The Taxation of Internationally Portable Pensions: Fiscal Issues and Policy Options

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Abstract

Pension scheme redesign has received much attention in recent decades, as a relevant policy issue and as a field of economic research. The tax treatment of old-age pensions has, at times, created limited country-specific attention while there was little economic research in this field. The taxation of internationally portable pensions is terra incognita at economic policy and research level. This paper explores the huge differences in old-age pension taxation within and across OECD countries and highlights fiscal equity and efficiency issues that emerge in a world of internationally mobile workers and pensioners. It offers explanations for this heterogeneity, highlights why deferred pension taxation under a residence principle is not sustainable, and proposes a switch from deferred towards front-loaded taxation of old-age pensions. The front-loading can be combined with three tax policy options that differ in the way income taxes are paid: On the spot, deferred till migration or benefit receipt, or phased over the contribution, return and benefit payment stages.

Keywords: taxation of old-age pensions, income tax reform, migration, double taxation treaty

JEL: H2, H24, H55

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1 Introduction

Recent developments in old-age pensions in OECD countries are reflected in several characteristic features. First, old-age income consists of a mix of public, occupational, and private retirement incomes whose components have become more diversified and variable across countries. Second, to motivate employers and individuals to compensate for lower public generosity, countries have increased support for occupational and private retirement savings with various forms of tax preferences or direct subsidies. Third, mandatory as well as voluntary pension savings are typically subject to income tax but tax rules deviate from the general principle of comprehensive income taxation within and between countries. Last, a rising number of individuals spend some part of their working life or their retirement period abroad, a circumstance facilitated by improved portability of pension claims between OECD countries but also within key migration corridors (e.g., France and Morocco; Germany and Turkey).

As a result of these developments, individuals increasingly acquire pension and other retirement income claims from institutions inside and outside their country of residence, and benefits from these claims differ in their tax treatment within and across countries. This has two main economic consequences:

(i) Taxation provokes efficiency losses due to planned tax arbitrage or unplanned exposure to tax distortions, as individuals are motivated to either move between countries (or prevented from doing so) or to restructure their retirement income portfolio with little effect on overall retirement saving.

(ii) Taxation infringes on equity principles at both the individual and country level. At the individual level, the application of different tax rules for retirement benefits and savings instruments by different countries violates horizontal equity and is a source of interpersonal fiscal unfairness. At the country level, different, inconsistent, and uncoordinated taxation rules for retirement income risk creating fiscal unfairness between countries and motivate tax competition.

A glimpse of the scope and dynamics of pensions paid abroad and received from abroad is provided for Germany in Table 1. The total number of pensioners living abroad on a German pension reached 1.7 million in 2013 (or 6.85 percent of all pensioners with a German pension). While the share of pensions paid to non-Germans living abroad is decreasing, the share paid to Germans living abroad is increasing. Non-German pensioners living in Germany may also receive a pension for pre-migration

[1] A first version of the paper was presented at the CEPAR/CESifo Workshop on “Taxation of Pensions” in Munich in September 2015 and is available as CESifo Working Paper 5702; a revised version was presented at the IMF/FAD-EPD Seminar in Washington in December 2016. We want to thank the workshop participants, as well as Hans Georg Ruppe and John Piggott for critical and helpful comments; any remaining errors and shortcomings are ours.

insurance periods in their country of origin (as do 1.1 million pensioners, or 4.21 percent of all pensioners with a German pension). Adding both together gives a total number of 2.8 million (or 11.1 percent) potential recipients of a cross-border pension. Yet these numbers of current pensioners reflect past labor mobility and do not include the effects of higher pan-European labor mobility since the 1990s. Estimates for the European Union (EU) of the likely share of pensions paid abroad to the current workforce in the future arrive at some 15–25 percent (Holzmann 2015).

Table 1: Recipients of statutory German pensions – in Germany and abroad

Number of pensioners in millions (% of total pensioners)	**2013**	**2010**	**2005**
Total non-German pensioners	2.562 (100%)	2.367 (100%)	2.032 (100%)
- living in Germany	1.059 (41.3%)	0.944 (39.9%)	0.774 (38.1%)
- living outside Germany	1.503 (58.7%)	1.423 (60.1%)	1.258 (61.9%)
Total German pensioners	22.602 (100%)	22.646 (100%)	22.452 (100%)
- living outside Germany	0.222 (0.98%)	0.206 (0.91%)	0.170 (0.76%)
Total pensioners	25.164 (100%)	25.013 (100%)	22.484 (100%)
- living outside Germany	1.725 (6.85%)	1.629 (6.51%)	1.427 (5.83%)
- non-German pensioners living in Germany	1.059 (4.21%)	0.944 (3.77%)	0.774 (3.44)
- potential recipients of cross-border pensions	2.784 (11.1%)	2.573 (10.3%)	2.201 (9.8%)

Source: Eurostat Online Database (June 2015); authors' calculations.

The traditional instruments to address inequity issues in taxation are: (i) an appropriate income tax reform at the national level; and (ii) renegotiation of double taxation treaties at the international level. It is doubtful that these unilateral and bilateral approaches are promising strategies to reduce the international complexity in income taxation of pensions and other retirement income. In particular, bilateral negotiations will be blocked by the fundamental antagonism that any assignment of taxing rights that supports interpersonal equity among migrating pensioners will generate inequity among national treasuries facing income tax revenue losses, particularly from tax-exempt retirement savings in the pension accumulation stage.

On the other hand, the international complexity in pension taxation[2] indicates that normative economics does not offer clear advice on how to tax old-age income consistently and is even less informative on the taxation of internationally portable pensions. Yet to overcome lengthy and ineffective bilateral negotiations dominated by tax lawyers and to support a coordinated international approach on the taxation of internationally portable pensions, a convincing conceptual framework based on a good economic foundation is urgently needed. This is *terra incognita.*

Against this background the paper is organized as follows. Section 2 offers an overview of the current state of taxing the main forms of retirement income provisions in and between OECD countries. Section 3 explains why the taxation of pensions has become so complex in OECD countries and why characteristic differences prevail between countries. Section 4 argues that international coordination of pension taxation is desirable and explores three possible blueprints for tax regimes

[2] Cf the contributions to the CESifo DICE Report Forum 2016/1, e.g. Kudrna (2016), Emmerson (2016), Bravo (2016), Genser and Holzmann (2016).

that replace the current dominant but not omnipresent approach of deferred pension taxation with a frontloaded approach to income tax liability that can be combined with different payment patterns of income tax due over the contribution, return, and disbursement cycle of pension wealth. Section 5 concludes.

2 The state of pension taxation within and between OECD countries

In all OECD countries, old-age income from pensions and other retirement savings[3] can be attributed to three pension pillars: statutory, occupational, and personal. The magnitude of these three tiers varies markedly between countries and between social groups within a country. Moreover, remarkable differences characterize the tax treatment of these pension pillars within and between countries.

Before exploring the diversity and complexity of tax treatment, this section offers some indicators on the importance of each pillar and the effects of taxation. Since no OECD- or EU-wide database is available to quantify the fiscal importance of the three tiers for pensioners across countries, the available coverage rates and gross replacement rates across the three pillars are used as proxies, as well as the gross versus net replacement rates for the public pillar in EU member states and some other OECD countries (Table 2).

The data in Table 2 confirm that countries with high net replacement rates in statutory pension benefits make less use of occupational pensions, whereas countries with a broad enrolment in occupational pensions grant substantially lower net replacement rates in statutory pensions. This is seen in countries where the tradition of high statutory pensions is still the dominant social policy goal, such as Germany, Austria, France, Italy, Spain, Portugal, Finland, and Slovenia, whereas a pronounced multipillar strategy of statutory and occupational pensions can be found in Denmark, Estonia, the Netherlands, Sweden, Ireland, Norway, and Switzerland as well as in Australia, Canada, and the United States. This assessment is confirmed by the size of pension funds as a percentage of gross domestic product (GDP) across these countries (OECD 2015b; Towers Watson 2016). For the top 19 countries in the world, the size of pension fund assets amounted on average to 80 percent of GDP at the end of 2015.

[3] A pension benefit paid as a lifetime annuity from retirement until death is the main but not the only form of retirement income. It is dominant but not omnipresent in mandated schemes; was dominant in occupational schemes at the time of defined benefit schemes that were gradually replaced by defined contribution schemes, often with no obligation to buy a lifetime annuity at a certain age; and hardly exists for voluntary savings. The remainder of this paper uses “pensions” and “retirement savings” interchangeably unless a differentiation is warranted.

Table 2: Coverage and pension income replacement rates by pillar for OECD countries, 2015

(Replacement rates in brackets)[1]

Country	Statutory	Occupational	Personal	Country	Statutory	Occupational	Personal
Austria	100 (76.6)	17.7 (n.a.)	18.0	Luxemburg	100 (87.1)	3.0 (n.a.)	n.a.
Belgium	100 (40.1)	45.2 (n.a.)	17.5	Netherlands	100 (29.5)	91.0 (61.1)	28.3
Bulgaria	100 (84.3)	98.0	n.a.	Poland	100 (48.8)	94.0 (n.a.)	4.7
Czech Republic	100 (51.3)	0	93.0	Portugal	100 (54.7)	3.3 (n.a.)	5.1
Germany	100 (57.1)	22.5 (n.a.)	40.0	Romania	100 (65.0)	n.a.	n.a.
Denmark	100 (35.2)	n.a.	n.a.	Sweden	100 (55.6)	n.a.(22.6)	n.a.
Estonia	100 (27.4)	75.0 (24.8)	7.0	Slovenia	100 (39.2)	47.0 (n.a.)	n.a.
Spain	100 (80.1)	9.0 (n.a.)	34.0	Slovakia	100 (n.a.)	n.a.	n.a.
Finland	100 (58.8)	6.4 (n.a.)	19.1	United Kingdom	100 (32.0)	46.0 (n.a.)	n.a.
France	100 (58.8)	16.5 (n.a.)	5.4	Switzerland	100 (32.0)	70.5 (23.1)	n.a.
Greece	100 (53.9)	0.2 (n.a.)	n.a.	Norway	100 (45.7)	68.1 (6.8)	23.2 (11.3)
Hungary	100 (76.3)	n.a.	18.9	Australia	100 (13.6)	68.5 (38.7)	19.9
Ireland	100 (36.7)	31.0 (n.a.)	12.0	Canada	100 (56.2)	33.4 (33.9)	32.8
Italy	100 (n.a.)	14.2 (n.a.)	n.a.	New Zealand	100 (40.6)	77.1 (14.1)	n.a.
Lithuania	100 (48.0)	78.1	n.a.	United States	100 (38.3)	41.6 (37.8)	22.0
Latvia	100 (47.0)	89 (n.a.)	11.6				

Source: Allianz International Pensions 2015.

Notes: [1] These estimates refer to employees (= 100%) and not total population; [2] n.a. = not available.

The net pension income replacement rates under the mandated scheme are determined by national pension law and also by national income tax law. The effects of income taxation on pension income can be approximated by comparing gross and net pension replacement rates; i.e., comparing the gross pension to the gross income before retirement and the corresponding net values after income tax deduction, respectively.[4] If the income tax rates on earned income and pension benefits are the same, both replacement rates will coincide. If the income tax burden on pension benefits is lower

[4] Replacement rates are a tricky concept that lends itself to many definitions. The same applies to the extent the net replacement rate covers all tax elements. This happens only if a pure backloaded taxation is considered. When some frontloading tax elements are present, the net pension and contribution base need to be adjusted accordingly.

than that on earned income before retirement, then the numerator of the gross replacement rate is reduced less than the denominator and the net pension replacement rate will be higher than the gross replacement rate. Table 3 shows this to be true for all OECD countries except Denmark and Sweden, which exhibit a negative replacement gap. Since OECD countries apply a progressive income tax schedule whose degree of progressivity shrinks with rising income, the replacement gap would also be expected to be large if the gross replacement rate is low, and to become smaller if the gross replacement rate rises. In effect this pattern characterizes the majority of OECD countries, but noteworthy exceptions arise. Whereas in New Zealand and a couple of developing countries the replacement gap is low despite a gross replacement rate well below 50 percent, some Eastern EU countries and Turkey have a high replacement gap although the gross replacement rate is high as well.

Average replacement gaps emphasize the importance of income taxation on the average purchasing power of pensioners in a country, but they do not capture distribution effects across those pensioners. For disaggregated national replacement gaps, one would expect that progressive income taxation would tend to favor high-income pensioners, whose gross replacement rates are usually lower than those of low-income pensioners. Empirically, however, these effects are fairly small. Besides preferential tax treatment of low-income pension earners, this finding may be related to changes in the composition of gross pension income along the income scale. For high-income pensioners, the share of statutory pension benefits will usually be smaller than the share of occupational and personal pensions, which are typically taxed differently under national income tax law.

Table 3: Gross versus net pension replacement rates for median-income earners in OECD countries in 2014 (or nearest available year)

2014	Replacement rates		Difference		Replacement rates		Difference
	Gross	Net	(net - gross)		Net	Gross	(net-gross)
Country				Country			
Argentina	71.6	87.5	15.9	Italy	69.5	79.7	10.2
Australia	44.5	58.0	13.5	Japan	35.1	40.4	5.3
Austria	78.1	91.6	13.5	South Korea	39.3	45.0	5.7
Belgium	46.6	60.9	14.3	Luxembourg	76.8	88.6	11.8
Brazil	69.5	76.4	6.9	Mexico	25.6	28.4	2.8
Canada	32.6	42.9	10.3	Netherlands	90.5	95.7	5.2
Chile	32.8	37.7	4.9	New Zealand	40.1	43.0	2.9
People’s Republic of China	74.0	80.5	6.5	Norway	49.8	60.2	10.4
Czech Republic	49.0	63.8	14.8	OECD	52.7	63.0	10.3
Denmark	67.8	66.4	-1.4	Poland	43.1	52.8	9.7
Estonia	50.5	59.8	9.3	Portugal	73.8	89.5	15.7
EU28	59.0	70.9	11.9	Russia	75.2	86.4	11.2
Finland	55.8	63.5	7.7	South African Republic	59.6	65.4	5.8
France	55.4	67.7	12.3	Slovakia	62.1	80.6	18.5
Germany	37.5	50.0	12.5	Slovenia	38.4	57.4	19
Greece	46.2	54.1	7.9	South Africa	10.5	11.8	1.3
Hungary	58.7	89.6	30.9	Spain	82.1	89.5	7.4
Iceland	69.2	76.7	7.5	Sweden	64.4	63.6	-0.8
India	96.5	109.7	13.2	Switzerland	40.2	46.9	6.7
Indonesia	13.0	13.8	0.8	Turkey	75.7	104.8	29.1
Ireland	34.7	42.2	7.5	United Kingdom	29.7	38.6	8.9
Israel	61.0	68.8	7.8	United States	35.2	44.8	9.6

Source: OECD 2015a; https://data.oecd.org/pension

Before exploring the actual modalities of taxation of pensions/retirement savings within and between countries, an appropriate benchmark must be established. Tax policy makers in most countries agree that the basic guideline of their income tax system is the Schanz-Haig-Simons (SHS) principle of comprehensive income taxation. Perhaps not surprisingly, income taxation of old-age pensions in almost all OECD countries is characterized by a deviation from the SHS standard. This benchmark would require that individual entitlements to pension benefits accrued during citizens’ working lives represent individual pension wealth whose economic value can be calculated. Annual increments of pension wealth increase individuals’ ability to pay and should therefore be taxed under a comprehensive income tax.

To compare national tax practices with the SHS benchmark, it is useful to distinguish three different forms of pension taxation, corresponding to the different phases of pension wealth accumulation and disbursement. Phase 1 is the establishment of pension claims through an individual’s contributions (and contributions on his behalf) or voluntary pension saving. Phase 2 is the explicit or implicit return on individual pension wealth by capital market or social security institutions. Phase 3 is the disbursement of pension wealth when benefits are paid out. All three phases affect individual pension wealth and are relevant under a comprehensive income tax. The three phases overlap along an individual's lifecycle since payment of contributions and returns on pension wealth occur in each year of earning and returns on pension wealth are incurred when pension benefits are paid out after retirement.

Technically, comprehensive income taxation of pensions can be characterized by a TTE income tax, where T is the individual income tax rate and E indicates that an income flow is tax exempt. The triplet TTE implies that: (i) individual contributions are not deductible from the tax base because they increase pension wealth (phase 1); (ii) accruals to pension claims stemming from financial or notional returns during pension wealth-holding in the working and retirement years are taxable (phase 2); and (iii) pension benefits paid out are neutral with respect to comprehensive income because they transform pension wealth into cash-holding and are therefore exempt (phase 3). Moreover, lowercase t is used to indicate that a reduced tax rate $t < T$ is applied according to the income tax code.

A review of pension taxation over the pension wealth cycle reveals a very complex picture of deviations from the principle of comprehensive income taxation across OECD countries. No country in the sample applies TTE taxation to statutory pensions (Table 4); all of them provide tax relief either by deferring income taxation or by subjecting income to lower rates. Slovakia is the only country that fully exempts income that is invested in pension savings and withdrawn after retirement.

Table 4: Income taxation of statutory pensions in OECD countries

Tax regime	Country	Characterization of tax regime
TTE	None	Comprehensive income taxation (CIT)
tET	France, Ireland, Canada, Malta, Netherlands, United Kingdom	Deferred CIT with double taxation relief
EET	Belgium, Denmark, Estonia, Finland, Greece, Italy, Latvia, Luxembourg, Austria, Poland, Portugal, Sweden, Switzerland, Slovenia, Spain, Czech Republic, Cyprus	Fisher/Kaldor expenditure tax, "Deferred income taxation"
TEE	Germany, United States	Prepaid expenditure tax
tEt	Lithuania	Partially deferred prepaid expenditure tax
tEE	Hungary	Reduced prepaid expenditure tax
EEE	Slovakia	Full income tax exemption

Source: Wellisch et al. 2008 (table 2, p.27); IBFD 2015.

The picture for income taxation of occupational pensions is similar and exhibits an even greater scope of complexity (Table 5), although no country fully exempts occupational pensions from income tax. Two countries in the sample, Denmark and the United States, codify comprehensive income taxation, at least for some forms of occupational pensions.

Table 5: Income taxation of occupational pensions in OECD countries

Tax regime	Country	Characterization of tax regime
TTE	Denmark, United States	Comprehensive income taxation (CIT)
tTt	Italy, Sweden	CIT with partially deferred savings taxation
TET	Canada, Malta	CIT with deferred return taxation
ETT	Denmark, Germany, Portugal, United States	CIT with deferred savings taxation
tET	Belgium, Estonia, Finland, France, Ireland, Latvia, Austria, Slovenia, United Kingdom, Cyprus	Deferred CIT with double taxation relief
EET	Germany, Greece, Canada, Luxembourg, the Netherlands, Austria, Switzerland, Slovenia	Fisher/Kaldor expenditure tax, deferred income taxation
TEE	Portugal	Prepaid expenditure tax
tEt	Germany, Lithuania, Austria, Portugal, Slovakia, Spain, Hungary, United States	Partially deferred prepaid expenditure tax
tEE	Greece, Lithuania, Luxembourg, Austria, Hungary, Cyprus	Reduced prepaid expenditure tax
EEE	None	Full income tax exemption

Source: Wellisch et al. 2008 (table 3, p. 29); IBFD 2015.

Personal pensions[5] are granted particular tax preferences that differ for specific pension savings vehicles (Table 6). None of the OECD countries in the sample offers expenditure taxation for personal pension savings. Despite the complexity in personal pension taxation, this finding seems to reflect a distinct dividing line in tax policy between taxing statutory and occupational pensions on the one hand and personal pensions on the other.

[5] Personal pensions subsume private savings vehicles that exhibit an explicit retirement income objective and are subject to specific regulations and supervision.

Table 6: Income taxation of personal pensions in OECD countries

Tax regime	Country	Characterization of tax regime
TTE	Denmark, Sweden	Comprehensive income taxation (CIT)
tTt	Italy	Partially deferred CIT
TET	France, Malta	CIT with deferred return taxation
ETT	Denmark	CIT with deferred savings taxation
tET	Belgium, Estonia, Finland, France, Ireland, Canada, Latvia, Luxembourg, Switzerland, Slovenia, United Kingdom, Cyprus	CIT with deferred savings and partially deferred savings taxation
T-E-t	Germany, Finland, France, Malta, Spain	CIT with deferred preferential savings taxation
EET	None	Fisher/Kaldor expenditure tax
TEE	PO, United States	Prepaid expenditure tax
tEt	Germany, Latvia, Lithuania, Luxembourg, Netherlands, Austria, Portugal, Switzerland, Slovakia, Spain, Czech Republic, Hungary, United States	Partially deferred prepaid expenditure tax
tEE	Greece, Latvia, Lithuania, Austria, Hungary, Cyprus	Reduced prepaid expenditure tax

Source: Wellisch et al. 2008 (table 4, p.30); IBFD 2015.

The complexity of the tax treatment of pensions is further increased if pensions are accumulated or disbursed across borders. The avoidance of international double taxation of cross-border pensions is codified in bilateral double taxation treaties. Although these treaties usually follow the recommendations of the OECD model treaty, those signed exhibit differences for a specific residence country whose residents receive pensions from different source countries. Differences also arise when a specific source country pays out pensions to pensioners in different residence countries. Nevertheless, the general tendency in bilateral treaties is to assign tax competences in line with the residence principle. On the other hand, none of the treaties in the sample applies exemption with progression, i.e., keeps the foreign pension untaxed but subjects the residential pension to the hypothetical average tax rate of foreign plus residential retirement income.

A closer look at the bilateral network of double taxation treaties of Germany and Switzerland reveals fundamental complexities of cross-border pension taxation, as both countries signed treaties that tax their residents' cross-border pension benefits differently depending on the source country and type of pension benefit. Thus a pensioner residing in Germany faces different tax rules for statutory, occupational, and personal pension benefits based on whether he receives them from France, Italy, the Netherlands, Austria, Denmark, Belgium, or Canada.

Table 7: Tax assignment of cross-border pension benefits in German double taxation treaties

Formatiert: Abstand Vor: 0 Pt., Nach: 0 Pt., Zeilenabstand: einfach

Tax assignment	**Statutory**	**Occupational**	**Personal**
Residence country exclusively	Canada, Switzerland, Czech Republic, Estonia, Spain, Finland, Greece, Hungary, Ireland, Italy, Luxembourg, Portugal, Sweden, Slovenia, United Kingdom, United States	Austria, Belgium, Switzerland, Czech Republic, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Sweden, Slovenia, United Kingdom, United States	Austria, Belgium, Switzerland, Czech Republic, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Sweden, Slovenia, United Kingdom, United States
Source country exclusively	Austria, Belgium, Denmark, France, Italy (citizens), Malta, Netherlands, Poland, Sweden	France (mandatory)	
Tax credit in residence country		Canada, Denmark	Canada, Denmark (rental income)
Exemption with progression			

Source: Wellisch et al. 2008.

Moreover, the double taxation treaties reveal that tax rules for pension benefits from the same source country (e.g., Canada) are codified differently in the treaty between Canada and Germany as well as in the treaty between Canada and Switzerland.

Table 8: Tax assignment of cross-border pension benefits in Swiss double taxation treaties

Tax assignment	Statutory	Occupational	Personal
Residence country exclusively	Canada, Switzerland, Czech Republic, Estonia, Spain, Finland, Greece, Hungary, Ireland, Italy, Luxembourg, Portugal, Sweden, Slovenia, United Kingdom, United States	Austria, Belgium, Switzerland, Czech Republic, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Sweden, Slovenia, United Kingdom, United States	Austria, Belgium, Switzerland, Czech Republic, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Sweden, Slovenia, United Kingdom, United States
Source country exclusively	Austria, Belgium, Denmark, France, Italy (citizens), Malta, Netherlands, Poland, Sweden	France (mandatory)	
Tax credit in residence country		Canada, Denmark	Canada, Denmark (rental income
Exemption with progression			

Source: Wellisch et al. 2008.

While it is true that negotiations between two treaty partners generate results that are determined by the initial positions of and the economic interdependencies between the two countries, it is amazing that bilateral bargaining for an equitable assignment of tax revenue has generated such a complex and uncoordinated multicountry pattern. This is particularly incomprehensible for OECD countries, which share basic principles of market economics, legality, and political governance and take account of recommendations by international institutions like the United Nations, OECD, the International Monetary Fund (IMF), and the EU Commission, all of which strive for a more transparent and coordinated international tax system. These countries must be aware that the status quo of international pension taxation is not fair and sustainable and opens the door for strategic tax competition. The next section offers explanations for this disarray and provides considerations to guide the policy options described in section 4.

3 Explaining the diversity, complexity, and inconsistency of approaches for taxing internationally portable pensions

Hardly any other field in public finance or international economics exhibits such a level of diversity, complexity, and inconsistency within and across countries as the taxation of internationally portable pensions. Before offering possible policy solutions in design and implementation, it is useful to identify likely reasons for such conceptual and operational turmoil as well as to analyze them to establish a common understanding against which alternative policy solutions can be judged.

Four interrelated elements help explain the turmoil: (i) the diversity of ways to tax national pensions; (ii) the lack of fiscal fairness across countries due to double taxation treaties that do not appropriately address taxation of internationally portable pensions; (iii) the coordination dilemma of bilateral double taxation treaties; and (iv) the separation of social and fiscal policy responsibilities at the national and international level. The main arguments of each of the four explanatory elements are sketched in the following subsections.

3.1 The diversity of taxing national pensions

The diversity of national pension taxation can be explained: (i) in a simple, cameralistic way that emphasizes the legal perspective of the differences in pension funding; (ii) in a more complex way that reflects the critical view of economists on consumption-oriented income taxation of retirement savings within a comprehensive income tax system; and (iii) by the varying scope and composition of tax preferences within countries.

3.1.1 A traditional explanation: Unfunded and funded pensions are to be taxed differently

In a cameralistic public finance view that reflects traditional legal positions, statutory pensions and certain forms of occupational pensions (working with book reserves or purely financed out of cash flow) are regarded as deferred labor income and hence are cash-flow taxed in the same way as labor income when pension benefits are paid out. Accordingly employer and employee contributions are considered as vehicles for withholding labor income and are deducted from the labor income base. These pensions are therefore taxed EET. In contrast, contributions to funded occupational pensions, particularly personal pensions, are regarded as capital investments and are therefore not deductible. Returns on pension wealth are regarded as capital income and taxed upon accrual. In line with the principle of comprehensive income taxation, these pensions are taxed TTE.

However, both funded occupational pensions and personal retirement savings are quite often granted preferential tax treatment for various reasons; e.g., to counterbalance biased individual preferences, to reap positive externalities of higher retirement savings, or to give way to lobbying pressure from trade unions or the financial sector. Preferential treatment ranges from full or partial tax deferral of income spent on pension savings and of returns on accumulated pension wealth, to reduced tax rates and full tax exemption of disbursements.

3.1.2 An alternative/supplementary explanation: The incomplete move from comprehensive toward consumption-oriented income taxation

For almost 100 years the comprehensive income tax approach has been the worldwide guideline for rational income tax design. The SHS principle of income taxation offers tax policy makers two key advantages: (i) a broad definition of income allows collection of the required amount of tax revenue with a lower tax rate on a larger tax base; and (ii) the application of the same (marginal and average) tax rates to all forms of a taxpayer’s annual income simplifies tax compliance, tax administration, and tax audits.

But for taxation of retirement income, the approach has a number of pitfalls that have contributed to its punctuation and partial demise: comprehensive income taxation according to a progressive schedule is equitable with respect to annual ability to pay but penalizes individuals with fluctuating annual income over their lifecycle. Furthermore, comprehensive income taxation distorts intertemporal consumption decisions as income spent on savings is subject to double taxation – once when parts of the income are saved and again when these savings earn returns. Economic recommendations to avoid these distortions by switching from comprehensive income taxation to consumption-oriented income taxation (Fisher 1930; Kaldor 1955) were largely ignored and rejected by tax policy makers and their advisers. On the other hand, tax policy makers were willing to deviate from the principle of comprehensive income taxation by deferring tax payment on unrealized capital returns and offering tax preferences on realized capital gains.

The theory of optimal tax policy in the 1970s brought an important change in the view on income or consumption as the superior tax base. Second-best tax policy models showed that political constraints and fundamental deviations from perfect market assumptions have important effects on optimal tax design that cannot be reduced to the decision of using either comprehensive income or personal consumption as the appropriate income tax base. A general result was that the principle of comprehensive income taxation, which requires labor and capital income to be taxed at the same rate, cannot be an optimal tax rule. The theoretical and institutional proposals in the 1970s suggested that a cash-flow approach that avoids double taxation by exempting normal returns to capital is operationally feasible (Atkinson and Stiglitz 1976; IFS 1978; US Department of Treasury 1977).

Despite the conceptual advantages of expenditure taxation, no industrialized country in the world has ever tried to replace the traditional comprehensive income tax by an expenditure tax (Auerbach 2009). Yet with regard to retirement income, a limited and variable consumption-type income tax treatment of contributions, returns, and payouts has taken hold in most countries.[6] This expenditure tax treatment of retirement savings became the typical benchmark for tax lawyers and pension economists (including Whitehouse 1999; Robalino et al. 2005; Huang 2008), although the SHS standard remains the guiding principle of income taxation.

3.1.3 The varying scope and composition of tax preferences within countries

Political motives for tax preferences vary between countries by the type of participation (mandated or voluntary) in pension schemes, the type of funding (nonfinancial or financial), the benefit type (defined contribution or defined benefit), and socioeconomic characteristics (such as family size and composition). Essentially three reasons explain the diversity of arrangements. First, the diversity of arrangements reflects differences in efficiency and equity concerns by governments across countries that may change over time. For example, the mostly unlimited deductibility of contributions to a mandated first- or second-pillar scheme is consistent with governments’ objective of providing

[6] Under standard model conditions the backloading form of income taxation, EET, is equivalent to the frontloading form, TEE, which therefore is regarded as a variant of expenditure taxation. This equivalence breaks down when excess returns on capital, progressive income taxes, or investment in risky assets are taken into account. Deviations from simple standard model assumptions usually create a rationale for further diversity in pension taxation (see Holzmann 2015).

income replacement within pension floors and ceilings that are related to lower and upper limits of statutory contributions. For voluntary schemes – occupational and personal – the limits are typically much tighter and more variable over time. Second, not only are the objectives of government and individuals reflected in the tax treatment of retirement provisions, but so are those of the financial industry, which is powerful and influential in most countries. Finally, changing tax preferences over time reflect the degree of fiscal pressure on government policy. When retirement savings contracts become unsustainable but cannot be adjusted for old contract-holders, one possibility to cope with growing fiscal pressure is to change tax preferences for new contracts only. This need for transitional arrangements has contributed to tax systems' complexity.

3.2 The lack of fiscal fairness across countries

No general consistent rule in double taxation treaties defines how portable pensions should be taxed. This is certainly due to the OECD model convention treaty, whose article on pensions (Article 18) only deals with the taxation of pension benefits and assigns the right to tax them to the residence country. An escape clause allows the source country (Article 19/2) to retain the right to tax income from public pensions paid directly by public authorities or by public funds (unless the pensioner is a citizen of the residence country). Thus Article 18 recommends the residence principle on statutory pensions for employees outside the public sector as well as on occupational and personal pensions, but offers room for bilateral negotiations on taxing pension rights that are related to services rendered to the public sector.

But the model convention does not address pension taxation in the contribution and accumulation phases. Indeed, two problems arise that violate either equity between individuals or fiscal fairness across countries.

If a *double taxation treaty* assigns the right tax pension benefits to the residence country, which is the typical case for statutory and unfunded pensions, then pensioners will be overtaxed if they were already taxed in the source country during the contribution or accumulation phase; this is because tax credits are restricted to income taxes paid on the identical tax base in the same year. If retirement savings and/or pension accumulation were tax-exempt in the source country, then EET taxation implies that all income tax on pensions goes to the residence country and the source country cannot recoup tax revenue losses due to exempting earned income spent on pension savings.

For nonresident civil servants, the OECD model convention allows pensions to be taxed in the country of disbursement. If this rule is included in a double taxation treaty, then the residence country has to forgo any income tax revenue from those pensions as well as from notional returns accrued after retirement.

Attempts by EU countries to unilaterally override fiscally unfair treaty rules and to recoup tax losses from pension tax preferences on occupational and private retirement savings upon migration were ruled as discriminatory and thus illegal by the European Court of Justice because they hamper free mobility (for details, see Wellisch et al. 2008: 48ff).

Yet even the application of either front- or backloaded consumption taxation (TEE or EET) in both countries does not guarantee fiscal fairness between national treasuries. Table 9 presents the fiscal impact of different taxation principles in the source and residence countries. The results range from no taxation to double taxation and reveal that interpersonal equity and fiscal fairness require a fundamental extension of the OECD model treaty.

Table 9: Equity effects of tax principles and taxation assignment rules

Source country **Residence country**	**TEE**	**EET**
TEE	I: Taxed once in source country C: Tax revenue only in source country	I: Untaxed in both countries C: No tax revenue in any country
EET	I: Double taxation C: Tax revenue in both countries	I: Taxed once in residence country C: Tax revenue only in residence country

Source: Holzmann 2015.

Notes: I: Individual; C: Country.

Extended double taxation treaties seem particularly necessary to ensure that residence countries of pensioners are capable of providing migrated retirees with public goods and services that are typically age-dependent. On the other hand, it is desirable to curb strategic or opportunistic behavior by countries that voluntarily forgo taxing pensions of resident retirees to attract high-income pensioners and expect revenue through indirect taxation (such as Portugal; see Bravo 2016).

3.3 The coordination dilemma of bilateral double taxation treaties

The standard instrument for settling tax assignment issues among countries is a bilateral tax treaty. The primary objective of such a treaty historically was avoidance of international double taxation of natural or legal entities but recent renegotiations increasingly try to limit strategic shifting of taxable income across national borders, particularly by multinational corporations (OECD 2013). Model treaties by the OECD and the United Nations led to a coordination of bilateral treaties, and six Scandinavian countries did sign a multilateral treaty. Nonetheless, the present international network still offers ample room for strategic tax arbitrage and treaty shopping.

Besides the complexity and inconsistency of this international network, further problems arise as bilateral tax assignments leave national tax autonomy unchanged. Yet the treaty network may trigger national tax reform measures that enable countries to benefit from strategic cross-border flows of tax bases and from the international redistribution of revenue. Tax revenue shifts across national borders reflect differences in national law (tax law, business law, pension law), in the international structure of taxable units, and in the strength of national tax administrations and tax audits.

Renegotiations of bilateral treaties are underway but multilateral treaty coordination is nevertheless poor because: negotiations start out from the traditional treaty concept; they remain bilaterally focused; political bargaining over country-specific taxation topics results in case-by-case agreements; and the model treaties still lack convincing global rules to grant international equity, although the OECD has tried to support treaty revisions by regular adjustments of its model treaty. Moreover, renegotiations of bilateral double taxation treaties have proven to be too slow and casuistic to keep pace with rapid economic and demographic developments.

Against this background, it is very unlikely that bilateral revisions of the treaty network will help reduce the diversity, complexity, and inconsistency in international taxation of pension income. A successful approach for a treaty network reform with respect to global pension taxation requires three necessary conditions: (i) multilateral consent on fair revenue-sharing of income taxation on cross-border pensions; (ii) a consistent conceptual framework that can be implemented in the model treaty to provide transparent information on prepaid income taxes in the national pension wealth accumulation cycle; and (iii) some readiness to listen to economic recommendations for a coordinated tax and pension policy within and across countries.

3.4 Separation of social and fiscal policy responsibility nationally and internationally

The complaint about the lack of conceptual and administrative coordination between social and fiscal policy is not new and was reiterated in the Mirrlees Report (Mirrlees 2010).

In most countries, social policy and tax policy are assigned to different ministries with little coordination requirements or overall government guidance. Consequently, there is little readiness to look for economic tradeoffs in the use of the most appropriate tax and pension policy instruments as no gains exist from a parochial perspective. It remains to be seen if the Mirrlees Report's call for a concerted policy design that simultaneously considers taxes and transfers will be taken up in the United Kingdom (or elsewhere).

The situation is similar at the EU Commission, where pension issues are split across a number of Directorates General (namely, the DGs for Employment, Social Affairs and Inclusion; Financial Stability, Financial Services and Capital Markets Union; Economic and Financial Affairs) and separated from income taxation issues handled by the DG Taxation and Customs Union. These DGs seem to have had little motivation to engage in cross-sectoral issues like equity and fiscal fairness of portable pensions in the internal market.

To the best of the authors' knowledge, no international organization has used its mandate to explore, analyze, and guide pension design and pension taxation coherently at the national and international level. The International Labour Organization (ILO), historically in the forefront of social policy and retirement income considerations, has never dealt with pension tax issues. For many decades the IMF's Fiscal Affairs Department (FAD) was the leader in taxation issues (micro and macro) and explored aging and pension issues at macro level, but these topics were never brought together, let alone in a trans-country perspective. The World Bank established itself as a leader in the international pension discussion with the 1994 publication "Averting the Pension Crisis" and the ensuing knowledge management on pension issues. The World Bank was never strong on taxation issues, though, and often had to rely on advice from IMF/FAD. Finally, the OECD hosts substantive pension work and taxation work under one roof but in different departments that often do not interact with one another, as their work programs are determined by committees that reflect the schedule of responsibilities of the national ministerial divisions (and we are back to entry point above).

4 Policy options to streamline taxing internationally portable pensions

The current approach of taxing internationally portable pensions is not only complex and distortionary but also unfair and fiscally unsustainable. With rising labor migration between countries within the EU and elsewhere in the world, a residence-based taxation approach leads to increasing tax revenue losses for the source country. It is rather unlikely that countries can solve the issue at the national level or through renegotiation of existing bilateral double taxation treaties. A globally sustainable solution requires consent on key objectives of an internationally fair tax revenue distribution and on implementable options to transfer individual equity in intertemporal taxation to a global setting with migrating workers and pensioners.

Efficiency and fairness in a tax regime for internationally portable pensions can only be achieved if national and international objectives are considered simultaneously. The following principles seem relevant in shaping an appropriate tax design. First, a consumption-type treatment of mandated retirement savings is justified as it aims at contributing to intertemporal neutrality for consumption decisions and also inasmuch as contributions to mandatory pension systems are perceived as “social security taxes” rather than savings. Second, (limited) consumption-tax treatment of private pension saving can be motivated because voluntary old-age pensions complement mandatory statutory and occupational pensions, which are regarded as insufficient to smooth intertemporal consumption in an aging society. Third, national as well as international double taxation of old-age pensions should be avoided. Fourth, revenue from income taxation over the lifecycle must be allocated fairly among involved states. Finally, pension taxation should not distort the migration decisions of individual workers or pensioners.

The problem of the current state of pension taxation in many OECD countries and in particular in the EU is that these institutions concentrated on specific objectives by recommending portability of pension entitlements and EET taxation of statutory and mandatory occupational pensions, but left the solution of the other objectives to individual countries. It is not surprising that countries focused on national fiscal revenue by using or extending the room of existing double taxation treaties.

The key problem of fairness among national budgets is that under the current design, the initial income tax exemptions to labor migrants cannot be recouped by usual double taxation treaty measures in a simple and transparent way. Negotiations on any form of source taxation of cross-border pension income suffer from a lack of transparency on previous income tax losses induced by preferential income tax treatment of pension savings. A temporary extension of unlimited income tax liability in the source country will only work if pensioners migrate after they start receiving pension payments. Codifying a reimbursement scheme by which residence countries compensate source countries for migration-induced income tax losses seems an impossible political venture under the current circumstances.

This section sketches a new set of pension tax policy options that directly address the double equity dilemma of cross-border pensions and proposes solutions that require modifications of pension tax liability calculations at the national level, but work efficiently within the current treaty network. The three pension tax options presented below have one common feature, namely the frontloaded calculation of pension tax liability, but they differ in the tax payment pattern across an individual's pension cycle. Section 4.2 presents a regime of frontloaded pension taxation and immediate tax payment; i.e., taxes have to be paid in the year when contributions are made and returns accrue. In section 4.3 the tax payment of the frontloaded pension tax liability is delayed to migration stage or the retirement period. Finally in section 4.4 the payment of the frontloaded pension tax lability is phased over the stages of contribution payment, returns received, and benefit disbursement.

Before presenting these options and to characterize different pension tax regimes in a transparent way it is useful to define them unambiguously in a stylized lifecycle model of a representative agent economy. Numerical simulations will help to explain and compare different tax regimes and reform options in subsequent sections.

4.1 A simple lifecycle model of pension benefits, saving, and taxation

In this model the agent earns labor income in period 1 that is spent on consumption, contributions to a mandatory pension regime, income taxes, and savings. In the retirement period 2, the agent's consumption is financed from pension benefits and accumulated savings net of income taxes levied on pension benefits and returns on saving.

Endogenous labor supply h_1 earns a constant wage rate w, and gross labor income in period 1 amounts to $y_1 = h_1w$. Gross labor income is the assessment base for statutory old-age pension contributions, levied at the rate β, and for the income tax, levied at the rate τ_y. Pension contributions may, however, be deductible from the income tax base. Statutory pension contributions reduce the personal income tax burden by $\tau_d\beta y_1$, while personal pension contributions reduce the income tax burden by $\tau_s s_1$. Full deductibility is granted for tax rates $\tau_s = \tau_{y,}$ and $\tau_d = \tau_y$ and nondeductibility applies for tax rates $\tau_d = 0$ and $\tau_s = 0$.

Net labor income in the working period 1 therefore is $y_1^n = h_1w(1 - \tau_y) - \beta h_1w + \tau_d\ \beta h_1w + \tau_s s_1$. The budget constraint for the representative agent in period 1 is:

(1) $c_1 + s_1 = h_1w(1 - \tau_y) - \beta h_1w(1 - \tau_d) + \tau_s s_1 = h_1w[(1 - \tau_y) - \beta(1 - \tau_d] + \tau_s s_1$

Gross income in the retirement period consists of the pension benefit b and savings inclusive of earned interest $s_1(1+r)$. Net income after the deduction of income tax on pension benefits τ_p and the income tax on interest τ_r becomes $y_2^n = (1 - \tau_p)\ [b + s_1[1 + r(1 - \tau_r)\ ]]$.

Disregarding bequests, the budget constraint for the retirement period 2 is:

(2) $c_2 = (1 - \tau_p)[b + s_1[1 + r(1 - \tau_r)]]$

For a rational consumer, the optimal labor/consumption plan is the solution to the following problem:

(3) max $u(c_1,h_1) + v(c_2)/(1 + \rho)$ subject to constraints (1) and (2),

with u and v as the period-specific utility functions and ρ the subjective rate of time preference.

With λ and η as the Lagrange parameters, the Lagrangian function is:

$L = u(c_1,h_1) + v(c_2)/(1 + \rho) – \lambda[h_1w[(1 – \tau_y) – \beta(1 – \tau_d) – c_1 – s_1] – \eta[(1 – \tau_p)[b + s_1[1 + r(1 – \tau_r)]] – c_2]$.

The optimal consumption/savings plan is determined by the four marginal conditions:

(4.1) $\partial L/\partial c_1 = u_c + \lambda = 0$

(4.2) $\partial L/\partial s = \lambda(1 – \tau_s) – \eta(1 – \tau_p)[1 + r(1 – \tau_r)] = 0$

(4.3) $\partial L/\partial c_2 = v_c/(1 + \rho) + \eta = 0$

(4.4) $\partial L/\partial h_1 = u_h - \lambda w[(1 – \tau_y) – \beta(1 – \tau_d)] = 0$

and the two budget constraints (1) and (2). Substituting out the two Lagrange parameters, the marginal conditions for the optimal consumption/leisure choice in period 1 and the optimal intertemporal consumption choice are:

(5.1) $u_h/u_c = –w[1 – \tau_y – \beta(1 – \tau_d)]$

(5.2) $u_c/v_c = (1 – \tau_p)[1 + r(1 – \tau_r)]/(1 + \rho)(1 – \tau_s)$

and reflect the standard tax effects: The marginal utility of leisure is reduced by the income tax and the net contribution rate of the mandatory pension system; the marginal utility of retirement consumption is reduced by the income tax on earned interest and the net of tax income ratio of retirement income taxation and tax relief by deductibility of savings.

This simple representative citizen model suffices to characterize the basic features of different pension tax regimes as well as the pension tax proposals sketched in sections 4.2 to 4.4. Appropriate choice of the tax parameters allows capturing the popular tax regimes, as summarized in Table 10.

Table 10: Tax parameters for standard tax systems

Model tax parameters	TTE	EET	TEE
τ_y	>0	>0	>0
τ_d	0	τ_y	0
τ_s	0	τ_y	0
τ_r	τ_y	0	0
τ_p	0	0	0

Inserting the tax parameters of the second column into (5.1) and (5.2) immediately reveals how a comprehensive income tax TTE distorts the leisure/consumption choice as well as intertemporal consumption:

(6.1) $u_h/u_c = –w[1 – \tau_y – \beta(1 – \tau_d)] = –w[1 – (\tau_y + \beta)]$

(6.2) $u_c/v_c = (1 – \tau_p)[1 + r(1 – \tau_r)]/(1 + \rho)(1 – \tau_s) = [1 + r(1 – \tau_r)]/(1 + \rho)$

Inserting the tax parameters of the third or fourth column into (5.2) shows that deferred expenditure taxation and prepaid expenditure taxation do not distort intertemporal consumption because for both tax regimes the marginal condition becomes:

(7) $u_c/v_c = (1 + r)/(1 + \rho)$

However under both expenditure regimes, the leisure/consumption choice remains distorted due to the price wedge of the income tax and the mandatory pension contribution.

Whereas this simple model allows identifying basic properties of the different tax regimes, it is not elaborate enough to serve as a building block in a normative optimal tax design analysis. For this purpose, important extensions incorporate heterogeneity of agents, multiperiod decisions, endogenous retirement, and labor market and survival risk. Moreover, the intertemporal budget constraints for the various pension schemes and the government sector must be considered.

4.2 Intertemporally neutral frontloaded pension taxation[7]

Deferred income taxation of old-age pensions has been adopted as an attractive tax regime by many OECD countries although it drives a wedge between regular saving and pension saving. Recent criticism of deferred taxation, however, does not concern the unleveled playing field for taxing returns from saving but complains about international income tax revenue shifts when workers or pensioners migrate. Countries that lose income tax revenue through labor migration call for amendments or revisions of bilateral double taxation treaties to find an acceptable balance between source and residence country taxation of old-age pensions.

This chapter proposes a promising alternative solution to the double equity dilemma inherent in the deferred income taxation of pensions. If the backloaded EET regime is replaced by an appropriate frontloaded tax regime, then international equity can be regained without major changes to the existing network of bilateral double taxation treaties. Source countries will not suffer from income tax revenue losses if income taxes are already paid when individuals migrate as workers or retirees.

It is true that comprehensive income taxation would serve this purpose and can even be justified if pension contributions are qualified as investments in a defined contribution system rather than deductible "social security taxes" that finance a subsistence-covering defined benefit scheme. But TTE taxation of pension savings instead of deferred EET taxation also implies taxing the annual nominal growth of individual "pension wealth" and distorting intertemporal consumption.

But intertemporal neutrality in consumption can be achieved not only by a Fisher/Kaldor-type deferred-consumption-oriented income tax. It can also arise from a frontloaded TtE income tax that exempts pension benefits withdrawn from accumulated pension wealth but taxes income spent on pension savings when contributions are made as well as annual returns on pension wealth that exceed normal capital returns. In line with Kaldor's terminology, EET designates an expenditure tax regime and TtE a prepaid expenditure tax regime.[8] Restricting the tax base on capital returns to excess returns has been proposed as a "Rate of Return Allowance" regime for the Nordic countries (Sorensen 2010) and for the United Kingdom (Mirrlees 2011 chapter 14), and has already been implemented in Norway (Alstadsæter and Fjærli 2009).

[7] See Genser (2015) for details.

[8] A TEE regime should not be regarded a prepaid expenditure tax regime, because excess returns remain untaxed under TEE whereas they are taxed under a EET expenditure tax (Table 11).

Using the simple model sketched in section 4.1, the equivalent tax effects of EET and TtE tax regimes can be illustrated for a representative pension saver who earns a fixed wage income y_1 while working, saves $ßy_1$ in a mandatory pension scheme and σy_1 voluntarily, earns excess returns on pension savings $r > \rho$, and is subject to an income tax rate τ_y. Table 11 reveals the tax burden differences for such a representative pension saver in a defined contribution system. The income tax is highest for a comprehensive income tax; it is lower for a deferred consumption-oriented income tax (i.e., an expenditure tax), which is equivalent in present value terms to a prepaid consumption tax (i.e., an earnings tax following the terminology of the Mirrlees report) with taxable excess returns; and and it is lowest for a prepaid consumption tax that leaves excess returns untaxed. Of course, EET and TtE regimes impose the same total tax burden on a pensioner in present value terms only, if the marginal income tax rate is the same over the whole pension cycle and if positive and negative income tax bases are treated symmetrically.[9,10]

Table 11: Consumer choice under comprehensive income and expenditure taxation ($y_1 = 120, s_1 = 24, r = 1.0, \rho = 0.5, \tau_y = \tau_r = 0.3, \beta = 0.2$)

Tax regime	TTE			EET			TtE			TEE		
Wage income	120	0	120	120	0	120	120	0	120	120	0	120
Pension contributions	24	0	24	24	0	24	24	0	24	24	0	24
Pension benefits	0	48	32	0	48	32	0	48	32	0	48	32
Personal saving	24	0	24	24	0	24	24	0	24	24	0	24
Saving benefits	0	48	32	0	48	32	0	48	32	0	48	32
Income tax base	120	48	152	72	96	136	120	24	136	120	0	120
Income tax	36	14.4	45.6	21.6	28.8	40.8	36	7.2	40.8	36	0	36
Consumption	36	81.6	90.4	50.4	67.2	95.2	36	88.8	95.2	36	96	100

Source: Authors' calculation.

Note: The three columns of each tax regime represent the monetary values for each variable in period 1 and 2 and the present value of the total lifetime sum over periods 1 and 2.

Whereas EET and TtE taxation are intertemporally neutral, with equal amounts of present value taxes paid by the taxpayer and received by the tax authority in a closed economy, the situation changes in an open economy setting. National tax authorities are no longer indifferent between the two tax regimes as their revenue situation changes if taxpayers migrate. According to the assumptions in Table 11, the present value of the migrant's tax burden is 40.8 under both regimes

[9] The argument that equivalence between EET and TtE can never be attained for real intertemporal income paths under progressive tax schedules because annual pension benefits will be lower than annual earned income and thus taxed at a lower rate is true but not well-targeted. The same argument can be raised against intertemporal horizontal equity because a constant progressive annual income tax schedule will always generate different tax burdens for the same lifetime income in present value terms whenever annual tax bases fluctuate over time. Perfect horizontal equity would require an *ex post* tax assessment of lifetime incomes and an imputation of an average lifetime income for each tax year in present values, which would result in a constant marginal tax rate over time. Horizontal equity is regarded a useful benchmark although income tax policy abstains from such an adjustment mechanism to attain lifetime equity. In the same sense, the assumption of a constant marginal tax rate over the pension cycle should therefore not be criticized as an untenable simplification.

[10] In a world of certainty, excess returns above a normal market return reflect market imperfections. In a world exposed to uncertainty and risk, excess returns are those that exceed the normal market return and the appropriate risk premium. Therefore t does not charge a tax burden on the risk premium and should be zero in a perfect capital market world.

(i.e., 30 percent of the discounted tax base of 136), but the emigration country's revenue, which is 36 under the TtE regime, shrinks to 21.6 under the EET regime.

The important advantage of applying TtE rather than EET is that pensioners' migration no longer violates international equity among treasuries. Since pension benefits are pre-taxed when contributions to pension systems are not deductible in the country of residence, no recovery of income tax relief is required to restore equity among countries' budgets. On the other hand, double taxation is avoided if the residence country applies TtE as well and exempts cross-border old-age pension benefits. An open question, however, is the assignment of tax revenue from excess returns that go to the residence country under EET. In the two-period model, this is also the case under TtE. In a multiperiod model with annual taxation of excess returns, this revenue remains in the emigration country before migration and goes to the immigration country in the years after migration. Even if a residence country abstains from implementing a TtE regime, double taxation can be avoided by the traditional treaty instruments of exemption (with or without progression) and foreign tax credits (unlimited or limited).

Another important point of discussion for every tax regime is administrative efficiency, which for a TtE tax depends crucially on a transparent and simple determination of excess returns on pension wealth. One attractive feature of TtE taxation is that its administration is largely in line with capital income taxation under a comprehensive income tax regime. Under both regimes, pension savings are not deductible, but a difference exists in the treatment of returns to pension wealth W. While under a comprehensive income tax the total annual returns on pension wealth rW are taxable income, TtE requires that only excess returns are taxable. The appropriate calculation of excess returns requires a political decision on the rate of normal returns to pension wealth. A theoretical benchmark for such a rate is a risk-free interest rate marked up by an actuarial risk premium. Scandinavian countries use such a normal rate of return ρ to run their dual-income tax systems. Basically this rate must be fixed for each tax year and is binding for the taxpayer and the tax authority. Once this normal rate of return ρ is fixed, the allowance ρW can be calculated for each taxpayer and the respective tax base is $(r - \rho)W$. Instead of using $(r - \rho)W$ as a component of the individual income tax base, TtE income taxation refers to a simple transformation by defining a reduced income tax rate t, which applied to total returns rW raises the same amount of income tax, $trW = T(r - \rho)W$. The reduced tax rate t is thus defined by $t = (1 - \rho/r)T$. The tax rate decrement $(T - t) = (\rho/r)T$ reveals the "tax preference" that is implicitly incorporated in the EU recommendation to defer pension taxation rather than taxing pension saving as comprehensive income.

A final advantage in administering TtE in contrast to EET is that no control of correct deductions for pension savings is required. Administration and compliance are greatly simplified, as old-age pension contributions and pension savings do not reduce the income tax base. Excess returns on pension wealth are calculated in the pension accounts of financial institutions that accumulate pension wealth or in pension agencies that administer notional defined contribution schemes. Monitoring of appropriate tax payment by tax authorities can thus focus on a small number of pension funds and other agencies managing old-age pensions; further audit of millions of individual income tax returns is no longer necessary. Since old-age pension benefits to pensioners are tax-free, filing income tax is not required even if pension benefits are received from several sources. This final advantage will not be reaped if not all pension savings vehicles are pre-taxed, although no mix of EET and TtE taxation for different types of old-age pensions jeopardizes intertemporal neutrality or interpersonal equity.

4.3 Deferred payment of frontloaded pension tax liabilities[11]

While deferred and frontloaded consumption tax regimes generate the same income tax burden and the same consumption in an aggregate lifetime perspective (see the last two rows in Table 11), they nevertheless differ in the staging of their tax payment, which leaves the consumption path unchanged but impacts the saving path. Table 12 demonstrates the consequences of strategic pension saving and reveals the equivalence of deferred and frontloaded income taxation with respect to period consumption if the capital market is perfect, i.e., r = ρ, and no excess returns can be earned. Without excess returns the TtE and the TEE regimes must of course be identical (see the last six columns in Table 12).

Table 12: Consumption smoothing under different pension tax regimes
($y_1 = 120$, $r = \rho = 0.5$, $\tau_y = \tau_r = 0.3$, $\beta = 0.2$)

Tax regime	TTE			EET			TtE			TEE		
Wage income	120	0	120	120	0	120	120	0	120	120	0	120
Pension contributions	24	0	24	24	0	24	24	0	24	24	0	24
Pension benefits	0	36	24	0	36	24	0	36	24	0	36	24
Personal saving	20.2	0	20.2	36	0	36	18	0	18	18	0	18
Saving benefits	0	30.3	20.2	0	54	36	0	27	18	0	27	18
Income tax base	120	22.1	134.7	60	90	120	120	0	120	120	0	120
Income tax	36	6.6	40.4	18	27	36	36	0	36	36	0	36
Consumption	39.8	59.7	79.6	42	63	84	42	63	84	42	63	84

Source: Authors' calculation.

Note: The three columns of each tax regime represent the monetary values for each variable in period 1 and 2 and the present value of the total lifetime sum over periods 1 and 2, respectively.

Although the intertemporally aggregated income tax revenue is the same under the EET and TtE regimes, substantial revenue differences arise between the single periods, which affect the corresponding government budgets. Moreover, the revenue effects are dramatically intensified if pensioners migrate because the distribution of income tax revenue between the emigration and the immigration country is fundamentally changed. Rather than solving the tax revenue allocation problem by revising the bilateral network of double taxation treaties, a legal separation of individual tax liability and individual tax payments must be considered.

A first tax policy option for such a separation is to postpone payment of the pension tax liability under a TtE regime until pension benefits are paid out. For non-migrating pensioners this deferred tax payment option largely parallels the current deferred income tax regime EET. For migrating pensioners, the accumulated tax liability is well-defined at the emigration date. Rather than becoming due as an "emigration tax," the liability can be turned into a tax annuity that must be paid to the tax administration after retirement in line with the payout of the monthly pension benefit. If pension wealth is portable across borders and pension benefits are paid out by a pension fund in the immigration country, the possibility exists for a revenue-sharing arrangement between the tax

[11] See Holzmann (2015) for details.

administrations of the emigration and immigration countries that grants that the tax annuity payable to the emigration country is withheld when the monthly pension benefit is paid out.

Conceptually, such an approach is very much simplified if both unfunded and funded pensions are defined contribution schemes in which at retirement or upon migration the accumulated notional or actual amounts of pension wealth and income tax liability are well-defined and both can be turned into an annuity using the same parameters (e.g., conditional cohort life expectancy).

What are the possible advantages of such a deferred TtE tax payment option over the immediate TtE tax payment regime proposed in section 4.2? Five considerations are offered:

First, the approach combines a formal frontloading of income taxation (TtE) that supports political credibility of tax policy and simplifies tax assessment in the contribution phase with a material backloading, as tax payments are only due when benefits are disbursed. Thus the downward pressure on private saving to avoid disposable income cuts will be mitigated and should not jeopardize overall societal saving, capital accumulation, and economic growth.

Second, as most countries currently operate retirement tax regimes that are close to EET, the transition toward a TtE regime with deferred tax payments should create less havoc. The higher immediate tax revenue will offer incentives for higher government spending and diminishing expenditure reform efforts.

Third, while exit taxation on accumulated pension wealth upon migration meets resistance under the current EU ruling and is not addressed in most double taxation treaties, the existence of an open income tax liability upon migration should be more easily accepted. Furthermore, moving to a new country of residence before or after retirement need not trigger immediate payment of the tax liability, if the deferred monthly tax payments are withheld when pension benefits are paid out in the source county and transferred directly to the tax authority. Such a tax payment arrangement avoids an imposition of an exit tax on migrants and an equal treatment of migrating and non-migrating pensioners. Moreover, informing the new residence country about the gross and net annuity would allow tax authorities of the residence country to assess the overall tax liability of the retiree correctly under a progressive income tax.

Fourth, the recording of deferred tax liabilities, of taxes already paid, and of the net amount of pension wealth over an individual's lifecycle should prove very useful and offer transparency on tax revenue claims, on tax payments, and thus on their distribution across individuals and groups. This is useful even if pension claims are not portable across borders because this information facilitates evaluating and auditing fairness across individuals and countries.

Last but not least, the availability of aggregated pension and tax liability data at the national level would allow an easier assessment of gross versus net implicit public debt. By 2017, EU member countries will be required to publish data on implicit pension liabilities through System of National Accounts (SNA) satellite accounts.

4.4 Phased payment of frontloaded pension tax liabilities

A natural extension of a frontloaded pension tax with deferred tax payment is to phase payments evenly across the whole lifecycle by charging a constant "tax payment" rate t* on income spent on contributions, on income from pension wealth returns, and on benefit payouts. Conceptually this third tax payment option is based again on the TtE income tax lability and an appropriately chosen payment rate t* that generates the net present value of tax payments to redeem the frontloaded expenditure tax liability.

Under the tax liability constraint the tax rate t* is an endogenous variable. This creates a problem because the tax rate has to be fixed before the actual returns on pension wealth are known. But given that the present value of contributions and pension wealth returns should cover the present value of pension benefits, an appropriate tax rate t* can be determined. Table 13 assumes excess returns and the model compares savings responses to the three different tax payment options: immediate tax payment in each period; deferred tax payment as a fixed percentage of pension benefits; and lifetime tax payment as a fixed percentage t* of pension wealth accumulation and decumulation flows. The results reveal that lifetime repayment of the pension tax liability generates the expected savings response, which increases personal pension saving and reduces the first-period income tax revenue payment compared to the benchmark case of immediate payment of income tax liabilities.

Table 13: Frontloaded pension taxation under different tax payment options
(y_1 = 120, r = 1.0, ρ = 0.5, $\tau_y = \tau_r$ = 0.3, β = 0.2)

Tax Regimes	Immediate payment			Deferred payment			Phased payment		
Periods	P1	P2	P1+2	P1	P2	P1+2	P1	P2	P1+2
Earnings	120	0	120	120	0	120	120	0	120
Contribution	24	0	24	24	0	24	24	0	24
Benefit	0	24	24	0	24	24	0	24	24
Saving	15.3	0	15.3	28.8	0	28.8	27.2	0	27.2
Dissaving	0	23.0	23.0	0	43.2	43.2	0	40.8	40.8
Tax base	120.0	7.7	127.7	120.0	14.4	134.4	120.0	13.6	133.6
on earnings	80.7	0	80.7	67.2	0	67.2	68.8	0	68.8
on savings	39.3	7.7	47.0	52.8	14.4	67.2	51.2	13.6	64.8
Tax liability	36.0	2.3	38.3	36.0	4.3	40.3	36.0	4.1	40.1
on earnings	24.2	0	24.2	20.2	0.0	20.2	20.6	0	20.6
on savings	11.8	2.3	14.1	15.8	4.3	20.2	15.4	4.1	19.4
Tax payment	36.0	2.3	38.3	20.2	20.2	40.3	22.0	18.0	40.1
on earnings	24.2	0	24.2	20.2	0	20.2	11.4	9.3	20.6
on savings	11.8	2.3	14.1	0	20.2	20.2	10.7	8.7	19.4
Consumption	44.7	44.7	89.4	47.0	47.0	94.1	46.8	46.8	93.5

Source: Authors' calculation.

Note: The three columns of each tax regime represent the monetary values for each variable in period 1 and 2 and the present value of the total lifetime sum over periods 1 and 2, respectively.

What are the possible advantages of a t* payment option compared to a TtE regime with immediate tax payment or deferred tax payment in the decumulation stage? Three main considerations are relevant.

First, t* is much lower than the income tax rate T because tax payments become due along the whole accumulation and decumulation phase of pension wealth. Although the present value of tax payments and therefore the lifetime income effect are the same, individuals may be induced to interpret t* as the relevant income tax rate in adjusting their intertemporal consumption behavior and to regard pension taxation as less distortive. Such an effect can result from reduced liquidity constraints under a lower tax rate and phased tax payment.

Second, the t* lifetime payment option should facilitate negotiations on fiscal fairness between countries under rising labor migration. For migrating workers, the pressure for any exit tax arrangement is reduced as an appropriate share of the income tax due has already been paid in the emigration country. For migrating retirees, the new residence country may get access to a substantial share of the migrant's income tax liability if it is entitled to keep the tax payment after migration as an adequate benefit tax. In this sense, income tax payment determines an income tax-sharing rule for migrants that lies between the residence-based EET regime (which is under attack because the emigration country suffers from a permanent loss of the exemption of income spent on pension saving) and an immediate frontloading regime, which would allocate almost all income tax on pension saving to the emigration country. Hence the t* option may be welcome because it addresses the double equity dilemma directly without any further agreement on income tax revenue-sharing between the emigration and immigration countries.

Third, expanding the base for pension tax payments introduces a new tax handle for revisions of double taxation treaties. Proposed here is a lifetime payment option with a rate t* that is unanimously determined by a TtE regime according to the national income tax code and the pension scheme. Newly designed double taxation treaties might, however, take account of t* and consider floors or ceilings to t* to reallocate pension tax revenue of migrants between residence and source countries. It remains to be seen whether this new instrument will be regarded as a helpful tool in double taxation treaty renegotiations.

5 Conclusions

The taxation of internationally portable pensions and other retirement savings is characterized by astonishing diversity, complexity, and inconsistency. This disarray reflects national autonomy in the taxation of retirement income but also room for specific bilateral rules in avoiding double taxation of different forms of old-age pensions. This conceptual and operational heterogeneity creates economic distortions and inequities among individual pensioners as well as fiscal distortions and revenue inequities between countries. In view of the rising share of individuals spending at least some part of their working life abroad and acquiring assets and pension rights in source countries away from their future retirement residence, the situation is unsustainable and must be corrected.

Addressing the issue requires a coordinated approach beyond bilateral tax treaties and an agreed general concept for the taxation of pensions that avoids or at least minimizes individual- and country-level distortions; neither a benchmark for coordination nor a conceptual framework is currently at hand.

To initiate discussion toward such a conceptual framework of portable pension taxation, this subsection suggests three nested policy options that build on existing policy thinking and should facilitate consensus building. It also offers new perspectives that may help to overcome reform resistance.

First, the analysis supports a consumption-type taxation of retirement savings but proposes a move from backloaded to frontloaded consumption-oriented income taxation. Frontloaded consumption taxation does not distort intertemporal individual consumption and facilitates the solution of fiscal inequity problems between countries triggered by migration.

Second, the analysis proposes a separation of the tax assessment of a pension saver from the payment of the assessed income tax liability. Three policy options are offered that subject an individual to the same frontloaded income tax liability in present value terms but differ in the timing of settlement: (i) immediate payment of the income tax liability in the period in which it is created; (ii) postponed settlement until emigration or until pension wealth is dispersed and liquidated (whichever comes first); and (iii) a phased settling of income tax liability across the stages of contribution payment, return receipt, and benefit disbursement.

Third, implementation of any of these three tax policy options requires a multilateral approach, starting with, for example, a pan-European decision to move from backloaded to frontloaded pension taxation, while the operational implementation of income tax payment can be left to a revision of bilateral treaties. The resistance of moving from back- to frontloaded pension taxation may be limited, as a number of European and non-European countries affected by cross-border migration have already started a discussion about frontloading pension taxation.

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