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PENSION REFORM, SAVINGS BEHAVIOR AND CORPORATE GOVERNANCE

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ABSTRACT

France, Germany and Italy, to take the three largest economies in continental Europe, have large and ailing pay-as-you-go public pension systems, very thin capital markets, and low capital performance. Taking Germany as an example, we show that these three issues are closely linked. Specifically, we argue that pension reform, via a change in portfolio composition of households and a strengthening of corporate governance through institutional investors, can have important beneficial side effects in terms of capital efficiency and total factor productivity. Discussions about pension reform should therefore be broader than the narrow debate on how to diffuse the future financial strain caused by population aging. We suggest that looking at pension reform and capital market problems together sheds additional and new light on the continuing debate about advantages and disadvantages of pay-as-you-go and fully funded pension systems.

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PENSION REFORM, SAVINGS BEHAVIOR AND CORPORATE GOVERNANCE

by Axel H. Börsch-Supan and Joachim K. Winter

1. Introduction

France, Germany and Italy, to take the three largest economies in continental Europe, have large pay-as-you-go public pension systems that face severe problems due to population aging. As computed by the International Monetary Fund (Chand and Jaeger, 1996), the size of the public pension systems as a percentage of GDP will increase by about 50 percent from 1995 to 2030 in France and in Italy, and almost double in Germany, if benefits will stay as they were in 1992, see Table 1. If the additional expenditures were financed solely by contributions, they will rise approximately in proportion. Expressed as a percentage of the wage bill, French workers would then pay 38 percent to their pension system in the year 2030 rather than 24 percent in 1995. In Germany, the contribution rate would rise to 41 percent, and in Italy even 62 percent of the wage bill. If the additional burden were financed solely by debt, it would exceed 100 percent of GDP in France, 115 percent in Germany, and even 180 percent in Italy by the year 2035. Similar numbers were published by the OECD (Rosevaere et al., 1996).

The main reason for the public pension problem, demographic change, is well known and has been documented extensively, e.g. OECD (1988) and World Bank (1994). Population aging will increase the number of beneficiaries per contributor, e.g. in Germany by about 100 percent. The demographic problems have been exacerbated by a strong decrease in labor force participation due to early retirement, unemployment, and a shift to jobs that escape social security taxation. This labor force participation decline can at least partially be attributed to the negative incentive effects of the public pension systems in these countries (Gruber and Wise, 1999; Schnabel, 1999a).

France, Germany and Italy also have very thin capital markets in the sense that only few households are direct owners of productive capital. French, German and Italian savers hold a considerable lower share of stocks than Anglo-Saxon households. As a result, stock market capitalization is low in these three countries. At the same time, the role share of pension funds is only minor, see Table 2.

Table 1: Public pension systems

	1995	2010	2030
France			
Pension expenditures (%GDP)	12.5	12.6	19.4
Equilibrium contribution rate ^a (% wage bill)	24.3	24.4	37.7
Fiscal deficit ^b (% wage bill)	0.5	0.6	100.5
Germany			
Pension expenditures (%GDP)	10.0	11.0	18.4
Equilibrium contribution rate ^a (% wage bill)	22.6	24.7	41.1
Fiscal deficit ^b (% wage bill)	(1.1) ^c	8.8	115.6
Italy			
Pension expenditures (%GDP)	16.0	15.2	23.3
Equilibrium contribution rate ^a (% wage bill)	42.6	40.4	61.9
Fiscal deficit ^b (% wage bill)	0	29.9	186.8

Notes: a) Contribution rate in percent of wage bill if increase in pension expenditures is financed solely by contributions. b) Deficit if increase in pension expenditures is solely financed by debt. c) Surplus.

Source: Chand and Jaeger (1996).

Table 2: Capital market features, 1996

	France	Germany	Italy	Netherlands	UK	U.S.
Stock market capitalization (%GDP) ^a	26.3	22.9	21.4	96.5	87.0	55.1
Share of stocks held by households and institutional investors (%) ^b	6.5	11.4	8.3	-	59.8	43.4
Size of pension funds (%GDP) ^c	4	3	4	92	77	62
Share of pension funds (%household assets) ^c	3	2	2	-	25	20

Sources: a) World Bank, 1998, Table 5.2; b) OECD Financial Accounts; c) Bank for International Settlements (1998), Table V.5.

Finally, France, Germany and Italy have low capital performance as measured by capital productivity and various rates of return. International comparisons of these statistics are difficult and controversial. Nevertheless, taking all the evidence together, a clear picture emerges which is summarized in Table 3. Companies in France and Germany have substantially lower capital productivity and return on investment than U.S. companies achieve. Many authors claim that an important cause for this underperformance is weak corporate governance

(see, e.g., Börsch-Supan 1999, Mueller and Yurtoglu 1998, Wenger and Kaserer 1997). The financial underperformance is correlated with total factor productivity, see last row of table 3.

Table 3: Capital performance (in percent of U.S. performance)

	France	Germany	Italy
Aggregate return on investment ^a	71	70	58
Mean return on investment (firm sample) ^b	64	59	40
Median return on investment (firm sample) ^b	78	82	51
Market sector capital productivity ^c	72	67	-
Total factor productivity ^d	82	81	84

Sources: a) Mueller and Yurtoglu (1998), Table 2. b) ditto, Table 5. c) Börsch-Supan (1999b), Table 3. d) C computed from Hall and Jones (1996), Table 9.

This paper proposes to study the three issues of pension reform, saving behavior and corporate governance together. The paper is not of the Introduction-Model-Results-Conclusions type. Unfortunately, research on these issues is not yet so far. Rather, the paper collects bits and pieces of suggestive evidence in order to set out a research agenda and to change the focus of the current debate on pension reform. The bits and pieces of suggestive evidence lend themselves to the interpretation that pension reform, via a change in portfolio composition of households and a strengthening of institutional investors, can have important beneficial side effects both in terms of capital efficiency and total factor productivity.

Consequently, we argue that discussions about pension reform should be much broader than the narrow debate on how to diffuse the future financial strain caused by population aging. Our line of argument is as follows. The lack of relatively aggressive pension funds in France, Germany and Italy has left corporate governance diffuse and thus lowered capital productivity. At the same time, few households in these countries hold financial assets with at least some minimal ownership rights. Those assets are highly concentrated among few households, much more so than in countries in which a substantial share of retirement income is financed through pension funds.¹ Pension reform towards a higher degree of prefunding can therefore strengthen corporate governance, increase capital productivity at constant or even increasing labor productivity, and therefore increase total factor productivity.

¹ We use the word pension fund in the literal sense and strictly distinguish it from unfunded (pay-as-you-go financed) pension systems.

The paper also sheds additional light on the ongoing debate of advantages and disadvantages of pay-as-you-go (PAYG) and fully funded (FF) pension systems. It is well known that in steady state funded pension systems are advantageous relative to PAYG pension systems whenever the interest rate exceeds the growth rate of the wage bill (Aaron 1966). The latter always holds unless the economy is dynamically inefficient. This is never the case if at least one factor of production is in finite supply, e.g. land (Homburg, 1990). Advantageous relative to a PAYG system means macroeconomically efficient in the sense that a funded pension system creates a higher capital stock which in turn increases output and consumption.

However, these well-known propositions are of little help for an economy which already has a PAYG pension system. Such an economy has to pay back its implicit debt (which had financed the first generation of beneficiaries) before being able to enjoy the advantages of a FF system. Paying back this implicit debt implies a consumption loss – the so-called transition burden. In a simple Solow economy with a fixed technology, the consumption loss due to the transition burden is exactly equal to the consumption gain that will be achieved through the higher capital stock in a FF pension system. This equivalence result goes back to Aaron (1966) and is most clearly stated in Pestieau (1996). The result also holds under more general conditions, e.g., when pension benefits must be financed by distorting payroll taxes that are in proportion to pension benefits (see Brunner 1994, 1996, and Fenge 1995, 1997).² There is a crucial condition for the equivalence result in these papers, namely a fixed technology. The point of this paper is that this condition will not hold under a fundamental pension reform. To the contrary: the production process in an economy will change when the pension system is altered from PAYG to FF. Specifically, following the line of argument given above, total factor productivity will increase due to tighter corporate governance. This opens the possibility for efficiency gains from a (partial) transition from PAYG to a FF pension system in spite of the transition burden.

The paper uses Germany as an example. It is a suitable example because Germany will have a particularly severe aging problem and because Germany is the country that gave the Rhine model of corporate governance its name. The paper is structured as follows. In Section 2, we sketch the pension problem in Germany, discuss its potential solutions, and compute the size of the capital stock generated by a realistic transition to a partially funded

² If the system is intragenerationally redistributive (i.e., benefits and contributions are not proportional within a given cohort), the equivalence result does not hold, and there are first order efficiency gains from a PAYG to FF transition, see Feld-

system. The potential magnitude of capital stock changes is an important factor as it shows the leverage of pension reform for changes in capital market structure and macroeconomic performance.

The sequel of the paper then explores how the German pension system has shaped the supply and the demand side of the German capital market. Section 3 delivers a picture of German households' saving behavior, in particular portfolio choice, links it to the pension system, and compares it to other countries and the situation after a transition to a partially funded system. In Section 4, we describe corporate governance in Germany and give evidence for its weak performance, again linking it to the omnipresent public pension system. We cannot predict how corporate governance in Germany will change if Germany were to move to a partially funded pension system because Germany has never experimented with funded pension systems since World War II. We therefore rely on international evidence to correlate pension funds with corporate governance. Section 5 summarizes and concludes.

2. Public pension reform in Germany

In this section, we show that Germany's public pension system faces severe problems, that these problem can hardly be solved within the current PAYG financing framework, and that a partial transition to a funded system is possible in a way that does not generate an excessive burden for the transition generation but will have sufficient leverage on the capital market to change corporate governance in Germany.

Germany has one of the typical contribution-based PAYG systems that are the dominant financing mechanisms of old-age social security around the globe (Gruber and Wise, 1999). The German system is very monolithical, covering almost all workers and providing almost all retirement income in a single system with relatively transparent rules.³ Until recently, it has been successful in providing a high and reliable level of retirement income. It has survived two major wars, a major depression, and more recently, unification.

However, times have changed, and a flurry of reforms since 1992 has not succeeded in stabilizing contribution rates, public support, and system enrollment. In addition to matura-

stein and Samwick (1998) and Kotlikoff (1998). We separate distortions created by intragenerational redistribution in the pension system from the core of the PAYG-FF transition debate because they can easily be offset by other taxation.

³ For a detailed description of the system, see Börsch-Supan and Schnabel (1999). A critical evaluation of the micro- and macroeconomic features of the German public pension system can be found in Börsch-Supan (1999a).

tion,⁴ there are two main reasons for the increasing difficulties of the German public pension system: negative incentive effects on labor supply and the problems of demographic change mentioned in the introduction. Both problems are easier to address with a higher extent of prefunding.

Negative incentive effects

Negative incentive effects on labor supply are created by the lack of actuarial fairness in the German PAYG pension system. This has been described in detail by Börsch-Supan and Schnabel (1999). The German social security system tilts the retirement decision heavily towards the earliest retirement age applicable because the failure to adjust benefits in an actuarially fair manner creates a loss in unfunded social security wealth when a worker postpones retirement. This loss is large relative to the labor income that could be earned when working longer and exceeds 50 percent of the latter.⁵ It will still be in excess of 20 percent in 2004 when the 1992 pension reform will have been phased in.

The resulting effect on early retirement has been estimated by several formal econometric analyses (Börsch-Supan, 1992; Schmidt, 1995; Siddiqui, 1997; Börsch-Supan, 1998b). The estimated reduction in the average retirement age ranges from 2.5 to 3.5 years. Since average life expectancy of a male worker at age 60 is about 18 years, the earlier retirement age amounts to an increase in pension expenditures of about 17 percent. The effect is smaller, but still significant, for women.

Similar incentive effects exist in almost all PAYG systems in the industrialized countries (Gruber and Wise, 1999) and are often even stronger in developing countries (Börsch-Supan, Palacios and Tumbarello, 1999). Actuarial fairness is not easy to achieve in a defined benefit system such as PAYG pension systems because it requires a forecast of life expectancy one generation ahead. Moreover, adjustments to the relation between benefits and contributions are subject to the political process, and many studies have shown that this process is typically dominated by the beneficiaries at the expense of the contributors (Browning, 1985; Verbon, 1988), making actuarial fairness hard to achieve in practice.

⁴ The German public pension system reached maturity only very recently. The German retirement insurance was a fully-funded system until one generation ago. During the Great Depression and after World War II, the capital stock of the retirement insurance was severely eroded. After a long and arduous debate, the German Bundestag decided in 1957 to convert the system gradually to a pay-as-you-go scheme. The remainder of the capital stock was spent by 1967. Since then, the German system is purely pay-as-you-go with a small reserve that is about one month of expenditures in early 1999.

⁵ Change in present discounted value of pension wealth when postponing retirement by one year, divided by net earnings.

The German public pension system also exerts other important incentive effects, most notably on private retirement saving. German public pensions have a high replacement rate, generating net retirement incomes that are currently about 70 percent of pre-retirement net earnings.⁶ This is substantially higher than, e.g., the corresponding United States net replacement rate of about 53 percent. In addition, the German retirement insurance system provides generous survivor benefits that constitute a substantial proportion of total unfunded pension wealth, and disability benefits at similar and sometimes even higher replacement levels than old-age pensions. As a result, public pensions are by far the largest pillar of retirement income and constitute more than 80 percent of the income of households headed by persons aged 65 and older, while funded retirement income, such as asset income from private saving or firm pensions in which the employer saves on behalf of the worker, plays a much smaller role than, e.g., in the Netherlands or the Anglo-Saxon countries.

Population aging

Population aging is particularly severe in Germany. According to Bos et al. (1994), the proportion of German elderly will increase from 21 percent in 1995 to 36 percent in the year 2035, the highest share among the industrialized countries. While the OECD projects an increase from 20.6 percent in 1990 to 39.2 percent in 2030 for its European member countries, the German old age dependency ratio will far more than double from 21.7 percent in 1990 to 49.2 percent in 2030.⁷ As a consequence, the German social security contribution rate, 20.3 percent of gross income at the beginning of 1999, would reach about 32 percent of gross income at the peak of population aging in 2035 if the current replacement rate were maintained and the current age-specific labor force participation rates would remain as they are now (Börsch-Supan, 1998a).⁸ Official estimates range between 26 percent and 29 percent, assuming considerable adaptation of the retirement age, the replacement rate, female labor force participation, an optimistic view about future labor demand, and a pessimistic view about the development of life expectancy.⁹

⁶ This replacement rate is defined as the current pension of a retiree with a 45-year average earnings history divided by the current average earnings of all dependently employed workers. This concept is different from the replacement rate relative to the most recent earnings because these are usually higher than the life-time average.

⁷ OECD, based on World Bank projection by Bos et al. (1994). The OECD dependency ratio relates persons age 65 and older to persons between ages 15 and 64. Very similar projections for Germany in Bundesministerium des Innern (1996).

⁸ These estimates are considerably lower than the IMF estimates in table 1 for various reasons. Two reasons are important. First, almost 25 percent of pension benefits are paid by general taxes included in table 1 but are not contributions. Second, table 1 does not account for pension reforms enacted after 1992 that reduced benefits.

⁹ Prognos (1995, 1998).

Population aging is therefore a serious threat to the stability of the German public pension system, and particularly so because the share of social contributions in total labor compensation is already about 50 percent and is viewed as an obstacle to German competitiveness. Reforms are currently concentrated on changes within the financing framework of the current PAYG system. We will discuss such parametric reforms first and then direct our attention to a more fundamental reform because we will see that no single policy change within the financing framework of the current PAYG system can keep the contribution rate at its current (already high) level without severely reducing benefits.

Parametric reform

An increase in the retirement age is the most powerful route to simultaneously increasing the number of contributors and decreasing the number of beneficiaries. In light of a prolonged life span, increasing the active part of it appears to be a rather natural option. Current retirement age is rather low in Germany, about age 59.5 in 1998. Several changes in the law and its implementing statutes in the wake of the 1992 pension reform attempts to change this. First, the window of early retirement will be shifted by 2 years. Second, normal retirement age will be age 65 for all workers, raising it by 5 years for women. Third, disability requirements have been tightened. Official estimates put the induced change in retirement age at about 3 years.¹⁰

While all this might help, there are two important caveats. First, it is by no means clear that legislative changes translate in actual behavior. Although the reaction to a decrease in the legal early retirement age has been impressively quick (see Börsch-Supan and Schnabel, 1998), the elasticity with respect to easing a system does not need to be symmetric to the one when the system is tightened. Prognos (1998) assumes that a third of the workers will escape to disability. This may well be an underestimate as disability has over and again proved to be a door that is hard to close, e.g. in the Netherlands and the United States. The high uptake of disability before flexible retirement was introduced in 1972 points out that this may happen again also in Germany.

Second, a shift in the average retirement age by a few years will not suffice to stabilize the contribution rate. In order to fully compensate for the effects of population aging, the av-

¹⁰ Implicit in Prognos (1998) and Hain and Müller (1998).

erage retirement age has to increase by about 9.5 years to age 69.¹¹ This is a huge shift into ages in which morbidity is increasing and productivity decreasing, and a shift that presupposes a sufficiently flexible labor market in order to absorb the additional labor supply.

An increase in female labor force participation is another frequently mentioned mechanism that might help to reduce the retirement burden. Again, there are several drawbacks. First, increasing female labor force participation is not a trivial policy exercise and requires structural changes in German daily life. Second, the effect is small and temporary. Even if female labor force participation would reach the level of male labor force participation within the next decade, the social security contribution rate in 2035 would be reduced by only about a third. The effect will only be temporary because the additional female workers will eventually claim pensions, equalizing the ratio of beneficiaries to contributors by about the year 2050 to the ratio that prevailed before the change in female labor force participation. Finally, the additional labor must substitute leisure to be a genuine enlargement of the labor force. If instead non-market (household) labor is only relabeled as market labor, the change is simply a contribution increase for two-worker households.

Migration is another potentially powerful mechanism to alleviate the effects of population aging. In theory, the influx of young immigrants can fully compensate for population aging. In practice, this policy faces a host of problems. First and again, the domestic labor market has to be sufficiently flexible to absorb immigrant workers and provide the necessary training. Given the current high unemployment rates, there is a serious short-run limitation on absorption. Second, the numbers have to work out. To fully compensate for population aging in Germany, about 800,000 persons (workers and family) have to immigrate annually into Germany from now on through the year 2035, assuming the current age structure of immigrants which are on average about ten years younger than the resident population. 800,000 persons are about 2.5 times the current net immigration which is already high in international standards.

Finally, the projected increase in the contribution rate could be offset by an equiproportional decrease in the replacement rate. This partial default on benefit promises would reduce the net replacement rate to about 47 percent of net wages. Since retirees will most probably not be content with such a significantly lower retirement income and are likely to fill

¹¹ Börsch-Supan (1998), based on simulations with a detailed demographic and employment projection model.

the resulting pension gap by their own savings, such a reduction would be a disguised step in the direction of a funded pension system.

Because no single policy instrument within the PAYG financing framework can stabilize the contribution rate to the German public pension system if the current generosity of benefits were maintained, the current policy in Germany adds many patches to the current system in a piecemeal approach that is exemplified by the 1992 and 1999 reforms and the many small modifications in between. These fixes include downsizing the system by decreasing benefits, increasing the retirement age, tightening the eligibility for disability pensions, and hoping for an increase in female labor force participation and some help from migration. As pointed out, these fixes require considerable additional absorption in the labor market and nevertheless include a partial default on benefit promises.

There is an additional and more fundamental problem with simply patching up the current PAYG system. The patches aimed at stabilizing the contribution rate massively reduce the implicit rate of return of the PAYG system. If the reforms and modifications between 1992 and 1999 were successfully enacted, benefits will be reduced by more than 10 percent while contributions will increase to about 25 percent of gross wages (Prognos, 1998, assuming that induced increase in labor supply will be completely absorbed in the labor market). Lowering benefits and at the same time increasing contributions will make the PAYG system less attractive, and thereby increases the incentives to evade from the system. The stabilizing patches thus in itself are potentially destabilizing by decreasing the contribution base.

Schnabel (1998) has computed projected internal rates of return of the German pension system. He related the flow of life-time contributions of a worker to the flow of expected pension and computed the rate of return that equalizes the present values of both flows. Workers who retired ten years ago received an implicit return on their contributions of 3.5 percent in real terms.¹² This may be considered adequate. Since then, the rate of return has sharply decreased. The cohort born in 1945 receives a real return of only 1.8 percent. The real rate of return for the 1980 cohort which retires around the year 2040 are about 0.3 percent if age-specific employment rates remain constant and increases in life expectancy will be modest. If instead life expectancy increases at the same pace as it has during the previous decade, real returns will become negative.

¹² More precisely: return of the cohort born in 1930.

Fundamental pension reform

The expected low rates of return of a patched-up PAYG system make more decisive steps towards prefunding not only economically but also politically attractive. However, not the entire PAYG system can be funded. Nevertheless, since the Bismarckian German public pension system has comparably few redistributive features and a relatively large share of the system is actual insurance, it is easier to privatize than Beveridgian systems such as the UK pension system. Estimates of the share of pensions that are pure transfers range between 20 to 40 percent (mainly topped-up pensions by a minimum retirement income mechanism and pension points earned while in education or while raising children), leaving 60-80 percent of pensions available for potential privatization in a multipillar system. There are also other reasons to be conservative in the degree of prefunding. PAYG systems have a built-in insurance against inflation and secular capital market failures. Since Germany has experienced the disastrous effects of hyperinflation and stock market crashes in a rather dramatic way, Germans are probably willing to pay a high premium for this insurance, reflected in poor rates of return.

The transition costs to a degree of prefunding that might be palatable to the German public, say 50 percent, are relatively modest, even if they are burdened onto a single generation. Börsch-Supan (1999c) proposes a scheme in which, ten years after announcement of the transition, each cohort finances a linearly increasing share of pension income by prefunding. This scheme does not resort to recognition bonds or similar devices that stretch the transition costs over several generations as, e.g., proposed by Feldstein and Samwick (1998). The transition costs are in the order of 2 percent of gross income, thus considerably smaller than the expected increase in the contribution rate if the PAYG system were maintained at its current generosity which is estimated to be at least 12 percent, from currently 20.3 percent to roughly 32 percent at the year 2035. Benefits from the transition accrue for cohorts born after 1980 who will then face a much reduced contribution rate of about 20 percent.

The capital stock needed to finance 50 percent of current retirement income depends on the rate of return on the capital market, and ranges from about DM 130,000 to DM 150,000 per worker (including disability and survivor insurance at current probabilities) for a 4.0 percent and 5.5 percent real rate of return.¹³ The number of retirees, currently about 17 million, will increase to about 20 million retirees in the year 2010 and peak at slightly above 25 mil-

lion in the year 2035, see Table 4. This adds up to a total capital stock invested in pension funds of between DM 3-4 trillion, which is about one third of the current stock of gross fixed capital. There may be some substitution from other savings to retirement savings, but it is unlikely that this substitution is large since a substantial part of German saving appears to be saving for homeownership which is unlikely to change much. Precautionary saving may even increase, while saving for intergenerational transfers is more likely to decrease in response to introducing a higher degree of self-provided retirement income. In any case, the share of pension funds in total productive capital would become substantial (and even larger under substitution) and is sufficiently large to change to nature of Germany's capital markets.

Table 4: Partial transition to a funded system in Germany

	1998	2010	2020	2030	2040	2050
Number of pensioners (million)	17.0	19.9	22.5	24.8	24.7	23.7
Contribution rate under current PAYG system (1992 legislation)	20.3	23.0	26.2	30.3	32.0	33.0
Contribution rate to PAYG part of system under 50% transition	20.3	22.9	24.4	24.5	23.1	21.7
Saving to funded part of system as percent of gross earnings	0	3.2	2.8	2.3	2.1	2.1
Resulting capital stock for worker retiring this year (in 1999 Euro)	0	6,800	40,900	68,000	68,000	68,000
Total capital stock in pension funds as percent of GDP	3	11	55	97	96	92

Source: Authors' calculations, based on model detailed in Börsch-Supan (1999c). Calculation assumes a 5.0 percent rate of return. The transition is announced on 1.1.1999 and starts on 1.1.2009, proceeding by 1/40 of the partial transition each year from 2009 to 2049. Amounts in last two rows are based on 1998 GDP, assuming that productivity growth equals consumption growth.

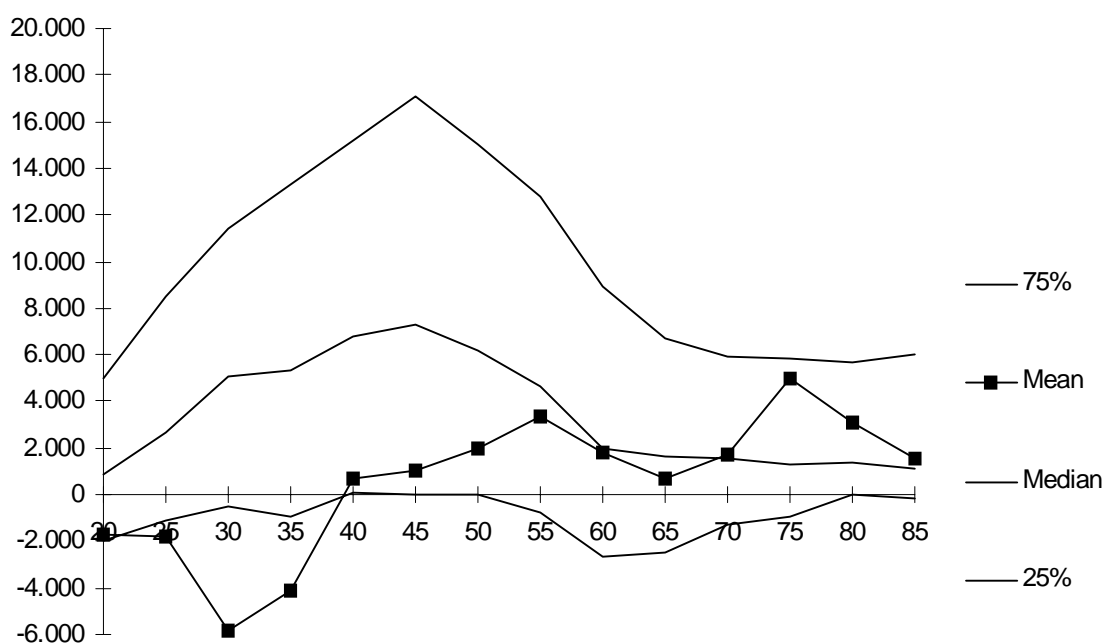
3. Saving Behavior in Germany

This section investigates the supply side of the capital market and delivers a picture of German households' saving behavior. It argues that the observed savings patterns are strongly influenced by the current public pension system. By the same token, we anticipate a distinct

¹³ The real rate of return for government bonds during the last 20 years was about 4.2 percent (Deutsches Institut für Altersvorsorge 1998). The real rate of return of a portfolio of all assets that entered the German business sector 1975-1994 was 7.4 percent, see Figure 5.

change in savings patterns in Germany if the German public pension system were to be reformed in a fundamental sense as outlined in the previous section. In particular, a (partial) transition to a funded pension system is likely to change how saving is related to age and how households select their portfolios.

Figure 1: Financial saving by age group, Germany, 1993



Note: Household data from the Einkommens- und Verbrauchsstichprobe (EVS). All figures in DM.

Source: Börsch-Supan et al. (1999).

Life-cycle saving patterns

Börsch-Supan, Reil-Held, Rodepeter, Schnabel and Winter (1999) have analyzed saving and consumption patterns of German households, using data from the Einkommens- und Verbrauchsstichprobe (EVS), the equivalent of the U.S. Consumer expenditure survey. Their central finding is that observed age-consumption profiles are very different from those predicted by the pure life-cycle theory.¹⁴ This can be seen from Figure 1 which shows, by age group, financial saving in the 1993 wave of the EVS.¹⁵ The striking difference between mean

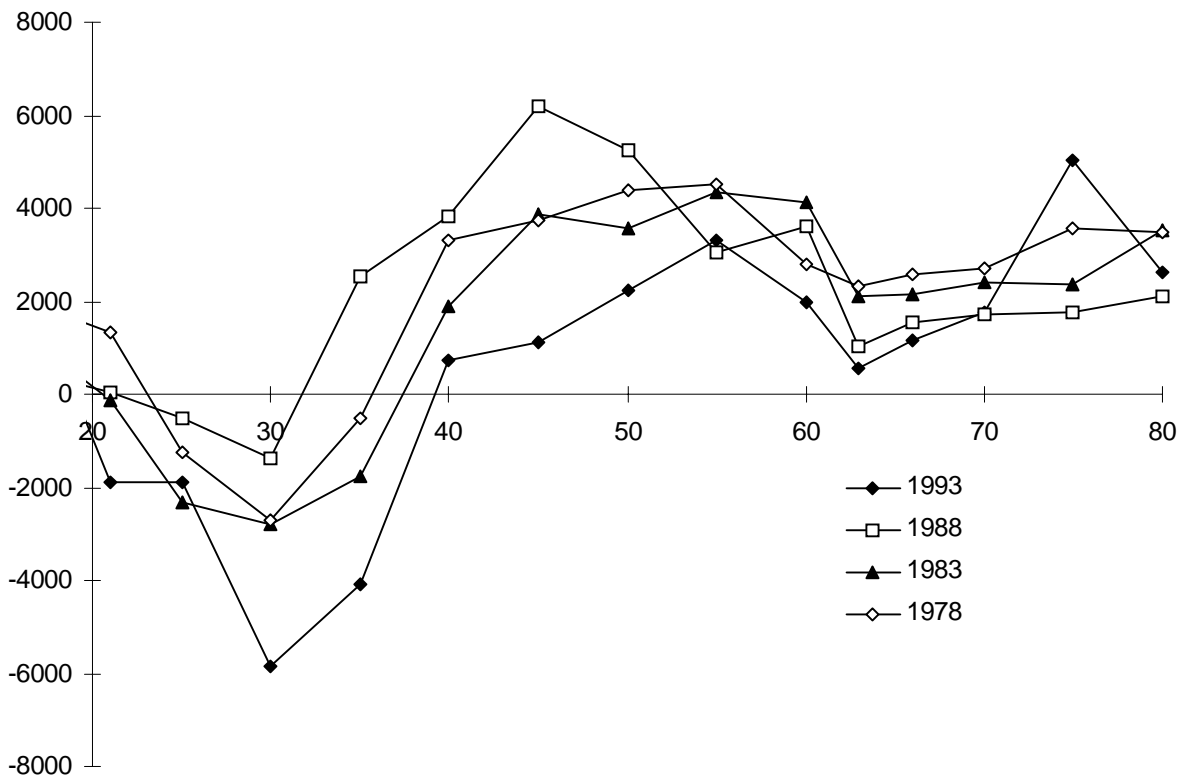
¹⁴ Similar results have been obtained earlier by Stahl and Börsch-Supan (1991) and Börsch-Supan (1992), using the 1978 and 1983 waves of the EVS. They focused on saving and consumption decisions of the elderly.

¹⁵ Financial saving is defined as the sum of deposits into, less withdrawals from, savings account, mutual money market accounts, and other money-like investements; net purchases of bonds; net purchases of stocks; net contributions to whole life insurance; contributions to dedicated savings plans (such as building societies, individual health care accounts, etc); volun-

and median saving, and the hump-shaped age pattern (in particular for the median and the third quartile) are the main features of the data.

One might argue that the cross-sectional results depicted in Figure 1 are confounded by cohort effects. However, Figure 2 which picks the 1993 mean profile and adds those from the earlier waves, shows that the life-cycle shapes remain roughly similar. In particular, there is no significant negative saving in retirement, in stark contrast to the predictions of life-cycle models. The sample covered by the EVS does not include the elderly living in institutions, so there might be a bias towards households which are less likely to dissave. However, Börsch-Supan (1992) shows that this bias cannot explain the observed pattern at the prevailing rates of institutionalization.

Figure 2: Financial saving by age group, Germany, 1978-1993



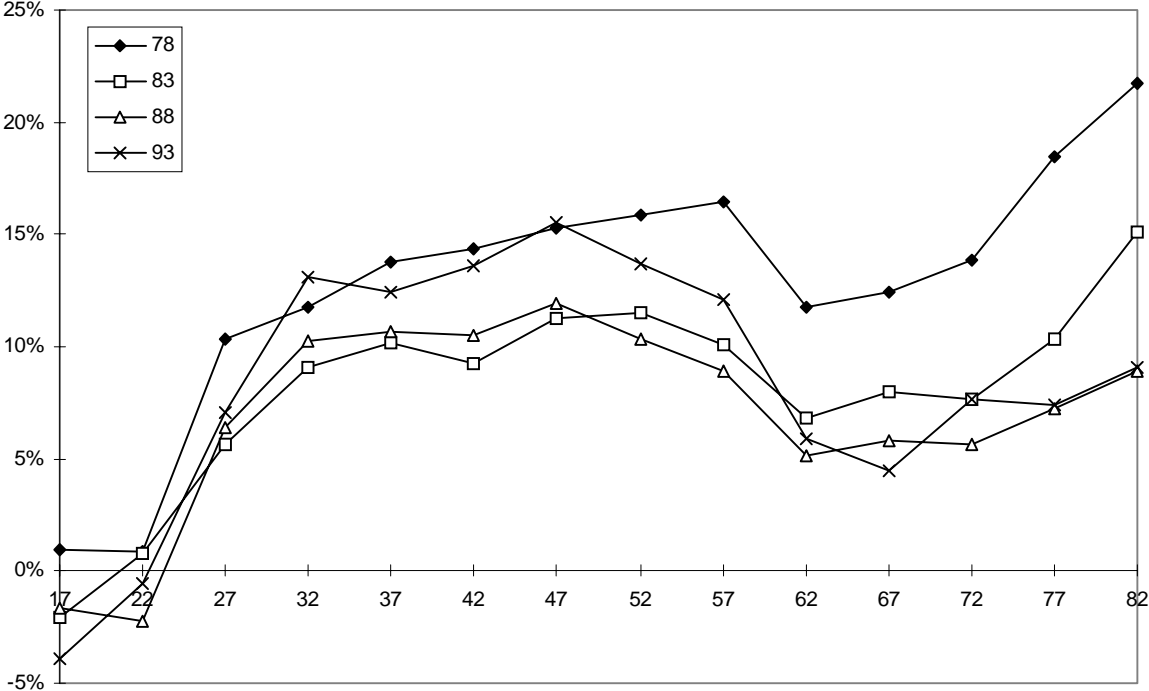
Note: Household data from EVS, waves 1978-1993. All figures in DM and in 1993 prices.

Source: Börsch-Supan et al. (1999).

tary contributions to individual retirement accounts and pension funds; and the net change in consumer loans. Adding real saving (notably housing wealth) does not alter the qualitative picture because housing equity is not reduced in old age. In particular, total saving is positive for all age groups, except for the lower quartile. See Börsch-Supan et al. (1999) for details.

The absence of negative saving during retirement can be seen even more clearly by looking at saving rates (i.e., the ratio of total saving and income, where total saving is based on the residual of income and expenditures in each year). Because mean saving rates are very sensitive to measurement error, we report median saving rates, again taken from the four EVS waves 1978–1993, see Figure 3. The hump-shaped life-cycle pattern disappears almost completely, and saving rates remain positive, and even increase, in retirement.¹⁶

Figure 3: Saving rates by age group, Germany, 1978–1993



Note: Household data from the Einkommens- und Verbrauchsstichprobe (EVS).
Source: Börsch-Supan et al. (1999).

There are several explanations for what might be called the German old-age saving puzzle, all linked to the pension system. First and foremost, the high replacement rates of the German public pension system make additional private retirement income largely unnecessary as pointed out in Section 2. Thus, saving for retirement, the only motive under the pure life-cycle hypothesis, cannot be the main savings motive in Germany. In fact, Schnabel (1999b) shows that in Germany retirement is not a time of scarce resources for current generations of pensioners. Rather, due to rising productivity and double indexation of pensions to gross

¹⁶ This effect is somewhat weaker if we compute savings based on flow measures, but saving rates still remain positive throughout the life cycle.

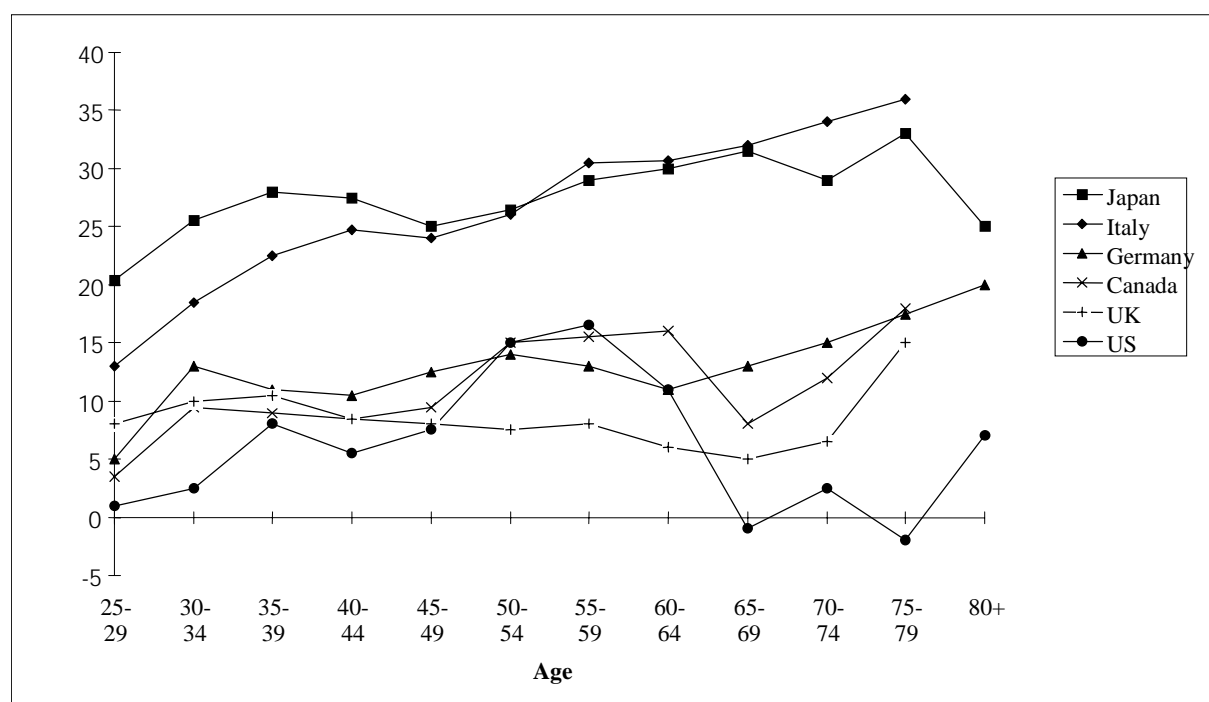
wages, retirement income has been above average income during working life for cohorts born before 1930.¹⁷ If other saving motives, such as precaution and intergenerational transfers, are more important than retirement saving, age-saving profiles are likely to be much flatter than under the pure life-cycle hypotheses. Indeed, Börsch-Supan and Stahl (1991), Börsch-Supan (1992), and Schnabel (1999b) find that after retirement, consumption remains low and there are high inter vivos transfers as well as positive savings.

Börsch-Supan and Stahl (1991) provide a complementary explanation. They argue that due to deteriorating health conditions, the elderly are simply less able to spend as much as they would need to make saving negative. Again, root cause is the high annuitized pension income which cannot be borrowed against even if the decline in health were anticipated.

While it may be suggestive and plausible that the deviations of saving patterns in Germany from those predicted by the life-cycle hypothesis are generated by the omnipresent German public pension system, the argument is vulnerable because we lack a counterfactual. International comparisons across countries with differing mixtures of PAYG and funded pension systems might help to overcome this problem, but comparable saving data is scarce due to the many measurement problems in international comparisons. The volume edited by Poterba (1994) provides cross sectional data for six OECD countries, see Figure 4, which suggest that the hump-shaped life-cycle savings pattern is most pronounced in the U.S. and Canada where the replacement rates of the public PAYG pension systems are lower than in continental Europe.

¹⁷ This holds for (equivalized) household income and even more so for per capita income.

Figure 4: Saving rates by age group, 6 OECD countries



Note: Household savings as percentage of disposable household income.

Source: Assembled from Poterba (1994).

If most of the high saving in retirement that is currently observed in Germany is caused by the (in part unexpectedly) generous retirement benefits from the PAYG pension system due to the rapid growth of the economy in the post-war period, we should expect changes in saving patterns in the future. Growth rates have declined and the dependency ratio is deteriorating rapidly. As described in Section 2, this implies that the current generosity of the PAYG system is unlikely to prevail. This will revive the retirement motive for saving. Hence, saving rates among the young will increase to accumulate retirement savings, and saving rates among the elderly will decline sharply, because they will dissolve their retirement savings.

Portfolio composition

The German PAYG public pension system appears also to have shaped the composition of household financial wealth. Table 5 displays portfolio choice in the 1993 wave of the EVS. The important role of whole life insurance as a part of saving for retirement can be seen from the fact that in 1993, its share in total financial wealth was about a third. The central reason for the important role of whole life insurance in German households life-cycle savings decisions is its favorable tax treatment (see Brunsbach and Lang, 1998, and Walliser and Winter, 1999). At the household level, saving in whole life insurance is more important than

saving in stocks and bonds.¹⁸ This fact is also significant for financial markets, as life-insurance companies are not allowed to invest significantly in stocks, see Section 4, which in turn is one of the main reasons for thin capital markets in Germany (see Deutsche Bank Research, 1996).

Table 5: Composition of household wealth, Germany, 1978–1993

	1978	1983	1988	1993	
Savings accounts	15.534	12.224	13.287	11.120	17.5%
Building societies	6.225	5.957	4.998	4.744	7.5%
Stocks and bonds	7.430	8.957	10.381	19.948	31.4%
Life insurance (cash value)	16.719	16.821	22.379	21.141	33.3%
Other financial wealth	-	1.811	1.784	6.614	10.4%
Gross financial wealth	45.909	45.770	52.830	63.567	100.0%
./. consumer loans	23.043	28,859	30.266	35.055	
Net financial wealth	22.866	16.912	22.563	28.512	

Note: Household data from the Einkommens- und Verbrauchsstichprobe (EVS). All figures in DM and in 1993 prices.

Source: Börsch-Supan et al. (1999).

It is highly speculative how this portfolio composition would change under a partial transition to prefunding as suggested at the end of Section 2. If there were no substitution between new retirement saving and current saving, the household saving rate would increase by between 2 and 3 percent, see Table 4. If all of this would be channeled into pension funds, which only recently have been introduced in Germany and still do not receive preferential tax treatment similar to whole life insurance, pension funds would amount to between 15 and 18 percent of households' portfolios, comparable to the United Kingdom, the U.S., the Netherlands and Switzerland, see Table 6 in the next section. Substitution between new retirement saving and current saving would increase this share, but part of new retirement saving may also be done as whole life insurance. Households' direct and indirect exposure to stock markets then depends on future investment decisions of life insurance companies who only recently began to increase their portfolio share of stocks. Judging from the international experience in countries as diverse as the United Kingdom, the U.S., the Netherlands and Switzerland, a more prominent role of equities on the supply side of the capital markets seems very

¹⁸ The majority of stocks and bonds are bonds. Stocks are less than 10 percent of the average household portfolio.

likely when more of the German retirement income will be prefunded. The next section therefore looks at the implications for the demand side of the capital market.

4. Corporate governance and pension funds in Germany

The central problem of corporate governance is the alignment of managerial goals with the interests of the owners who hold the capital.¹⁹ In this section, we argue that a higher share of pension funds in an economy is likely to strengthen corporate governance in the production sector, with resulting higher returns to investors and higher total factor productivity.

Our argument proceeds in three steps. We first show that capital ownership structures in Germany are particularly diluted by cross holdings of banks and non-financial companies and quite different from the pattern of ownership in countries in which pension funds manage a major share of the capital. Second, we link corporate governance and ownership to firm performance as measured by productivity and rates of return. Third, we use international evidence to link the size of pension funds to productivity.

Ownership structures

Owners of capital are ultimately households (and the state) but industrial cross holdings and bank ownership dilute this link. This dilution is particularly pronounced in Germany: German households and institutional investors on behalf of households hold a very low share of productive capital. The corresponding share is 11.4 percent in Germany while it is 59.8 percent in the United Kingdom and 43.4 percent in the U.S., respectively. In turn, crossholdings of German banks and non-financial companies are very large in comparison to the Anglo-Saxon countries. 46.8 percent of all shares (measured as gross capitalization) are held by banks and non-financial companies while this share is only 1.5 percent in the United Kingdom and 2.5 percent in the U.S., mainly due to legal restrictions. Wenger and Kaserer (1997) estimate cross holdings to be at least 27 percent of gross capitalization in 1994 and presumably much more.²⁰

¹⁹ See Shleifer and Vishny (1997) for a review of corporate governance issues.

²⁰ Wenger and Kaserer (1997), p.41.

Table 6: Pension fund assets

	1980	1985	1990	1993	1996		
	bn \$				bn \$	% GDP	% HH Assets
United States	701	1,606	2,492	3,449	4,752	62	20
Japan	-	-	343 ^c	460	442	10	4
Deutschland	15	22	52	47	65	3	2
Italien	-	-	39	34	43	4 ^a	2
United Kingdom	116	224	537	682	897	77	25
Canada	42	75	165	187	242	40	20
Australien	-	45 ^d	45	78	100	29 ^a	22
Niederlande	77	105	230	262	363	92	-
Schweiz	-	107 ^e	138	148 ^f	189	73 ^b	-
Schweden	-	-	79	71	93	40	38

Notes: a) 1995, b)1994, c)1991, d)1998, e)1987, f)1992.

Source: Bank for International Settlements (1998), Table V.5.

Among institutional investors, pension funds play only a minor role in Germany's capital market. As reported by the Bank for International Settlements (1998), pension fund assets represented only 3 percent of total GDP in Germany, while in the U.S. and the U.K., the shares are 57 percent and 77 percent, respectively, see Table 6. Deutsche Bank Research (1996) provides similar numbers. There are two main reasons for this. First, and most importantly, the majority of pension income is provided by the public PAYG pension system, as has been described in Section 2. Thus, few households invest in pension funds in the first place. Second, mainly due to tax advantages, individual retirement saving is channeled into whole life insurance, see Section 3. Life insurance companies are legally barred from investing more than a small part of their portfolios in stocks – up to about 30 percent of assets for traditional whole life insurance according to life insurance regulations, but much less in practice.²¹ Finally, assets that are accumulated for funded firm pension schemes are currently not invested in the capital market, but are set aside as capital reserves in firms' balance sheets, again because of legal and tax reasons.

²¹ Insurance companies have started to offer other life-insurance products which allow heavy investment in risky assets such as stocks in recent years, but until now, they claim only a small share of the market.

As a result, Germany has few institutional investors and stock market capitalization is very low by international standards, see Table 2 above. The low capitalization is strengthened because Germany also provides less venture capital than other countries, in particular the United States and the United Kingdom, where pension funds provide most venture capital.

Ownership, corporate governance, and firm performance

The pattern of capital ownership in Germany – a small role for households and institutional investors, and a large role of banks and industrial cross holdings – presumably affects corporate governance in Germany. Reviews can be found in Baums (1994), Edwards and Fischer (1994), Franks and Mayer (1995), Hellwig (1997), and Becht and Boehmer (1999). These papers agree that control rights of German firms are highly concentrated. Becht and Boehmer (1999) report that 85 percent of all publicly traded firms have a dominant shareholder who controls more than 25 percent of the voting rights, in most cases a bank or a non-financial company. This control is pronounced by the German proxy voting system which gives the banking system convenient access to the votes of the dispersed owners in the general shareholder meetings.

There is less agreement on the impact of the concentrated ownership of shares by banks and non-financial companies on firm performance.²² In a competitive capital market, institutional investors such as pension funds may play a major role in disciplining management and improving corporate governance. Competing pension funds need to offer high rates of return to their clients because clients will switch to better performing funds. However, this may lead to short-term considerations that compromise long-term performance. Porter's (1992) seminal criticism of the U.S. corporate governance system concentrates on this point and recommends several steps towards the German system, in particular a move to universal banking that is a main reason for the extent of cross holdings in Germany. Moreover, decentralized ownership may be informationally inefficient as opposed to concentrated ownership by banks.²³

Wenger and Kaserer (1997) strongly object to this view. They provide evidence that the degree of bank involvement is negatively correlated with firm performance, using a sample of large German companies covering 56 percent of market capitalization. Wenger and

²² This debate goes back to the take-over wave in the U.S. in the 1980s; see Jensen and Ruback (1983).

²³ This argument goes back to theoretical models of financial intermediation by, e.g., Diamond, 1984. See Mayer, 1988, and Hellwig, 1997, for discussions.

Kaserer's widely cited results have credibility because they overcome to a large extent the primary weakness of the empirical side of the debate, namely the lack of clear cut natural experiments. Most analyses (e.g., Perlitz and Seger, 1994) lack a counterfactual. Germany has never experimented with large institutional investors, and its corporate governance system has been quite stable over the last decades. Wenger and Kaserer come fairly close to using proper exogenous variation in corporate governance because they use a difference-in-difference approach to link changes in returns to changes in the supervisory board for companies with high and low bank involvement.

International comparisons are another way to exploit variation in governance structures. International comparisons of corporate governance systems and their significance for firm performance can be found in Franks and Mayer (1990), Prowse (1994), Kaplan (1997), and Carlin and Mayer (1998). International evidence also permits an assessment of long-term performance differences.

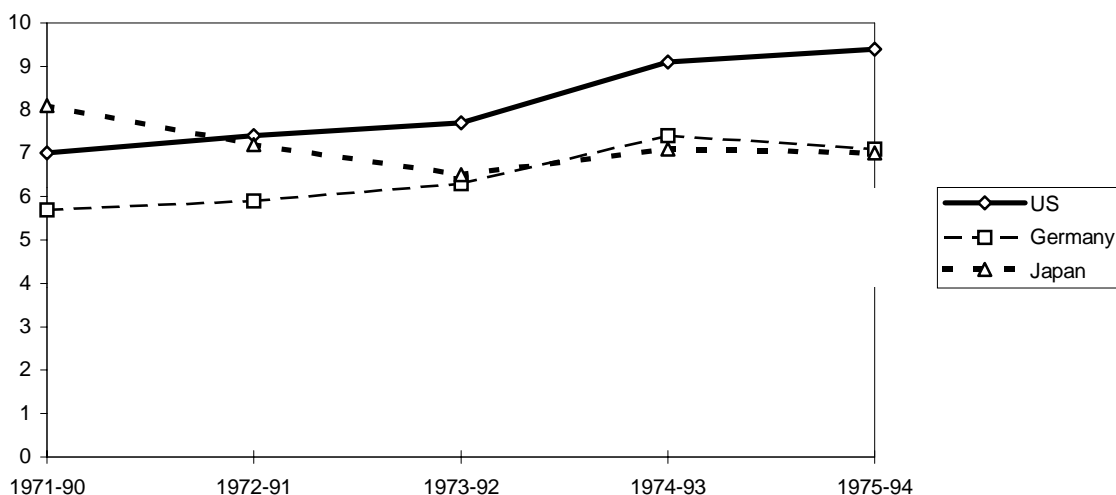
DeJong (1995), Mueller and Yurtoglu (1997) and Börsch-Supan (1999b) combine both sources of variation, across countries and across companies, to estimate rates of return on investment. Börsch-Supan (1999b) investigates the contribution of capital – more precisely, capital management and capital utilization – to total factor productivity in West Germany, Japan and the United States, using data from company benchmarking studies by McKinsey Global Institute (1996). Notwithstanding substantial variation across companies and industries, the market sectors of West Germany and Japan had significantly lower rates of capital utilization in the early 1990s and created less productive capacity per unit of physical assets than the United States did. Börsch-Supan shows that these low rates of capital utilization were only partially due to high labor costs relative to capital, leading to high capital intensity at short work hours. More important for the aggregate result of low capital productivity were the many cases in which basic managerial goals did not focus managers' attention on how productively they were using their assets. Conversely, a focus on financial performance, especially prevalent among U.S. firms, did create a clear performance objective that was generally aligned with productivity.

In order to address Porter's (1992) criticism of short-termism, Börsch-Supan (1999b) then looked at the long-run rates of return. Over the 1974 to 1993 period, U.S. financial performance was significantly better than in Germany, and on average better than in Japan. He calculated financial performance by relating the payouts from the corporate sector (interest,

dividends and capital gains) to the inflows into the corporate sector (debt and equity) through the corresponding internal rate of return, including the initial and final stock of financial wealth.²⁴ Results are displayed in Figure 5.

For the 20 years between 1974 and 1993, the annualized aggregate rate of return was 9.1 percent in the United States compared to 7.4 percent in Germany. U.S. rates of return also exceeded Japanese returns on average by 7.1 percent. These estimates are robust with respect to changes in definition and computation period for the U.S.-German comparison, while the high income share to capital in the early 1970s and the Japanese bubble at the end of the 1980s make the U.S.-Japan comparison subject to higher variance.²⁵

Figure 5: Aggregate rate of return during different 20-year windows



Source: Börsch-Supan (1999b).

These differences in the long-run rates of return do not support the view by Porter (1992) that short-termism in the United States compromises long-run financial performance. The long-run results by Börsch-Supan (1999b) are a reflection of the short-run estimates by DeJong (1995) and by Mueller and Yurtoglu (1997). In turn, they are reflected in the persis-

²⁴ The computation is based on the flow of funds data in the OECD National Accounts, augmented by capital gains from Standard and Poor 500 (U.S.); DZ-Index of all publicly listed companies (Germany); Index of all Section 1 companies listed on the Tokyo Exchange (Japan). For details, see MGI (1996).

²⁵ However, comparisons that cover the full cycle of bubble boom and burst, i.e., from 1992 onward, and that exclude the very early 1970s, when Japan's capital market development was not comparable to the U.S. and Europe, yield a return difference between U.S. and Japan that is even larger than that between the U.S. and Germany.

tence of total factor productivity difference between Germany and Japan versus the United States (about 15 percent lower in Germany, 40 percent in Japan for the 1991-1996 period). While the returns to invested capital are trivially linked to capital productivity, the link to total factor productivity needs more attention because in theory, differences in labor productivity might offset opposite differences in capital productivity. However, this is not the case in practice – just the opposite: Labor and capital productivity are positively correlated across countries and industries (McKinsey Global Institute, 1996), generating the positive correlation between the returns visible in Figure 5 and total factor productivity.

In summary, the Rhine model of corporate governance with a highly concentrated ownership of capital by banks and cross holdings appears to generate lower short- and long-run returns to invested capital as well as lower total factor productivity than the United States with its dominance of institutional investors.

Of course, there are many other reasons for international differences in financial performance and productivity in addition to corporate governance. A prime candidate is the extent of competition in the products market. However, there may be important interactions. Börsch-Supan (1999b) and McKinsey Global Institute (1996) argue that lower productivity can be traced to a self-reinforcing interaction of less product market competition and weaker capital market pressures in West Germany and Japan, which in turn are exacerbated by government regulation and ownership. Januszewski, Köke and Winter (1999) investigate whether such interactions exist in Germany. Using a panel with data on almost 1000 German firms over the 1986–94 period, they find that those industries which are characterized by more intensive product market competition tend to see higher productivity growth rates, controlling for the effects of corporate governance. Similar findings have been obtained by Nickell (1996) for the U.K. There is also some evidence that the productivity effects of tighter corporate governance are enhanced by more flexible labor markets, but strong empirical evidence is hard to obtain for the industrialized countries. For developing countries, Holzmann (1997) and Börsch-Supan, Palacios and Tumbarello (1999) provide evidence that links the reduction of the informal labor market sector to pension reform and improved productivity.

Pension funds and productivity

The third, and final, step of our analysis is to look how pension funds have changed, and will continue to change, capital markets and thus ultimately total factor productivity of an economy. Pension funds can play an important role in developing financial markets in addi-

tion to their role in disciplining management and improving corporate governance as active institutional investors. This line of reasoning has been put forward by the World Bank, emphasizing positive feedbacks of financial development through endogenous growth mechanisms such as those described by Cosetti (1994), Holzmann (1997), and Cosetti and Schmidt-Hebbel (1997).

Indirect evidence for this view stems from the growing literature on the role of financial development and financial market structure for productivity and growth. For instance, Levine and Zervos (1998) provide empirical evidence for the importance of financial markets in economic growth. They report that stock market liquidity is positively and robustly correlated with contemporaneous and future rates of economic growth, consistent with the view that a greater ability to trade ownership of an economy's productive technologies facilitates efficient resource allocation, physical capital formation, and faster economic growth. Levine and Zervos also find no negative impact of stock market liquidity, international capital market integration, or stock return volatility on private savings. Similar findings have been obtained by Rajan and Zingales (1998) who compare industrial sectors across countries, arguing that financial development reduces the costs of external finance to firms.

Direct empirical evidence is scarce for the same reason that we already encountered: usually there is no counterfactual, since pension systems change rarely and if so, only gradually. One exception is Chile, the quintessential pension reform example.²⁶ Among the many references which describe this experiment are Diamond and Valdes-Prieto (1995) for a detailed survey, Diamond (1994) for a succinct review, and Schmidt-Hebbel (1998a and b) for very recent assessments of the macroeconomic evidence.

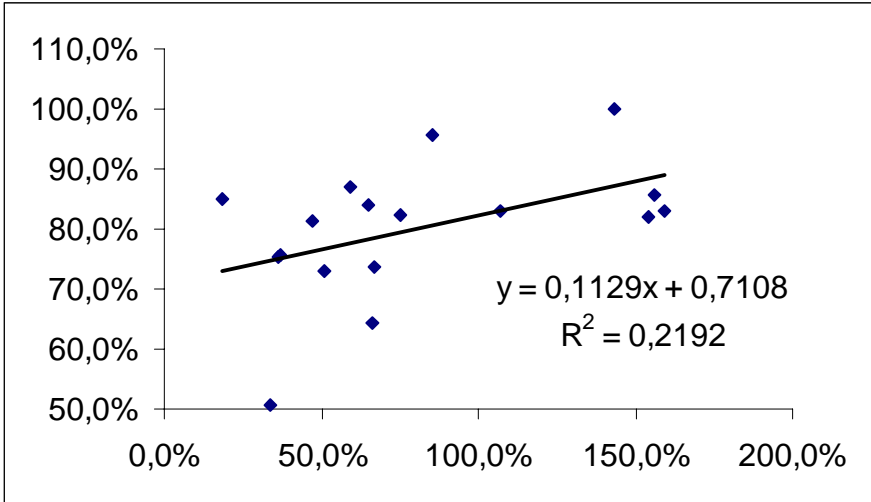
Most reviews agree that the Chilean reform was successful in terms of reducing contribution rates and nevertheless providing a high level of retirement income. It is more controversial whether the pension reform (as opposed to the many other policy changes) caused the increases in productivity and growth. Holzmann (1997) estimates that the improvements in a set of financial market indicators, themselves correlated with the amount of savings in AFPs, the Chilean pension funds, contributed to a 2 percent increase in the rate of growth through an increase in total factor productivity. This is a strong result as it shifts the entire growth path, not only the level of GDP. Schmidt-Hebbel (1998b) estimates a 50 percent

²⁶ In addition to Chile, a study by the U.S. Congressional Budget Office (1999) provides evidence on pension reforms in the United Kingdom, Australia, Mexico, and Argentina.

lower coefficient but still finds a large and significant effect. Specifically, he shows that gross national savings, gross domestic investment, and GDP growth have increased in their levels and have decreased in their volatilities significantly in the third decade after the reform. While the improvements in financial performance and productivity are undisputed, it is not clear how much of the success can be attributed to pension reform per se. Some attempts have been made to establish a causal role of the pension reform – separating pension reform from fiscal consolidation and macroeconomic stabilization – but the historical experiment has been too recent to permit a reliable econometric separation. However, this may be besides the point because pension reform, fiscal consolidation and macroeconomic stabilization were a re-enforcing package that generated the positive economic development in Chile.

Turning to the industrialized countries there also appears to be a positive link between institutional investors and productivity, again relying on international comparisons. Figure 6 relates the ownership share of institutional investors, drawn from the Bank for International Settlements (1998), to total factor productivity, obtained from Hall and Jones (1996). The sample of countries corresponds to Table 6. The relation is anything but tight with an R^2 of about 20 percent, but nevertheless, those countries which have a high share of institutional investors tend to have higher total factor productivity.

Figure 6: Institutional investors and total factor productivity



Notes: The vertical axis represents total factor productivity as percent of U.S. total factor productivity. The horizontal axis displays the share of funds held by institutional investors as percent of GDP.

Sources: Authors' calculations based on Bank for International Settlements (1998), Table V.5, and Hall and Jones (1996).

There is also a host of case studies that report on single companies and their developments when corporate governance and shareholder activism changed, see Black (1998) for a skeptical review of the literature. He concludes that the correlation between shareholder activism and firm performance is positive but small. The most prominent successful examples are CalPERS, the largest state pension plan in California, and TIAA-CREF, the U.S. pension fund for teachers and academics. Smith (1996) and Carleton, Nelson and Weisbach (1997) discuss these success stories of active involvement in targeting poorly performing companies.

However, there are also counterexamples. Prominent cases are the provident funds in Southeast-Asia which have destroyed wealth, as detailed by Asher (1998), and did contribute to economic growth only through a massive accumulation of capital, but not by increasing total factor productivity. This has been shown in the growth analyses of Kim and Lau (1994) and Young (1994). These two faces of the Asian miracle have obtained dramatic relevance in the recent Asian crisis and bear several lessons for funded pension systems, in particular the need for competition among funds as realized in the Anglo-Saxon countries and Chile, and to a lesser extent in the Netherlands and Switzerland.

5. Summary and conclusions

We have tried to broaden the debate about public pension reform. Our main argument is that fundamental pension reform – a transition from the omnipresent pay-as-you-go systems to a substantially higher extent of prefunding – has benefits over and above those that are usually in the focus of the transition debate. These additional benefits occur through more efficient capital markets and have the potential to overcompensate the welfare losses created by the transition burden.

Using Germany as an example, we first showed that an increase in the extent of prefunding is unavoidable unless future retirees are content with a major reduction in retirement income. This shift comes silently as households increase their currently small retirement savings in response to a reduction in the replacement rate of public pensions. A more formal transition, say to an equal share of pay-as-you-go and funded pension provision, would imply only a small transition burden but nevertheless generate a stock of pension funds that is sufficiently large to change the nature of the German capital market.

On the supply side of the capital market, we argued that saving patterns and portfolio choice in Germany are indeed strongly shaped by the current pay-as-you-go system, and will consequently change in the wake of a fundamental pension reform. The old-age savings puzzle – a relatively flat age-saving profile with positive saving in old age – may disappear when retirement saving becomes a dominant savings motive as envisaged in Modigliani's life-cycle hypothesis.

The demand side of the German capital market is also strongly shaped by the German monolithic pension system. Germany has few institutional investors, and very few pension funds among them. Most stocks are controlled by banks and through industrial cross holdings which arguably exhibit weaker corporate governance than aggressive pension funds. In this situation, a transition to funded pension schemes can have positive effects on firm performance and productivity growth for two main reasons. First, the flow of retirement savings into pension funds broadens financial markets and hence facilitates the provision of external finance to private firms. Second, providing outside equity finance (as opposed to bank credits) puts more pressure on management and improves corporate governance. Finally, functioning corporate governance is the mechanism that transmits the pressure to earn high returns on the financial side to a pressure on productivity on the real side of the economy, thereby linking financial performance and GDP growth. This link will fail if capital markets lack competition. In turn, there is some evidence indicating that the positive effects of investing in pension funds will be more pronounced when they are accompanied by increased product market competition.

The paper provided many bits and pieces of evidence for this set of links. Clearly, more research is needed to make this line of argument tight. This is not a simple task because economic theory provides us with countervailing effects, and empirical research often lacks proper exogenous variation to identify causes and effects. Nevertheless, more research appears to be a worthy cause since we have a potential here for small but persistent changes in total factor productivity which will have large long-run effects on growth.

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