

Athena SWAN and Gender Diversity

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Appendix 1

Linear mixed effect models of female representation in leaders and professors from 2012/13 to 2016/17

	Among Athena Charter Members				Among All HEIs ^d			
	Leaders		Professors		Leaders		Professors	
	β	95% CI	β	95% CI	β	95% CI	β	95% CI
N	111		111		148		148	
Fixed effect								
Intercept ^a	0.44***	[0.41, 0.47]	0.29***	[0.25, 0.33]	0.39***	[0.37, 0.41]	0.30***	[0.24, 0.35]
Athena Award								
Non-Athena					(Ref)			(Ref)
Non-Recipients	(Ref)		(Ref)		0.052*	[0.011, 0.093]	-0.0069	[-0.079, 0.065]
Bronze	-0.062*	[-0.12, -0.0019]	-0.041	[-0.11, 0.031]	-0.0093	[-0.066, 0.047]	-0.048	[-0.13, 0.040]
Silver	-0.110**	[-0.19, -0.034]	-0.084	[-0.17, 0.0062]	-0.059	[-0.13, 0.016]	-0.090	[-0.20, 0.015]
Year								
2012/13	(Ref)		(Ref)		(Ref)		(Ref)	
2013/14	0.00038	[-0.011, 0.011]	0.001	[-0.0062, 0.0085]	0.001	[-0.0092, 0.011]	0.002	[-0.0056, 0.0091]
2014/15	0.014*	[0.0031, 0.025]	0.0084*	[0.0011, 0.016]	0.012*	[0.0017, 0.022]	0.0079*	[0.00054, 0.015]
2015/16	0.026***	[0.015, 0.037]	0.016***	[0.0084, 0.023]	0.022***	[0.011, 0.032]	0.014***	[0.0067, 0.022]
2016/17	0.034***	[0.023, 0.045]	0.023***	[0.016, 0.030]	0.030***	[0.020, 0.040]	0.022***	[0.014, 0.029]
Duration of Award ^b	-0.0068	[-0.019, 0.0051]	-0.0017	[-0.015, 0.012]	-0.0068	[-0.019, 0.0052]	-0.0017	[-0.017, 0.014]
Random effect ^c								
Intercept variance	0.005***		0.006***		0.005***		0.008***	
Residual variance	0.002***		0.001***		0.002***		0.001***	
AIC	-1565.2		-1772.9		-1959.8		-1817.7	

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BIC	-1538.1	-1745.8	-1926.9	-1784.7
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Note. AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria; 95% CI = 95% Confidence Interval.

^a Intercept coefficient estimates the mean initial percentages of female leaders or professors among the non-recipients (in the model among Athena Charter members) and non-Athena HEIs (in the model among all HEIs).

^b Duration of being awarded Bronze or Silver during the study period (2012/13-2016/17).

^c Intercept variance indicates the between-group variances across HEIs; year invariance indicates the structured variance across years; residual variance indicates the variability of individual HEI's female representation around the individual regression lines for each subjects.

^d All high education institute in the study, including non-Athena charter members, non recipient of Athena award, Bronze, and Silver awardees.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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Appendix 2

Linear mixed effect models of female representation in leaders and professors from 2012/13 to 2016/17

	Among Athena Charter Members				Among All HEIs ^d			
	Leaders		Professors		Leaders		Professors	
	β	95% CI	β	95% CI	β	95% CI	β	95% CI
N		111		111		148		148
Fixed effect								
Intercept ^a	0.44***	[0.40, 0.47]	0.29***	[0.25, 0.33]	0.40***	[0.37, 0.42]	0.31***	[0.25, 0.37]
Athena Award								
Non-Athena					(Ref)		(Ref)	
Non-Recipients	(Ref)		(Ref)		0.038	[-0.01, 0.08]	-0.023	[-0.10, 0.06]
Bronze	-0.05	[-0.12, 0.01]	-0.04	[-0.11, 0.034]	-0.016	[-0.07, 0.04]	-0.063	[-0.15, 0.03]
Silver	-0.11**	[-0.20, -0.03]	-0.09	[-0.18, 0.0002]	-0.076	[-0.15, 0.002]	-0.114*	[-0.22, -0.01]
Year								
2012/13	(Ref)		(Ref)		(Ref)		(Ref)	
2013/14	0.01	[-0.02, 0.04]	0.002	[-0.02, 0.02]	0.003	[-0.02, 0.03]	0.007	[-0.024, 0.038]
2014/15	0.01	[-0.02, 0.04]	0.009	[-0.01, 0.03]	0.004	[-0.02, 0.03]	-0.006	[-0.040, 0.028]
2015/16	0.04**	[0.01, 0.06]	0.020	[-0.003, 0.04]	0.007	[-0.02, 0.03]	-0.028	[-0.064, 0.008]
2016/17	0.04**	[0.02, 0.07]	0.018	[-0.005, 0.040]	0.016	[-0.01, 0.04]	-0.024	[-0.063, 0.014]
Year*Athena Award					(Ref)		(Ref)	
2012/13* Non-Athena					(Ref)		(Ref)	
2013/14* Non-Athena					(Ref)		(Ref)	

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2014/15* Non-Athena					(Ref)		(Ref)	
2015/16* Non-Athena					(Ref)		(Ref)	
2016/17* Non-Athena					(Ref)		(Ref)	
2012/13* Non-Recipients	(Ref)		(Ref)		(Ref)		(Ref)	
2013/14* Non-Recipients	(Ref)		(Ref)		0.006	[-0.03, 0.04]	-0.006	[-0.044, 0.033]
2014/15* Non-Recipients	(Ref)		(Ref)		0.007	[-0.03, 0.04]	0.015	[-0.025, 0.056]
2015/16* Non-Recipients	(Ref)		(Ref)		0.031	[-0.005, 0.07]	0.047*	[0.005, 0.090]
2016/17* Non-Recipients	(Ref)		(Ref)		0.028	[-0.008, 0.06]	0.041	[-0.003, 0.086]
2012/13* Bronze	(Ref)		(Ref)		(Ref)		(Ref)	
2013/14* Bronze	-0.013	[-0.04, 0.02]	-0.001	[-0.02, 0.02]	-0.007	[-0.03, 0.02]	-0.007	[-0.039, 0.026]
2014/15* Bronze	0.004	[-0.03, 0.03]	-0.003	[-0.03, 0.02]	0.011	[-0.015, 0.04]	0.012	[-0.023, 0.047]
2015/16* Bronze	-0.02	[-0.05, 0.01]	-0.007	[-0.03, 0.02]	0.014	[-0.012, 0.04]	0.041*	[0.004, 0.077]
2016/17* Bronze	-0.02	[-0.05, 0.01]	0.004	[-0.02, 0.03]	0.012	[-0.014, 0.038]	0.046*	[0.007, 0.085]
2012/13* Silver	(Ref)		(Ref)		(Ref)		(Ref)	
2013/14* Silver	0.003	[-0.04, 0.04]	0.004	[-0.03, 0.03]	0.008	[-0.03, 0.05]	-0.002	[-0.039, 0.036]
2014/15* Silver	0.001	[-0.04, 0.04]	0.010	[-0.02, 0.04]	0.007	[-0.03, 0.05]	0.025	[-0.014, 0.064]
2015/16* Silver	0.001	[-0.04, 0.05]	0.010	[-0.02, 0.04]	0.036	[-0.004, 0.08]	0.058**	[0.017, 0.099]
2016/17* Silver	0.005	[-0.04, 0.05]	0.016	[-0.01, 0.05]	0.033	[-0.007, 0.07]	0.058**	[0.014, 0.101]
Duration of Award ^b	-0.007	[-0.02, 0.01]	-0.002	[-0.02, 0.01]	-0.007	[-0.02, 0.01]	-0.002	[-0.017, 0.014]
Random effect ^c								
Intercept variance	0.005***		0.006***		0.005***		0.008***	
Residual variance	0.002***		0.001***		0.002***		0.001***	
AIC	-1555.4		-1760.7		-1946.2		-1809.5	
BIC	-1506.6		-1711.9		-1877.3		-1740.6	

Note. AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria; 95% CI = 95% Confidence Interval.

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^a. Intercept coefficient estimates the mean initial percentages of female leaders or professors among the non-recipients (in the model among Athena Charter members) and non-Athena HEIs (in the model among all HEIs).

^b. Duration of being awarded Bronze or Silver during the study period (2012/13-2016/17).

^c Intercept variance indicates the between-group variances across HEIs; year invariance indicates the structured variance across years; residual variance indicates the variability of individual HEI's female representation around the individual regression lines for each subjects.

^d. All high education institute in the study, including non-Athena charter members, non recipient of Athena award, Bronze, and Silver awardees.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix 3

Linear mixed effect models of QS scores in leaders and professors from 2012/13 to 2016/17

	QS Overall Scores ^d			
	Model 1		Model 2	
	β	95% CI	β	95% CI
N	93		93	
Fixed-effect				
Intercept ^a	58.00***	[26.11, 89.89]	57.64***	[25.77, 89.51]
Athena award levels				
Bronze	(Ref)		(Ref)	
Silver	16.09**	[3.86, 28.32]	17.34**	[5.06, 29.62]
Year				
2012/13	(Ref)		(Ref)	
2013/14	2.75***	[1.84, 3.65]	2.88***	[1.87, 3.89]
2014/15	3.52***	[2.62, 4.42]	3.53***	[2.53, 4.54]
2015/16	4.72***	[3.82, 5.63]	5.73***	[4.72, 6.74]
2016/17	-1.51**	[-2.41, -0.60]	-0.89	[-1.90, 0.13]
Year*Athena award				
2012/13* Bronze			(Ref)	
2013/14* Bronze			(Ref)	
2014/15* Bronze			(Ref)	
2015/16* Bronze			(Ref)	
2016/17* Bronze			(Ref)	
2012/13* Silver			(Ref)	
2013/14* Silver			-0.49	[-2.41, 1.42]
2014/15* Silver			-0.05	[-1.96, 1.86]
2015/16* Silver			-3.57***	[-5.48, -1.65]
2016/17* Silver			-2.19*	[-4.10, -0.27]
Duration of award ^b	-0.99	[-7.52, 5.54]	-0.99	[-7.52, 5.54]
Random effect ^c				
Intercept variance	353.90***		353.63***	
Residual variance	4.89***		4.40***	
AIC	1321.0		1309.3	
BIC	1343.8		1342.2	

Note. AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria; 95% CI = 95% Confidence Interval.

^a Intercept coefficient estimates of the mean initial QS score among Bronze awardees.

^b All high education institute in the study, including non-Athena charter members, non recipient of Athena award, Bronze, and Silver awardees.

^c Intercept variance indicates the between-group variances across HEIs; year invariance indicates the structured variance across years; residual variance indicates the variability of

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individual HEI's female representation around the individual regression lines for each subjects.

^d. Duration of being awarded Bronze or Silver during the study period (2012/13-2016/17).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.