

## Political Feasibility of Pension Reforms

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# Political Feasibility of Pension Reforms \*

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## Abstract

The impending demographic crisis calls for fundamental reforms of old-age security. In a democracy, however, reforms require the support of the majority. A reform that aims at reducing the size of unfunded pension systems is supported by the young and opposed by the old. As long as the young have the majority, this reform is feasible; as soon as society becomes a gerontocracy, there is risk of further expansion.

We determine for Germany, France and Italy the latest point in time at which a majority is in favour of a reform. For this, we calculate for each year the “indifference age” as the age of the cohort that is not affected by the reform and the “median age” as the age of the politically decisive cohort. In Germany, a reform can be democratically enforced until 2012. France becomes a gerontocracy in 2014 and Italy as early as 2006.

**KEYWORDS:** Demographic crisis, pension reform, political feasibility, median age, indifference age, France, Germany, Italy

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*Securing the long-term sustainability of pension systems requires [us ...] to maintain the financial sustainability of pension systems, so that the future impact of ageing on public finances does not [...] lead to an unfair sharing of resources between the generations.*

Social Protection Committee  
(2001, p.i)

In a majoritarian voting system, reforms are only feasible if they are supported by the majority of the electorate. This requirement is clearly fulfilled by reforms which make all voters better off. But usually, not all voters are winners.

This paper focuses on reforms of unfunded pension systems which involve the redistribution of the pension burden across individuals of different generations making some generations better off and some worse off. For the purpose of illustration, we look at the specific situation in France, Germany and Italy.<sup>1</sup> According to the demographic projections, all three countries expect an evolution where more and more old individuals are supported by fewer and fewer young individuals. This endangers the financial sustainability of the unfunded pension systems which rely on a “healthy” ratio of young to old. Reform activities are needed to guarantee a fair sharing of the rising pension burden. Germany and Italy have already initiated more fundamental changes to their pension systems while France has so far only agreed on parametric reforms. But given the projected demographic time pattern, further reforms must follow in all three countries.

In order to analyse the chance for success of reforms against the background of gerontocracy alone and to determine the point in time when reforms are no longer feasible, we assume that the young cannot react in any respect other than by voting. We thus exclude any form of exit option (Hirshman, 1970). The young can neither emigrate nor escape the pension system by working less or working in the shadow economy. Even though we must expect that the young will put pressure on unfunded pension systems in one way or another after they have lost the majority, it is nevertheless useful for all voters to be aware of the path to

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<sup>1</sup> Although pension issues are not voted on directly in France, Germany and Italy – in contrast to, for example, Switzerland, public pension systems are of growing importance for the election campaign and election results in these countries.

gerontocracy in order to be immune against attempts from politicians to manipulate election outcomes.<sup>2</sup>

In the next section, the latest reform activities in France, Germany and Italy are described. In section 2, we briefly discuss a simple voting model. Section 3 is then devoted to the question of whether a stylised reform that redistributes the pension burden more equally across generations is supported by a majority. For this, we determine for France, Germany and Italy the path of the age of the decisive (median) voter and of the (indifferent) voter who is just not affected by the reform. Comparing the age of these two voters tells us whether the stylised reform is still supported by a majority and, if yes, for how long. Section 4 concludes.

## 1 Recent reform activities

Due to low fertility rates and increasing life expectancies without large migration numbers, total population in the 15 countries of the European Union will decline by about 4% in the next five decades with a large variance between individual countries (Eurostat, 2000 – baseline scenario): while France will gain by 4%, Germany will lose about 8% of the population and the number of Italians will decrease by almost one fifth.<sup>3</sup>

In order to draw some conclusions about how unfunded pension systems will be affected by the projected demographic evolution, the age composition of the population must be analysed in more detail. A decreasing or – in the case of France – an increasing total population must not necessarily endanger the financial sustainability of the pension system if the ratio of young to old stays approximately the same. If fertility and life expectancy, however, change without counter-balancing migration in a way that alters this ratio fundamentally, serious consequences for the pension systems are inevitable.

This can be best illustrated with the help of the dependency ratio, i.e. the ratio of those 60 years and older to those between 20 and 59 years. Today, the situation is comparable for the three European countries considered with a de-

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<sup>2</sup> Moreover, the power of the young after the transition to a gerontocracy depends in particular on their specific outside options and/or their ability to organise quickly and effectively. These aspects will, however, not be considered in what follows.

<sup>3</sup> The Eurostat baseline scenario is based on the following assumptions: Between 2000 and 2050, migration will remain constant for France with 50,000 migrants, while it will decrease for Germany from 300,000 to 200,000 and increase for Italy from 50,000 to 80,000. Concerning the fertility rates, France enjoys a relatively high level with 1.7 children per woman in 2000, which is expected to rise to 1.8 in 2050. In Germany and Italy, fertility is much lower with 1.4 and 1.2 respectively and will only increase to 1.5 in the next 50 years. During the same time-span, life-expectancy for men will increase by 5 years in all three countries from 75 years in France and Germany and from 76 years in Italy, while life-expectancy for women is assumed to grow by 4 years from 83 years in France, 81 years in Germany and 82 years in Italy.

dependency ratio of about 0.40. This ratio will, however, increase strongly over the next half century, reaching about 0.70 for France, 0.80 for Germany and a dramatic 0.90 for Italy. This means that while today, 10 individuals of the working generations support four retirees, they will have to finance pension benefits for 7 to 9 retirees in 2050. Or, to express it in terms of the potential support ratio, which is the inverse of the dependency ratio: in 2050, for every retiree there will be only 1.4 working-age individual in France, 1.3 in Germany and no more than 1.1 in Italy, compared to an EU average of 2.5 in 2000.

It is evident that this development endangers the financial stability of systems which are based on a balanced ratio of young to old. The similar demographic projections for the three European countries have, however, so far led to very different reform activities.<sup>4</sup>

### *Germany*

The reform in 1992 was the first major alteration of the pension system (*Gesetzliche Rentenversicherung*). By replacing pension benefits tied to gross wages with benefits tied to net wages as one of the main parts of the reform, an increase in the contribution rate to 40% of wages was avoided. But German reunification took place just before the reform, bringing with it the expansion of the pension system to East Germany. This made further reforms necessary. After some minor reforms, which only slowed down the rise of the contribution rates without bringing this development to a halt, the so-called Riester Reform was passed in 2001 initiating a partial transition to a funded system combined with a reduction of the non-funded part of the pension system. (Voluntary) private savings for old age will be subsidised with about €10 billion a year from 2008 onwards – after a gradual phasing in over the next six years starting with a subsidisable sum of 1% of gross wages in 2002 and reaching 4% of gross wages from 2008 onwards. The aim is to make it attractive for young individuals to build up a funded supplement to their reduced non-funded pension claims. At the same time, recommended private savings of 4% of gross wages from 2008 onwards will lower what is called “net wages” in the pension formula and hence reduce pension benefits and contribution rates. But despite this reform, it is very likely that the financial sustainability of the pension system cannot be guaranteed without further – more radical – changes.

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<sup>4</sup> For details and for reform activities in other countries see, for example, Gruber and Wise (1999), Feldstein and Siebert (2002), or Fenge et al. (2002).

### France

In France, the projected ageing of the population has so far not led to any fundamental changes. In 1993, the first major reform to the pension system (*Régime général*) aimed at changing the calculations of pension benefits. The main feature was a switch from wage to price indexation. In addition, the minimum number of years necessary to qualify for pension benefits as well as the reference period for calculating pension benefits were increased (Gern, 2002). This rather parametric reform has, however, not fundamentally affected the French unfunded pension system. In 1997, it was decided to introduce the possibility for employees and employers to contribute to private funded systems in addition to the unfunded pension system. Similar to the change that Germany put into practice 4 years later with the Riester Reform, it was planned that the contributions should be voluntary but generously subsidised. But a change of government prevented this reform from coming into effect. Funded pension components still play a minor role. There is thus much need for reforms.

### Italy

Italy has opted for a more fundamental reform of the pension system (*Fondo Pensioni Lavoratori Dipendenti*). After some smaller changes initiated by the Amato Reform in 1992, the Dini Reform was passed in 1995. The main objectives were to stabilise the ratio of pension expenditure to GDP, to reduce labour market distortions and to increase the actuarial fairness of the system (Franco, 2002). Linking contributions and pension benefits closer together reduces the distortionary effects on the labour supply. This reform initiated the shift to an unfunded, notional defined contribution system based on individual accounts (*Sistema contributivo*). Pension benefits are related to contributions paid over the whole working life and no longer to the wage income of the last five working years. These contributions yield an internal rate of return equal to the growth rate of GDP and are converted into an annuity at retirement which depends on retirement age and life expectancy. The minimum years necessary to qualify for pension benefits were reduced.

In total, the Italian “social insurance type” pension system is now marked by a quasi-actuarial link between contributions and benefits. The reform, however, will become very gradually effective. Only from 2015 onwards will the new system be relevant for most individuals, and not before 2050 will all pension benefits be calculated according to these new rules (Fenge et al., 2002).

To sum up, the reform activities in France, Germany and Italy have started from different points and have advanced in different ways. The French reforms so far

were only parametric leaving the general structure of the pension system unchanged. Germany has initiated more fundamental changes with the last reform which can be seen as the first – albeit small – step towards a partially funded system. Italy has opted for the most radical departure with a shift towards a notionally defined contribution system – even though with a long phase-in period. This means that while the pension system in France and Germany remain defined benefit systems where benefits are fixed and contributions adapt such that the budget constraint holds, it is the other way round in the Italian system. This aspect will be of importance for the discussion of the results below.

## 2 Voting model

Starting from Aaron (1966), a country should adopt an unfunded pension system if the growth rate of the wage sum exceeds the market rate of return – at least if we assume that countries choose the system which guarantees the best way of saving for retirement. All parametric changes to the system concerning contribution rates, pension benefits, etc. should also be decided with this in mind. Breyer and Craig (1997), however, argue that this view is too “naïve” as it neglects the aspect of political economy,<sup>5</sup> and that voting over the shape and size of pension systems needs to be taken into account. In fact Browning (1975) shows how the preferred contribution rate increases with the age of the individual. The intuition for this result is that in calculating the marginal cost of a higher benefit level, past contributions are sunk costs which do not influence the trade-off between the marginal costs of future contributions and the marginal benefits of future pension benefits. The older the politically decisive individual, i.e. the median voter, the higher is thus the realised contribution rate as a relatively short period of paying contributions is dominated by a relatively long retirement period.

We build on the model by Browning (1975) as described by Sjoblom (1985) to reproduce the result that the preferred contribution rate increases with age within a 3-period overlapping generation (OLG) model.<sup>6</sup> In the simplest version, this model is based on the following assumptions: Decisions are taken by simple majority rule by which each individual has one vote. They are assumed to be binding forever. Individuals are selfish and homogeneous. Factor prices are exogenous and labour supply is completely inelastic.

The members of the young and the middle-aged generation work and pay contributions to the unfunded pension system and the members of the old generation receive pension benefits. Individuals maximise utility by choosing the opti-

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<sup>5</sup> See Breyer (1994) and Galasso and Profeta (2002) for comprehensive surveys of the literature.

<sup>6</sup> See also Homburg (1988).

mal level of consumption in all periods  $c_t^X$ ,  $X = Y, M, O$  for young, middle-aged and old, and the optimal contribution rate  $\theta$  so that

$$\max_{c_t^X, \theta} U_t(c_t^Y, c_{t+1}^M, c_{t+2}^O) \quad (1)$$

subject to the budget constraints

$$\begin{aligned} c_t^Y + s_t^Y &= (1 - \theta)W_t \\ c_{t+1}^M + s_{t+1}^M &= (1 - \theta)W_{t+1} + s_t^Y(1 + r) \\ c_{t+2}^O &= p_{t+2} + (1 + r)s_{t+1}^M. \end{aligned} \quad (2)$$

This implies that life-time consumption must equal labour income, i.e. gross wages  $W$  net of contribution rate  $\theta$  in the two working periods, plus pension benefits  $p$  in the retirement period. Savings  $s$  then cancel out in present-value terms – with  $r$  as the interest rate – but are necessary for consumption smoothing. Pension benefits can be written as

$$p_{t+2} = W_{t+2} \frac{\theta}{D} \quad (3)$$

with  $D$  as the dependency ratio

$$D = \frac{1}{(1+n) + (1+n)^2} \quad (4)$$

where we assume for the moment that the growth rate of the population  $n$  is constant.

Differentiating equation (1) with respect to  $c_t^X$  and  $\theta$  subject to equation (2) yields with equations (3) and (4)

$$U_{c_t^X} + \lambda_i = 0 \quad \text{for } i = t, t+1, t+2 \text{ and} \quad (5)$$

$$\begin{aligned}
\lambda_t W_t + \lambda_{t+1} \frac{W_{t+1}}{(1+r)} - \lambda_{t+2} \frac{W_{t+2}}{(1+r)^2 D} &= 0 \quad \text{young individual in } t \\
\lambda_{t+1} \frac{W_{t+1}}{(1+r)} - \lambda_{t+2} \frac{W_{t+2}}{(1+r)^2 D} &= 0 \quad \text{middle-aged indiv. in } t+1 \quad (6) \\
-\lambda_{t+2} \frac{W_{t+2}}{(1+r)^2 D} &= 0 \quad \text{old individual in } t+2
\end{aligned}$$

with  $\lambda_t, \lambda_{t+1}, \lambda_{t+2}$  as the Lagrange multipliers and with  $r$  as the interest rate. Periods before the vote are not affected by the chosen contribution rate. The number of terms for the young, middle-aged and old individual in equation (6) thus equals the number of periods remaining in the individual's life as individuals only take into account those costs and benefits which are due in this and the next period(s). Using equation (5), we can rewrite equation (6) as follows:

$$\begin{aligned}
U_{c_t^y} W_t + U_{c_{t+1}^M} \frac{W_{t+1}}{(1+r)} - U_{c_{t+2}^o} \frac{W_{t+2}}{(1+r)^2 D} &= 0 \\
U_{c_{t+1}^M} \frac{W_{t+1}}{(1+r)} - U_{c_{t+2}^o} \frac{W_{t+2}}{(1+r)^2 D} &= 0 \quad (7) \\
-U_{c_{t+2}^o} \frac{W_{t+2}}{(1+r)^2 D} &= 0.
\end{aligned}$$

If we assume utility to increase with consumption at a decreasing rate and normal goods, old-age consumption must increase for older individuals to satisfy the first-order conditions in equation (7). This implies that utility-maximising pension benefits and – according to equation (3) – contribution rates must rise with age. Older individuals consequently vote for higher contribution rates than younger individuals, who can be expected to vote for no contribution rate at all if the internal rate of return falls short of the market rate of return. This holds equally within a model with more than 3 generations.<sup>7</sup>

This model can be used to show that an unfunded pension system with an internal rate of return below the market rate of return may be supported by the majority if those close to retirement or already retired outnumber the younger voters. This can even lead to the result that a rising dependency ratio decreases the internal rate of return, while raising at the same time the number of supporters of the pension system (Marquardt and Peters, 1997). These two effects of population

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<sup>7</sup> The result that the age of the median voter has a positive impact on pension benefits as a fraction of GNP has been confirmed by Breyer and Craig (1997) for OECD data – even though the effect on benefits per pensioner is not significant.

ageing – the (potential) median-voter effect and the rate-of-return effect – will be carefully analysed in what follows.

For this, two cases have to be distinguished with respect to the age cohort the median voter belongs to: First, the decrease in population growth is so small that the identity of the median voter does not change. Contributions have to increase or benefits have to decrease as fewer contributors have to finance the pension benefits of more retirees. This results in a lower rate of return and induces the median voter to prefer a smaller system. Second, the decrease in the population growth is sufficiently large to change the identity of the median voter. Then there are in fact two effects which have to be taken into account. On the one hand, there is again the negative impact on the rate of return. On the other hand, an older median voter has to pay contributions for fewer years. This makes a more generous pension system more attractive. This at least partially offsets the preference for a smaller system due to the rate-of-return effect. The system only grows or – in our framework – the preferred contribution rate only increases if the latter effect dominates the former.

This reasoning makes it clear that the number of overlapping generations matters. If we start from a two-period OLG model with ageing but positive population growth, the median voter remains a member of the young generation. There is only the rate-of-return effect. The median voter thus prefers a lower contribution rate. Based on this reasoning, Casamatta, Cremer and Pestieau (2001) warn that population ageing may leave retirees of the transition generation worse off and lead to the elimination of the pension system.

In the following, we assume single-year periods for every year of life. This enables us to allow explicitly for both effects and to determine which effect dominates for the three countries considered.

### 3 Feasibility of pension reforms

We analyse the feasibility of an idealised reform similar to the reform adopted in Germany in 2001 (Riester Reform) as described above. For this we assume that the whole time path of the contribution rate without a reform is shifted in a parallel way. Starting with the year 2002, each year's contribution rate in France, Germany and Italy is set one percentage point below the contribution rate which would have resulted without a reform. Pension benefits fall correspondingly. The missing pension claims can then be offset by private savings in a way that corresponds to a partial transition to a funded system.<sup>8</sup> This results in a smoothing of

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<sup>8</sup> The present value of the cash flow generated by private savings equals zero if we assume equality of the market interest rate and the discount rate which equals the rate of time preference. Thus,

the pension burden across generations. We want to see whether this reform finds a majority although it favours generations which are not yet born and therefore cannot vote and burdens some of the present voters.<sup>9</sup> The focus of the analysis is thus on the distributional effects for different age cohorts; efficiency aspects of a partial transition to a funded system are not considered. The reforms are then second best solutions which will not allow a Pareto-ranking.

In more detail, we abstract from risk issues and price changes induced by both demographic changes and policy reforms. We also assume that there is no heterogeneity within an age cohort; voters only differ with respect to age. This simplification can be justified for France, Germany and Italy as the pension systems in these three countries are in the tradition of Bismarck with rather stable replacement ratios across wage levels and thus no significant intragenerational redistribution.<sup>10</sup> This enables us to concentrate on the issue of intergenerational redistribution and allows us to model the choice of the contribution rate as one-dimensional voting.

To calculate the time of shifting majorities for the reform, we choose a present value approach. By affecting the intergenerational distribution of the burden of the pension system, this reform leads to changes in the behaviour of the retired and the contributors. One can expect an increasing labour supply and reduced incentives for early retirement. However, these behavioural changes are second-order effects which – within the framework of our marginal reform – only lead to negligible utility changes. The calculations, therefore, do not need an economic optimisation model but can be made – without any loss of generality – by assuming a given behaviour. This model is thus in the tradition of Browning (1975), who was the first to analyse the choice of contribution rates based on present value calculations and without considering behavioural reactions.

We consequently abstract from an explicit general equilibrium model and a more extensive simulation exercise.<sup>11</sup> Instead, we base our analysis on calculations according to the present rules of the pension systems as briefly described above.<sup>12</sup> This gives us the status-quo paths of the contribution rates and the replacement ratios relative to gross wages in France, Germany and Italy. Figure 1

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the concrete form of the funded system does not have any impact on the calculations of the distributional effects.

<sup>9</sup> There are no subsidies included to make the partial transition to a funded system more attractive which distinguishes this stylised reform from the Riester Reform.

<sup>10</sup> See the discussion in Casamatta, Cremer and Pestieau (2000).

<sup>11</sup> See Fehr (2000) and Hirte (1999, 2000) for Germany, Galasso (1999) and Bohn (1999, 2003) for the USA and Bütler (2000) for Switzerland for examples for extensive simulation models. Galasso and Profeta (2004) determine for six countries the pension system that would arise as an equilibrium outcome of an election.

<sup>12</sup> For a similar analysis of the feasibility of pension reforms in Germany, see Sinn and Uebelmesser (2002).

shows the projected evolution in the three countries for the coming decades.<sup>13</sup> The paths of the contribution rates are then shifted below by one percentage point. As a marginal change of the contribution rates only has second-order effects, the economic equilibrium is not significantly disturbed.

As has been discussed before, France serves as an example of a country in which no fundamental reforms have taken place so far, while Germany has initiated a partial transition to a funded system and Italy has started a more fundamental transition from a defined benefit to a defined contribution system. In these countries, a sufficient majority is covered by the public pension system so that it is possible to assume that all voters are affected by the stylised reform or, alternatively, that the same share in each age-group is affected.<sup>14</sup>

France will see a significant rise in the contribution rate from 16% to 27% between 2002 and 2050 without any further reforms while the replacement rate will stay more or less constant at 30%. In Germany, the contribution rate will increase from 19% to 26% over the next five decades and the replacement ratio will fall from 45% to 38%. In Italy, the contribution rate remains at 33% in the same period of time while the replacement ratio will fall quite strongly from 53% to 39%.

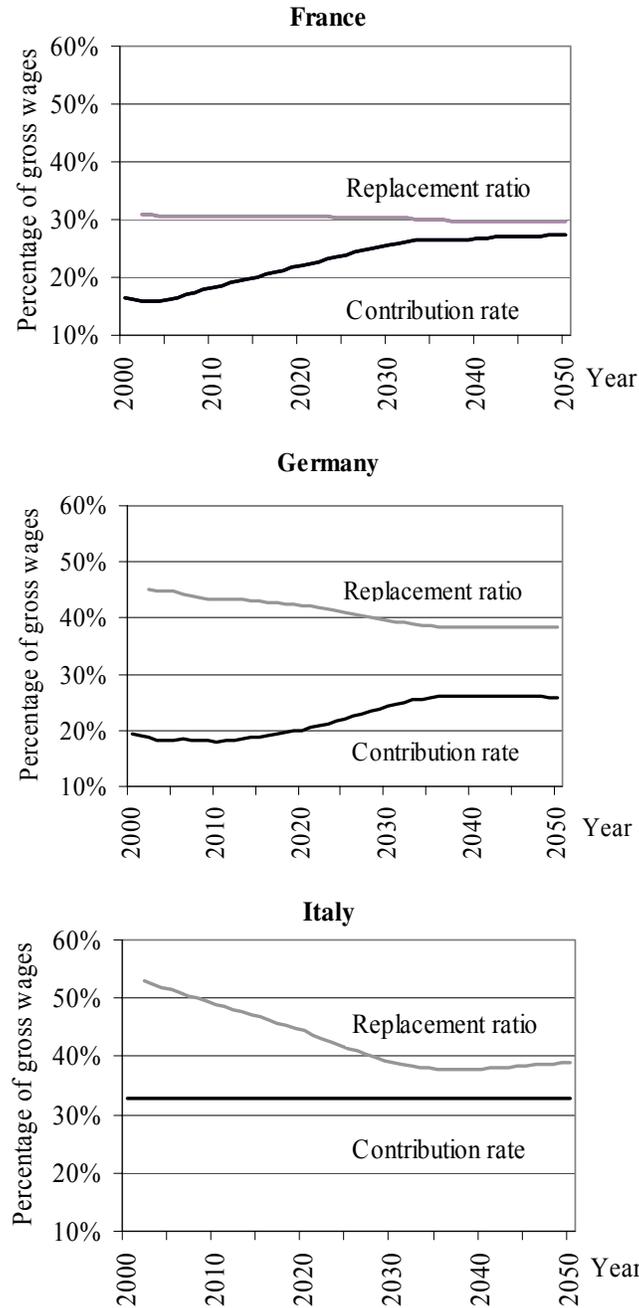
This underlines the different approaches chosen so far by the three countries in order to cope with the projected demographic crisis. If nothing changes, a doubling of the dependency ratio – which is approximately projected for France, Germany and Italy (see section 1) – must lead to a doubling of contribution rates, a halving of pension benefits or a combination of both. In fact, we can observe versions of all three strategies when looking at the three countries. While in Germany, both the young and the old have to carry part of the rising burden – the former via increasing contribution rates and the later via decreasing pension benefits, the situation is different for young and old in France and in Italy. In France, the ageing of the population leads to a higher burden for the contributors while the replacement ratio will stay approximately constant and in Italy, the demographic evolution results in a lower replacement rate while the burden of the contributors will not change.

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<sup>13</sup> These projections concern the contribution rates and replacement ratios of the “*Gesetzliche Rentenversicherung*” in Germany, the “*Régime Général*” in France and the “*Fondo Pensioni Lavoratori Dipendenti*” in Italy.

<sup>14</sup> This is a problem concerning, for example, the United Kingdom. Only about a third of all employees are covered by the public earnings-related pension system (*SERPS*). It is, however, not possible to assume a constant share of individuals covered in each age-group as the contracting-out principle has been effective only since 1988 with a wider opening towards company and private pension plans during the last few years.

Figure 1: Facts about the national pension systems in France, Germany and Italy



Source: CESifo pension model: calculations of the Ifo Institute for Economic Research (see Fenge, Uebelmesser and Werding, 2002)

The question is whether a majority still favours a partial transition to a funded system and, if yes, for how long. For this, we calculate the “median age” and the “indifference age”.

### 3.1 Median age and indifference age

The median age is defined as the age that splits the voters into two equally large groups when they are arranged in ascending order as to their age. We assume that the minimum voting age remains at 18 and that identical shares of voters of all age cohorts participate in the election and decide non-altruistically.<sup>15</sup> For the calculations of the median age, we use the baseline scenario of Eurostat (2000). The projection contains information about the distribution of the population over different age cohorts for every calendar year based on assumptions about migration, the evolution of fertility rates and of life-expectancy.<sup>16</sup>

As figure 2 shows, in Germany, the median age will be 50 in 2010 and will go up to 55 in 2025. In France, the median age will reach 50 in 2015 and increase to 53 in 2029. The Italian median voter will be 50 in 2010 and 55 already in 2023. In 2030, half of the voters in Italy will be 58 and older.<sup>17</sup> This development will strengthen the position of those who are in favour of an extension of the present unfunded pension system and weaken the position of those who have to carry the burden.

The indifference age is defined in a way that the cohort with this age is not affected by the stylised reform. Older cohorts lose and younger cohorts win. In present value terms, the indifferent cohort loses as much in pension claims as it saves in contributions. For the derivation of the indifference age, we use the CE-Sifo pension model<sup>18</sup> and again the baseline scenario of Eurostat (2000). In addition, we assume a productivity growth rate of 1.75% per capita and a strict (Bismarckian) equivalence between contributions and pension benefits.

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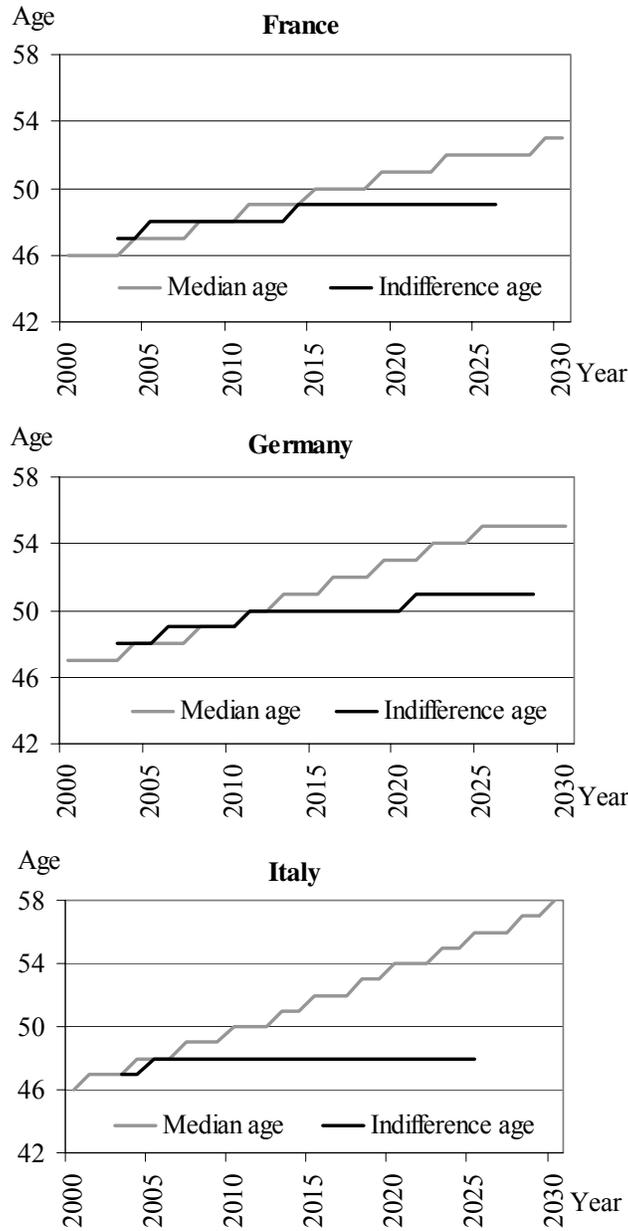
<sup>15</sup> See appendix 1 for details about the assumptions made with respect to immigration and naturalisation.

<sup>16</sup> Footnote 3 provides more detailed information about the assumptions of the baseline scenario of Eurostat (2000).

<sup>17</sup> The evolution of the median age is comparable to the computations for the one-dimensional analysis by D’Amato and Galasso (2002) based on the projections of ISTAT. In 2000, the median age in both models is 46 years. In 2025, our model yields 55 years compared to 54 years.

<sup>18</sup> This model has already served as the basis for the calculations of the Council of Advisors to the German Ministry of Economics (Wissenschaftlicher Beirat, 1998, see also Sinn and Thum, 1999, Sinn, 1999) and has been adapted by the Ifo Institute for Economic Research to pension models of other countries (see Fenge, Uebelmesser and Werding, 2002, for an example).

Figure 2: Median and indifference age: France, Germany and Italy



**Source:** Indifference age: CESifo pension model, Eurostat (2000) – baseline scenario, own calculations; Median age: Eurostat (2000), OECD (2001), Bundesausländerbeauftragte (2002), own calculations

**Legend:** The calculations of the median age are based on German citizens of the year 2000, their descendents and naturalised foreigners

We calculate the effects of a cut in contributions for alternative age cohorts and calendar years. The cohort for whom the present value of the changes in the cash flow is closest to zero is the indifferent cohort. The age of this cohort is the indifference age of the respective calendar year. Repeating these calculations for alternative calendar years yields the time path of the indifference age as shown in figure 2.<sup>19</sup>

In Germany, the indifference age will rise to 50 in 2011 and to 51 in 2021. The increase is much slower in France and in Italy. In France, the indifference age will reach 49 in 2014 and remain at this level and in Italy it will stay at 48 from 2005 on. The increase in the indifference age slows down at around 2012 in Germany and even earlier in France and Italy.

Figure 2 shows for how long the stylised reform will find a majority in a democratic voting process in France, Germany and Italy. In Germany, the indifference age exceeds the median age up to the middle of the next decade. The majority, however, is slight. In France, the indifference age lies above the median age until 2007 and stays close to it until 2014. In Italy, the indifference age and the median age coincide until 2006.

### 3.2 Discussion

It can easily be seen that the evolution of the indifference age depends only indirectly on the demographic development. The ageing of the population in general and the rise in the dependency ratio in particular are most dramatic in Italy, followed by Germany and France. If this implied a one-to-one increase in the pension burden falling on lifetime income of the contributing generations, one would expect that more age-groups would support the stylised pension reform in Italy than in Germany and France. But above all, the distribution of the burden across generations and how this distribution is affected by the stylised reform depend on the rules of the existing unfunded pension system. With respect to the rules, the pension systems in France and Germany differ in one essential aspect from the Italian one. In a defined contribution system as in Italy, contributions are set and benefits adapt such that the budget constraint holds, while in a defined benefit system as in France and Germany, it is the other way round.

The growing pension burden of the coming decades will be the better shared between the generations, the more the pension systems are characterised by funding and defined contributions. First of all, a higher degree of funding as results from the stylised reform reduces the amount of intergenerational transfers and thus decreases the dependencies across generations with respect to old-age security. Second, a defined contribution system in which contributions grow with

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<sup>19</sup> See appendix 2 for an illustration of the procedure.

the wage sum and benefits adapt implies that a lower growth rate of the wage sum due to ageing leads to lower benefits. The risk of a negative demographic evolution is thus mainly carried by the old generation: ageing of the population no longer leads to an unlimited increase in contribution rates, but results in lower pension benefits.

A smaller pension system thus frees resources for funded old-age provision, benefiting younger generations and hurting older generations. This first effect shows up in the indifference age for all three countries and is constant over time. The question then is how the growing burden due to ageing of the population will be distributed across generations and how this distribution is changed by the stylised reform. For this second effect, the rules of the pension systems are essential. In a notionally defined contribution system as in Italy, the old already carry the risks from ageing. The possibilities to shift the burden even more to these generations are thus very limited. In a defined benefit system as in France and Italy, however, there is still scope for an intergenerational redistribution of the pension burden favouring the young at the expense of the old.

Consequently, the number of age-groups which prefer to abolish the unfunded pension system stays almost constant in Italy – the small increase at the beginning resulting from the long phase-in period of the new system. In France and Germany the stylised reform finds supporters among an increasing number of age-groups.<sup>20</sup>

## 4 Conclusion

For Germany and France, the beginning of the next decade will be decisive for reforms which initiate a partial transition to a funded pension system. For Italy, the crucial point in time will be in the present decade. Afterwards, all three countries will be characterised by a gerontocratic system where the old outvote the young.

It should be noted that the analysis is not based on the presumption that a funded pension system is superior to an unfunded one in terms of efficiency. In fact, as has been pointed out, the focus is on distributional issues, not on efficiency aspects. If reforms are not enacted soon, the distribution of the pension burden across generations might endanger the sustainability of the national unfunded pension systems while reforms initiating a partial (marginal) shift towards

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<sup>20</sup> The transition to gerontocracy must be expected even earlier if one takes into account the fact that participation in elections is clearly biased towards older age-groups as indicated, for example, by data about the share of each age-group voting in the elections of the European Parliament in Germany (Statistisches Bundesamt, 1999).

more funding might help to maintain an unfunded system albeit of a (slightly) reduced size.

There is an argument that many people do not understand what is going on and especially do not know whether they belong to the winners or losers of a pension reform. A survey conducted in France, Germany, Italy and Spain in 2000 sheds some light on this position (Boeri, Boersch-Supan and Tabellini, 2001). Individuals were asked whether they would accept a proposal that implied a reduction of contribution rates by 50% and a reduction of pension benefits as if worked for only 50% of the wages actually earned starting from now on without affecting already acquired pension claims. 47% would accept this proposal in Germany and Italy, while 4% in Germany and 7% in Italy did not answer. If we interpret the latter individuals as being indifferent and voting for the proposal, we have a majority in favour of the proposal in both countries. In France, however, only 24% would accept the proposal while in Spain, only 19% gave a positive answer.<sup>21</sup>

As this reform is qualitatively very similar to our stylised reform where we consider a one percentage point reduction in contribution rates and pension benefits – without, however, excepting already acquired pension claims – we can compare the responses with our results. For Italy and Germany, our results are confirmed. We have seen that there is a small majority for the reform right now in both countries. This majority will vanish in this or in the next decade. Our results are, however, different for France. We find that more individuals in France are positively affected by the reform than negatively and should therefore vote in favour of the reform. But this is not reflected in the answers; and it is not reflected in the actions either. The protests in May 2003 in response to the reform proposals of the French government show this very clearly. The French in general and the winners of the reform in particular seem to be less informed about the mechanisms of the pension system than Germans and Italians. According to Boeri, Boersch-Supan and Tabellini (2001) this can be attributed to two factors: the intensity of the public debate and the fragmentation of the national pension systems. A low coverage in the media and a high degree of fragmentation make it difficult for private-sector employees to know about the conditions that apply for them and the prospect for the future. The French system is very fragmented consisting of different systems with different contribution rates for every sector. In contrast to this, the system is not at all fragmented in Germany and only to some degree in Italy. In addition, the higher reform activities in Germany and Italy in

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<sup>21</sup> It is not clear whether individuals have realised that pension benefits which result from 50% of the wages actually earned imply a reduction of pension benefits by less than 50% given minimum pensions and other redistributive instruments. If so, their approval is not surprising – and in fact one would expect even higher rates – as their burden in form of contributions decreases without affecting their benefits to the same extent.

the last decade have led to a larger coverage of pension topics in the media compared to France.

Even more interesting in our context are the questions about the characteristics of those who are in favour of the proposal. The rate of acceptance clearly decreases with age, which is what one expects on the basis of our cash flow calculations. In addition, being informed about the pension system and being aware of the crisis increase the probability of accepting the proposal as well as does being male and rich.

Clever parties might therefore succeed in tricking some voters – especially in France – and in postponing the turning point of the electoral majority. But this strategy will not succeed forever and the bigger the lag between an election year and the switching year, the more difficult it will be to fight politically against the strategic majorities which will result from the ageing of the population. Substantial pension reforms which prevent the collapse of the system should therefore be executed before the strategic majority for the pension reform has vanished. Afterwards, reforms which aim at further reducing the size of the unfunded pension system are no longer supported by a majority and even reforms which have been passed earlier may be undone by the then prevailing majority of the old. Constitutional safeguards would be useful to prevent this from happening, but they can hardly be implemented. In the absence of such safeguards it can only be hoped that the earlier reforms will imply a strong implicit commitment for politicians beyond the time where the majority switches.

## Appendix 1 – Calculating the median age

For the calculation of the median age, we have to make some assumptions concerning the participation of foreign-born individuals in the election.

### 1. Stock of foreigners:

The stock in 1999 was 3.3 million in France, 7.3 million in Germany and 1.3 million in Italy (OECD, 2001, Table A.1.5).

### 2. Net migration flow:

According to the baseline scenario of Eurostat (2000), the projected net migration flows are:

in 1,000	2000	2010	2020	2050
Germany	300	250	200	200
France	50	50	50	50
Italy	50	65	80	80

Source: Eurostat (2000) – baseline scenario

### 3. Naturalisation:

- For Germany, we assume a yearly rate of naturalisation of the foreign population of 4%, which corresponds to the average rate of naturalisation in the years 1994-1999 (Bundesausländerbeauftragte, 2002).
- For France, we assume a yearly rate of naturalisation of 4% on the basis of the 1999 value of 4.5% (OECD, 2001, table A.1.6).
- For Italy, we assume a yearly rate of naturalisation of 1% on the basis of the 1999 value of 0.9% (OECD, 2001, table A.1.6).

### 4. Share of non-naturalised foreigners of total population:

Based on the projections for the total population of the Eurostat (2000) baseline scenario, we calculate the share of non-naturalised foreigners of the total population.

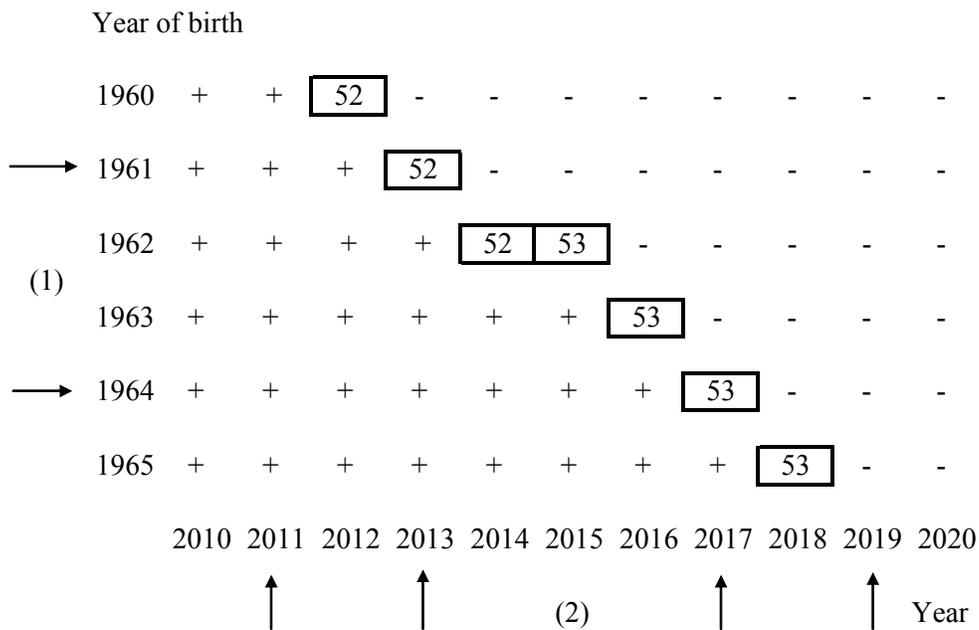
### 5. Age distribution:

We take for all three countries the age distribution of German immigrants in 2000 and assume this distribution to remain constant (Bundesausländerbeauftragte, 2002). Age distributions which change over time to take a potential ageing of the immigrant population into account do not affect the path of the median age significantly and are without any impact on the result.

## Appendix 2 – Calculating the indifference age

For a fictitious example, we illustrate with the help of figure A1 the procedure for calculation of the indifference age:

Figure A1: procedure for calculation of the indifference age



(1) Horizontal direction: we calculate the present value of the change to the cash flow for different birth cohorts starting at different calendar years, i.e. different ages. For younger individuals, the change to the present value is positive (+) whereas for older individuals, the change to the present value is negative (-). We note the age of each birth cohort at which the present value of the change is closest to zero. This is the indifference age of each birth cohort.

(2) Vertical direction: at the same time, we have determined for every calendar year the age of the indifferent birth cohort, i.e. the indifference age. Younger individuals who belong to later birth cohorts are in favour of the reform (+) while older individuals are against it (-).

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