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ABSTRACT: Using data from the social survey ALLBUS for West Germany in the period 1980 to 2006, this paper demonstrates that union members are on average older than non-unionized employees. The probability of being unionized shows the inverted U-shaped pattern in age conjectured by Blanchflower (BJIR 2007) only in very few years. It is demonstrated that both intra-cohort change and cohort replacement effects have played a roughly equal role in the substantial fall in union density since 1980. If older cohorts with high densities continue to be replaced by young cohorts with low densities, average union density will fall further.

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The unions are big business, friend,
And they're goin' out like a dinosaur.
Bob Dylan (Union Sundown, 1983)

1. MOTIVATION

In the German system of corporatism, trade unions are given an important economic and political role, and in some sense they really are "big business" as termed by Bob Dylan. Due to the autonomy in collective bargaining granted in the constitution, unions and employer associations largely determine wage setting and thus influence the level of employment. Both "social partners" are involved in managing social security and the Federal Employment Agency, which enables them to influence labor market policy. German labor courts rely on lay judges nominated by unions and employers, and the social partners are actively involved in shaping labor legislation. In the German system of codetermination, unions are given seats on the supervisory board of large firms, and they have the right to initiate the election of works councils at establishment level.

Against this background it is important to note that today German unions are in a precarious state. Total union membership in West Germany peaked in 1981 and has fallen ever since. Since 2001 total membership in united Germany has been lower than it was in West Germany before unification. Union density too has fallen substantially. Representative data from the German general social survey ALLBUS (described below) paint a bleak picture: Whereas in 1980 one in three employees belonged to a union, by 2006 this was true of just one in six employees in West Germany. Figure 1 shows that while union density of men is about twice as high as that of women, the negative trend in density is observed for both sexes alike. It is an open – though politically incorrect – question whether such a low rate of unionization is consistent with a corporatist model requiring encompassing trade unions and whether the German labor movement will be able to reverse the negative trend.[1]

(Figure 1 about here)

[1] While the majority of German workers are still covered by union contracts, bargaining coverage has also been falling for years. For a comprehensive discussion of the evidence and its implications see Addison et al. (2007) who also provide figures for crumbling union density in East Germany.

The reasons for this dramatic fall in unionization are still open to debate. Explanations range from adverse economic developments (such as business cycle effects) through political factors and intra-organizational problems to structural or compositional factors (such as de-industrialization) that work against unionization.[2] Aggregate time-series analyses for West Germany have indicated that business cycle variables such as wage and price inflation and unemployment influence union membership growth (see Armingeon 1989; Schnabel 1989) and that the composition of the labor force also seems to play a significant role in explaining long-run trends in unionization (Carruth/Schnabel 1990). Cross-sectional and panel analyses using individual-level data on union and non-union employees have identified a number of personal and occupational characteristics (such as sex, political orientation and employment status) as well as firm characteristics (such as establishment size) that are related to the probability of union membership (see, e.g., Beck/Fitzenberger 2004; Goerke/Pannenberg 2004, 2007; Schnabel/Wagner 2005, 2007; Fitzenberger et al. 2006; Biebeler/Lesch 2007). However, significant covariates often differ widely between (and even within) studies depending on the data set and the years analysed and on the econometric specification used. Recently, two decomposition analyses found that – contrary to widespread perceptions – changes in the composition of the workforce have only played a minor role for the de-unionization trend in Germany (see Fitzenberger et al. 2006; Schnabel/Wagner 2007).

One aspect that has received scant attention in analyses of falling union density in Germany is age. While an age variable is usually included as a covariate in individual-level analyses of membership probability, its estimated coefficient is seldom interpreted in detail. In particular, the empirical regularity identified by Blanchflower (2007), that in many countries the probability of being unionized follows an inverted U-shaped pattern in age, has not yet received much attention and testing in Germany. One reason for such a U-shape and for declining union density could be cohort effects. It is well possible that due to special economic or socio-political conditions the probability of joining a union (and the probability of staying there) was higher in some years or decades and that the observed fall in union density partly reflects the labor market exit of such cohorts. While the failure of unions to recruit young people and the aging of their membership has been identified as a serious problem to labor movements in post-industrial welfare states (see, e.g.,

[2] Detailed discussions of variations in union membership and density are provided by Fichter (1997) and Ebbinghaus (2003).

Ebbinghaus 2006), cohort effects in union membership have not been analyzed yet in detail in Germany.[3]

This suggests that an investigation on the various effects of age on unionization may be worthwhile. We proceed as follows: After a brief discussion of the relationship between age and the probability of being a union member in section 2, estimations of union membership functions that test the Blanchflower (2007) conjecture for West Germany are presented in section 3. Section 4 discusses cohort effects in unionization and decomposes the overall decline in union density into an intra-cohort change and a cohort replacement effect. Section 5 discusses implications of our findings and concludes.

2. THE RELATIONSHIP BETWEEN UNIONIZATION AND AGE

Variables reflecting the age (or the years of work experience) of individuals have been included in many cross-sectional studies of unionization in Germany and other countries.[4] The international empirical evidence is somewhat mixed, with many estimated coefficients not being statistically significant, but in general the relationship between age and union membership tends to be positive or concave (i.e. increasing at a decreasing rate and possibly falling at the end). For Germany, Biebeler/Lesch (2007) and Schnabel/Wagner (2007) report a positive relationship while Beck/Fitzenberger (2004) and Goerke/Pannenberg (2007) find a concave impact of age that – according to Fitzenberger et al. (2006) – seems to become less concave over time.

In a recent empirical investigation of international patterns of union membership covering 38 countries, Blanchflower (2007: 1) documents "an empirical regularity not hitherto identified": Using various sets of micro data at the level of individuals and estimating separate union membership regressions for each country, he finds that the probability of being unionized follows an inverted U-shaped pattern in age, maximizing in the mid- to late 40s in 34 of the 38 countries studied. For West and East Germany he reports a maximum in unionization at age 43. Although the specifications estimated are not fully documented, seem to differ across countries, and

[3] In a case study of the German metalworkers' union, Hassel (2007) presents the age distribution of IG Metall members, which has shifted to the right between 1979 and 2002, and she points out that the union has stabilized its membership by maintaining a large cohort of members who were already members 20 years ago. Böckerman/Uusitalo (2006) show that the decline in union density in Finland can partly be attributed to the declining inclination of the cohorts born after the early 1960s to become union members.

[4] For a survey of theoretical models of unionization and of the empirical evidence, see Schnabel (2003).

seem to contain fewer control variables (such as gender and education) than usually employed, this finding by Blanchflower (2007) is interesting and calls for an explanation (as well as for further investigation).

There are various reasons why the relationship between age and unionization may be positive. Since family ties and specific human capital increase with age, older workers are more interested in job security and therefore in union membership as an implicit insurance (Fitzenberger et al. 2006). Younger workers may be more difficult to organize because in Germany they are often trained in small- and medium sized firms where union representation is lower (Schnabel/Wagner 2005). In addition to such life-course phenomena, period or cohort effects can also play a role. Today's youths may have experienced a different socialization than former generations as well as changes in social customs which both may have resulted in lower identification with unions (that are often regarded as old-fashioned movements). Compared to earlier periods and older age groups, they have more difficulty in finding an apprenticeship and/or a job, they obtain more often atypical employment contracts, they engage more frequently and longer in tertiary education, and they increasingly work in white-collar and service sector jobs, all of which reduces the probability of union membership (Ebbinghaus 2006).

What is more difficult to explain is the Blanchflower (2007) finding that the probability of being unionized peaks in the mid- to late 40s and falls thereafter. One obvious explanation could be that there are simply cohort effects at work here. Addressing that question for the United States and the United Kingdom, Blanchflower (2007) finds that cohort effects exist but that removing the cohort effects does not remove the inverted U-shape in age (although it does flatten it somewhat).

Turning to explanations referring to labor demand, Blanchflower (2007) suggests that seniority wage profiles paying older union workers above and younger workers below the values of their marginal products give an incentive to employers to replace older unionized workers with younger workers who are often not unionized (although this argument neglects negative reputation effects). Similarly, if union members are disproportionately employed in manual occupations with heavy work that results in deteriorating health, they (and the firms where they are employed) will be more likely to make use of the generous schemes for early retirement available in Germany. Union workers are also disproportionately employed in older workplaces and traditional industries, which have been subject to increased international competition. When this results in downsizing or plant closing, union members may have difficulties in finding new jobs and may leave the unions while being unemployed.

Other potential explanations put forward by Blanchflower (2007), which refer to the changing behavior of individuals over the life-cycle, are that older workers increasingly free-ride as they age, that they are promoted to managerial jobs usually not associated with union membership, and that older workers have less need for unions, for instance because of higher employment protection for older workers provided by law or labor courts. Put more generally, the interest in union representation may fade out once employees know that they have established themselves successfully in the labor market (see also Fitzenberger et al. 2006).

3. Unionization and age in West Germany

In the following, the relationship between unionization and age is investigated using data that are taken from various waves of the ALLBUS, the German general social survey. This survey has been conducted every second year since 1980, and for a nominal fee the data are available for scientific research. Note that the ALLBUS data sets are not part of a panel study; for each wave an independent random sample is drawn covering people aged 18 years or more.[5] We look at individuals who were 18 to 64 years old and who were working full time or part time, either as blue-collar workers, white-collar workers (except top managers) or civil servants (*Beamte*). Foreigners are excluded here because they were not covered in the years before 1991 and because they form a small and rather heterogeneous proportion of the samples. We focus on West Germany because of the special modalities of quasi-automatic union recruitment in East Germany before and after unification[6] and because this enables us to cover a longer period of observation. We conduct separate analyses for male and female employees to take into account the

[5] For additional information on the ALLBUS, see Terwey (2000). Data on union membership can also be found in several waves of the German Socio-Economic Panel (GSOEP) since 1985 and have been employed in various econometric studies, e.g. by Beck/Fitzenberger (2004), Goerke/Pannenberg (2004, 2007), and Fitzenberger et al. (2006). We use the ALLBUS data instead of the GSOEP for three reasons: First, we can cover a longer period of observation. Second, since the survey is conducted every second year, analysis of cohort effects is made easier. Third, while a panel design would allow us to look at the entry into and the exit out of unions, union status switchers tend to be rare in the samples, and the use of panel econometric methods to control for unobserved heterogeneity has to rely heavily on information from this small subgroup. However, we see our study as a complement and not as a substitute for investigations of unionization in Germany based on the GSOEP data.

[6] For details on the takeover model applied by the Deutscher Gewerkschaftsbund (DGB), see Fichter (1997, p. 86) who states: "In principle, all West German unions adhered to the rule of individual enrollment. But in practice, it was often disregarded. … Indeed, not a few East Germans became members of a DGB union without really knowing it and without having time to make a conscious decision for or against." Econometric analyses of unionization in East Germany are provided by Schnabel/Wagner (2003, 2007) and Fitzenberger et al. (2006).

different work histories of men and women and the lower labor force attachment of women which both can be expected to affect union membership differently.

(Table 1 about here)

A descriptive analysis of the relationship between union membership and age that shows up in our data set is presented in Table 1 for the years 1980 and 2006 which form the beginning and the end of our observation period. For both points in time it can be seen that union members are on average older than non-unionized employees in West Germany. However, this difference does not exceed three years, and it is not statistically significant for women. The average age of union members has increased from 41.3 years in 1980 to 44.2 years in 2006 for men and from 38.5 to 43.8 years for women. This increase is somewhat stronger than the rise in the average age of non-unionized employees. This has a parallel in the age distribution where union members in 2006 are clearly overrepresented in the age class 51 to 64 in comparison to non-unionized employees. Taken together these descriptive results indicate that unions are composed of relatively old employees and are "graying" over time.[7] Only a multivariate analysis, however, will enable us to see whether an age-membership relationship does also show up when controlling for other factors that may influence unionization.

Table 2 presents the results of estimating standard union membership functions for West Germany where the dependent variable is a dummy for being a union member or not (descriptive sample statistics are shown in an Appendix Table). Our main focus here is on the age-membership nexus and the Blanchflower (2007) conjecture which is tested by including an age variable and its square into the probit regressions. In addition, we employ a number of control variables which are standard in union membership analyses and which will not be discussed here in detail. These include personal characteristics of employees (such as formal qualification, working full- or part-time, and political attitudes), occupational status (being a blue-collar worker or a civil servant, working in the public sector), and family background (father being a blue-collar worker).[8] It can be seen from Table 2 that most of these

[7] This corroborates descriptive evidence on the changing age structure of the metalworkers' union IG Metall between 1979 and 2002 presented by Hassel (2007).

[8] For a discussion of various theories from economics and other social sciences that motivate the inclusion of these variables in the empirical model, see Schnabel/Wagner (2005). Using the same set of data, Schnabel/Wagner (2005) found firm size to be another significant explanatory variable in 1980. Since this variable is not available in our data in 2006, we decided not to include it in all estimations. Results of estimations not reported here indicate that the inclusion of firm size in 1980 would not change our inferences.

control variables are statistically significantly related to the probability of being a union member in at least one of the models estimated but that none of the variables is significant in every year and for both men and women. It is also obvious that the empirical model works better for men than for women, for which the entire regression is insignificant in 2006.

(Table 2 about here)

Turning to our main variables of interest, the estimations in Table 2 show that for men there is a significant age-membership relationship in 1980, which is much weaker in 2006. Wald tests indicate that the age variables in linear and squared form are jointly significant at the 1 percent level in 1980 and at the 10 percent level in 2006. Using the estimated coefficients to simulate this relationship, it is found that in 1980 the estimated probability of being unionized reaches a maximum for men at the age of 51, which reflects an inverted U-shape. If the estimated coefficients for 2006 are used for simulations (despite their individual insignificance), the estimated maximum lies outside the range of ages observed, so that an inverted U-shape no longer can be found.[9] For women the age variables are completely insignificant in both years.

To investigate the relevance of age variables and the presence of an inverted u-shape more closely, we estimate union membership functions with the specification used in Table 2 for all years between 1980 and 2006 for which data are available from the ALLBUS surveys. Table 3 reports the estimated marginal effects of age and age squared from these membership functions for men and women as well as the results of Wald tests of joint significance of both variables. These Wald tests indicate that for men age does play a role in most years (at a significance level of 5 or 10 percent), whereas for women this is usually not the case. If we consider a positive coefficient of the age variable and a negative coefficient of the age squared variable as evidence for the Blanchflower (2007) conjecture, for men this conjecture can only be confirmed in 1996 and 2000 at the 5 percent level (and in 1982 at the 10 percent level). For women, corresponding empirical evidence is only found in the years 1998 and 2004. Note that according to the results reported in Table 3 the effect of age on union membership does not seem to follow a uniform pattern over time – neither the estimated marginal effects nor the statistical significance of the estimated effects decrease or increase in the period under investigation.

[9] This finding corresponds to evidence from a union survey conducted in 2005 indicating that the propensity to leave the metalworkers' union is significantly lower for older union members (see Pyhel 2006).

(Table 3 about here)

All in all, these results show that in West Germany an age-unionization relationship mainly exists for men and that the Blanchflower (2007) conjecture of an inverted U-shape in age can only be confirmed in very few years. Potential reasons for these differing results could be that we employ more control variables, use a different data set and investigate a more recent period than Blanchflower (2007). Evidence regarding an inverse U-shape and information on its statistical significance might also be difficult to interpret when samples are relatively small and when there is collinearity between the age variables in linear and squared form.

4. COHORT EFFECTS IN UNIONIZATION

The drastic decline in union density, the differences in the age of union and non-union members, and the varying age effects on the probability of being unionized identified in the previous sections suggest that it may be worthwhile to have a closer look at unionization according to birth cohorts. From the perspective of cohort analysis, the fall in union density could be due to age effects, period effects, or a combination of both, and it may reflect intra-cohort changes as well as cohort replacement effects (for details, see, e.g., Firebaugh 1997, chs. 2 and 4). The age effect refers to changes in the propensity to unionize that are related to aging or life-cycle status of individuals, which were discussed in section 2. The period effect reflects changes in unionization produced by general events or processes associated with the historical era (such as German unification or business cycles). For a given cohort, individual-based changes in unionization over time can be due to age and/or period effects. For different cohorts, cohort effects arise from the unique experiences and socialization of each cohort (such as a good or bad economic situation when entering the labor market)[10] as well as from the unique reaction of each cohort to the same historical events (say, the unification boom in 1990). All of these effects may have influenced individuals' decision to join or leave a trade union and would be reflected in union densities which vary over time and between birth cohorts.

[10] Studies with micro data show that the vast majority of union members join the union during their first years of employment, and that the probability of leaving the union is also highest in the first years of membership (see Visser 2002). Cohort effects therefore reflect particularly conditions at an early stage in the life course.

(Table 4 about here)

Table 4 presents calculations of union density for seven birth cohorts (or quasi-cohorts) that were created by pooling the data of employees who were born within periods of ten years. The first of these periods comprises the years from 1916 to 1925 and the last covers the years from 1976 to1985.[11] For our period of observation ranging from 1980 to 2006, union density of each of these cohorts and of all employees is shown in intervals of two years. It can be seen that between 1980 and 2006 average union density of all cohorts fell from 39.6 percent to 23.2 percent for male employees and from 20.3 to 11.3 percent for females (as expressed graphically in Figure 1).

Looking at birth cohorts and following these over time, we see that for almost all cohorts union density is lower at the end than at the beginning of our observation period. In between, unionization rates fluctuate considerably, sometimes expressing a concave shape. Taking the male birth cohort 1956 to 1965 as an example, union density first increases from 31 percent in 1980 (when many of these employees may have entered the labor market) to 39 percent in 1986, but then slowly declines to 27 percent in 2006. However, in this and other cohorts, the decline is less pronounced than the overall fall in density. This suggests that in addition to individual-based intra-cohort change (which may reflect age and/or period effects) differences in unionization between cohorts also play a role.

Looking at union density in different cohorts at the same point in time, it can be seen for men and women alike that in almost each year the youngest birth cohorts have a union density which is below average. Moreover, the youngest cohorts usually record a lower union density than the oldest. In 1990, for example, union density is 24 percent in the female birth cohort 1926 to 1935 and just 16 percent in the cohort 1966 to 1975 (the corresponding values for males are 44 and 25 percent, respectively). However, the relationship does not seem to be linear and constant over time. What becomes obvious when comparing the situation at the beginning and the end of our observation period is a cohort replacement effect for men and women: In 2004 and 2006 two cohorts with high union density in 1980 have left the labor market and were replaced by two cohorts with low density, which is reflected in lower average density.

[11] Note that we do not have a panel but make use of repeated cross-sectional surveys. For a discussion of the advantages and disadvantages of both methods, see Firebaugh (1997, p. 2ff.).

The overall decline in union density can be interpreted as the sum of these two effects – the cohort replacement and the intra-cohort change. In order to unveil the contribution of these two effects to the overall decline, we now apply a linear decomposition approach which consists of two steps (see Firebaugh 1997, p. 24ff.). In the first step, a linear probability model is estimated using pooled data from the 14 ALLBUS surveys for 1980 to 2006 with a dummy variable indicating the union membership status of person i in year t, $UNION_{it}$, as the endogenous variable and two exogenous variables, the year of measurement of respondent i in survey t, $SURVEY_{it}$, and the birth year of person i in survey t, $BIRTH\ YEAR_{it}$ (e_{it} denotes an error term):[12]

$$UNION_{it} = b_o + b_1 * SURVEY_{it} + b_2 * BIRTH\ YEAR_{it} + e_{it} \qquad (1)$$

The coefficient b_1 estimates change with the cohort (BIRTH YEAR) controlled for (i.e. the *intra*-cohort slope), while b_2 is the *inter*-cohort slope – the average difference between adjacent cohorts. Note that linear decomposition assumes linearity for both the intra- and the inter-cohort slopes.

The second step uses the estimates for the regression coefficients b_1 and b_2 to compute the contributions of intra-cohort change and cohort replacement to the overall change in union density over time. Intra-cohort change *per year* is measured by b_1, so b_1 multiplied by 26 (the number of years covered by our data ranging from 1980 to 2006) gives us the estimated contribution of intra-cohort change. To estimate the contribution of cohort replacement, b_2 is multiplied by the change in the birth-year mean from the first to the last survey (i.e. the average birth year of all individuals taken from the ALLBUS 2006 minus the average birth year of all individuals taken from the ALLBUS 1980).[13]

The empirical model (1) was estimated separately for 9,430 men and 6,097 women. For men the results are as follows (robust t-values in parentheses):

$$UNION_{it} = \underset{(9.36)}{11.02} - \underset{(3.23)}{0.0024} * SURVEY_{it} - \underset{(6.98)}{0.003} * BIRTH\ YEAR_{it} \qquad (2)$$

[12] Note that this approach treats cohort as continuous (birth year) rather than grouping birth years in cohorts of ten years as in Table 4.

[13] For a formal proof that the components computed according to the formula given in fact sum to total change when relations are additive and linear, see Firebaugh (1997, p. 25f.). He also points out that while in an application the two components computed this way typically do not sum exactly to the overall change, the discrepancy should not be too large, because large differences call into question the linear-additive assumption and signal that this method should not be used.

From this estimated equation the contribution of intra-cohort change is -0.062 (computed as -0.0024 * 26) and the contribution of cohort replacement is -0.073 (computed as -0.003 * (1964.27 – 1939.84). The sum of the two effects is -0.135 which can be considered to be reasonable close to the observed overall change in union density for men over the time span considered here which is -0.164 (computed as 0.232 – 0.396).

The results for women are as follows (robust t-values in parentheses):

$$UNION_{it} = \underset{(4.18)}{4.96} - \underset{(1.81)}{0.0013} * SURVEY_{it} - \underset{(2.56)}{0.001} * BIRTH\ YEAR_{it} \qquad (3)$$

Applying the same decomposition method as for men, the contribution of intra-cohort change is -0.034 and the contribution of cohort replacement is -0.024. These two estimated effects sum to -0.058, while the observed total effect is -0.090. Since this discrepancy is much greater than in the case of men, casting some doubt on the validity of the linear-additive assumption made, the effects for women should be interpreted with a pinch of salt.

Despite this qualification, it seems safe to conclude that both intra-cohort change and cohort replacement effects have played a role in the decline of union density in West Germany since 1980. A rough estimate would be that each of the two effects explains about half of the total effect.

5. Conclusions

Using data from the German social survey ALLBUS in the period 1980 to 2006, this paper has demonstrated that trade unions are composed of relatively old employees and that union members are on average older than non-unionized employees in West Germany. Contrary to the Blanchflower (2007) conjecture, the probability of being unionized shows an inverted U-shaped pattern in age only for men in 1996 and 2000, and for women in 1998 and 2004. Using cohort analysis, it has been shown that both intra-cohort change and cohort replacement effects have played a roughly equal role in the substantial fall in union density since 1980. Within a birth cohort, union density tends to be lower when people are older, and across cohorts the youngest birth cohort usually records a lower union density than the oldest. Since in the last years cohorts with relatively high union densities have left

the labor market and were replaced by cohorts with lower densities, this has contributed to falling overall union density.

The potential reasons for union cohort effects in Germany are manifold and have not been investigated yet in detail. For instance, younger birth cohorts may have experienced a different socialization and education than older generations resulting in lower identification with unions.[14] The labor market situation also has changed considerably from full employment in the 1960s and early 1970s to mass unemployment since the 1990s, which could have influenced cohorts' propensity to unionize. In addition, the tertiarization of the economy with the rise of white collar, service sector and atypical employment may have played a role (see also Ebbinghaus 2006). Finally, changes in the *Zeitgeist* and in the image of mass organizations such as unions may have affected the willingness to unionize negatively.[15] This list of potential factors of influence is far from complete, and there is certainly scope for additional research by economists, sociologists and political scientists.

Cohort effects pose a serious problem for German unions for at least two reasons which are related to the union density and the size of future cohorts entering the labor market: First, if the process identified above goes on and older cohorts with high union densities continue to be replaced by young cohorts with low densities, this implies that average union density will fall further. Of course changes in the *Zeitgeist* may alter the attitudes towards unions and thus increase individuals' propensity to unionize across all cohorts, or union recruitment efforts targeted at young employees may be successful. Even in this case, however, the relatively low densities of the young cohorts that will be in the labor market for another two or three decades (shown in Table 4) mean that unionization will be dampened and will not recover easily. Second, and probably even more important, due to demographic change in Germany future cohorts of potential union members will be smaller than the cohorts of employees which they replace (see Fuchs/Dörfler 2005). This means that even if union density of new cohorts was the same as that of exiting cohorts,

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[14] An indication for such a socialization effect could be that in Table 2 the variable reporting whether the father of a male employee was a blue-collar worker shows a (marginally) significant relationship with the probability of being unionized in 1980 but is insignificant in 2006.

[15] In this context it is interesting to see that in a series of repeated opinion polls by *Institut für Demoskopie Allensbach* the percentage of West German respondents who were satisfied with the way trade unions represent the interests of employees fell from 40 percent in 1979 to 30 percent in 2002 (we would like to thank the institute for providing these data). In a more recent survey conducted by *GfK Custom Research* in 2007, 54 percent of respondents in Germany regarded trade unions as very or quite untrustworthy, whereas the respective percentages for the fire service and the police were just 2 and 17 percent (see GfK Custom Research press release January 11, 2008).

the smaller size of new cohorts would result in a fall of total union membership and probably even of overall union density (if exiting cohorts have an above-average density).

While unions will not be able to influence demographic change, intensifying recruitment efforts among the probably rising number of immigrants could be a way to compensate for the falling number of German employees. Furthermore, unions must approach young employees as soon as possible (e.g. in vocational training), listen to their individual needs and make attractive offers to convince them to join the union. While such a strategy (that has already been applied by some unions in recent years) is quite expensive, it may pay off if these cohorts of young employees become strongly unionized and if the young recruits stay in the union and in the labor market for a long period of time.

Falling and low density figures call in question the unions' claim to represent the interests of all employees. Given fixed costs of running the organization, falling membership figures also imply that the financial problems of German unions will become even more serious. Taken together, both trends mean that unions will find it increasingly difficult to play the important political and economic role which they still occupy in the German system of corporatism. We do not know whether there exists a minimum critical mass of membership or density below which union existence is not viable (as predicted in social custom models of unionization in the spirit of Booth 1985) and where this threshold lies. Coming back to the analogy drawn in the song by Bob Dylan, we also do not know what triggered the extinction of dinosaurs and whether a quicker adaptation to changing environmental conditions might have saved the species. However, without stretching the analogy too far, our study has demonstrated that it is clearly high time for the German unions to reverse the negative trends if they do not want to be relegated to a museum of extinct species.

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Table 1: Age distribution and average age of union and non-union members in West Germany, 1980 and 2006

Men	**1980**		**2006**	
Age class	Members	Non-members	Members	Non-members
18-30 years	18.6 %	23.8 %	15.0 %	17.4 %
31-50 years	60.7 %	57.1 %	56.0 %	60.7 %
51-64 years	20.7 %	19.1 %	29.0 %	21.9 %
All (Number of observations)	100 % (N=295)	100 % (N=450)	100 % (N=100)	100 % (N=333)
Average age (years)	41.3	39.4	44.2	41.3
t-test of difference (prob-value)	0.017		0.016	
Women	**1980**		**2006**	
Age class	Members	Non-members	Members	Non-members
18-30 years	28.2 %	34.8 %	18.6 %	17.7 %
31-50 years	55.3 %	48.4 %	39.5 %	57.7 %
51-64 years	16.5 %	16.8 %	41.9 %	24.6 %
All (Number of observations)	100 % (N=85)	100 % (N=333)	100 % (N=43)	100 % (N=317)
Average age (years)	38.5	37.4	43.8	41.8
t-test of difference (prob-value)	0.447		0.287	

Source: ALLBUS 1980 and 2006, own calculations.

Table 2: Estimations of union membership functions for West Germany

Dependent variable: union member (1=yes); method: probit; marginal effects

Sample	**Men**		**Women**	
Explanatory variables	**1980**	**2006**	**1980**	**2006**
Age *(years)*	0.027 (0.049)	0.006 (0.692)	-0.004 (0.795)	-0.001 (0.912)
Age squared	-0.00026 (0.113)	-0.000014 (0.936)	0.000087 (0.612)	0.000035 (0.813)
Full time worker *(dummy, 1 = yes)*	(dropped)	(dropped)	0.101 (0.046)	0.023 (0.532)
Completed apprenticeship or master craftsman *(dummy, 1 = yes)*	0.118 (0.090)	-0.025 (0.729)	0.076 (0.223)	0.045 (0.444)
Polytech or university degree *(dummy, 1 = yes)*	0.087 (0.392)	-0.185 (0.021)	0.061 (0.626)	0.013 (0.863)
Blue-collar worker *(dummy, 1 = yes)*	0.086 (0.075)	0.179 (0.001)	-0.010 (0.876)	0.087 (0.191)
Civil servant *(dummy, 1 = yes)*	0.210 (0.010)	0.423 (0.001)	0.100 (0.393)	0.017 (0.816)
Public sector employee *(dummy, 1 = yes)*	0.004 (0.951)	-0.00077 (0.992)	0.088 (0.126)	0.049 (0.256)
Political orientation *(index from 1= extreme left to 10 = extreme right)*	-0.030 (0.011)	-0.00018 (0.989)	-0.026 (0.030)	-0.019 (0.110)
Father: blue-collar worker *(dummy, 1 = yes)*	0.077 (0.078)	0.014 (0.767)	0.050 (0.308)	-0.039 (0.312)
Number of observations	596	356	338	303
LR test of entire regression (chi²), prob-values	0.0001	0.0000	0.0167	0.6363
Wald test of joint significance of age variables, prob-values	0.0048	0.0880	0.2085	0.6333

Notes: prob-values in brackets; since all men working part-time (these were 5 in 1980 and 6 in 2006) were non-union members, the full-time worker variable was dropped in the estimations.

Source: ALLBUS 1980 and 2006, own estimations.

Table 3: Coefficients and significance of age variables over time

Sample	**Men**			**Women**		
Year	Age	Age squared	Wald test of joint significance (p-value)	Age	Age squared	Wald test of joint significance (p-value)
1980	0.027 (0.049)	-0.00026 (0.113)	0.0048	-0.004 (0.795)	0.000087 (0.612)	0.2085
1982	0.027 (0.060)	-0.00034 (0.062)	0.1707	-0.010 (0.505)	0.000144 (0.429)	0.5203
1986	0.011 (0.432)	-0.00010 (0.538)	0.3766	0.015 (0.258)	-0.00018 (0.285)	0.4966
1988	0.018 (0.221)	-0.00014 (0.443)	0.0020	0.007 (0.626)	-0.00005 (0.774)	0.3651
1990	0.021 (0.141)	-0.00020 (0.256)	0.0164	-0.0004 (0.981)	3.48e-6 (0.986)	0.9985
1992	0.019 (0.265)	-0.00017 (0.417)	0.0450	0.029 (0.090)	-0.00031 (0.145)	0.0531
1994	0.025 (0.095)	-0.00029 (0.122)	0.1767	0.019 (0.254)	-0.00017 (0.411)	0.0487
1996	0.040 (0.017)	-0.00048 (0.019)	0.0592	0.003 (0.818)	-3.59e-7 (0.998)	0.2333
1998	0.023 (0.199)	-0.00026 (0.235)	0.3596	0.038 (0.039)	-0.00049 (0.037)	0.1133
2000	0.043 (0.012)	-0.00048 (0.019)	0.0296	0.028 (0.072)	-0.00031 (0.111)	0.0870
2002	0.016 (0.325)	-0.00013 (0.513)	0.0419	0.032 (0.065)	-0.00037 (0.085)	0.1400
2004	0.019 (0.337)	-0.00017 (0.489)	0.0999	0.040 (0.051)	-0.00049 (0.051)	0.1477
2006	0.006 (0.692)	-0.000014 (0.936)	0.0880	-0.001 (0.912)	0.000035 (0.813)	0.6333

Notes: prob-values in brackets; probit estimations based on the specifications shown in Table 2; no estimation possible for 1984 since data on political orientation not available in this year.

Source: ALLBUS 1980 – 2006, own estimations.

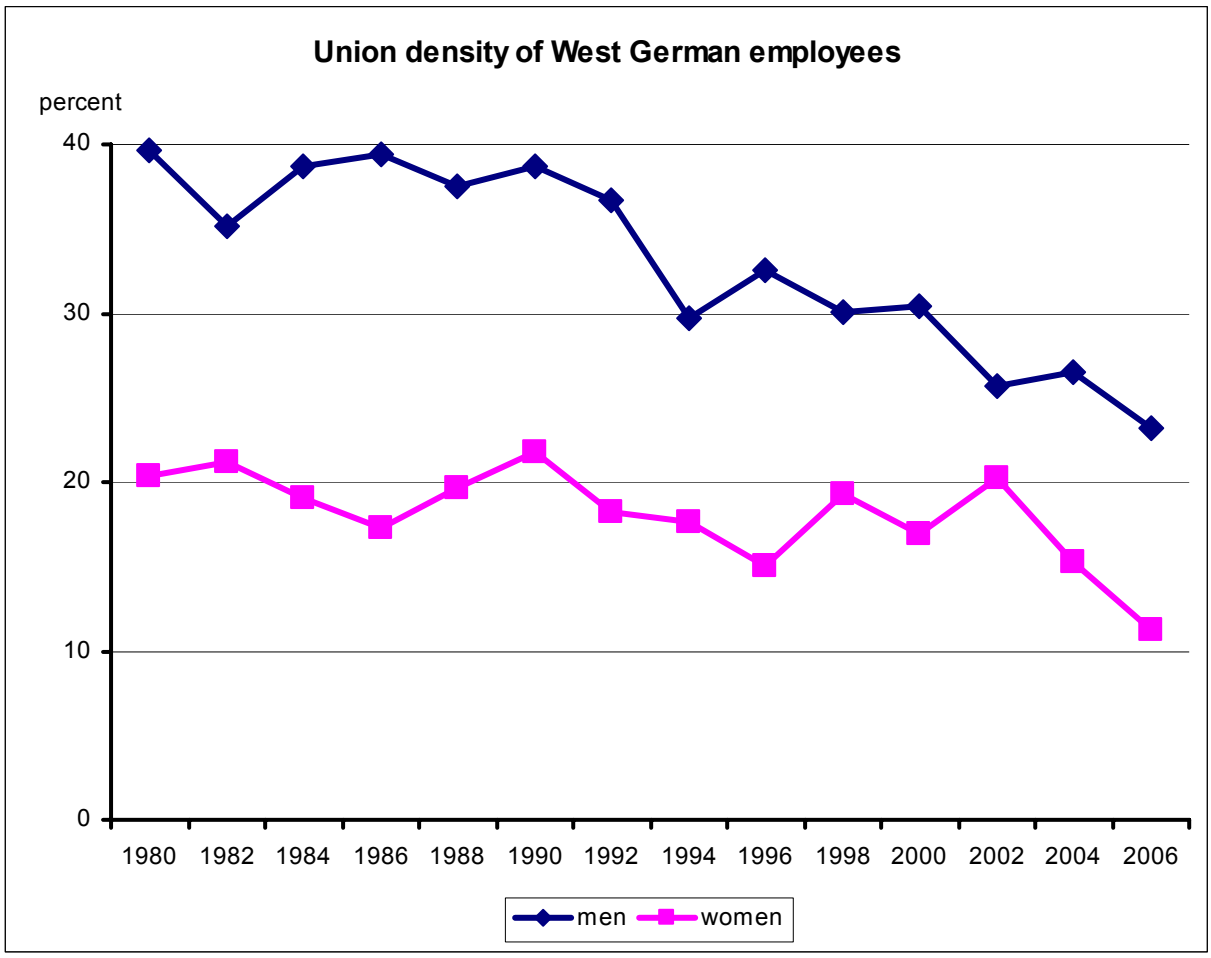
Table 4: Percentage of union members among West German employees (aged 18-64) according to birth cohorts

men															
birth cohort \ year		1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006
1	1916 – 1925	35.2	23.8	42.4	(45.0)	-	-	-	-	-	-	-	-	-	-
2	1926 – 1935	48.5	40.8	43.1	47.1	49.0	44.0	47.5	21.2	-	-	-	-	-	-
3	1936 – 1945	44.5	36.2	37.7	40.0	40.9	42.9	39.7	33.6	36.4	31.4	28.2	16.7	(21.4)	-
4	1946 – 1955	30.3	32.4	40.8	35.8	37.6	39.4	36.7	36.1	36.3	31.3	34.4	38.4	40.0	29.0
5	1956 – 1965	30.9	34.7	29.6	38.9	33.0	36.0	35.9	26.4	33.8	33.6	33.1	32.2	30.3	27.4
6	1966 – 1975	-	-	-	(16.7)	21.4	24.5	28.7	26.0	25.5	27.1	27.5	14.2	19.7	14.9
7	1976 – 1985	-	-	-	-	-	-	-	-	(22.3)	(13.0)	17.6	16.3	15.5	21.3
all cohorts		39.6	35.2	38.7	39.4	37.5	38.7	36.7	29.7	32.5	30.1	30.4	25.7	26.5	23.2
women															
birth cohort \ year		1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006
1	1916 – 1925	27.9	(7.4)	(13.3)	(50.9)	-	-	-	-	-	-	-	-	-	-
2	1926 – 1935	20.5	29.9	19.6	12.5	23.8	(24.0)	(23.5)	(11.1)	-	-	-	-	-	-
3	1936 – 1945	19.1	19.8	16.5	12.4	13.8	26.6	21.7	19.7	15.5	10.5	6.1	(14.3)	(11.1)	-
4	1946 – 1955	19.0	18.8	25.4	20.3	19.3	20.0	22.5	27.6	21.1	27.5	26.1	21.1	14.8	20.2
5	1956 – 1965	19.7	24.0	15.4	21.4	14.3	21.1	13.1	13.7	15.2	14.6	17.7	24.0	20.3	8.5
6	1966 – 1975	-	-	-	(0.0)	20.9	16.3	14.5	12.6	8.1	22.8	10.8	22.4	15.2	7.4
7	1976 – 1985	-	-	-	-	-	-	-	-	(16.7)	(13.3)	14.7	10.4	2.5	11.9
all cohorts		20.3	21.2	19.0	17.3	19.6	21.8	18.2	17.6	15.0	19.3	16.9	20.2	15.3	11.3

Note: Values in brackets are based on less than 30 observations.

Source: ALLBUS 1980–2006, own calculations.

Figure 1:


Union density of West German employees
percent
40
30
20
10
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
men
women

APPENDIX

Table: Descriptive statistics for regression samples in Table 2
Means and standard deviations (in brackets)

Sample	**Men**		**Women**	
Variables	**1980**	**2006**	**1980**	**2006**
Union member *(dummy, 1 = yes)*	0.398 (0.490)	0.239 (0.427)	0.216 (0.412)	0.116 (0.320)
Age *(years)*	40.08 (11.00)	42.23 (10.65)	37.30 (11.88)	41.96 (10.95)
Age squared	1726.77 (902.04)	1896.29 (890.30)	1532.00 (941.97)	1879.80 902.52)
Full time worker *(dummy, 1 = yes)*			0.680 (0.467)	0.558 (0.497)
Completed apprenticeship or master craftsman *(dummy, 1 = yes)*	0.792 (0.406)	0.730 (0.444)	0.672 (0.470)	0.713 (0.453)
Polytech or university degree *(dummy, 1 = yes)*	0.112 (0.316)	0.211 (0.408)	0.092 (0.289)	0.191 (0.394)
Blue-collar worker *(dummy, 1 = yes)*	0.440 (0.497)	0.438 (0.497)	0.251 (0.435)	0.119 (0.324)
Civil servant *(dummy, 1 = yes)*	0.163 (0.369)	0.115 (0.320)	0.089 (0.285)	0.079 (0.271)
Public sector employee *(dummy, 1 = yes)*	0.237 (0.425)	0.216 (0.412)	0.287 (0.453)	0.370 (0.484)
Political orientation *(index from 1= extreme left to 10 = extreme right)*	5.73 (1.77)	5.31 (1.71)	5.79 (1.87)	5.00 (1.62)
Father: blue-collar worker *(dummy, 1 = yes)*	0.532 (0.499)	0.517 (0.500)	0.441 (0.497)	0.459 (0.499)
Number of observations	596	356	338	303

Source: ALLBUS 1980 and 2006, own calculations.

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