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Title: Pension Funding, Fiscal Sustainability and Government Debt[1]

Author: Niels Kleis Frederiksen (nkf@fm.dk)

Abstract:
The note deals with the interaction between private institutional savings, public finances and fiscal sustainability. The fiscal impact of pension savings depends on income tax rates on contributions and pension income, the taxation of pension returns and the extent to which assets are diverted from other, taxable investments into pension funds.

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[1] The views and analyses presented in the working paper series are the sole responsibility of the authors. The papers may therefore include views, which are not necessarily shared by the Ministry of Finance.

Taxation affects both the net income flows derived from, and the incentive to participate in, institutional saving programs. In return, funded pensions affect the time path and potentially also the net present value of tax receipts. This paper deals with the consequences of funded pension schemes for fiscal sustainability and government debt accumulation. The numerical examples that we examine below may be thought of as either a mandatory savings scheme or private, non-mandatory savings stimulated through tax concessions.

We take as the starting point the current fiscal outlook of an "average" EU Member State, using 2000 as the base year. In 2000, the average GDP-weighted primary, general government budget surplus stood at 4,2 per cent of GDP[2], while adjusted for cyclical conditions and one-off revenues, the primary surplus was 3,4 per cent. Over the last two decades, the actual budget balances of Member States have tended to fluctuate around the structural level in an asymmetric fashion, with negative deviations more persistent than positive ones. The average shortfall is roughly 0,5 per cent of GDP. Hence, the "true" structural primary surplus in 2000 amounts to 2,9 per cent of GDP.

The primary surplus, of course, measures the excess of tax receipts over non-interest public spending. Below, we compare the structural primary surplus to the level required for fiscal sustainability. Fiscal policy is sustainable if the current settings of tax and expenditure instruments, and hence, e.g., current welfare state programs, may be maintained over time. In turn, this implies that the primary surplus must be sufficient to service the government's total net debt obligations. These obligations consist of explicit net debt (the outstanding stock of public debt minus government financial assets) as well as the implicit debt reflecting the future budgetary implications of expenditure programs and population change.

At the beginning of 2000, GDP-weighted average government net debt stood at 51,2 per cent of GDP. The long-term impact of ageing on the government financial balance of Member States is in the order of magnitude of 5,5 per cent of GDP on average. In what follows, this decline in the primary surplus is assumed to come about in linear fashion from 2001 through 2030. Finally, the rates of nominal interest and growth are set at 6,1 and 4 per cent, respectively. Throughout, in part to avoid the conceptual difficulties associated with risk, we assume that the rates of return on pension assets and government bonds are identical.

The level of initial government debt and the projected budgetary impact of population ageing thus define the baseline fiscal environment. Obviously, one way to reduce the future budgetary pressures associated with population ageing is to cut directly the generosity of old age income support programs. However, this may cause an undesirable shift in the income distribution. Against this background, an important policy problem therefore relates to whether the build-up of supplementary, funded pensions can contribute to financing the long-term increase in old age government expenditures.

The fiscal impact of funded pensions operates through the tax treatment of contributions and benefits, including means-testing of public pensions, as well as the accrued return on pension assets. Typically, contributions are income tax deductible, while benefits are taxed. Pension savings are thus afforded effective consumption tax treatment[3].

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[2] OECD Economic Outlook 68, December 2000.

[3] The overall desirability of such a system is thus closely related to the well-known pro and cons of consumption taxation. The pros include inflation and risk neutrality as well as the opportunities for income averaging. The cons

Also the extent to which contributions paid into pension funds simply reflect a relocation of assets subject to income taxation is a key determinant of the impact on public finances. We defer for a while the issues of accrual taxation and asset diversion, and focus first on the accumulation of pension assets when contributions and benefits are both taxed at a rate of 40 per cent.

Table 1 shows the dynamic evolution of a funded pension scheme with constant gross contributions equal to 1 per cent of GDP beginning in 2001. During the first several decades, net disbursements are negative, but eventually, as the pension fund gradually matures, they become positive. This is mirrored in the impact on the government financial balance, where net contributions imply an initial period of lower tax revenue followed by increased net tax receipts in the long term.

The "deferred income tax" nature of institutional savings implies that the government builds up substantial claims on the private pension sector. Thus, after 30 years, total pension assets are equal to 25 per cent of GDP, but due to the taxation of benefits, 40 per cent of accumulated assets effectively belong to the government. The government accordingly participates as a "sleeping partner" in the funded pension scheme, making initial contributions equal to the reduction in net taxes, while sharing equally in long term net disbursements.

Table 1. Pension Asset Accumulation at 40 Per Cent Symmetric Taxation of Contributions and Benefits. Per Cent of GDP

	2001	2010	2020	2030	2050	2100
Contribution	1,00	1,00	1,00	1,00	1,00	1,00
Benefits[1]	0,00	0,27	0,55	0,79	1,19	1,86
Pre-tax net benefits	-1,00	-0,73	-0,55	-0,21	0,19	0,86
Pension assets[2]	1,00	9,50	17,9	25,3	37,7	58,4
Of which						
- Net pension assets[3]	0,60	5,70	10,7	15,2	22,6	35,0
- Deferred taxes.............................	0,40	3,80	7,20	10,1	15,1	23,4
Net tax receipts..............................	-0,40	-0,29	-0,18	-0,08	0,08	0,34

Notes: 1) Pension benefits are assumed to equal 3,3 per cent of total pension assets, which corresponds to an average holding period of 30 years.
2) Total pension fund asset holdings.
3) Net present value of future after-tax pension benefits.

The consequences for fiscal sustainability of the build-up of tax deferred pension savings operates through the net present value of tax receipts. *Table 2* highlights the time path of primary surpluses with and without pension funding. In the absence of institutional savings, the primary surplus declines over time by the 5,5 per cent of GDP long-term impact of population ageing. Fiscal sustainability necessitates a primary surplus of 5,1 per cent of GDP in the base year, and hence the initial fiscal position of the average Member State is not sustainable; net tax receipts need to be permanently raised by 2,2 per cent of GDP to satisfy this requirement.

As noted above, introducing a funded pension scheme shifts net tax receipts forward in time. However, without taxation of the accrued return, fiscal sustainability is unaffected. This reflects the fact that the present value of the government's net tax receipts is zero when the funding scheme allows for symmetric tax treatment of contributions and benefits. On reflection, this is

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are very much associated with the interaction between the consumption tax status of one type of asset and the income taxation of the nominal return on assets held outside pension funds.

not really surprising as it is just an application of the well-known result that the net present value of a cash-flow tax levied on an investment project yielding the market return is zero.

When the returns to pension assets are taxed as they accrue, net incremental tax revenue is positive. In the last column of table 2, this shows up as a lower shortfall between the actual 2000 primary surplus and the one required for fiscal sustainability. Hence, the fiscal program is brought closer to long-run solvency, although the effect is quite modest. The combination of annual pension contributions amounting to 1 per cent of GDP, and taxation of accrued returns at a 10 per cent rate, wipes out one-twentieth of the initial fiscal imbalance and amounts to only one-fiftieth of the required initial primary surplus.

Table 2. Pension Funding and Fiscal Sustainability. Per Cent of GDP

	No pension funding			Symmetric taxation of contributions and benefits		Symmetric taxation of contributions and benefits *plus* taxation of pension returns	
	-- Primary surplus --						
	Actual	Required[3]	Fiscal sustainability[4]	Required[3]	Change[5]	Required[3]	Change[5]
2000	2,90	5,13	+2,23	5,13	0,00	5,04	-0,09
2001	-	4,95	-	4,55	-0,40	4,46	-0,49
2010	-	3,30	-	3,01	-0,29	2,96	-0,33
2020	-	1,46	-	1,28	-0,18	1,28	-0,19
2030	-	-0,37	-	-0,45	-0,08	-0,44	-0,07
2050	-	-0,37	-	-0,29	0,08	-0,25	0,12
2100	-	-0,37	-	-0,03	0,34	0,01	0,38

Notes: 1) Contributions and benefits subject to 40 per cent income taxation.
2) Contributions and benefits subject to 40 per cent income taxation. The accrued return on pension assets taxed at a rate of 10 per cent.
3) The primary surplus in 2000 required for fiscal policy to be sustainable.
4) A positive number indicates the permanent increase in net tax receipts required for fiscal sustainability.
5) Change relative to the case of no pension funding. Because the funded pension scheme is assumed to take effect in 2001, the change in 2000 shows directly how fiscal sustainability is affected. A negative number implies that the required increase in the primary surplus is reduced and hence that the fiscal program is moved closer to being sustainable.

When the return on pension assets is not subject to taxation on accrual, pension funding thus affects the government financial balance solely through the timing of tax revenue. This tax timing effect has implications for the fiscal consolidation implied by pursuing a sustainable fiscal strategy. The time path of government debt in the "no funding" and "funding with symmetric taxation" cases are shown in *figure 1*.

The projected future increase in government spending implied by population ageing calls for an extended period of fiscal consolidation. In the baseline scenario, the 51 per cent of GDP initial debt ratio is in fact turned into net government financial assets equal to roughly 19 per cent of GDP. These net claims are, of course, the mirror image of the long run primary deficit shown in the second column of table 2.

The postponement of tax revenue implied by tax-deferred pension funding means that the required reduction in government debt is now lower, because the funded pension scheme leads to a more flat time profile of primary surpluses. Accordingly, 30 years into the transition, government net financial asset holdings are lower by about 10 per cent of GDP in the case of funding. This difference is the exact mirror image of the deferred taxes recorded in table 1. The government thus effectively borrows in the bond market in order to acquire claims on private

pension assets. Consequently, although the pension funding case implies less fiscal consolidation, the true fiscal position is exactly the same as in the baseline case.

Figure 1. Government Debt With and Without Pension Funding. Per Cent of GDP
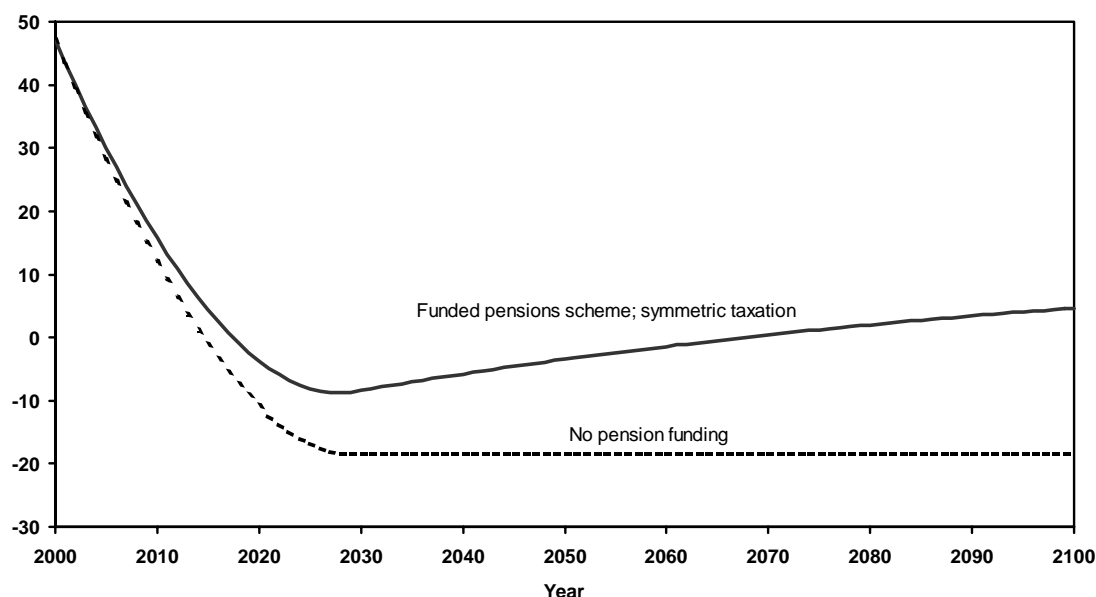
The numerical examples in table 2 ignore the impact on assets held outside pension funds. If, e.g., tax concessions to pension saving are introduced, a strong incentive to divert other types of assets into tax-favored pension accounts is created. Similarly, if the pension asset build-up reflects the introduction of a mandatory savings program, households are likely to, at least partly, finance contributions by reducing other savings

Table 3 elaborates on this issue. The table shows, for different holding periods and combinations of tax rates, the implied effective tax rate on the underlying 4 per cent real market rate of return. We introduce here two additional features, namely asymmetric taxation of contributions and benefits and means-testing of public pensions. In order to assess the incentive to divert savings, we compare the implicit real tax rates on institutional savings to the real tax rate on non-institutional, i.e. household, savings.

In the case of symmetric taxation of contributions and benefits, the effective tax rate on the real return is zero, once again demonstrating the equivalence of income tax deferral and consumption taxation. The 20 per cent income tax rate levied on the nominal return on non-institutional assets implies an effective real rate of almost 30 per cent. Hence, a strong incentive is created to shift assets into pension accounts.

Asymmetric taxation of pension contributions and benefits may lead to very high - negative or positive - effective tax rates, especially for short holding periods. Hence, if contributions may be deducted against income taxes at a 40 per cent rate, and benefits are taxed at a rate of 20 per cent (perhaps reflecting the marginal tax bracket of the investor before and after retirement), contributions made five years prior to the payment of benefits effectively earn two-and-one-half times the market return. Surely, in this situation, a strong incentive to relocate assets, or even borrowing to invest in the tax-favored savings vehicle, is created.

Table 3. Annual Effective Real Tax Rates on Institutional and Non-Institutional Savings. Per Cent

Tax system					Effective real tax rate[1]						
Institutional				Non-institutional	Institutional savings at holding period of						Non-institutional
Contri-butions	Benefits	Means-testing	Current return		5 yrs.	10 yrs.	20 yrs.	30 yrs.	40 yrs.	50 yrs.	
40	40	0	0	20	0	0	0	0	0	0	29,8
40	40	0	10	20	14,9	14,9	14,9	14,9	14,9	14,9	29,8
40	20	0	0	30	-154,0	-75,9	-37,7	-25,1	-18,8	-15,0	44,7
40	40	30	10	20	192,9	105,5	60,6	45,5	37,9	33,3	29,8

Notes: 1) The effective tax rate is defined as the percentage of the annual, real before-tax return that is absorbed by taxation and means-testing of pension benefits

The opposite picture may emerge when public pension benefits are subject to means-testing. In that case, corresponding to the bottom row of table 3, even at very long holding periods, from an investor perspective it may be attractive to avoid altogether institutional savings.

The pattern of effective tax rates shown in table 3 highlights the need to assess also the public finance implication of asset relocation. Generally, the more smoothly financial markets perform, the easier will it be for tax-payers to exploit differences in effective tax rates in order to maximize after-tax net wealth.

Table 4 shows the consequences of asset diversion for fiscal sustainability in the four cases considered above. A degree of savings diversion of zero amounts to assuming that the entire build-up of funded pension assets represents incremental saving. In the opposite polar case of one-hundred per cent diversion, non-pension assets are reduced by the full amount of net pension wealth.

Table 4. Pension Funding, Savings Behavior and Fiscal Sustainability

Tax system					Change in fiscal sustainability[1]					
Institutional				Non-institutional	Diversion of non-institutional savings					
Contri-butions	Benefits	Means-testing	Current return		0,0	0,2	0,4	0,6	0,8	1,0
Per cent					Per cent of GDP					
40	40	0	0	20	0	+0,07	+0,13	+0,20	+0,27	+0,34
40	40	0	10	20	-0,09	-0,05	0	+0,04	+0,08	+0,13
40	20	0	0	30	+0,19	+0,38	+0,57	+0,76	+0,95	+1,14
40	40	30	10	20	-0,24	-0,21	-0,17	-0,15	-0,12	-0,09

Notes: 1) The measure of fiscal sustainability is defined as the lasting change in net tax receipts required from 2000 onwards in order to satisfy the present value budget constraint of the government sector. The change in fiscal sustainability is measured relative to the situation without pension funding. A positive number indicates an adverse effect on fiscal sustainability.

In the case of symmetric and neutral taxation, fiscal sustainability is unaffected provided there is no relocation of assets. However, the zero effective tax rate on accrued pension returns makes such diversion attractive. If all pension assets are mirrored by lower non-institutional holdings, a permanent increase in net taxes of 0,3 per cent of GDP is required for each 1 per cent of GDP in annual contributions, when assets held outside pension funds are subject to income taxation at a 20 per cent rate.

In the case of a 10 per cent tax rate levied on accrued pension returns, the contribution to fiscal sustainability is negative if the extent of savings diversion exceeds 40 per cent.

If income tax rates levied on contributions and benefits imply net subsidies to institutional savings, fiscal sustainability may be strongly negatively affected. Since this is also the case where asset relocation is likely to be strongest, we may conclude that tax concessions to funded pensions hold the potential for seriously undermining long-run fiscal solvency.

When pension benefits are subject to means-testing, very high marginal tax rates on institutional savings may result as table 3 shows. In this case, the consequences of funded pensions for fiscal sustainability are positive, even with full asset diversion. However, the higher net tax receipts simply mirror the higher effective tax rates on – and hence the disincentive to participate in – the funded pension scheme.

Concluding remarks

In order to prepare for the fiscal impact of population ageing, Member States should continue the process of fiscal consolidation now under way. Under plausible assumptions, these efforts will even have to be accelerated, as the current rate of fiscal consolidation is probably insufficient for fiscal policy to be sustainable.

Increased private pension savings, whether mandatory or brought about through favorable tax treatment of institutional savings, cannot - even in the most favorable circumstances - contribute significantly towards these goals. By contrast, favorable tax treatment of institutional savings holds the potential for undermining the process of fiscal consolidation thus necessitating either (further) tax increases or expenditure cuts.

Consequently, establishing supplementary, funded pension programs cannot alleviate the fiscal impact of population ageing unless combined with (either direct or indirect through means-testing) reductions in public pensions. Although this may offer a way of improving moderately the long-term fiscal outlook, it is also likely to entail an efficiency loss due to increased life-time progressivity of the overall tax and expenditure package.

Comments on Feldstein (1995)

In a frequently cited contribution, Feldstein (1995)[4] argues that the tax revenue consequences of tax-favored private pension savings are likely to be strongly positive. Obviously, this conclusion stands in sharp contrast to the one reached above.

Although the paper does not develop a direct measure of how tax-favored savings affect fiscal sustainability, the framework is otherwise quite similar. The key difference relates to the rates of return on government debt, and hence the cost of funding the up-front subsidies to pension savings, and the market rate of return at which pension assets may be invested.

In the present paper, it is assumed that pension assets are invested at the same, risk-free rate of return as faced by the government. By contrast, the Feldstein study is based on the assumption that government bonds yield a real return of 2 per cent, while pension fund assets are invested at an (average) real return equal to 10 per cent. Surely, when compounded over a long investment horizon, this makes a huge difference in terms of net tax revenues.

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[4] Feldstein, Martin, "The Effects of Tax-Based Saving Incentives on Government Revenue and National Saving", *Quarterly Journal of Economics*, 1995.

The substantial increases in net taxes produced by these assumptions, and hence the desirability of providing favorable tax treatment of pension savings, thus reflect the fact that the government exploits the equity premium indirectly through its participation as a sleeping partner in the accumulation of private pension assets.

This is not necessarily reasonable, however. First, the historical magnitude of the equity premium, i.e. the excess of the average equity return over the risk-less interest rate, is often referred to as a puzzle. At least for the U.S., it is simply too large to be consistent with standard models of risk averse investors.

Furthermore, the relevant (marginal) return that should be used on pension fund assets is not necessarily the average equity return, as the latter also embodies the return to innovation, market power and so on. And this component is largely unaffected by the addition of more physical capital. Instead, the return to incremental physical capital should be used.

Finally, taken at face value, the methodology adopted in Feldstein's paper is based on the implicit assumption that the government (and everyone else, one might add) fails to exploit an enormous arbitrage opportunity implied by the return differential. Hence, a rational government should not limit itself to encouraging private asset accumulation. Rather, it should raise money in the bond market and invest directly in equities. Clearly, the nature of this policy prescription casts significant doubt on the validity of the desirability of the tax-favored treatment of pension assets.

One could of course argue that (and interpret Feldstein's assumption as an implicit statement to that effect) the government is capable of bearing risk more efficiently than private financial markets. However, it is well known from the finance literature that this contention is not likely to be true, even leaving aside the moral hazard-problems that would arise if governments were in fact to invest large amounts in risky securities.

While the appropriate treatment of risky, future tax revenues is a difficult matter, it thus seems safer to assume that, on a risk-adjusted basis, government bonds and pension assets earn the same gross-of-tax return. The negative conclusion regarding the fiscal consequences of tax concessions to institutional savings then follows immediately as the above analysis makes clear.