



# Working Papers

## WHEN WILL THE GERMANS GET TRAPPED IN THEIR PENSION SYSTEM?

Hans-Werner Sinn  
Silke Übelmesser

CESifo Working Paper No. 561

September 2001

CESifo  
Center for Economic Studies & Ifo Institute for Economic Research  
Poschingerstr. 5, 81679 Munich, Germany  
Phone: +49 (89) 9224-1410 - Fax: +49 (89) 9224-1409  
e-mail: [office@CESifo.de](mailto:office@CESifo.de)  
ISSN 1617-9595



An electronic version of the paper may be downloaded

- from the SSRN website: [www.SSRN.com](http://www.SSRN.com)
- from the CESifo website: [www.CESifo.de](http://www.CESifo.de)

## WHEN WILL THE GERMANS GET TRAPPED IN THEIR PENSION SYSTEM?

### Abstract

The upcoming demographic crisis in Germany demands fundamental reforms of the pension system. In a democracy, reforms are, however, only feasible when they are supported by the majority of the electorate. To determine whether the majority is in favor of reforms of the pension system, we calculate for each year the "indifference age" as the age of the cohort which is not affected by the reform and the "median age" as the age of the politically decisive cohort. Until 2023, the median age is below the indifference age implying that the young have the majority and the reform can be democratically enforced. After 2023, Germany will be characterized by a gerontocratic system where the old decide over the young. Only the fear that the young might emigrate – and perhaps a certain altruistic attitude towards their own descendants – will prevent the old from exploiting the young.

JEL Classification: H55.

Keywords: demographic crisis, pension reform, political feasibility, median age, indifference age

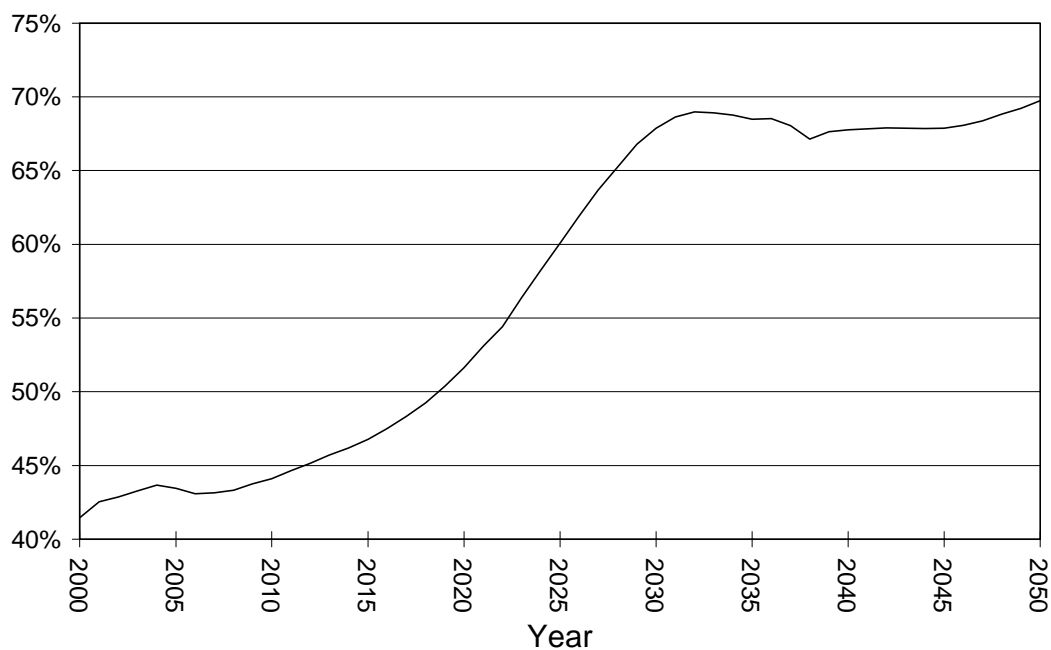
*Hans-Werner Sinn*  
CESifo (University of Munich & Ifo  
Institute)  
Poschingerstr. 5  
81679 Munich  
Germany

*Silke Übelmesser*  
CESifo (University of Munich & Ifo  
Institute)  
Poschingerstr. 5  
81679 Munich  
Germany  
[uebelmesser@cesifo.de](mailto:uebelmesser@cesifo.de)

## 1. Introduction

Currently, for every ten Germans no more than seven children are born, and life expectancy is increasing by one year every eight years. By the year 2035, the ratio of old to young will have almost doubled and only then will the situation improve. Germans will have the oldest population on earth already around 2030. These are the known facts which will lead to a crisis of the pay-as-you-go pension system (Sinn 1999).

Figure 1: *The development of the dependency ratio*



Legend: The dependency ratio is defined as the ratio of the number of people aged 60 or older to the number of people between 20 and 59.

Source: Statistisches Bundesamt (1994), own calculations.

In the political discussion, these dangers have been known for some time. But only in the last years were serious attempts at a fundamental reform being undertaken. The reform

of the pension system of 1992 avoided an increase of the contribution rate to 40% of wages.<sup>1</sup> With the benefit cuts which the German Bundestag passed in 1999 as part of the Riester-Reform by restricting the growth of pension benefits in 2000 and 2001 to the inflation rate,<sup>2</sup> the increase in the contribution rate would have been limited to 26%, or 28%, depending on the specific assumptions. The benefit cuts would have slowed down the increase in the contribution rate, but the projected level would have been still ominously high. This reform has, however, been suspended after the first year. So in 2001, pension benefits grow again in line with wages net of tax.

Experts and many politicians agreed, however, that the increase in the contribution rate must be further slowed down, making further cuts necessary. To compensate for these cuts, many proposed building up a complementary funded system which every contributor finances via additional savings and this was exactly at the heart of the reform passed in spring 2001. From 2002 on, there will be a partial transition to a funded pension system combined with a reduction of the non-funded part of the pension system. Private saving for old age will be subsidized with about €10 billion a year at the final stage in order 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 saving will lower what is called “net wages” in the pension formula and hence reduce contribution rates and pension benefits.

The crisis of the pension system mainly results from the fact that Germans no longer have as many children as they used to. Instead of investing in human capital, they consume the resources necessary to raise children otherwise. The few children born will contribute to

---

<sup>1</sup> One of the main parts of the reform was to replace tying the pensions to the gross wage with tying them to the net wage.

<sup>2</sup> Besides, the state subsidy would increase financed by the newly introduced ecological tax on energy, petrol, oil, and gas.

the pay-as-you-go system when joining the working population, but they will not be able to maintain the pension benefits at the present level. Therefore, it is a reasonable approach to smooth the burden of education expenditures and pension contributions over the generations by investing the spared resources of the generations with few children into a funded pension system (Sinn and Werding 2000).

Smoothing the burden over the generations will lead to cries of support or rejections, depending on personal interests. This reform is only feasible in a democratic community when the majority of the voters will benefit from the changes.

Whether one belongs to the losers or winners of the reform depends on age. In general, older individuals will be among the losers and younger individuals among the winners. As long as the young are in the majority, reforms which lead to a partially funded system can be implemented. As soon as the elderly are in the majority, such reforms are no longer feasible. They would defend the pension formula without taking the exorbitant burdens into account which this system would imply for the working population. All the negative economic effects of increasing social security contributions, which economic councils all over the world have described for many years, would become reality. Germany's last chance for a reform is now, before the young lose their majority.

These fears are the starting point for this paper. The question is whether a majority still favors a partial transition to a funded system even without subsidies for private saving and – if yes, for how long. On the basis of a simple, theoretical approach, we use the CESifo pension model based on the demographic projections of the German Federal Statistical Office to answer these questions. This model allows us to calculate the gains and losses for alternative age cohorts. Under the assumption that all individuals from the age of 18 vote and decide non-altruistically, this model generates a well-founded projection about the political feasibility of reforms and the point of time where the German society becomes a gerontocracy.

The projection describes the time frame for the transition of the pay-as-you-go system to a partially funded system.

This paper is in the tradition of Browning (1975), who was the first to analyze the choice of contribution rates based on simple present value calculations and without taking behavioral reactions into account. In the framework of a median voter model, Browning has shown that democratic voting leads to an over-provision of social security.<sup>3</sup> Several authors have dealt with this question within the framework of more and more extensive simulation models in order to take into account the numerous interactions and interdependencies within and around the social security system. A special focus is on changes in behavior as reaction to reforms. Fehr (2000) and Hirte (1999, 2000), for example, analyze the economic effects of different reform proposals for Germany within a dynamic CGE model. Fehr quantifies the distributional and efficiency effects of some recently discussed reforms in Germany without, however, analyzing the political feasibility of the proposals. Hirte includes the question of the political feasibility into his retrospective analysis of reforms enacted during the 1990s. He also emphasizes this aspect when looking at privatizing old-age insurance where he does not find a majority for a partial or full transition to a funded system against the alternative of the pension system of 1992. This result changes only when introducing a pre-announcement period between 15 and 25 years thus altering the timing of the reforms and shifting the burden of the transition to later generations.

Galasso (1999) focuses on some demographic, economic, and political aspects of the reform debate in the United States determining for different scenarios the social security

---

<sup>3</sup> This fundamental model has been enlarged in many ways. For an overview see Breyer (1994) and Myles (1995).

system that would arise as an equilibrium outcome of an election. For given realizations of the demographic and economic variables, a system is then sustainable if it implements this equilibrium tax rate. By adopting this equilibrium concept, he abstracts from transitional aspects excluding a politically relevant aspect of the debate.

Bütler (2000) looks at reform proposals for Switzerland given the demographic situation of 2005. She analyses the feasibility of different reforms for different adjustment mechanisms as to the governmental budget constraint by identifying the losers and winners of the reforms. In this respect, our approach is similar. However, for the case of Germany, we do not stop after one year. Instead, we are interested in determining the path of the majorities for or against a reform of the pension system in order to find out when the majority shifts.<sup>4</sup> It is not only important to know whether a reform is feasible today or in the near future. It is also important to have an idea about the time period within which the reform has to be enacted. To calculate the time of shifting majorities, we choose a simple present value approach with a particular focus on the political feasibility of the discussed reform in the next decades. This allows us to concentrate on the demographic development and the consequences of having fewer children and more retirees for the political feasibility of reform proposals.

## **2. Politically feasible reforms**

The problem underlying the political feasibility of a reform which implies the partial transition to a funded system is that this reform favors generations which are not yet born and there-

---

<sup>4</sup> See also Sinn and Übelmesser (2000).

fore cannot vote and burdens the present voters. Thus, it is doubtful whether a structural majority for reform can ever be found.

The pay-as-you-go system leads to a distribution in favor of the introductory generation and at the costs of all succeeding generations. Later generations pay for earlier generations and acquire claims versus the generations following even later. But these claims always consist of only a present value of pension benefits which is too small to offset the contributions. The pension benefits of a pay-as-you-go system are always smaller than a pension resulting from an equally high investment on the capital market, because the pension system is a zero-sum game over the generations, and the introductory gains must be balanced by later losses. Only a small part of the contributions are equivalent to savings on the capital market. The rest is an implicit tax which is lost from the point of view of an individual. Today, the part of the pay-as-you-go contributions which can be called an implicit tax is about 50%, and the tendency is increasing because of the demographic development. The present value of the implicit tax which all generations bear is equal to the historical gains of the first, introductory generation. And at every moment in time in a continuous pay-as-you-go system, the present value of the then-existing claims, the implicit public debt, matches exactly the present value of the implicit taxes yet to be paid (Sinn 2000).

This shows the basic problem of the reform. A reform that respects the claims of the already retired and of those close to retirement, following the arguments of the German Council of Economic Advisors to the Federal Ministry of Economics and Research (1998) and Sinn (1999), makes the working population, which would be the first generation to be affected by the reform, carry the total implicit tax burden of the transition to a partially funded system. The implicit tax burden results from the implicit public debt which would have been serviced by all succeeding generations. A discharge can happen by introducing an explicit tax to finance the pension system or by continuing payments of contributions which, however, no longer lead to claims. In both cases, the transition generation has to carry a heavy burden.



This generation will, therefore, be against the reform. A structural majority for a partial transition to a funded system cannot be found when the situation of the retired is not changed and the present working population is the loser.

In order to find a majority for the reform, the transition period could be extended by converting one part of the implicit public debt into an explicit public debt which will be serviced later. The larger the part of the implicit public debt converted into an explicit debt, the smaller is the objection of the present working population against the transition to a funded system. But this undermines the reform. In the extreme case, the transition burden can be stretched with the help of a clever debt policy in a way which leads to a concurrence of the time path of the explicit and implicit tax burden of a continuing pay-as-you-go system (Sinn 2000). It is even possible to ease the burden of the present working population. Then, of course, a majority would be for the reform, but instead of introducing a partially funded system the pay-as-you-go system would effectively be expanded, with an explicit tax and an explicit public debt higher than the respective implicit values that would have prevailed without the reform. This reform does not achieve its intended results but leads away from a funded system.

In order to find a majority for a partial transition to a funded system, it is necessary to cut acquired claims and relieve the burden on the working population. In this case, the retired and almost retired will be against the reform, but the younger electors could be in favor of the proposed changes because these cuts might reduce the implicit-taxes to be paid by them. Young contributors who are freed from contributing to the pension system can save and build up their own pensions. They gain from the reform because the necessary savings are lower than the contributions in the present pension system.

The German government seems to have realized this. The Riester Reforms put forward in 2000 and 2001 aim at easing the burden for the younger members of the working genera-

tion by reducing the value of the already acquired claims. This is reached by no longer increasing pension benefits in line with net wages.

In this paper we analyze the feasibility of an idealized reform of the Riester type. We, therefore, clearly abstract from considering efficiency aspects of a partial transition to a funded system. This question has already been dealt with extensively in various contexts.<sup>5</sup> Our focus is on the distributional effects of a reform between different age cohorts.<sup>6</sup> We assume that the whole time path of the contribution rate without a reform is shifted in a parallel way. Starting with the year 2001, each year's contribution rate is set one percentage point below the contribution rate which would have resulted without a reform. Consequently, the pay-as-you-go pension benefits fall. 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>7</sup> It is interesting to see whether the reform finds a majority although there are no subsidies included to make the partial transition to a funded system more attractive. To say it differently, the question is whether €10 billion in subsidies are necessary for this reform to be feasible.

The distributional effects of a Riester-type reform certainly lead to changes in the behavior of the retired and the contributors. One can expect an increasing labor supply and reduced incentives for early retirement. However, these behavioral changes will not affect voting behavior because they are second-order effects which – within the framework of our marginal reform – only lead to negligible utility changes. The calculations, therefore, do not

---

<sup>5</sup> See, e.g., Breyer (1989) and Fenge (1995).

<sup>6</sup> See Besendorfer et al. (1998) who also neglect efficiency considerations and focus on intergenerational redistribution effects of various reform proposals. They, however, do not particularly analyze the feasibility of the proposals.

<sup>7</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. Thus, the concrete form of the funded system does not have any effect on the calculations of the distributional effects.

need an economic optimization model but can be done – without any loss of generality – by assuming a given behavior.

To determine whether the majority is in favor of pension cuts or pension increases, we calculate a "median age" and an "indifference age. The median age is defined as the age that splits the electors into two equally large groups when they are arranged in ascending order as to their age. One half of the electors is older than the median age, one half is younger. In the case of pension reforms which distribute between age cohorts, the median age plays an important role. A reform will be feasible if and only if the median voter votes in favor of it. The indifference age is defined in a way that the cohort with this age is not affected by a Riester-type reform. Older cohorts lose and younger cohorts win. The indifferent cohort loses as much pension claims in present value terms as it saves in contributions.

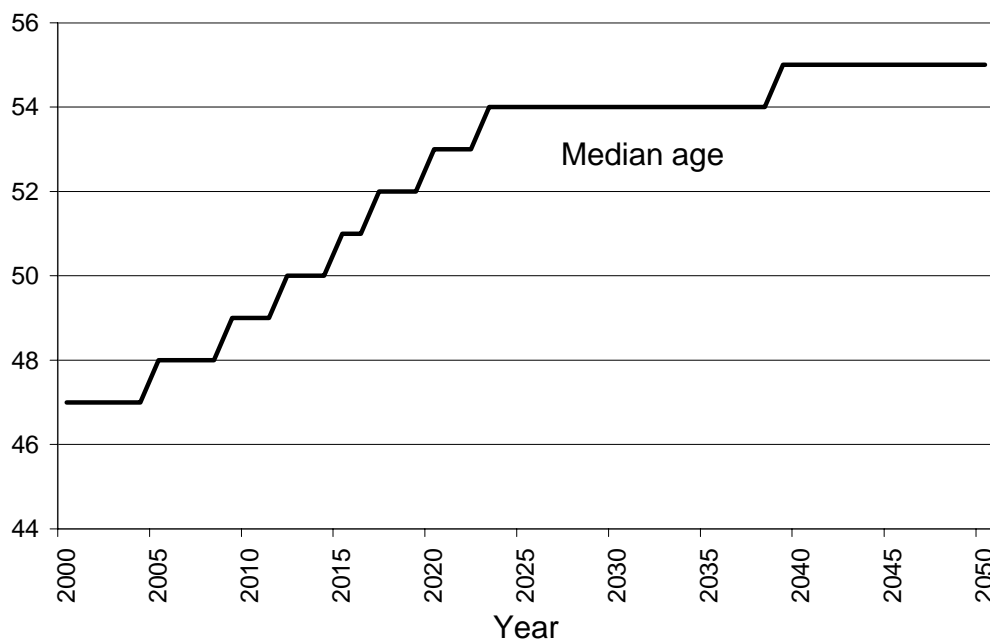
For a median age below the indifference age, the young have the majority and a Riester-type reform can be democratically enforced. The situation would be different though if the old had the majority. We calculate the median age and the indifference age for alternative calendar years to see how the chances for a reform may change in the course of time.

### **3. *The median age***

For the median age, we use the middle variant of the 8<sup>th</sup> coordinated demographic projection of the German Federal Statistical Office. We assume that the minimum voting age remains at 18 and that an identical share of voters of all age cohorts participate in the election. The projection contains information about the distribution of the population over different age co-

horts for every calendar year. With the help of this information it is possible to calculate the median age which splits the distribution of voters into two equally large parts.<sup>8</sup>

Figure 2: *The median of the age distribution of the eligible voters*



Legend: The data are based on German citizens of the year 2000, their descendents, and naturalized foreigners.

Source: Statistisches Bundesamt (1994), Statistisches Bundesamt (1997), own calculations.

According to our calculations, the median age of German voters is currently 47 years. There are as many voters younger as older than 47. A party that represents the interests of the 47-year old has a strategic majority compared to other parties. Of course, the median age is changing rapidly because of the already mentioned decrease in fertility and increase in life expectancy. This demographic development will shift the age distribution of the German population to higher and higher levels in the course of the next decades. Figure 2 dis-

<sup>8</sup> One difficulty of the calculations is the question how the result changes by allowing for immigration and naturalization. We assume a yearly migration surplus of 200 000 according to the middle variant of the demographic projections of the German Federal Statistical Office, and a yearly rate of naturalization of 4% of the given foreign population. This corresponds to the average rate of naturalization of the years 1994-1997. We further assume that the voting behavior of a foreign-born is identical to a German-born as to the evaluation of pension reforms.

plays the time path of the median age from 2000 to 2050. It can easily be seen that the median age is 50 in 2012 and goes up to 54 in 2030. In 30 years, the decisive age cohort will be seven years older than today. This will strengthen the position of those who are in favor of an extension of the present pay-as-you-go pension system.

#### **4. *The indifference age***

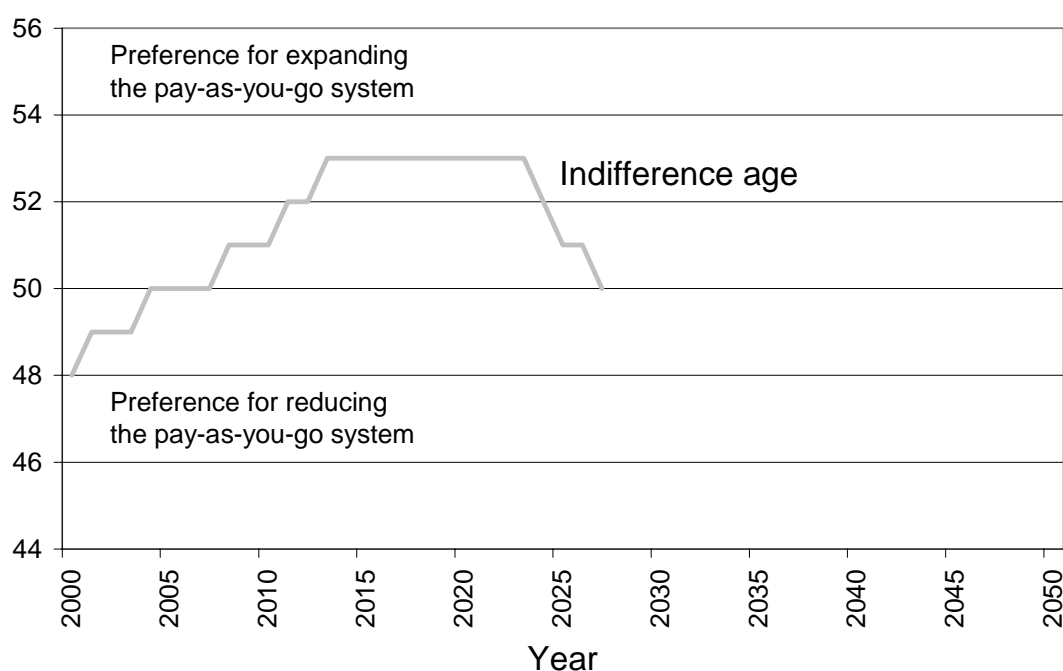
To calculate the indifference age, we use the CESifo pension model which has already served as the basis for the calculations of the German Council of Economic Advisors to the Federal Ministry of Economics and Research (1998). This model also relies on the middle variant of the 8<sup>th</sup> coordinated demographic projection of the German Federal Statistical Office. Some additional assumptions have been made such as a growth rate of 2% of the net wages and a strict equivalence between contributions and pension benefits.

We calculate the effects of a cut in contributions for alternative age cohorts and calendar years. A special focus is on the effect of the cut in contributions on a generation's present value of the cash flow which accrues from the chosen calendar year until the expected year of death. For a positive present value, we assume a vote in favor of the reform and for a negative present value, we expect a vote against the reform. As already mentioned, we assume that the contribution rate in this and in all succeeding calendar years is one percentage point below the contribution rate without any reform and that the pension benefits are adapted accordingly.

Until retirement age, this reform eases the financial burden of the contributors. After retirement, however, the retirees face lower pension benefits. For a young cohort, the positive effect on the contributions dominates, because, as explained above, a normal generation in an ongoing pay-as-you-go system faces a net loss in present value terms which matches the introductory gains. However, for a cohort close to the retirement age, the negative effect on

pension benefits dominates. The cohort for which 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 3.

Figure 3: *The indifference age*



Source: Statistisches Bundesamt (1994), own calculations.

In 2000, the indifference age was 48. Younger individuals should demand a cut of pay-as-you-go benefits. The lower these benefits are, the easier it is for the younger individuals to get rid – at the cost of the older individuals – of the implicit tax in the contributions. Conversely, individuals older than 48 should be in favor of an extension or at least of the maintenance of the present level of the pay-as-you-go system. The higher the contribution rate, the higher are the pension benefits and the higher is the part of the implicit tax burden which can be shifted to the younger contributors.

The indifference age will increase by five years until 2013. This increase results from the growing demographic crisis. The number of retirees rises more and more relative to the number of contributors. This deteriorates the situation of the contributors around the age of 50 and leads to a rising number of contributors who prefer to abolish the pay-as-you-go system.

The indifference age reaches a maximum of 53 in 2014 and falls from 2024 on. Those who are 53 in 2024 can be more optimistic concerning their pensions. They know that they will retire at the peak of the pension crisis, but they also know that the situation will relax in the years to come. This makes this cohort hope for higher pension benefits relative to the incomes than the pension benefits for these cohorts that retire at the beginning of the 2030s.

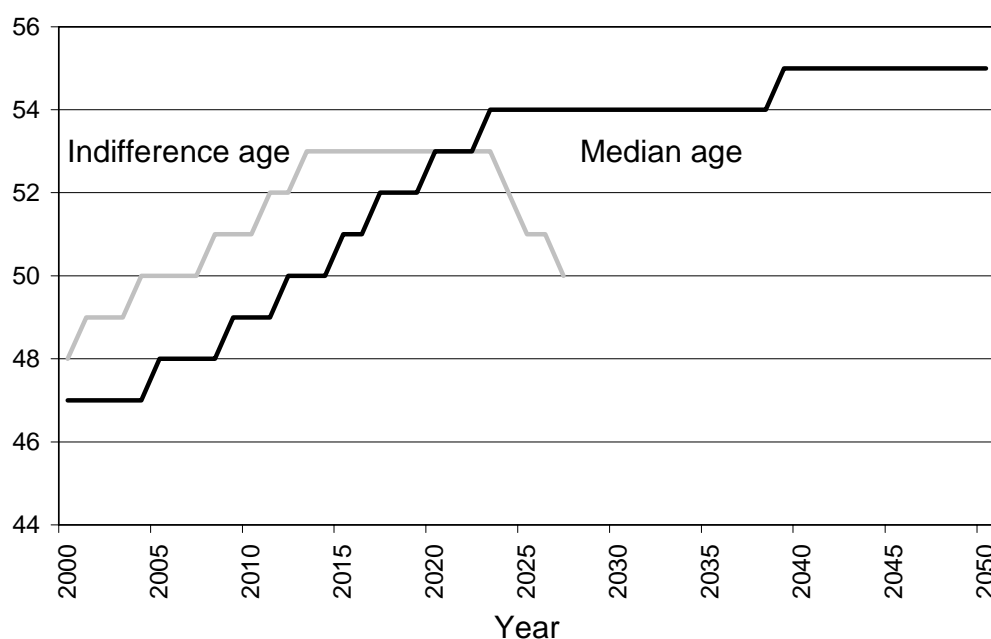
### **5. *Germany's last chance***

A comparison of Figures 2 and 3, as displayed in Figure 4, shows that the indifference age today and up to the middle of the second decade of the new millennium exceeds the median age. Thus, in a sense, the young outweigh the old, and there is a majority for a Riester-type reform towards a partially funded pension system even if the subsidies of €10 billions a year were not granted. The majority, however, is slight. According to our calculations, 53.2% of the eligible voters gain from such a reform whereas 46.8% lose.

This majority will, however, vanish around 2023, as Figure 4 shows, when the time path of the median age cuts the time path of the indifference age from below. In 2027, the median age will already exceed the indifference age by 4 years and the majority of those who are in favor of an extension of the pay-as-you-go system will be 55.5%. Then, Germany gets trapped in its pension system, unable to further reforms in the direction of funding. In fact, the country will have reached a situation which can be called a gerontocracy.

The reason for why Germany gets trapped can be seen in a phase-shifting between both curves. The curve of the median age reflects more or less the curve of the dependency ratio of the German population (see Figure 1). The curve of the indifference age anticipates, however, the curve of the dependency ratio and displays the end of the pension crisis earlier because the situation during the retirement period is part of the calculations of the indifferent individual. Thus, there is a period after the year 2023 where the group of people who put their hope in the pension system outweighs those who fear this system, and in this period a funding of pensions which effectively comes along with a pension cut, will be difficult if not impossible.

Figure 4: *Germany's last chance*



Source: Statistisches Bundesamt (1994), Statistisches Bundesamt (1997), own calculations.

## 6. Concluding remarks

For Germany, the beginning of the 2020s of the new millennium – to be more precise the year 2023 – will be very decisive because this is Germany's last chance for a partial transi-



tion to a funded pension system. After 2023, the country will be characterized by a gerontocratic system where the old decide over the young. Only the fear that the young might emigrate – and perhaps a certain altruistic attitude towards their own descendants – might prevent the old from exploiting the young.

Of course, it is possible that many people do not understand what is going on and do not know whether they belong to the winners or losers of a pension reform. Therefore, clever parties might succeed in tricking many voters 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 year of Germany's last chance, the more difficult it will be to fight politically against the strategic majorities which will result from the ageing of the German population. Substantial pension reforms which prevent the collapse of the system should therefore be executed immediately. With each year, the strategic majority for the pension reform shrinks.

### **References**

Besendorfer D., C. Borgman, C. and B. Raffelhüschen (1998), "Ein Plädoyer für intergenerative Ausgewogenheit: Rentenreformvorschläge auf dem Prüfstand", *ifo Studien* 44, 209-231.

Breyer, F. (1989), "On the intergenerational Pareto efficiency of Pay-as-you-go financed pension schemes", *Journal of Institutional and Theoretical Economics* 145, 643-658.

Breyer, F. (1994), "The political economy of intergenerational redistribution", *European Journal of Political Economy* 10, 61-84.

- Browning, E.K. (1975), "Why the social insurance budget is too large in a democracy", *Economic Inquiry* 13, 373-88.
- Bütler, M. (2000), "The political feasibility of pension reform options: the case of Switzerland", *Journal of Public Economics* 75, 389-416.
- Bundesausländerbeauftragter (2000), *Entwicklung der Gesamtzahl der Einbürgerungen von 1994 bis 1997*, <http://www.bundesauslaenderbeauftragte.de/fakten/tab13b.htm>.
- Galasso, V. (1999), "The U.S. social security system: What does political sustainability imply?", *Review of Economic Dynamics* 2, 698-730.
- Fehr, H. (2000), "Pension reform during the demographic transition", *Scandinavian Journal of Economics* 102, 419-443.
- Hirte, G. (1999), "Raising the retirement age - why should anybody lose?", *Jahrbücher für Nationalökonomie und Statistik* 219, 393-408.
- Hirte, G. (2000), "Privatizing old-age insurance - economic effects and political feasibility", *Diskussionsbeiträge der Katholischen Universität Eichstätt*, Wirtschaftswissenschaftliche Fakultät Ingolstadt, No. 138.
- Myles, G. D. (1995), *Public Economics*, Cambridge University Press, Cambridge, New York, Melbourne.
- Sinn, H.-W. (1999), "Die Krise der Gesetzlichen Rentenversicherung und Wege zu ihrer Lösung", *Jahrbuch 1998 der Bayerischen Akademie der Wissenschaften*, Beck Verlag, München, 95-119.

- Sinn, H.-W. (2000), "Why a funded system is useful and why it is not", *International Tax and Public Finance* 7, 389-410.
- Sinn, H.-W. and M. Thum (1999), "Gesetzliche Rentenversicherungen: Prognosen im Vergleich", *Finanzarchiv* 56, 104-135.
- Sinn, H.-W. and Übelmesser S. (2000): " Rentenreform, strategische Mehrheit und demographische Entwicklung: Wann kippt Deutschland um?", *ifo Schnelldienst* 28-29, 20-25.
- Sinn, H.-W. and M. Werding (2000), "Rentenniveausenkung und Teilkapitaldeckung", *ifo Schnelldienst* 53 (18), 12-25.
- Sommer, B. (1994), "Entwicklung der Bevölkerung bis 2040", *Wirtschaft und Statistik* 7, 497-503.
- Statistisches Bundesamt (1994), *Achte koordinierte Bevölkerungsvorausberechnung*, Variante 2, Wiesbaden.
- Statistisches Bundesamt (1997), *Fachserie 1 "Bevölkerung und Erwerbstätigkeit" Reihe 2(j)*, Wiesbaden.
- Thum, M. and J. v. Weizsäcker (2000), "Implizite Einkommensteuer als Meßlatte für die aktuellen Rentenreformvorschläge", *Perspektiven der Wirtschaftspolitik* 1, 453-468.
- Wissenschaftlicher Beirat beim Bundesministerium für Wirtschaft (1998), *Grundlegende Reform der gesetzlichen Rentenversicherung*, Bundesministerium für Wirtschaft, Bonn.