

How to fund NDC pension plans and why

by
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Abstract

Some pension plans have an actuarial benefit formula to improve efficiency in the labor market, but remain financed with the PAYG method to avoid transition costs. This paper presents a reform to these plans that allows tradability of the PAYG asset they rely on. This proposal "funds" the plan in a financial sense, without funding the economy in the sense that PAYG finance is preserved. The paper identifies the main steps for such a reform and some preconditions for success. It argues that these conditions are more easily met when starting from a balanced Notional Defined Contribution (NDC) plan, than when starting from other PAYG plans such as a DB plan managed through discretionary legislation or an unbalanced NDC plan. The paper compares a NDC plan "funded" in this sense with a two-pillar mandatory pension system, where one pillar is a standard funded and DC plan and the other is a standard NDC plan. Five potential social gains from this reform are identified. Two of them is more efficient sharing of investment risk, both domestically and internationally. Some possible costs are also identified. This reform may be attractive within the European Union, because within that group of countries international diversification is not just desirable but also viable.

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1. Introduction

It has been known for many years that it is possible to fund a pension plan without asking the economy as a whole to accumulate savings. For example an employer may fund its occupational pension plan by issuing corporate debt, and transferring the proceeds to the plan. The plan in turn, invests the money in a diversified portfolio of corporate debt, by purchasing securities to other investors. The latter, directly and indirectly, use the funds to purchase the employer's original debt issue. It is clear that the plan becomes funded, but the economy has not increased its saving, since there has been no delay of consumption³. In this financial sense, "funding" is defined as the practice of backing pension promises with tradable assets, say financial assets, titles to real estate and even titles to precious metals and commodities. The sum of these investments is the "pension fund" owned by the pension plan.

This paper exploits this definition and shows that pension plan financed with the pay as you go (payg) method, can be transformed instantaneously into a funded plan in this financial sense, by granting tradability to the asset that backs the plan's liabilities. This approach avoids the so-called "transition cost" of funding, by failing to retire even a small portion of the public debt hidden in payg finance. Alternatively, it can be interpreted that retiring the hidden debt in payg finance is unnecessary to fund a pension plan in this financial sense.

Retiring the debt hidden in payg finance can be inequitable and also inefficient because net tax rates must be made to change over time, bringing forth some intertemporal distortions (see a clean summary in Lindbeck and Persson, 2003). On the other hand, retiring part of the hidden debt can be a Pareto improvement under some development scenarios. The specific reason for why a reduction in the net public debt may have large effects may vary substantially across countries, ranging from evading political constraints that impose an inefficient fiscal policy, to development of the domestic capital markets, but should be substantiated separately, and to allowing a country to escape a low-saving, low-income growth path. Judging whether a particular economy should or should not retire some of the debt hidden in payg finance is an assessment of development policy which is not the topic of this paper. Moreover, as development policy has many tools to deal with the size of the public debt in all its forms, ranging from tax and debt policy to education policy and health policy, we submit that retiring public debt is not part of pension policy. Of course, a separate assessment of development opportunities may make a particular demand on pension policy in this regard.

³ This example is taken from XXX, 1983.

The more modest decision of funding a mandatory pension plan in the financial sense is likely to improve welfare for entirely different reasons: improved risk allocation for members and for the economy in general. This paper proceeds as follows. Section 2 defines and presents the asset hidden in payg finance, which is not tradable. Section 3 describes how to make this asset tradable, thus funding the plan in the financial sense. A discussion of the preconditions that pension policy must meet to achieve this is supplied. Section 4 outlines the social gains that may be achieved by funding a plan that is mandatory. Section 5 outlines potential costs of doing so.

2. The hidden asset in balanced PAYG finance

The financing methods used by pension plans include pure pay as you go, full funding in the sense that the plan owns tradable assets, and a range of intermediate degrees of funding. Every pension plan has a liability given by the expected present value of its past commitments to pay pensions to its current members. The size of this liability is set by the benefit formula and the salary or contribution histories of members⁴. This liability does *not* depend on the financing method used by the plan.

However, a plan financed with balanced or "pure" pay as you go (PAYG) does not own financial assets nor real estate in any significant measure. It may seem that this plan has no assets, but as it certainly has a large liability, it appears that it violates the balance sheet identity⁵. But as the cash flow in this plan is balanced at zero by assumption, for every period, the net worth of the plan for its sponsor must be zero, not negative.

This section shows that in a dynamically efficient economy⁶, any pension plan that is has a balanced cash flow now and in the future, so that it is financially independent before transfers to and from the government, holds a special asset, in addition to whatever pension fund it may own. This "PAYG asset" fills up the asset side of the balance sheet. This asset is the expected present value of the hidden taxes that the plan expects to collect from its members in the future, in order to keep its financial independence.

⁴ Members include current pensioners and those that contributed in the past earning a claim to pensions, be them active contributors or not. These claims usually extend to their survivors.

⁵ Sometimes this "imbalance" is called an actuarial insolvency, suggesting that the net worth of the plan is negative. This is nonsense, because the cash flow of the plan to its "owner" whoever may be, is zero in all periods and thus the owner does not have a negative patrimony.

⁶ An economy is dynamically efficient when the government cannot issue perpetual debt at an interest rate below the growth rate of tax revenue, or equivalently, when consuming physical capital now must reduce consumption in the future. If this condition fails to hold, then the infinitely lived government does not have an intertemporal budget constraint, and a balanced PAYG-financed plan does not have such a constraint either.

The model⁷

Consider an overlapping generations economy populated by agents whose lives have two periods, young and old, with probability 1. The young are different in that they work and each one earns labor income in amount " y_t " (for the generation that is active in date t), while the old do not. In the working phase of life, contributions are paid at rate θ per cent of labor income, while in old age benefits are received so that β per cent of the labor income earned in the previous period is replaced. The number of workers that are active in date t is " N_t ". We also make assumptions about aggregates: the covered wage bill grows at rate " g " per cent per period, in real terms; the interest rate earned by the pension fund is " r " per cent per period; and to assure dynamic efficiency we assume that in the long term $r > g$. Note that g is also the internal rate of return of mature PAYG finance. To simplify the exposition, we also assume that both the plan and the economy are in a steady state, so θ , β , g and r are constant over time.

Consider the mandatory plan's liability in this economy. These can be separated between the amount owed to the currently old generation and those owed to the current young. At the end of period t , essentially nothing is owed to the currently old generation. The young generation is finishing the contributory phase of its life, and in the next period it will draw aggregate benefits for $\beta \cdot (y_t N_t)$. Bringing this to the present period requires discounting, i.e. division by $(1+r)$, so liabilities are:

$$(1) \quad L_t = 0 + \frac{\beta \cdot y_t N_t}{1+r}$$

The aggregate hidden tax perceived by the generation of members that are young as of period t is denoted by T_{yt} . The "hidden tax" on that generation of members of the pension plan is the difference between the present value of contributions and the present value of benefits. This definition implies:

$$(2) \quad T_{yt} \equiv \theta \cdot y_t N_t - \frac{\beta \cdot y_t N_t}{1+r} = \left(\theta - \frac{\beta}{1+r} \right) \cdot y_t N_t \equiv \tau \cdot y_t N_t$$

The ratio $\tau = (T_{yt}/y_t N_t)$ is the *rate* at which the hidden tax is levied on covered labor earnings⁸. The hidden tax rate τ always meets the condition $\tau < \theta$, because a portion of

⁷ This model and proof are a summary of Chapter 8.5 of Valdés (2002), published in Spanish.

⁸ Because this definition of T_{yt} assumes that the tax is collected when the member is young.

contributions are recovered by the worker as pension benefits. In a more general model with endogenous hours and labor force participation, τ would distort labor decisions.

The cash flow identity of the pension plan creates a link between the parameters of the plan and its "degree of funding", denoted by γ . The degree of funding is defined as the proportion of the plan's liabilities that is backed by tradable assets. At the end of period t , the degree of funding is:

$$(3) \quad \gamma_t \equiv \frac{F_t}{L_t} = \frac{F_t}{\beta \cdot y_t N_t / (1+r)}$$

where F_t = value of tradable assets owned by the plan, as of the end of period t ; L_t = value of liabilities at the end of period t . The second equality is obtained by using (1). It can be readily seen that with pure PAYG finance, $\gamma = 0$, that γ in $(0,1)$ represents partial funding and that $\gamma = 1$ corresponds to full funding. The degree of funding is an aggregate property of the plan, and is not related to whether the benefit formula is actuarial (such as in annuity contracts and in individual accounts) or is a "years of service" formula.

The cash flow identity of a financially independent pension plan creates the following accounting link between the parameters of the plan:

$$(4) \quad C_t + (1+r_{t-1}) \cdot F_{t-1} = P_t + F_t$$

where C_t is aggregate contribution revenue and P_t is aggregate pension expenditure in period t . Incorporating the steady state assumptions and previous definitions, (4) becomes:

$$(4') \quad \theta \cdot y_t \cdot N_t + (1+r) \cdot F_{t-1} = \beta \cdot y_{t-1} \cdot N_{t-1} + F_t$$

Now use definition (3) for the degree of funding to represent the size of the pension fund in terms of γ . Assume that the degree of funding is also constant over time - consistent with a steady state-. Then, divide by the wage bill of period t , so that (4') turns into:

$$(4'') \quad \theta + \frac{\gamma \cdot \beta}{(1+g)} = \frac{\beta}{(1+g)} + \frac{\gamma \cdot \beta}{1+r}$$

Each term in (4'') corresponds to the term in (4) that is in the same position. Using this equation to express θ as a function of the other parameters, and replacing in expression (2) for the hidden tax revenue, the latter is transformed into:

$$(5) \quad T_{yt} = \beta \cdot (1-\gamma) \cdot \left(\frac{r-g}{(1+r) \cdot (1+g)} \right) \cdot (y_t N_t)$$

Equation (5) confirms the intuition that the tax burden imposed by a fully funded plan is zero (T_{yt} and $\tau = 0$ for $\gamma = 1$). For other financing methods, the burden is proportional to the size β of the plan, to the lack of funding $(1-\gamma)$ and to the difference between the market rate of return and the growth rate of the wage bill $(r-g)$.

Now calculate the size of the hidden asset or "PAYG asset", denoted H_t , by taking the present value of the hidden tax revenue over all future generations, excepting the current young generation⁹. To make the infinite sum, note that the aggregate revenue of the hidden tax grows at rate g , and that the value of assets is measured as of the end of period t :

$$(6) \quad H_t^{PAYG} \equiv \sum_{j=1}^{\infty} \frac{T_{y,t+j}}{(1+r)^j} = \frac{\beta \cdot (1-\gamma)}{1+r} \cdot (y_t N_t) \quad \text{provided } r > g$$

To prove that a financially independent partially funded plan has as its *only* assets its pension fund F_t and the PAYG asset H_t , calculate total assets as of the end of period t .

Total assets are given by (3) and (6) as:

$$(7) \quad F_t + H_t^{PAYG} = \gamma \cdot \left(\frac{\beta}{1+r} \cdot y_t N_t \right) + (1-\gamma) \cdot \left(\frac{\beta}{1+r} \cdot y_t N_t \right) = \frac{\beta}{1+r} \cdot (y_t N_t) \quad , \text{ provided } r > g$$

Comparing (7) with the total liability of the plan in (1), it is clear that these assets are just enough to cover the liabilities, so the plan's net worth is zero. Thus, this "PAYG asset" fills up the asset side of the balance sheet. QED.

Consider some of the policy implications. First, the PAYG asset is the value of a tax farm conceded by the authorities to the pension plan, through the laws that force workers to join this plan. Participating workers are taxed, because the rate of return on saving through the plan¹⁰ is below the rate of return offered by investment in the financial market (r). The PAYG asset is not a normal asset on two counts: first, it is not tradable, because the plan does not hold legal title to this revenue (more on that below). Second, the PAYG asset is not acquired by purchase, but by a grant from the state. Granting such a tax farm may have

⁹ This exception is needed because the degree of funding was defined at end of period.

¹⁰ For a partially funded plan, additional work with (4") shows that the internal rate of return ρ is the harmonic mean between r and g : $1/(1+\rho) = \gamma/(1+r) + (1-\gamma)/(1+g)$. For $\gamma < 1$, $\rho < r$.

been socially desirable or not, depending on the uses to which the plan put these resources- in most actual cases it granted pensions to the old generation that was alive when the plan started but had an incomplete contribution history to this plan - . Social desirability also depends on views on intergenerational redistribution and on views about the social cost of reducing the capital stock of the economy.

Second, the plan's net worth is zero only if the pension plan is financially independent *forever* (equation (4) obtains forever). If to the contrary, current projections show that the present value of cash flow is negative, then the plan is technically insolvent. This means that the PAYG asset is not large enough to cover the plan's liabilities, net of the pension fund F_t , at current values for the parameters of the benefit formula (including pension ages). Insolvency does not imply that the pension plan is illiquid. Its cash flow may be positive for the next 10 or 20 years. Insolvency means that financial independence is unsustainable over time if current parameter values are not modified¹¹.

3. Making the PAYG asset tradable¹²

This section describes how to make tradable the PAYG asset, and focuses on the preconditions on pension policy that must be met to achieve this. Recall that "funding" in the financial sense is the practice of backing pension promises with tradable assets, including financial assets, titles to real estate and titles to precious metals and commodities. The sum of these investments is the "pension fund" owned by the pension plan.

There is a second definition of funding, introduced gradually by economists since the 1960's. It defines that a pension plan becomes funded (to a greater degree) when national saving rises, usually because some of the public debt hidden in PAYG finance is retired during a "transition". In a closed economy, a higher stock of national saving brings forth an increase in the ratio of physical capital to employment. In a small open economy, an increase in national saving merely raises the stock of net foreign assets.

Both meanings of funding can be useful, but are certainly different. Problems arise when the two meanings are confused. For example, consider an economy where credit-card securitization is introduced, allowing an expansion of the stock of consumer credit outstanding and a transitory increase in the flow of consumer expenditures in non-durables. If a fully funded pension plan buys these securitized bonds, the plan will remain fully funded (γ remains at one). However, the economy has a lower stock of national saving, and

¹¹ This is currently the situation of the U.S. Social Security System. See Shoven, J. (1999), figures 1.1 and 1.8; also Steuerle and Bakija (1994, Table 5.5 at p. 118).

¹² This section relies heavily on Chapter 10.3 of Valdés (2002), published in Spanish.

the economist's definition implies that the economy's degree of funding has fallen. If an initially balanced payg-financed plan has its contribution rate and pensions payments increased in the same proportion the saving outcome is also a reduction¹³, even though the degree of funding of the plan has not worsened (γ remains at zero).

Barro (1999, p. 123) gives the intuition of why it is possible to fund *a plan* without paying a transition cost, and without altering the paths for national saving in the economy: the debt implicit in PAYG finance is a "sunk cost", i.e. a decision taken in the past and now inevitable. But sunk costs should not affect new decisions. We add that among those new decisions lies the one of funding *the plan* in the financial sense, i.e. making the PAYG asset tradable.

This section focuses on methods that make the PAYG asset tradable, and thus fund *the plan* (not the economy) in ways that does not generate new mismatches between assets and liabilities for any economic agent. Methods are sought that make tradable the public debt hidden in pension promises financed with the PAYG method, subject to the constraints of not repaying that debt, and of not exposing the fiscal position to new mismatches and liquidity risks, nor to larger contingent liabilities than had been assumed initially.

Consider a reform that comprises two steps. First, the tax hidden in PAYG finance is made explicit. One way to do this is to split the initial mandatory contribution rate θ_0 into a new (smaller) contribution rate θ' and a new explicit tax on covered earnings, levied at rate τ , where τ is the rate of the hidden tax in the initial situation, defined in section 2¹⁴. In our model of two-period lives for a financially independent plan, this implies

$$(8) \quad \theta_0 = \theta' + \tau \quad \text{where} \quad \tau \equiv \theta_0 - \frac{\beta}{1+r} > 0 \quad \text{if} \quad \gamma < 1$$

Second, a new law endows the plan with a new source of income: the revenue collected by the new explicit tax on covered earnings. Keep in mind that this law can be changed by another law in the future, and the plan will not have the right to claim a compensation for expropriation. Thus, the plan does not yet enjoy a property right over this explicit tax revenue.

It is readily seen that these two steps merely relabel existing cash flows. The total income flows received by the pension plan does not change, the take-home earnings of workers do not change, and firms' labor costs do not change. The only difference so far is

¹³ The generations alive at this point obtain a windfall gain that allows them to increase their consumption.

¹⁴ There exist two other ways to do this. One separates the replacement rate into a higher "pre tax" replacement rate β'' and a hidden tax rate on benefits ($\beta'' - \beta$). Another separates the rate of return ρ credited to individuals into the market rate r and a tax on interest income at rate $(r - \rho)$. See Valdés (2002), section 10.2.

that the internal rate of return earned by plan members on their new contributions (just θ') rises from ρ to r (this rate of return becomes $(\beta / \theta') - 1 = \beta / (\theta_o - \tau) - 1 = r$). This difference expresses in yet another way the identities discussed by Geanakoplos, Mitchell and Zeldes (1998).

Making the PAYG cash flow tradable

One requirement to make the PAYG asset tradable is to assign it to an owner, so somebody can sell it. Obviously, the initial owner must be the pension plan. Another requirement is to make the asset divisible. Securitization is defined as a process that transforms an illiquid asset that cannot be sold to investors in the financial markets, into a set of many securities that are standardized and tradable, which can be sold to investors in the financial markets (Kendall and Fishman, 1996)¹⁵. To make the PAYG asset tradable, property rights over it must be assigned and it must be securitized.

Making the PAYG asset tradable involves assigning property rights over large cash flows that run indefinitely into the future, indicated by Ty_t in the model of section 2, to the plan. This may be achieved in several ways. A law can introduce a tax on covered labor earnings that can be avoided by paying τ per cent to the plan¹⁶. Alternatively, a law may decree a tax on earnings at rate τ and at the same time the state may promise - through a contract with the plan- that it will pay all the revenue actually collected by this tax to the pension plan. The most efficient method for collecting the tax revenue is likely to vary from one country to the next, as it depends on the incentives for retention agents and on the possibilities to minimize collection costs by taking advantage of joint costs with the collection of other taxes and social contributions.

However, a new law in the future may repeal this mandate or this contract, totally or partially. As long as this remains possible, there will be no "real" property right over the PAYG asset, and it will not be possible to securitize it. The standard approach to such problems is for a law to declare explicitly that if the state wishes to withdraw this tax on covered earnings in the future, or if the state taxes or otherwise ceases to pay the tax collection to the plan in the future, then the plan will be considered expropriated, and will be entitled to compensation at market value, paid by the state. Without this clause, which

¹⁵ For example, securitization can transform assets such as the accounts receivables of a telephone company into securities that can be traded in a stock exchange.

¹⁶ The close connection between taxes and mandates is best exemplified by the Australian Superannuation reform of 1993. In this reform, a mandate to contribute was effectively created by imposing a tax on labor earnings that can be "substituted" with contributions to a pension plan (Bateman and Piggott, 1997).

must be clear for the courts, the protection of property rights will not have been extended to the PAYG asset.

This is not different from the current legal status of government debt securities, so there is no legal novelty. In fact, this is also the legal status of *all* private property, since it is always subject to the possibility that a tax in the future may cut all or part of its value to the owner¹⁷. There is no assumption that property rights grant an absolute protection to the plan. The only assumption is that the degree of protection for the financial position of the plan is likely to be higher when the plan also owns the PAYG asset than when it doesn't.

Of course, when the reasons why states honour their promises to compensate in the case of expropriation are considered, it is found that there are political reasons behind this decision. A major political consideration arises when the ownership of an asset is widely dispersed across the economy and the identity of the owners are changing over time, as happens with housing and with government bonds. In addition, the constitutional rules that require taxes to be uniformly applied to similar entities make it politically difficult harder to tax pension funds at rates that are discriminatory when comparing with the rates applied to other owners of financial assets. This means that as long as these measures to make the PAYG asset tradable, succeed in generating many trades, the owners' property rights will be stronger.

But this is not enough yet. The procedure for claiming compensation in the case of expropriation has to be exactly delineated in the law that assigns the PAYG asset to the plan, specifying the exact procedures, the authority of each public official involved and the delays that it can lawfully apply. The objective of such details is to minimize the risk that procedural objections by a cash-strapped state may devalue the plan's property right over the PAYG asset in a significant way. These procedures are also specified in normal government debt securities, and international experience with securitization of private assets shows that an analogous condition by which the initial owner of the cash flows is precluded from clawing them back must be met before securitization becomes possible.

This commitment does not reduce the freedom of future politicians to modify the rate and the base of taxes on covered earnings, and thus engage in welfare-improving tax policy in the future. The state keeps the freedom to replace the tax on earnings at rate τ by other substitute revenue sources, such as an increase in VAT rates. The only requirement imposed so far is that any new policy that imposes losses on the plan by diverting the cash flow from this now-explicit tax on earnings has to compensate the plan for the loss.

¹⁷ Also, a constitutional reform in the future may eliminate the compensation clause in the case of expropriation from the definition of a property right.

One requirement for this procedure to be workable is that the "rule of law" must be trusted in this country. This in turn requires courts that are independent from the executive power, that rulings are predictable and that those rulings are highly likely to be enforced by the police without interference from other powers. These conditions are not met by many countries.

So far, the plans access to the PAYG asset has been protected by a standard property right. Now consider how to make this asset tradable in the financial markets, i.e., how to securitize it. To do so without changing the mismatches initially present in the pension plan, "covered wage-bill bonds" (CWB bonds) should be created. These bonds differ from standard public debt in a fundamental way: the sum of all payments offered by all CWB bonds in each and every contingency and time period adds up to the total tax revenue available at that contingency and time period. If in the future the covered wage bill varies for any reason (demographic, labor market, productivity, coverage of the plan), the financial consequences will affect the owners of CWB bonds. Securitization of the PAYG asset into CWB bonds is essential to disperse its ownership across the economy and to achieve a changing identity of its owners over time. This increases the political support for protection of the property rights of the owners of CWB bonds, feeding back to assure the tradability of the PAYG asset.

The fact that the cash flows coming from the tax on covered earnings are perpetual does not pose special problems, in the same ways as equities are perpetual claims on a firm's profit stream. The CWB bonds can be either uniform, consisting of a simple pro-rata share of the tax revenue to be received in the future, or can take different shapes over time and over states of nature, oriented to the preferred habitats of different investors, provided that the sum of all payments in each and every contingency and time period adds up to total tax revenue available at that contingency and time period.

One significant obstacle to trade these new bonds comes from meeting the requirement that the sale of CWB bonds by the plan to other investors must be a "real sale", as opposed to a situation in which the tax revenue is a mere guarantee for the payment of CWB bonds. The difference arises from the fact that in the latter case, if the plan becomes insolvent, the other creditors of the plan – say pensioners - may dispute the ownership of the tax revenue to the investors that bought the wage bill bonds.

To achieve a "real sale", the sale contract must operate within a transparent legal framework. In some legal settings, investors may be better protected by not having any servicing contract with the plan. For this purpose the plan may hire several securitizing agents to act as specialized intermediaries, in charge of collecting the tax revenue and making payments to bondholders. In this case, the requirement is assurance that in case of

insolvency of the plan, the portion of tax revenue backing the CWB bonds will be entirely separate from the securitizing agent and from the plan, so that revenue cannot be reached by other creditors of the plan. Symmetrically, it is also important to assure that the sale contracts do not include guarantees that may force the plan to pay bondholders even when the tax revenue supporting a particular CWB bond dries up.

Another obstacle to securitization is the valuation of CWB bonds. Before trading commences, the market price of the CWB bonds will be unknown, so initial valuation is somewhat arbitrary. However, most wealth transfers can be avoided by securitizing the PAYG asset gradually, in several tranches, so that the stock of securities subject to the surprises in the initial valuation is relatively small from the point of view of members.

After this process is completed, the mandatory plan will have exchanged its hidden asset by financial securities that are tradable in any stock exchange. According to the financial definition, the plan is now fully funded. The economy has not increased its saving, since there has been no delay of consumption.

Preconditions on pension policy

An assignment of property rights over the PAYG asset and a securitization into CWB bonds such as the one proposed are a sensible idea, only when pension policy meets some preconditions:

a) The plan must be solvent, which usually requires a previous parametric reform. If this requirement is not met, then the plan will be unable to meet its financial commitments in finite time (will go broke). At that point the state, who mandated participation in the plan, will have to come in to pick up the pieces. In that setting, making the PAYG asset tradable changes the form of the pre-existing contingent liability for the state. This change may be a mistake if future governments lose to some extent the discretionary option to legislate parametric reforms that may avert the plan's insolvency, say by raising the average effective pension age. This would weaken fiscal stability, with important negative side effects for society. This outcome may occur if society consider that pension promises are protected to a greater extent when the PAYG asset is transformed into CWB bonds, say because it is less likely that politicians will be able to agree on a cut of taxes on earnings. This may be because future generations of taxpayers would have to compensate bondholders if they legislate a reduction in the tax on earnings. In a setting where insolvency remains, making the PAYG asset tradable may not be advisable if it helps

freeze current pension liabilities at unsustainable levels. Of course, such an evaluation is contingent to each country.

Only if the change in form of the pre-existing contingent liability for the state were beneficial for fiscal stability, this objection to make the PAYG asset tradable could be lifted. If this were the case, tradability would add value by achieving some of the social gains discussed below, such as improving the allocation of risk in the economy.

It appears that most pension plans financed with the PAYG method currently fail to meet this solvency requirement. An exception is given by those few NDC plans that have adopted mechanisms to ensure automatic financial stability, as in Sweden¹⁸. If the plan is insolvent, then this requirement can be met by modifying either the replacement rate, the pension age, or the new tax rate on covered earnings must be set above the level indicated in (8) by the amount necessary to achieve solvency.

b) Recognition of accrued pension rights. In a continuous time setting, the problem faced by members that are caught by the reform at mid career must also be faced¹⁹. When the contribution rate drops to θ' , the problem is how to set the recognition for pension rights accrued under the higher old contribution rate θ_0 . An alternative method is to recognize past contributions. The consequences for individual members can be quite different when the initial parameters are unsustainable (the plan is insolvent). For example, accrued promises may be too high (say, a promise to start a pension at age 55 with a 80% replacement rate). If precondition (a) is met, then recognizing accrued pension rights is the same as recognizing past contributions. Subsequently, this case is assumed.

In present value terms, this recognition should be equal to the pension rights accrued until the reform date. Setting this accrued value is inherently difficult in defined benefit plans, because those plans involve guarantees and options that are difficult to price.

Recognition is more easily defined in NDC plans²⁰, because in these plans every member has a current balance in his or her notional account. However, this is still difficult in NDC plans where members were credited notional contributions, say when in military service or when taking care of children, but the state did *not* finance them explicitly, but

¹⁸ Other NDC plans seem far from solvency, in the sense that their current parameters are inconsistent with financial independence in the long run.

¹⁹ For members that are already pensioned, the plan must continue paying the previously promised pensions.

²⁰ This applies regardless of whether the NDC plan is mature, or it was introduced less than a full working life ago. This is because at the inception of the NDC plan, some provision must have been made for recognition of the pension rights accrued previously. In this case, the worker will obtain a supplementary pension from the recognition that has been legislated already.

rather raised the contribution rate without increasing benefits²¹. The hidden wealth redistributions in the original NDC plan must be sorted out before past contributions can be recognized. Subsequently, this case is assumed.

At the date of reform, the notional account balance for an individual differs from the account balance that would have been accumulated in a fully funded DC plan, on two counts. First, the notional interest rates credited to the account by the NDC plan were generally below the market interest rate (due to the dynamic efficiency assumption, and provided that the NDC plan was financially balanced). If this factor operated alone, the notional balance is below the balance that would have been accumulated in a fully funded DC plan. Second, the contribution credited to the account by the NDC plan was higher than what it would have been in a funded DC plan, because the latter is just θ' , which is smaller than θ_0 . Recall that the hidden tax rate τ does not originate contributions into the funded DC plan. If this factor operated alone, the notional balance is above the balance that would have existed in a funded plan. For young members, the second factor should dominate, the notional account balance should be above the funded DC account balance, and recognition implies a cut in account balances. The opposite should happen for members nearing the standard pension age.

In all cases in which individual records exist, it should be possible to reconstruct the appropriate account balance that should be recognized to each member. Regarding the level of interest rates that would have applied if the plan had been funded in the past, a natural idea is to use the discount rate set by the financial markets on the initial issues of CWB bonds. These prices should be used to fine-tune the valuation of accrued rights under the old rules, namely the account balance recognized to members caught in mid career. An exact valuation is necessary to assure that the plan remains solvent after securitization. This can be achieved by allowing for an adjustment of the account balance recognized to members, to be made *after* the first issues of CWB bonds start trading, as a function of an average of the observed prices.

c) Insure that the plan has a DC risk-allocation method after the reform. Some definitions are necessary to have a precise language. The risk allocation method of a pension plan specifies who will bear and who will not bear the economic consequences of the aggregate financial shocks that buffet the plan, be them demographic or economic. Potential candidates to bear these risks are current contributors, current pensioners, future contributors, taxpayers, sponsoring employers, and the shareholders of life insurance

²¹ A similar need to sort out previous wealth redistribution arises when a contribution for survivor and disability insurance was not explicitly separated to finance those benefits on an independent basis.

companies that issue annuities. The most common risk allocation methods are defined benefit (DB) and defined contribution (DC)²².

In another dimension, the risk allocation method may be a pre-set rule, or may identify a set of individuals (“trustees”) that are given the power to decide ex-post the allocation of realized gains and losses, on a discretionary basis²³. The uncertainty about the future decisions of trustees can be designated as the “political” risk borne by members of plans that rely on the discretionary approach. For example, when a legislature discusses a parametric reform to restore plan solvency, it acts as the effective “trustee” of the pension plan, and the uncertainty about this legislation is a political risk for members. Many mandatory pension plans have two features that are not fully compatible: the discretionary approach is used and it is promised that pensioners will not bear the economic consequences of the aggregate financial shocks that buffet the plan (the promise is DB). The polar opposite is a DC rule, but other combinations exist.

Now the requirement for making the PAYG asset tradable. Consider a case where the plan allocates risk with the discretionary approach under a DB promise. This would mean, for example, that if fertility drops and the number of future contributors falls, promised pension benefits will be exempted when future legislatures decide how to allocate the financial consequences. The discretionary approach implies that hidden taxes are changed over time by the trustees. As these decisions are uncertain, the value of the PAYG asset is subject to political risk. Assuming that an expected tax rate τ was used to define the cash flows that underlie the covered wage bill bonds, then the discretionary decisions of the trustees create a further PAYG asset, whose value fluctuates over time around a zero mean.

Moreover, when analyzing discretionary risk allocation one should always consider the incentives for the trustees (i.e. the legislators). If the original PAYG asset was made tradable, then the pension plan becomes able to sell the PAYG asset to raise cash and pay higher benefits than original envisaged, during a substantial period of time. Of course this policy renders the plan insolvent, but not illiquid for the foreseeable time horizon of current trustees. Thus, some trustees may choose this path. In this setting making the PAYG asset tradable may increase political risks, to the detriment of members and the economy. Of course, this violates the requirement that making the PAYG asset tradable does not create contingent liabilities for members or taxpayers.

²² Our definition is *Defined Benefit* is that pensioners and members close to pension age are exempted from the risk allocation, so they are insured by the other candidates to bear aggregate risks. Our definition of *Defined Contribution* is that aggregate risk is allocated in proportion to the accrued pension rights held by each current plan member. This exempts taxpayers and future members from participating in the allocation of risk. For more details, see chapter 13 in Valdés (2002), in Spanish.

²³ This distinction was first developed in Valdés-Prieto (1998).

To prevent this outcome and meet this requirement, one method that is effective but not necessarily the most efficient, is for the plan to adopt, before the PAYG asset becomes tradable, a DC risk allocation rule. In a DC plan the aggregate financial risk is distributed only among current plan members, so taxpayers are exempt. In addition, as this is a rule that eschews the discretionary approach, political risk is taken away from pension policy and is relocated in fiscal policy discussions. Of course, this approach - shifting to a DC risk allocation- may be hard to accept in countries that prefer or have developed powerful pressure groups in favor of a DB promise within a discretionary framework. In comparison, this requirement is easily accommodated by an NDC plan that includes an automatic financial balance mechanism. The reason is that such a plan has adopted already a DC risk allocation rule.

4. Gains from making the PAYG asset tradable

To assess the value of making the PAYG asset tradable, this section uses the following benchmark alternative: a two-pillar mandatory system, where one pillar is funded and the other is not, remains for ever. This is demanding benchmark, because it has already gained some of the advantages of diversifying risk that accrue to plan members, as has been emphasized by Gora and others. Thus, the focus is on additional advantages allowed to making the PAYG asset tradable.

To make the comparison valid, the paths for national saving and fiscal saving remain the same for both cases. To achieve this, we assume that the starting point is a two-pillar mandatory system, and the question is whether to make the PAYG asset in the payg-financed pillar tradable, and then merge it with the other pillar, which is a conventional DC funded pillar. This seems to be a valid alternative for the NDC plans in Sweden, Italy, Poland and Latvia. The next section concentrates on the costs of taking this option, and this section analyzes the gains.

Equation (7) made clear that γ , the degree of funding of a pension plan measures the composition of the assets that back the plan's promises. This suggests that the funding policy of the pension plan should be analyzed like a portfolio decision, an idea first developed by Gora et al (1996???) during the Polish pension reform. The empirical evidence validates this approach, because the risk profile paid by the hidden asset, which is proportional to the covered wage bill, differs from the risk profile for standard financial assets such as bonds and equities. The empirical evidence in the literature (xxx to be completed Boldrin, Dolado, Jimeno, 1999) shows that the revenue from the covered wage bill is much less volatile in the short run than other components of GDP. It also shows that

the correlation between the wage bill and other aggregates such as profits and with payments in consumer credit to buy housing, is way below 1. The empirical evidence also suggests that shocks to wage bill growth have a large permanent component, implying that the wage bill may be subject to substantial long-term risk.

Now let us identify the implications of the portfolio approach for pension policy. The primary goals of pension policy have been summarized as prevention of old age poverty at a country-specific absolute level, and providing a reliable means to smooth lifetime consumption for a vast majority of the population (Holzmann et al, 2003). The first goal is met by creating basic pensions of several types. The second goal should be met by a combination of mandatory plans and fiscal incentives for voluntary pensions (including occupational and individual voluntary pensions). As voluntary pensions usually achieve limited coverage of benefits, the mandatory plans set the size of the overall pension for a broad group of middle-income and lower-middle income workers. Thus, the question is what should be the asset mix that backs the promises of mandatory pension plans. The answer coming from the portfolio approach is that the optimal asset mix for a single-pillar mandatory pension plan is partial funding (XXX complete references here).

Now consider a pension system where the total mandatory pension received by a worker is made up of two mandatory tiers, as in Poland. In that case, it might be optimal to finance each tier in a different way, one by payg finance and the other from investments in bonds and equities (full funding). This section claims that it is possible to do even better by merging both pillars into a single plan and making the PAYG asset tradable. This would increase welfare for the following five reasons:

a) By achieving effective international diversification of the risk in the wage bill. The wage bill in small countries such as Latvia and Sweden is risky, due to the unpredictable impact of future shocks to international trade in a globalized world. The covered wage bill in larger economies such as Poland and Italy also has unpredictable components, due to fertility shocks, to shocks to women's labor force participation, and to shocks to the average effective retirement age. The size of the informal economy can also change substantially over time, as the technologies for tax collection and the technologies for tax evasion vie for dominance in an uncertain contest. As long as the correlation between these shocks to the covered wage bill in different countries is below 1, there can be a gain to be gleaned from international diversification. The gains from this diversification seem particularly attractive in the European Union, where sovereign risk levels are comparable and internal migration is rising, and should rise further as suggested by Holzmann (2003). In fact, this could be a large step towards the unification of labor markets across the European Union, which

remain largely segmented in part due to difficulties in transferring pension rights across borders. (XXX expand)

The question is whether this gain can be reached through international agreements between NDC plans to exchange cash flows in excess of the average cash flows coming from the wage bill, in the context of the two-mandatory-pillars approach. In practice, these agreements remain theoretical because they may require a particular NDC plan to transfer cash to a foreign NDC plan who is running a cash deficit when the "paying" plan is also running a cash deficit. It is obvious that the domestic political obstacles to such transfers would be large. Accusations may arise that the foreign legislature that sets the parameters of the foreign NDC plan has allowed its cash deficit to expand, and has failed to reform its benefit formula, just because it knows that it can be "bailed out" by transfers from other countries' NDC plans.

These problems would be avoided by making the PAYG asset tradable for the respective national NDC plans, and allowing them to trade internationally. This is because these trades would be protected by property rights, taking the detailed decisions away from the national legislatures. As these decisions would be taken in a continuous basis, there would be no single "big" decision, but many small decisions. Of course, the managers each NDC plan could be required to justify their allocations, and they would do so on the basis of detailed studies that take into account the changing correlations across countries.

b) By completing the capital market, and more generally, by improving the welfare of other investors that are not members of the pension plans. For example, covered wage bill bonds may be attractive investments for all those that want to reduce their exposure to inflation risk, because the wage bill is protected from inflation in the medium term, after the labor market adjusts. But the point is much more general than inflation risk. The value of completing the financial markets allowing the trade of "macroeconomic" risks was first proposed by Shiller (1993). He has elaborated on the gains from offering these new securities, and wage bill bonds are just an example of a more general approach.

The availability of bonds indexed to the covered wage bill would allow life insurance companies to offer annuities indexed to future wages. For those individuals that care to some extent about relative consumption as compared to the young, rather than purely about the absolute level of consumption, such products may be quite attractive, increasing individual welfare. For pension funds and Central Banks from emerging countries, it may be safer to hold part of their international reserves in wage bill bonds of the advanced nations, than in nominal bonds subject to inflation risk. These advantages are not available

for the economy as a whole with the two-mandatory-pillars approach, because it implies that wage bill risk is not tradable.

c) To allow the emergence of a more efficient principal-agent structures. As the merged plan sells some of its "covered wage bill bonds" in the financial markets, it will become able to purchase traditional bonds and equities. An important gain lies in that these purchases - and the portfolio over time - can be chosen with a view to minimize the volatility of the *overall* projected mandatory pension. For example, the new investments can be chosen to exhibit little correlation with wage bill risk, by eschewing equities and bonds issued by firms that are heavily dependent on consumer demand, and whose returns are more heavily correlated with the wage bill. This selection expands the investment opportunity set and allows both a reduction in risk and increase in expected return.

The two-mandatory-pillars model could replicate this desirable selection if the managers of the funded pillar were made responsible for optimizing the overall portfolio of the worker. This appears difficult in a two-mandatory-pillars model, where each manager in the funded pillar is at most required to maximize the return and security of the funds under his management, ignoring the correlations that may exist with the pension coming from the NDC pillar. As a solution to the principal-agent problem faced by workers vis-à-vis fund managers, the two-mandatory-pillars design is problematic.

The two-mandatory-pillars approach also confuses the choice of an allocation of the stock of wealth, with the choice of an allocation of the flow of new contributions. These are not equivalent when the investment opportunity set changes stochastically over time, because the optimal response to this is to change the allocation of the stock of wealth, not the allocation of flows (Campbell and Viceira, 2002).

A related issue is the efficiency of the resulting principal-agent structure. In the two-mandatory-pillars approach the legislature is responsible for setting the relative size of contributions to the funded and the NDC tiers, so it merely sets the relative size of cash flows. It does not take responsibility for choosing the allocation of the stock of assets, which is what matters for risk allocation according to portfolio theory. A second layer of agents is formed by portfolio managers, but these agents are present only in the funded pillar. In addition, these managers are judged on the basis of the volatility of their own pension tier by itself. The asset allocation of the NDC pillar is set institutionally at 100% in covered wage bill risk, as in Italy and Poland, or in more complicated ways in the Swedish NDC plan, which is partially funded by its access to a stabilization fund. It appears that it

would be a short-lived coincidence if this agency structure generated an optimal response from the point of view of workers.

By making the PAYG asset as tradable as any other long-term financial asset, more efficient principal-agent structures would emerge. There would be clearly identified portfolio managers responsible for managing stocks (not flows). These agents would have access to standard trading strategies that are effectively banned in the benchmark design, such as rebalancing the overall portfolio of assets on a continuous basis, as investment opportunities change. In addition, they would become responsible for balancing the overall portfolio to maximize the expected value and to minimize the risk of the overall mandatory pension. Thus, the level of welfare that could be attained in the proposed environment would be higher than the one possible with the two-mandatory-pillars approach.

Moreover, this welfare improvement is likely to be distributed in a progressive manner. This is because some high-income members may have already adapted their portfolio decisions on voluntary wealth in order to make these failures and limitations irrelevant, and they would gain little. Lower-middle income and middle-income members, many of who do not own equities directly, would improve their welfare more significantly.

d) By improving the risk profile that NDC plans offer their members. It is well established that young workers have more flexibility in the allocation of time between leisure and covered paid work, than older workers and pensioners. This is because if a shock reduces their financial wealth, and they choose to work more hours as part of the adjustment, the adjustment can be spread out over a long time period and thus reduced utility by less than in the case of older workers. However, a financially stable NDC plans must pay variable annuities, subjecting the old to the risk of fluctuations in their consumption level. More generally, the DC risk-allocation rule with a single portfolio allocates risk in proportion to notional account balances, and these balances are highest for people in the 55-70 years of age range. They are not the most risk tolerant of members, so the DC risk allocation is inefficient.

The solution in funded DC finance is to have different asset portfolios to back the pension promises of different cohorts. The plan is allowed to divide its assets among different "cohorts" of members, indexed by the year in which they plan to start a pension. The commitments towards each cohort are backed by a portfolio of assets whose risk caters to the risk tolerance of each one of them. It is likely that the best portfolio for pensioners will be almost fully invested in wage bill bonds, with just small amounts invested in equities and traditional bonds.

The endowment of a young worker is made up almost exclusively by human capital. Merton (1983) proved that when this human capital is not tradable, the young are forced to absorb too much human capital risk. If they could trade - and they could under this proposal - the optimal portfolio for young workers would include short sales of wage bill bonds, which would be purchased by the older cohorts. The young would acquire participation in physical capital (equities, corporate bonds and real estate) with the proceeds of these short sales. Thus, the funding of NDC plan would allow currently prohibited financial trades between plan members of different generations, improving welfare.

e) By improving the governance of pension policy. In some but by no means all countries, the transformation into a funded DC plan may allow a reduction of some political risks due to greater transparency. Contrary to standard portfolio theory, a partially funded NDC plan does not *own* the hidden asset. The hidden asset is available to the plan only because the state imposes participation to the members. However, the sovereign power of a state means that future legislation is difficult to constrain, and future legislation may take away the tax farm that created the hidden asset in the first place. Of course, there are substantial political promises and reputations involved in pension plans where participation is mandatory. If those plans become insolvent, some financial support is likely to be granted to them by the authorities, at taxpayers expense. Still, historical experience suggests that this support may be only partial, specially in emerging countries and in those where the political process is not adept at long-range planning.

Assets protected by property rights are also constrained by the future taxes a sovereign state may impose, which effectively may also take away assets protected by property rights. However, in constitutional states there can be a large difference of degree between these two cases. Taking away a tax farm that was effectively a donation is legally different from taxing an asset, because in the latter case uniform rules and rates must be used to avoid discrimination objections. This means that to tax financial assets owned by a partially funded NDC plan, the state must tax also other owners of similar assets, such as life insurance companies and occupational pension plans. A tax that is narrowly focused on NDC plans alone can be deemed unconstitutional by the courts. Thus, the point stands that on legal and political grounds, the risk profile of the hidden asset is quite different from the risk profile of financial assets.

The question arises on how far should a prudent investor such as a pension plan, be willing to purchase assets not protected by property rights. Such assets may be subject to "political bets": revenue may rise if new grants are obtained, but it may fall in the opposite case. Protecting pension plans with property rights would eliminate some of these bets - in

the set of states of nature where the state is not insolvent nor desperate to tax anything. Bad policies adopted under stress or by inertia would be less likely to affect plan members. Another difference made by property rights is that the policy decisions regarding pension finance would be much more transparent, as more financial information would be freely produced by the plan managers and the financial markets. Higher transparency in these matters could help, in some countries, to more responsible policy making, raising welfare in this way too.

In addition, this objection should be overcome in the same way as it is now for occupational pension plans: NDC plans should be required to issue audited quarterly balance sheets, to assure that the authorities and public opinion have the true economic picture. To the contrary, one should count as another defect of the two-mandatory-pillars institutional structure that the NDC pillar is not required to report a balance sheet on a timely basis, and rather relies on cash flow projections that are sensitive to assumptions that are not checked with the opinions of investors willing to put their money behind their words by trading wage bill risk²⁴. In some cases, the two-mandatory-pillars structure may allow a NDC plan that runs a cash surplus to be seen as financially secure, while in fact the plan may be insolvent on a balance sheet basis.

5. Possible costs of making the PAYG asset tradable

To assess the cost of making the PAYG asset tradable, this section uses again as benchmark alternative, a two-pillar mandatory system, where one pillar is funded and the other is not, remains for ever. To make the comparison valid, the paths for national saving and fiscal saving remain the same for both cases. To achieve this, we assume that the starting point is a two-pillar mandatory system, and the question is whether to make the PAYG asset in the payg-financed pillar tradable, and then merge it with the other pillar, which is a conventional DC funded pillar.

One important cost of this proposal is higher administrative charges.

But this can be controlled by restricting choice.

²⁴ The absence of a "market test" for projections is a major weakness in countries that have created an institutional structure to make and publish long-term cash-flow projections for the partially funded mandatory plan, such as the United States.

An important objection to the adoption of a DC risk allocation rule is that, in the conventional model, it allocates too much investment risk to older workers that own the largest accrued pension rights, and to pensioners that choose options such as programmed withdrawals, variable annuities and CREF annuities. Note that the risk for individual pensioners can be made quite low in the NDC plan newly endowed with property rights by allowing the plan to divide its assets among different "cohorts" of members, indexed by the expected decade or even year in which they plan to start a pension. The commitments towards each cohort could be backed with a different portfolio of assets, that caters to the risk tolerance of each one of them. It is likely that the best portfolio for pensioners will not be invested in equities at all, but rather in traditional bonds and in the revenue of the covered earnings tax. This standard method used in DC plans to reallocate risk optimally is discussed in more detail in section 4.

Another cost is that by failing to retire even a small portion of the public debt hidden in payg finance, it may fail to engage in intertemporal fiscal policy that is highly valuable in economies trapped in a low saving / low income equilibrium.

Only in instances where there exists a positive externality from increasing national saving (see below), there is a serious chance that *all or almost all* generations may gain from a tax-financed shift to funded finance in the pension plan²⁵.

One instance in which this externality may be present –likely in poorer economies, but also in the OECD according to conservative views – is where fiscal policy is badly run because of political externalities. Say that the model by Browning (1975) describes correctly the political incentives in a given country, which means that currently voting generations (or currently influential military commanders) are selfish as regards future generations and thus are in favor of increasing pension benefits and contribution rates at the same time (with payg finance) because this redistributes wealth towards them (or their supporters). In that setting, it is also attractive for politicians to run the pension plan

²⁵ I develop these ideas in chapters 10 and 11 of my textbook *Políticas y Mercados de Pensiones*, Ediciones Universidad Católica, 2002, Santiago, Chile, 930 pages.

in unbalanced payg style, i.e. promising benefits whose present value is way above the present value of contributions at current rates. It is likely that in such a political setting tax rates will also be biased against wage earnings (the young) and in favor of consumption (the old) by having VAT rates that are too low. The public debt is also likely to be too high, so the risk premium on the public debt may be large, say above 300 basis points per year, and inflation is likely to be or to have recently been a major revenue earner. This setting implies also a lot of informality because tax rates on formal sector employment are likely to be too high. Informality prevents firms from offering collateral, but this means that they lose access to bank credit, so those with the best projects cannot invest as they should. This setting implies low growth because of an excessive cost of capital (the risk premium) and inefficient allocation of the scarce existing saving (banks lend only to formal sector firms).

A tax-financed transition to increase funding non marginally, as the one proposed by Averting, may break this equilibrium, by forcing sounder fiscal policy and escaping the political externality²⁶. However, such a policy has to be introduced by stealth, because if politicians subject to the assumed incentives realize what is going on, they will also reject this pension reform. However, stealth is hardly a democratic way of making policy. Moreover, if politicians continue to be given the previously described incentives, they may foist specially high taxes on the new pension funds. In addition, respectable liberals in OECD countries consider that their countries are definitely not in the scenario described above, so they object to increases in funding.

I offer the following idea: make a distinction between *pension* policy and *development* policy. An analysis of the latter for a certain country may conclude that national saving should be stimulated. In that case, pension policy could be adapted to take into account this need, but it would not be presented is asked to shade into development policy: the development policy diagnosis should be comprehensive enough to discuss explicitly how the emerging pension funds will be protected from the political incentives that underlie that same diagnosis. In my view, the message in page 2, point (c) from Averting

²⁶ There may exist an alternative for some cases: making the plan assets tradable may scare the voters into mending their ways, by making the pension plan imbalance explicit. This seems to be the strategy of the OECD in Europe, where it regularly publishes the “hidden pension debts” of each country. However, the effectiveness of this alternative solution has not been investigated in detail.

was salient, but too imprecise to be accepted widely, and at some points quite misleading.

6. Concluding comments regarding Europe

It has been shown that the transition from NDC to full funding can be made instantaneously with zero impact on the fiscal position, by adequate relabeling of financial flows and astute granting of property rights. This proposal does not attempt to increase national saving nor to increase the capital-labor ratio of the economy, but rather attempts to distribute risk more efficiently.

This transition to funding appears particularly attractive in the European Union, where sovereign risk levels are comparable and where different national plans have attained diverse degrees of funding. There are at least four countries that have implemented full-fledged NDC mandatory plans. In addition, France and Germany have mandatory plans with points, which are not far from NDC. If these NDC plans chose to become funded, then they would place themselves on a par with many of the pension plans in the United Kingdom, Denmark, the Netherlands and Switzerland. These countries also have large number of DB occupational plans that would also engage in trade in the financial markets with these plans once the latter become funded. Thus, Europe would have almost ten countries in compatible pension schemes, facilitating unification.

It must be stressed that the proposed transition to funding does not reduce the freedom of any member state to modify the rate and the base of taxes on covered earnings. If Germany, say, considers that the now explicit tax on covered earnings is too high for the efficiency of its labor market and for mobility across Europe, it can decree a long-term program of purchases of wage bill bonds in the open financial market, financed with the proceeds of some alternative tax (say an increase in VAT rates), or by reducing expenditure in some other program deemed to be less urgent, or by selling state-owned assets. After purchase, those wage bill bonds would be cancelled and the tax rate on covered earnings would be cut. Thus, under this proposal individual governments retain the full rights to engage in welfare-improving tax policy in the future.

In the same way, the state retains the right to engage in intergenerational risk sharing. It can always do this by issuing more public debt when a specially needy generation arises, and paying off this debt over time when other more lucky generations become taxable (i.e. alive). Moreover, this approach to intergenerational risk sharing appears to be more transparent, and thus more germane to democratic governance, than the usual implicit sort that just a few specialists understand.

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