The Impact of Policies Influencing the Demography of Age Structured Populations: The Case of Academies of Science

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MOTIVATION

Population ageing is slowly but surely transforming the demographic makeup of Europe. While longstanding patterns of low fertility have been major contributors for the observed trends their occurrence in the context of significant reductions in adult mortality –including the old ages- have had and will continue to have a commensurable impact in the age structure.[1] Under prevailing systems of social security, labor market policies and institutional frameworks in most industrialized countries these demographic developments will pose economic challenges and endanger the sustainability of economic growth. While most economists are mainly concerned in how to adapt the prevailing welfare systems under changing demographic developments, demographers and sociologists are more interested in understanding policies that could influence demographic development. Given the continued increasing trend in adult life expectancy in the near future and the recent reproductive trends, particularly in Europe, scholars have particularly looked at the role of immigration in potentially regulating the age structure or maintaining certain dependency ratios (Alho 2006; Arthur and Espenshade 1988; Blanchet 1988; Cerone

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[1] Even if milder, the consequences of ageing 'from the top' tend to be more immediate than those of ageing brought by decreasing fertility.

1987; Espenshade, Bouvier and Arthur 1982; Feichtinger and Steinmann 1992; Mitra 1990; Mitra and Cerone 1986; Schmertmann 1992; Sivamurthy 1982; Wu and Li 2003).[2]

Academies of science are an example of an institution whose age structure may be especially affected by increased survival due to the remarkable longevity of their members and virtual lifetime membership after election (see Cohen 2009; Leridon 2004; Winkler-Dworak 2006). Regulating the age structure of elections (hereafter also referred to as intake), which are analogous to immigration in geographically-defined populations, does not only represent a potential way to control the pace of ageing, but in fact the only one, despite the fact that age-graded inflows tend to have milder rejuvenating effects than those of fertility given the stochastic dominance of the flows (Schmertmann 1992).[3]

In addition to these structural conditions, many European academies have enacted policies aimed to curb or slow down growth. Effective growth-curbing policies, however, tend to exacerbate ageing or reduce the number of elections to very low levels (Feichtinger and Steinmann 1992). As such, and due to the relative heterogeneity in policies and practices aimed to regulate the size and –to a lesser extent- age structure of such intake, academies of science represent a special yet useful case-in-point of how a combination of these policies might be used to mediate between the size and age structure of many types of populations, in particular for institutions with clear size constraints, like management positions in a company or professorships in a university.

[2] These studies have generally looked at conditions that ensure stationarity (i.e. fixed below-replacement fertility, a fixed mortality schedule, and a constant immigrant inflow, see Espenshade, T.J., L.F. Bouvier, and W.B. Arthur. 1982. "Immigration And The Stable-Population Model." *Demography* 19(1):125-133..

[3] As retirement in learned societies tends to be only nominal (i.e. members keep all their privileges after reaching the retirement age) we do not consider this a solution to ageing per se. However, we will consider the situation in which the number of elections is anchored to the ranks of those retiring.

In this paper, we assess the role of various policies aimed to control the size and age structure of intake in influencing the potential evolution of regular membership of five European academies of science. We do this by contrasting the steady-state and transient dynamics of different projections of Regular Members (hereafter RM) in each academy into 2070 and measuring the size and age-compositional effect of enacting or not enacting a given policy vis-à-vis a standard policy scenario. While the optimality of having a younger/older ages at election and higher/lower numbers of yearly elections under an anchored regime has been studied in the context of the Austrian Academy of Sciences (Feichtinger et al. 2007) no study to our knowledge has considered the potential effects of a broader set of policies and initial conditions on the size and age structure of a given academy.[4] Our comparative study will thus ultimately provide a more general assessment of the effect of various age-graded recruiting policies in the size and age structure of various types organizations. Though these are generally more restrictive than more generally-defined populations, this should also draw some lessons with respect to population ageing.

THE ACADEMIES AND THEIR POLICIES

We base our comparisons between different election policies using data from historical membership records (up to 2005) of five European learned societies, namely: the Austrian Academy of Sciences (OEAW), the Berlin-Brandenburg Academy of Sciences (BBAW), the Royal Society of London (RSL), the Russian Academy of Sciences (RAS), and the Norwegian

[4] Given the large variation across academies in these variables, a natural first step would be to compare their recent evolution. However, this exercise yields limited results with respect to the relevance of policies for two reasons. First, although the academies studied represent a good mix of policy conditions, these have been in place for different spans in each and in fact have varied in the recent past. Second, 'external' conditions that might have a role explaining differences in the size and age structure of academies, such as (surely) differential longevity and (potentially) differences in the age structure of the pool of potential academicians do not only vary by country but have also varied across time.

Academy of Sciences and Letters (NoAS). The size and age structure of regular membership varies considerably across academies (see Table 1) given variation in intake rates, their age structure, and –to a lesser extent- in the mortality conditions to which members are exposed to (see Leridon 2004; Winkler-Dworak 2006).

-TABLE 1 ABOUT HERE-

The Austrian Academy of Sciences (OEAW), founded in 1847, limits the number of members below a statutory 'retirement' age of 70 (since 1972, 75 in 1950-1971) to 45 in each of its two classes, Mathematics and the Natural Sciences, and Humanities and the Social Sciences. As mentioned, this limits the total number of RMs below that age to 90, though the actual size of the academy as of mid-May 2005 (when elections take place) was 167 (i.e. 46% of RMs were over age 70). New members need only to have Austrian residence (and stellar academic records), but they generally come from the ranks of a junior status known as Corresponding Membership (hereafter, CM). Only the Austrian and Russian academies have this status, which could partly explain their older ages at election as we explain below.

The Berlin-Brandenburg Academy of Sciences was in strict sense founded in 1993 in the wake of German reunification, though all of its members belonged to the roster of the old Berlin Academy, which in turn had become the Academy of Sciences of the German Democratic Republic during the Cold War Era. In 1989, the whole academy was phased out and reopened in 1993 with the new name in the wake of German reunification. While all of members elected into the BBAW had also been members of the old GDR Academy, not all of its former members were elected into the new one. Upon re-foundation, the Academy dropped the Corresponding Member status while enacted a retirement age of 68 and established a limit of 200 members below it. As those members elected in the 1990s were relatively young and as the BBAW seems to have enacted a regulated growth policy beyond these statutory limits for its first few years, the population of RMs under 68 years of age is still well below limit, at 154. In fact, the *whole* regular membership of the BBAW sums up to 200, making those above the SR age only 23% of total membership.

The Russian Academy of Sciences lacks a statutory retirement age not has clear limits in the number of elections, which take place every three years unlike the other academies where elections occur annually. As of Jan 1st 2005, there were 449 RMs, by and large elected from a pool of corresponding member. Despite having one of the highest growth rates and the lowest life expectancy of all academies (Riosmena et al., in progress; Winkler-Dworak and Riosmena, in progress), the Russian academy had the oldest observed age structure: 56% of their members were above age 70. This is due to the fact that RAS new members tend to be much older than those elected in other academies: mean age at election in the last 15 years is around 60, around 5 years older than in the other four academies.

Like in the Russian case, the Royal Society of London lacks a statutory retirement age or any membership size limits per se (in addition, it lacks a corresponding member category). However, the RSL does have a limit of 44 elected fellows per year, an intake large enough relative to membership to ensure high growth in recent years: the RSL is by far the largest learned society of the five, with membership standing at 1,286 on January 2005. This is partly due to the fact that, unlike any of the other academies under study, fellows of the RSL must pay an annual membership fee as opposed to receiving any kind of stipend as it is the case in the other academies. Moreover, the high growth of the RSL has indeed resulted in a younger age structure to that of the Austrian and Russian academies, but not than the still young group of academicians from Berlin-Brandenburg.

Finally, the Norwegian Academy of Sciences and Letters, which does not have a corresponding member status, has a statutory retirement age of 67 (in line with Norwegian law for any member of the labor force). As in the Austrian and Berlin-Brandenburger cases, membership size below the SR age is limited (in this case to 220 members). However, the total size of the academy is 460 implying that 48% of members are older than 66. This percentage is similar though slightly lower than that observed in the Austrian academy.

The considerable variation in the size, number of elections, and age structure of the five academies are due to 1) differences in 'external' conditions (such as mortality and the relative size of the pool academicians, affected by various supply and demand factors) and 2) most importantly, policies that affect both the size and age structure of elections and thus the size and age structure of the whole academy. As mentioned, some academies indeed restrict the number of (generally, yearly) elections to a fixed number, or to match the number of regular members reaching a given statutory 'retirement' age. In both cases, the number of elections is surely well below the potential supply of academicians and, as such, the age structure of election is a policy variable with few constrains brought by the aforementioned external conditions. However, a structural constraint present in some academies could indeed affect size and, especially, age structure of intake. If an academy elects regular members from a pool of corresponding members, the age structure of elections could be potentially constrained by that of the corresponding member population or, at the very least, occur later than it otherwise would in the absence of a junior status. We discuss each of these in detail next.

Policies affecting intake: limiting and anchoring the number of elections

Academies limit the number of regular members to be inducted in a given election period in two main ways. First, academies may select a <u>fixed</u> number of new members per election period, as in the case of the Royal Society. Under this policy, as in the case of a typical human population with a fixed number of births (and constant mortality), there will be an initial phase of growth (decline) if the crude rate of intake (i.e. the ratio of elections to exposure) is higher (lower) than the crude death rate, which in turn is influenced by the age structure of the academy of course. In the long run, an population (academy) with a fixed number of inflows (elections) and constant mortality rates will eventually become stationary (see Espenshade et al. 1982; Preston, Heuveline and Guillot 2001: Chapters 3, 7) though its size could be much larger/smaller than observed previous to achieving stability depending on the age structure of intake (e.g. Arthur and Espenshade 1988).

Alternatively, intake per election period (typically, yearly) could be anchored to a given though not fixed amount. The Austrian, Berlin-Brandenburg, and Norwegian academies have set the number of elections to match the number of people reaching a "statutory retirement" (henceforth SR) age, currently of 70, 68, and 67 in each respectively. This has fixed the number of regular members below the SR age limit to 90 in Austria, 200 in Berlin-Brandenburg, and 220 in Norway. As members past this age generally retain *all* their rights and privileges as regular members, this policy has not limited the *de facto* size of the academy as much as anchored intake rates to the pace of ageing of academicians *below* the SR age. As such, the age structure of elections becomes the key policy variable to regulate both the future number of open seats and the pace of ageing in the academy and, under a fixed age-specific intake and mortality schedule, the academy will also reach stationarity (Feichtinger et al. 2007).

For this reason, choosing between a policy that fixes or anchors the number of elections with the same age distribution will affect the final stationary size but not the stationary age structure of an academy. However, the pre-stationary fluctuations will most likely be larger under anchored intake as the number of elections fluctuates. These fluctuations will of course be most likely to occur if the current age structure of an academy differs considerably from the intrinsic one that will emerge after reaching stationarity (Preston et al. 2001: Chapter 6).

Under fixed intake, a larger number of and lower ages at election will rejuvenate the age structure of an academy the most. However, as this would naturally yield high growth rates both directly through the intake rate and indirectly on the crude death rate through the age structure, this policy may not be desirable in the medium run due to prestige or cost considerations. In contrast, the intake rate of academies that anchor the number elections to a given SR age is determined by the age structure of elections in previous years. As such, a younger/older age structure of elections will yield a smaller/larger number of openings in the next few years. Given these restrictions, the potential rejuvenating effect of anchored intake *in the medium run* may be lower than that of a fixed number of elections in the same academy, standardizing for mortality (in the long run, again, both age structures will be identical). However, the potential for observing 'excessive' growth (i.e. that brought by momentum until reaching stationarity) will also be lower under anchored intake (in fact solely determined by survival above the statutory retirement age) than under fixed intake. Moreover, in the end, both fixed and anchored intake will yield an identical stationary age structure if (and only if) they have the same distribution of intake (and the same age-specific mortality schedule).

Corresponding membership and other policies affecting the age distribution of elections

In addition to any policy *directly* aiming to regulate the age distribution of elections due to its profound consequences in determining the pace of ageing (especially under anchored intake) some policies may indirectly affect the age distribution of learned societies. Academies such as the Austrian, the Russian, and –until 1993- the Berlin-Brandenburg have had a ‘corresponding member’ status with more limited (e.g. no voting) rights previous to regular membership. The existence of a junior status can affect the age distribution of elections in two main ways. First, even if all CMs were elected into regular membership, the size and age distribution of corresponding members would set constraints to the pool of people that can become regular members. This restriction is relaxed by the fact that not all CMs get elected as RM. This seems to be a function of age and –to some extent- age at election as CM. For instance, Table 2 shows estimates of lifetime probabilities of being promoted from CM to RM in Austria. In the most recent period under observation (ending in 1990 to avoid overly truncating exposure), probabilities of transitioning were *lowest* the older academicians were when elected as CM: transition probabilities ranged from 88% for the few elected at age 45 or below to 38% to those elected as CM after age 55 (the progression in probabilities in in-between age groups changes monotonically).

-TABLE 2 ABOUT HERE-

Second, regular membership might be attained later than it otherwise would without a junior status.[5] Figure 1 shows mean age at election as RM in the five academies under study by period. It is rather clear that age at election not only has increased over time, but is considerably higher in academies with a corresponding status previous to regular membership, like in Russia and Austria, despite their contrasting policies regarding number of elections. The fact that

[5] For instance, if the corresponding member status was eliminated from an academy (e.g. the BBAW in the 1990s) and thereafter everyone eligible to become a regular member had the same chances of election irrespectively of having previous experience as corresponding members, the existence of a corresponding member status would have ‘delayed’ entry into regular membership if the age at election as regular member after the policy change was lower than the age at election as regular members under the previous policy of having a corresponding member status. While the (expected) age at election as regular member under the old policy would be exactly equivalent to the (expected) age at election as corresponding member plus the (expected) waiting time in the corresponding state, this would only be so if the covariance between age at election as corresponding member and the waiting time before entry into regular membership were zero. Hence, adding a corresponding member status (even after waiting for members to accrue experience in the corresponding state) in a situation where waiting time varied according to age at election (say, in a concave form) would change the age distribution of intake in potentially interesting ways.

promotion from CM to RM can be viewed as a stochastic process with systematic variation by age at election and as academies with a CM status have higher ages at election as RM altogether suggest that the age distribution of CM elections is a relevant variable to consider when choosing the optimal age at RM election subject to size and age structure constraints.

-FIGURE 1 ABOUT HERE -

While we do not explicitly model this aspect of the election process directly (thus far, we are considering different strategies to do so), we do look at different scenarios considering the effect of changes in the age structure of intake under both fixed and anchored intake regimes. While an older age structure of intake will of course make an academy older than it otherwise would be, this effect could have stronger medium-run implications under a specific type of intake. However, this will depend on the implied number of elections under anchored intake and an older age distribution. If this number is higher (lower) than that under fixed intake, then the ageing effect of an anchored intake policy will be slightly milder (stronger) than that observed in an academy with a fixed number of elections and the same age structure .

COMPARING ACADEMIES' TRANSIENT AND ULTIMATE SIZE AND AGE STRUCTURE UNDER DIFFERENT POLICIES

Our basic approach is to compare the size, intake and age structure across different policy scenarios by comparing their steady states. We obtain these by projecting each academy into 2070, after which transient compositional effects of changes in policies have taken place. We standardize longevity conditions for all academies by using a standard mortality scenario. We manipulate two main policies: intake type (anchored vs. fixed) and the age distribution of elections (status quo vs. standard). Some of these policy scenarios require some additional assumptions. For instance, while going from fixed to anchored intake has no particular complications as the number of elections becomes tied to the number of regular members becoming 70 during that year, we do truncate and rescale the status quo distribution of age at elections for that particular academy so no RM elections take place after 70 in the status quo calculations. In addition, going from anchored to fixed intake requires an additional decision on which number to fix elections to. We fixed elections for these academies (Austrian, Norwegian, and BBAW) to the average number of elections in the previous 20 years. The standard age structure we used was that of the Austrian Academy of Sciences, which implies we only projected two scenarios for the AAW (fixed and anchored intake, both under the same age structure). Note that this standard age structure is younger than that of the Russian academy and older than that of the Berlin-Brandenburg and Norwegian Academies as well as the Royal Society's.

Table 3 shows results from our main scenarios in terms of (a) academy size, (b) number of elections per year, (c) mean age of the academy and (d) proportion of members below age 70 at current, medium-run, and stationary conditions as reflected by the values of these quantities in 2005, 2025, and 2070. For each academy, we present results from three scenarios. First, the status quo scenario assumes academies have followed the same intake type they currently practice with an age structure of elections based upon academy-specific practices in the 1990-2005 period. The second scenario uses this same academy-specific age structure of elections but the opposite intake policy to that currently followed (i.e. from fixed to anchored intake or vice versa). The third scenario uses the same intake policy as current practice but with a standard age structure of elections. As the standard chosen is that of the Austrian academy, we do not present this scenario for the AAS as it is of course exactly the same as the status quo projection.

-TABLE 3 ABOUT HERE-

Regarding size (see Table 3, Panel A), going from anchored to fixed intake (to levels equal to the average number of elections per period in 1990-2005) in the Austrian and Norwegian cases implies growing more rapidly (ultimate size is 22% and 3.5% higher respectively) while it actually implied a lower stationary size in the case of Berlin-Brandenburg, where the ultimate status quo size of 541 members is 7% larger than that of a fixed-intake policy with 15 elections per year. This is due to the fact that the most recent number of elections in Berlin-Brandenburg is rather high as the academy has not met its stipulated limit of 200 members below age 70.

On a similar fashion, while we expected going from fixed to anchored intake to imply a higher average number of elections in the projection period and thus a larger population, we observe this is very much the case for the Russian academy, where the ultimate size under fixed intake would be 1,276 members while under anchored intake the stationary size would be only of 552. This striking difference is due to the fact that such a large proportion of the current Russian academy is above 70 that anchoring the number of elections to fix the number of members below 70 to current levels (around 162) would reduce the number of elections dramatically. This would take place even if we fixed this number to a considerably higher number (e.g. 300). In contrast, the Royal Society would grow less rapidly under its current policy of fixed intake than by anchoring the number of elections to those reaching age 70. This is due to the fact that the recent past memory of a large number of elections under a young age structure of intake would imply a considerable amount of growth as these relatively large cohorts age.

The size implications of standardizing an age structure vary depending on the direction of that change of course. However, it also varies according to intake type and the age compositional effects of the intake schedule on the medium run mortality rate. Under fixed intake, an older age structure implies a smaller stationary size than a younger structure. This is the case of the Russian Academy, where the status quo older age structure of intake is older than the standard. In Russia, electing 45 younger members per year (as implied in the standard age structure) would result in a larger stationary size (1,482) than electing 45 academicians with the older status quo age structure (1,276). In a similar fashion, going from a younger to an older intake schedule in the Royal Society would imply attaining a slightly smaller academy in the steady state (1,557 vs. 1,449). In both cases, this is a result of a higher pre-stationary transitional growth under a younger age structure as a result of lower crude death rates.

The effect under anchored intake and a standard mortality scenario is a bit more difficult to predict as it depends on the net effect of the reduced (additional) number of vacancies opened by a younger (older) age structure *relative* to the fact that the age distribution of intake will also affect the crude death rate in the opposite direction of the change. An older age structure of intake would yield a higher number of vacancies in the long run while yielding a higher number of deaths in the medium run. In the case of the Norwegian Academy, the older standard schedule yields a higher number of elections (20 vs. 14 in the status quo scenario) and a larger population size (649 vs. 519) significantly higher than that of the status quo scenario. In contrast, the ultimate size of the Berlin-Brandenburg Academy is smaller under an ever so slightly older standard age schedule than it would be under the status quo scenario. This puzzling paradox is a result of an age compositional effect on the intake flow given the rather young age structure of the recently-founder Berlin Academy (see Table 1).

Changing intake policies while keeping the age structure of elections constant has no consequences regarding the ageing prospects of academies *in the long run* (it does have implications in the medium run).[6] In contrast, an older (younger) age structure of intake implies that the ultimate age structure of the academy will be sensibly older (younger) under fixed intake. Regardless of initial conditions, academy size, and intake type, the same age-specific schedule makes the academies' age structure to be the same (i.e. one with mean age 74.2 years, where 41.6% of members have 70 years or less. Going from an older to a younger age structure (cfr. the Russian academy vs. the standard age scenario) implies a reduction of the mean age and an increase of the percent below age 70 (from 76.4 to 74.2 and from 33% to 42% respectively) while it is the contrary in the other academies (see Table 4, Panels C and D). For instance, in the Berlin-Brandenburg Academy, the mean age of membership under the status quo vs. the standard scenario goes from 73.7 to 74.2 while the proportion below 70 goes from 42.7% to 41.6%.

Note that this effect is stronger under fixed rather than anchored intake *for every marginal change in the mean age at election*. This is visible by comparing the change in the mean age at election in the standard vs. status quo scenario to that of a change in the mean age of the population in the two scenarios, That is, obtaining the ratio of the difference in the mean age of members between scenarios to the difference in mean age at election one can see relative changes in the mean age of members relative to a one year change in the mean year of election. The mean age of the Royal Society and the Russian Academy would increase 0.59 and 0.45 years by an increase of 1 year in the mean age at election while they would increase 0.54 and 0.6 in the case of the Norwegian and Berlin-Brandenburg Academies.

[6] The minor differences in the steady state between the status quo and change-in-intake scenario are due to the fact that the age distribution of intake is slightly truncated in the case of anchored intake as we assumed no elections occur after age 70.

DISCUSSION

In this paper, we have shown the importance of different policy types on the intrinsic stationary size and age structure of academies of science using data from five academies with a heterogeneous mix of heterogeneous policies/practices. We have shown that a fixed (anchored) intake policy will actually not unequivocally yield a larger academy size than an anchored (fixed) policy but that, rather, this will depend on the past dynamics of an academy. If an academy is younger, then fast-paced aging will imply a higher growth when going from fixed to anchored intake. Although the ultimate number of vacancies under anchored intake is higher when academies are old, the transient effect of a younger age structure seems to be stronger when academies are young because the pace of aging will be temporarily faster. Academies should thus consider their recent demographic history before deciding to enact specific policies as the *transient* growth and ageing dynamics and ultimate size of the academy will also depend on them.

Our analyses also suggest that the age structure of intake is even more important than the intake policy *per se*. This is so as said age structure will govern the pace of ageing of an academy in the medium-run and its ultimate age structure, regardless of intake policy and intake size. Having said that, the age structure of elections is particularly relevant under anchored intake. In perspective, anchored intake policies seem more reasonable only if the recent history of the academy has been relatively stable. Otherwise, academies should be aware that the transient dynamics and ultimate size will be especially sensitive to enacting anchored intake.

	OEAW	BBAW	RAS	RSL	NoAS
Year of foundation	1847	1700, 1993	1724	1660	1857
Data availability	1847 – 2005	1700 - 2005	1724 – 1999	1660 - 2006	1950 - 2005
Status previous to RM	Yes	Until 1993	Yes	No	No
Current maximum intake	N/A	N/A	N/A	44	N/A
Statutory retirement (SR) age	70 (prev. 75)	68	N/A	N/A	67
Year where SR enacted	1972 (1950)	1993	N/A	N/A	1950
Current maximum size	90	200	N/A	N/A	~200
Current RMs	167	200	449	1,286	460
Current RMs below retirement age	83	154	449	1,286	216
Percent above age 70	50.3	18.2	56.5	N/A	45.7

N/A – Not Applicable

Table 1. Summary of Intake Policies and Conditions by Academy

		Raw probabilities of ever becoming a Regular Member (RM)			Mean duration as CM for those who became RMs			Mean age at election as RM		
		All	Math. Nat.	Hum. Soc.	All	Math. Nat.	Hum. Soc.	All	Math. Nat.	Hum. Soc.
All	1847-1915	0.497	0.489	0.505	7.7	8.5	7.0	49.9	49.0	50.7
	1916-1965	0.448	0.434	0.462	6.4	6.9	6.0	59.2	58.5	59.8
	1966-1990	0.629	0.641	0.618	6.7	6.8	6.5	57.3	57.8	56.7
Less than 45	1847-1915	0.637	0.644	0.630	7.7	8.5	6.8	45.3	45.5	45.0
	1916-1965	0.673	0.593	0.773	8.8	10.6	7.2	50.6	52.1	49.2
	1966-1990	0.872	0.842	0.900	8.0	8.3	7.8	49.6	50.4	48.8
45 to 49	1847-1915	0.520	0.405	0.632	8.0	8.3	7.8	55.7	55.9	55.6
	1916-1965	0.672	0.639	0.714	6.6	6.4	6.8	54.6	54.4	54.8
	1966-1990	0.792	0.800	0.786	8.1	9.3	7.3	55.7	56.9	54.8
50-54	1847-1915	0.333	0.250	0.400	7.9	9.7	7.1	60.8	62.2	60.2
	1916-1965	0.563	0.525	0.600	6.5	5.9	7.1	59.2	58.8	59.6
	1966-1990	0.764	0.800	0.720	6.0	5.8	6.2	58.4	58.5	58.3
55 and over	1847-1915	0.169	0.143	0.182	5.9	6.7	5.6	66.2	65.3	66.5
	1916-1965	0.295	0.269	0.313	5.1	5.9	4.6	66.5	66.2	66.8
	1966-1990	0.378	0.396	0.360	4.6	4.8	4.5	64.6	64.0	65.2

Table 2.Probability of Ever Becoming a Regular Member, Mean Duration before RM election, and mean age at election as RM in the Austrian Academy of Sciences by Class, Age and Period of Election as Corresponding Member

	Austrian		Royal Society			Russian			Norwegian			Berlin-Brandenburg		
I	Anchored		Fixed			Fixed			Anchored			Anchored		
II	57.7 (5.4)		54.6 (7.2)			62.5 (7.5)			54.5 (6.2)			56.9 (6.2)		
	Status quo	Δ intake policy	Status quo	Δ intake policy	Δ age structure	Status quo	Δ intake policy	Δ age structure	Status quo	Δ intake policy	Δ age structure	Status quo	Δ intake policy	Δ age structure
a. Regular membership														
2005	164	164	1,257	1,257	1,257	496	496	496	459	459	459	173	173	173
2025	197	220	1,431	1,471	1,424	966	524	1,011	484	499	563	432	415	385
2070	216	263	1,571	1,596	1,449	1,276	552	1,482	519	537	649	541	503	480
b. Number of elections														
2005	8	8	44	66	44	45	43	45	4	15	18	32	15	30
2025	6	8	44	45	44	45	18	45	15	15	22	17	15	15
2070	7	8	44	44	44	45	18	45	14	15	20	16	15	15
c. Mean age of regular members														
2005	70.9	70.9	68.6	68.6	68.6	73.2	73.2	73.2	69.0	69.0	69.0	59.3	59.3	59.3
2025	72.9	72.1	71.0	70.7	72.8	73.5	75.1	69.9	71.7	71.4	72.4	69.7	69.9	70.3
2070	74.2	74.2	72.4	72.3	74.2	76.4	75.6	74.2	72.5	72.5	74.2	73.7	73.7	74.2
d. Proportion of regular members below age 70														
2005	0.549	0.549	0.580	0.580	0.580	0.367	0.367	0.367	0.580	0.580	0.580	0.988	0.988	0.988
2025	0.457	0.493	0.495	0.510	0.444	0.420	0.382	0.592	0.498	0.507	0.479	0.534	0.526	0.519
2070	0.416	0.417	0.465	0.470	0.417	0.327	0.362	0.417	0.466	0.466	0.416	0.427	0.428	0.416

Notes:

I. Intake type under status quo conditions

II. Mean age (and standard deviation) of election under status quo conditions

Table 3. Membership size, intake, and age structure of membership according to different scenarios by academy

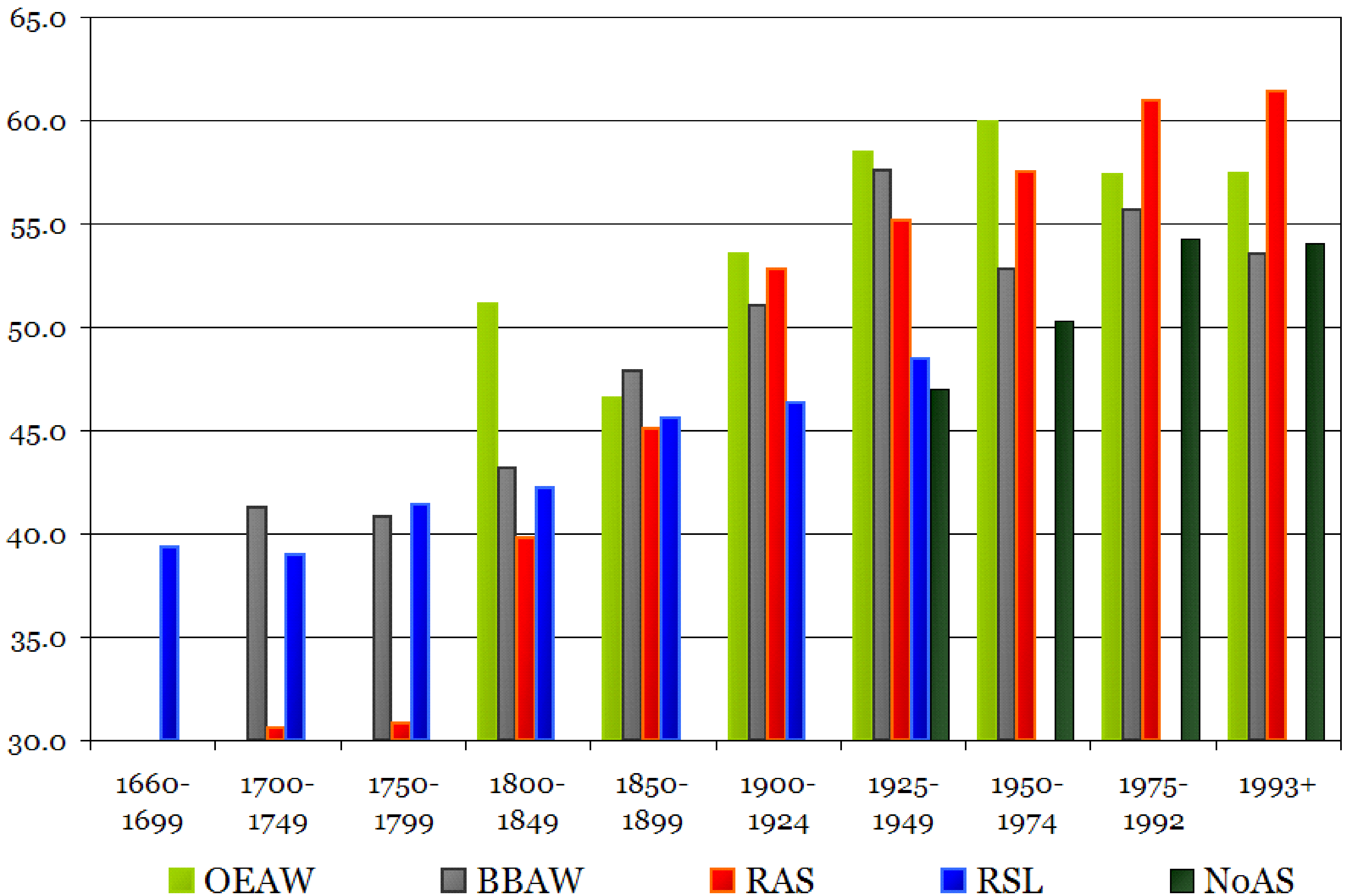

Figure 1. Mean age at election as Regular Members by Academy and Period

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