for Australia, the authors find that these hypothetical superannuation tax reforms have positive implications for vertical equity, as indicated by larger relative welfare gains and income improvements experienced by lower-income households. The simulation results also show positive long-run effects of the reforms on domestic assets as well as reduced pension expenditures.

1.3.4 Overview of Part IV: Cross-Border Taxation of Pensions—Chapter 15

Part IV enters new territory, exploring the taxation of cross-border pensions. Very little economic analysis has been done in this area to date, although the topic has garnered some attention from legal scholars. Two chapters were planned for this part of the volume, one written by

economists and one by legal scholars, but only the economics chapter was completed.

Chapter 15, by Bernd Genser (University of Konstanz) and Robert Holzmann (CEPAR and CESifo), explores the taxation of internationally portable pensions—a topic that is still terra incognita for economists. This chapter highlights the huge differences in old-age pension taxation within and across OECD countries and spells out the fiscal equity and efficiency issues that emerge under the current complex and inconsistent taxation of cross-border pensions in a world of internationally mobile workers and pensioners. It offers explanations for this heterogeneity, shows why deferred pension taxation under a residence principle is not sustainable, and proposes a switch from deferred taxation to front-loaded taxation of old-age pensions. The three policy options proposed share the same timing of when the tax liability is established but differ in the timing of when the tax liabilities are settled: immediately, delayed, or phased across accumulation, when returns are received, and at the disbursement phase. All options are claimed to be superior to single-country measures taken to uphold deferred pension taxation or to rely on renegotiations of bilateral double-taxation treaties.

1.4 Research Needs

This volume offers valuable information on the analysis of pension taxation—at the theoretical, country, and empirical levels. It provides some guidance for policy makers and as a reference source for researchers interested in but not yet involved in the topic. The topic itself remains seriously underresearched. The process of workshops, conferences, and paper preparation that culminated in this volume crystallized a menu of research needs. This chapter thus closes with a brief discussion of the most important research needs.

1.4.1 Refining the Analysis of Consumption-Oriented Income Taxation for Pensions

Most economists favor a consumption-oriented income taxation approach for the tax treatment of retirement income provision across the key pension pillars. It is in essence an income tax with a retirement savings deduction. Not all theoretical and empirical issues are resolved, however. Perhaps most topical is the timing of tax collections under this rubric. It is possible to tax either contributions or benefits under

this tax design—either front- or back-loaded taxation of retirement income provision. Both are variations of the way consumption-oriented income taxation can be implemented—as earnings taxation if contributions (or other retirement savings) are paid out of taxed income or as expenditure taxation when benefits are taxed when disbursed.

Many pension economists claim that the different versions of the consumption-type approach to pension taxation (TEE and EET) are essentially equivalent up to second-order effects on economic outcomes (see, for example, Kingston and Piggott 1993). This theoretical equivalence, however, holds only under very strict conditions that are typically violated in reality. How important these deviations are for individual and societal outcomes is not clear, and research is required to determine what their impact might be. This is of particular importance in the current global economy, because governments under fiscal stress will be tempted to move revenue collection from the future to the present, as exemplified by recent changes in the United Kingdom. Three brief examples provide more context.

1. *Ricardian equivalence and the timing of tax collections* Under the assumption of Ricardian equivalence, whether taxation is front- or back-loaded will not matter for public finance as the intertemporally optimizing government would be able to establish neutrality by appropriate borrowing and saving behavior, and households would recognize and take account of this. However, this requires both households and governments to have very long foresight. When Ricardian equivalence is violated, what are the implications of choosing between EET and TEE?

2. *Progressive income tax* It is well known that, under a progressive income tax, TEE-EET neutrality is violated, and individuals with fluctuating earnings are penalized. The Mirrlees Review (Mirrlees et al. 2011) suggested that offering a variety of front- and back-loaded tax savings options would smooth many of the differences, also through self-selection. But does any analytical evidence exist for this statement?

3. *Excess returns taxation* The Mirrlees Review (Mirrlees et al. 2011) argued that while in general excess returns on investment should be taxed (but not normal returns), for pension taxation the excess returns tax should not be invoked. Others (Genser and Holzmann, chapter 15, this volume) argue for its inclusion in pension tax design. Excess returns might be earned through innovation or alternatively through rent seeking. This unresolved issue could be clarified with a more intensive and focused research program.

1.4.2 Analyzing and Comparing Large-Scale Model Results on Pension Taxation

The macroeconomic impacts of pension taxation can best be analyzed using large-scale models that capture the general equilibrium effects of price changes and have some representation of passing time, either through a dynastic or an overlapping-generations structure. These models, however, while steadily proliferating, do not adhere to standard assumptions regarding expectations, the treatment of revenue equivalence through time, and other model features and parameters that can be critical in determining results over a long time frame. A serious research effort is needed to understand the implications of possible alternative benchmark model assumptions for pension tax policy analysis. Such research would better leverage the considerable time investment in the highly skilled work these models require. An early step in this direction might be to run simulations of equivalent reform options in different country-calibrated CGE models and to explore and identify the differences resulting from different modeling designs and parameter values.

An important application of large-scale modeling in the context of pension taxation is a comprehensive investigation of the macroeconomic and welfare impacts of coordinating pension and tax policies. A few estimates referenced in this volume's chapters offer magnitudes from ad hoc calibrations, but executing well-reasoned simulations with full-fledged and country-calibrated CGE models should offer deeper insight.

1.4.3 Assessing the Impact of Tax Preferences on Behavior and Behavioral Alternatives

An important motivation for income tax breaks for pension savings concerns encouraging saving for retirement, but how effective is this design in achieving this end? The international evidence suggests limited effects of tax preferences on the size of savings, but some research signals relevant and often sizable (distortionary) effects of heterogeneous tax preferences on the composition of savings. Widespread and well-established workplace-linked pensions are observed around the world, however, and firms are not likely to offer these in the absence of a tax break (Mitchell and Piggott 2016).

Very recent country research suggests that only a subset of retirement savers are sensitive to any tax preferences at all. Finally, a burgeoning body of literature is emerging on the role of behavioral

economics in improving scheme participation as an effective and cheaper alternative to incentivize retirement saving. Much research on this issue still needs to be done to establish a firm evidence base one way or the other.

1.4.4 Determining the Implications of Population Aging and Globalization on Pension Taxation

Both population aging and globalization are anticipated to be major forces in the world economy for decades to come. Both phenomena create various challenges for pension taxation, including the timing of expenditures and tax revenue receipts, and where these financial flows are going—to the source country or the residence country. These topics have received little attention from either tax or pension economists so far, possibly because a sophisticated treatment of demographic dynamics immensely complicates the structure and solution of large-scale models. Issues of strategy and international cooperation inherent in the international mobility of workers and retirees have hardly been analyzed at all. The first indications of issues and possible solutions are offered in this volume, but much more research is needed.

1.4.5 Operationalizing Age-Based Taxation

Age-based taxation and the linking of pensions and taxation is a promising avenue for reducing labor supply and savings distortions and thus creating measurable individual welfare effects. This idea has been around for 25 years, and various valuable contributions have been produced, but no move to operationalize it has occurred. The potential operationalization of consumption-oriented income taxation in the 1960s and 1970s provided the dynamism for the related policy discussion. A similar operationalization breakthrough is needed to move this approach from a curiosity in optimal tax theory to actual policy relevance.

Notes

This chapter was inspired by the outstanding contributions to this volume and profited from intensive interactions with the authors throughout the long process of preparing it for publication. Special thanks go to Bernd Genser, who was a great source and supporter for conceptualization of the workshops and this volume's preparation; he also offered important comments and suggestions on this opening chapter. The revision of this chapter profited very much from the pertinent comments and suggestions by Cagri Kumru and by an anonymous reviewer during the MIT manuscript review process. Rafal

Chomik offered a range of drafting suggestions; John Whalley's overview conference comments also informed our thinking. Any remaining errors are our own.

1. The concept was first advocated by German public finance scholar Georg von Schanz (Schanz 1896) and was further developed by two American economists, Robert Haig (Haig 1921) and Henry Simons (Simons 1938).

2. Recently, however, this has been reconsidered by Straub and Werning (2014), who argue that in a Ramsey context, substantial capital taxation may be optimal for a long period of time. Others (e.g., Chari, Nicolini, and Teles 2016) have responded.

3. The letters *E* and *T* refer respectively to *exempt* or *taxed* in the three stages of retirement income provision: contribution payment or saving effort, return on pension wealth, and disbursement.

4. See the papers on nonfinancial defined contribution by Holzmann and Palmer (2006) and Holzmann, Palmer, and Robalino (2012, 2013) for a comprehensive overview of theoretical, empirical, and policy issues. This approach has been implemented by eight countries so far (including Italy, Norway, Latvia, Poland, and Sweden), borrowed in part by various others (including Brazil), and is under discussion in many others (including China). The forthcoming third conference (Rome 2017) and the planned 2018 volume on the topic aim at addressing the challenges of marginalization and polarization to the design of the scheme; this may reintroduce issues of earnings test and taxlike distortions.

5. For summary articles on the dual income tax system in theory and practice and select country proposals, see the contributions by Boadway and by Eggert and Genser in *CESifo DICE Forum*, no. 3 (2004).

6. The best up-to-date source on these flat-tax countries is Wikipedia, http://wikipedia.org/wiki/Flat_tax, available in various languages.

7. Based on personal interviews and correspondence with reform committee members.

8. For the European Union, it is estimated that of those who entered the labor market after the 1990s, 15–25 percent will have spent at least one spell of their working life outside their home country (Holzmann 2015).

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