Appendix

In the appendix, further graphical evaluations of the gof statistics and the MCMC diagnostics of the calculated models are presented. This is only done for the first wave, which was imputed with different methods. The imputations for the second and third wave do not show any abnormalities. For the ERGM the presentation is more detailed because these graphs cannot be reproduced without switching to the older version of the package *ergm*. For the same reason, the results of the ERGM-based imputation model are presented.

	Network at the first wave	
	Estimate	SE
edges	-5.312^{***}	0.326
mutual	1.070^{**}	0.476
gwesp(0.69)	0.728^{***}	0.152
Netzwerk zum Zeitpunkt der 2. Welle	2.574^{***}	0.241
odegree1.5	0.236^{**}	0.100
Fokus Statistik	0.321	0.230
Akaike Inf. Crit.	407.714	
Bayesian Inf. Crit.	439.821	
*p $<$ .05; **p $<$ .01; ***p $<$ .001		

Table 1: *Imputation model with the first wave imputed by ERGM. Estmated by ergm version 3.8.0. The table was created by the author with the package stargazer in R and manually edited in LaTeX.*

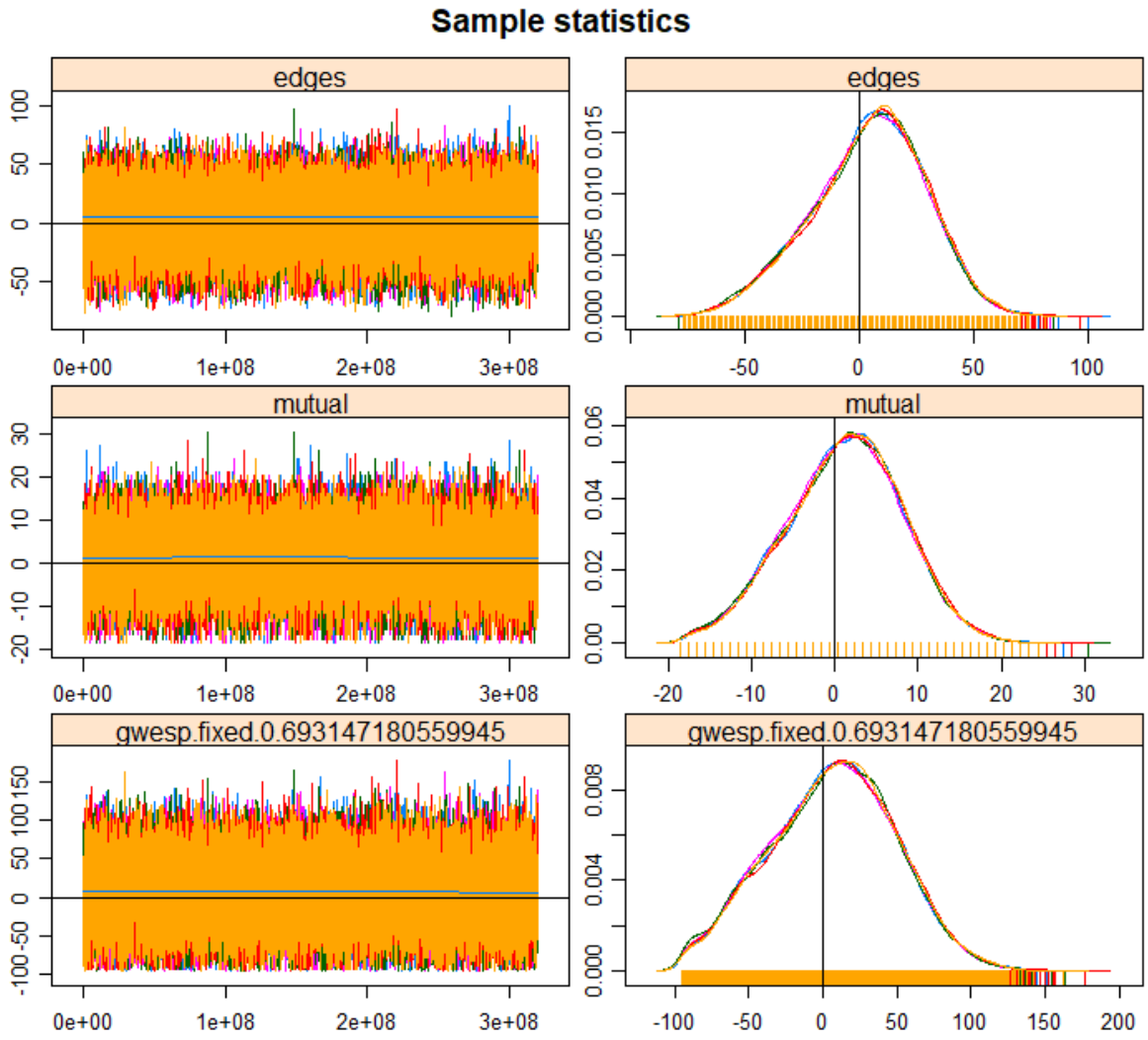

Figure 1: *MCMC diagnostics (sample statistics) for the ERGM for imputation of the first wave - part 1 of 2. On the left, the mixing of the chain in the process of parameter estimation can be seen. Each colour represents one of the five chains. On the right is a z-standardised distribution of the parameter estimates.*

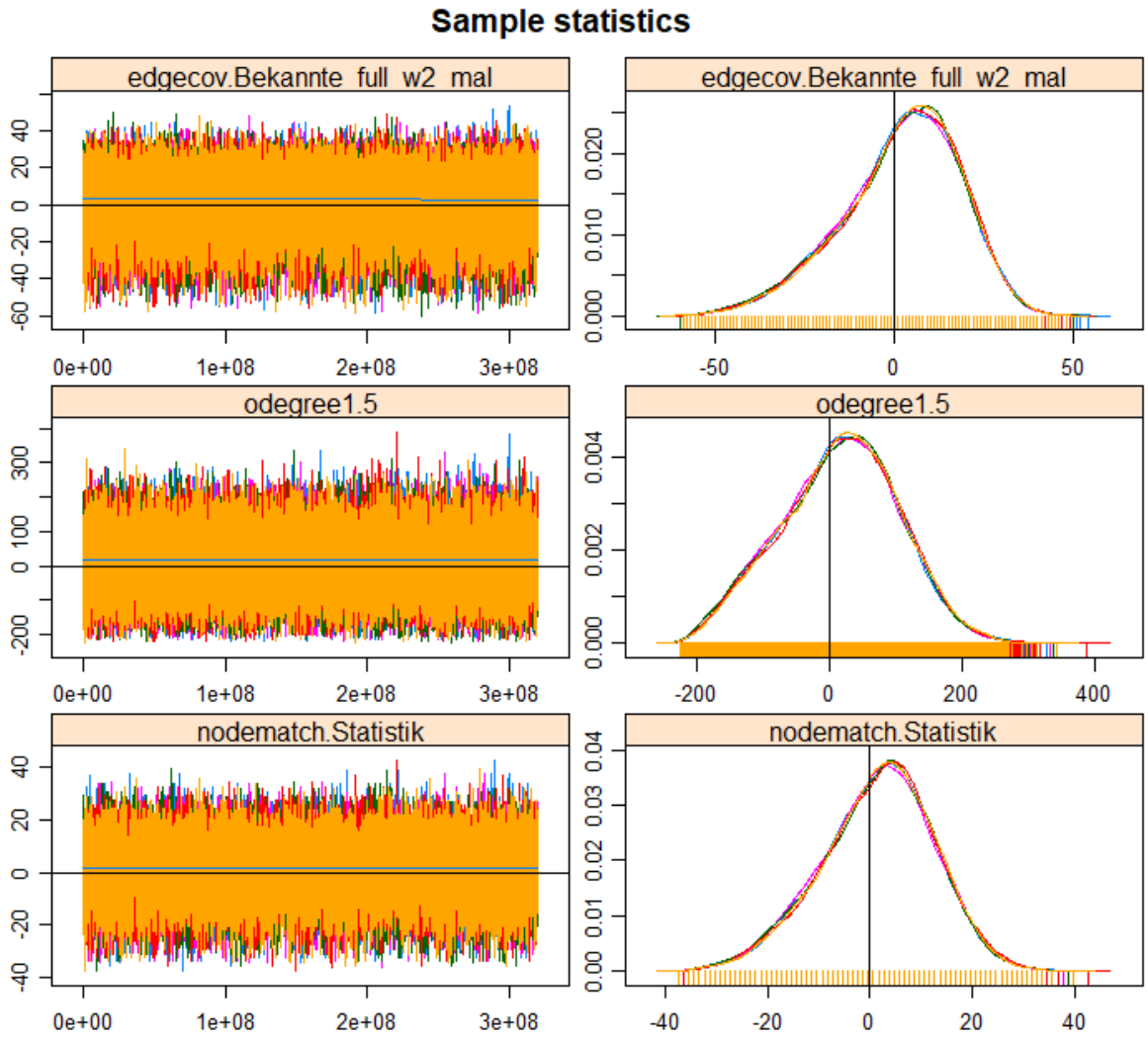

Figure 2: *MCMC diagnostics (sample statistics) for the ERGM for imputation of the first wave - part 2 of 2. On the left, the mixing of the chain in the process of parameter estimation can be seen. Each colour represents one of the five chains. On the right is a z-standardised distribution of the parameter estimates.*

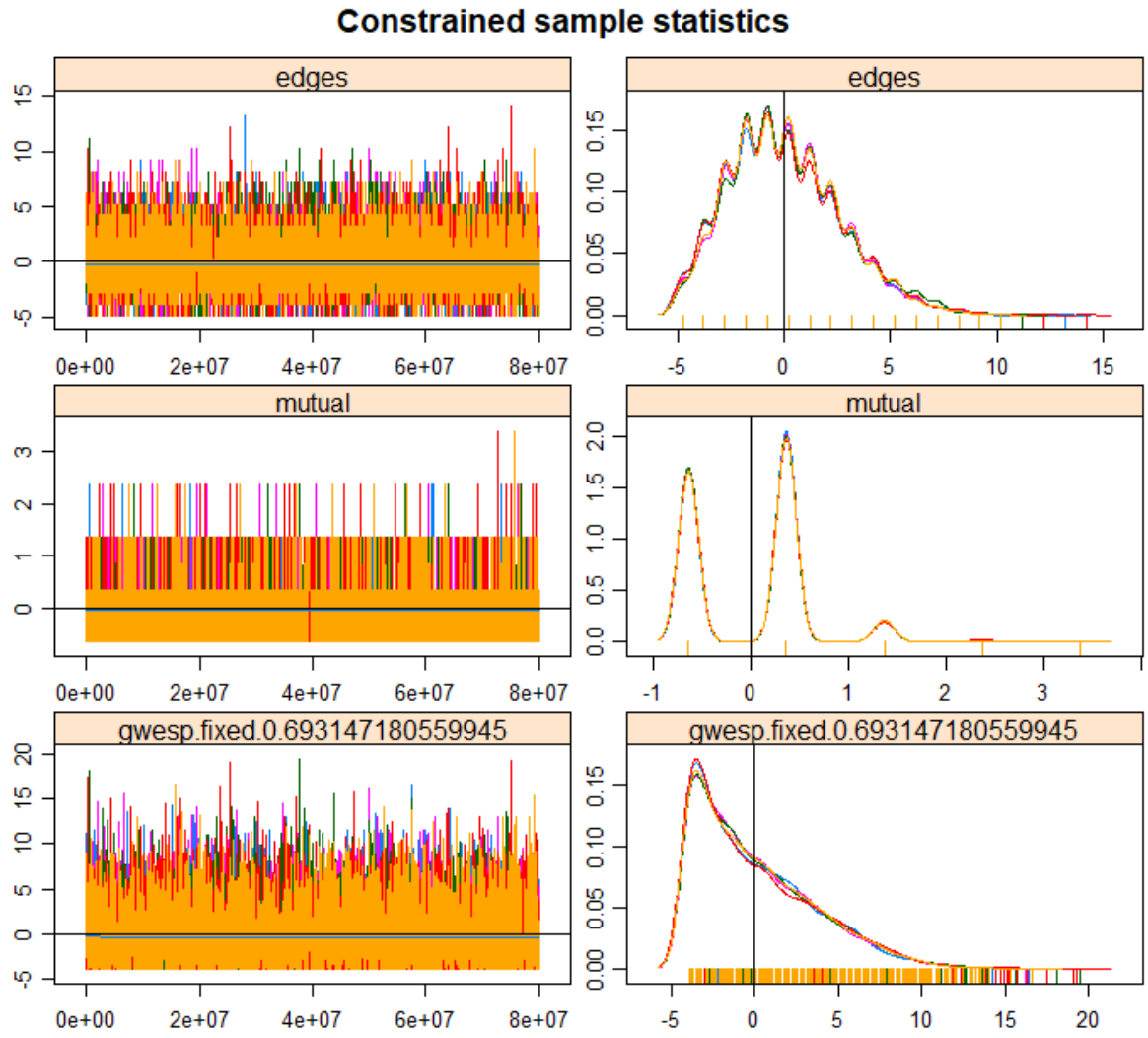

Figure 3: *MCMC Diagnostics (constrained sample statistics) for the first wave imputed by ERGM - part 1 of 2. On the left, the mixing of the chain in the parameter estimation process can be seen. Each colour represents one of the five chains. On the right is a z-standardised distribution of the parameter estimates.*

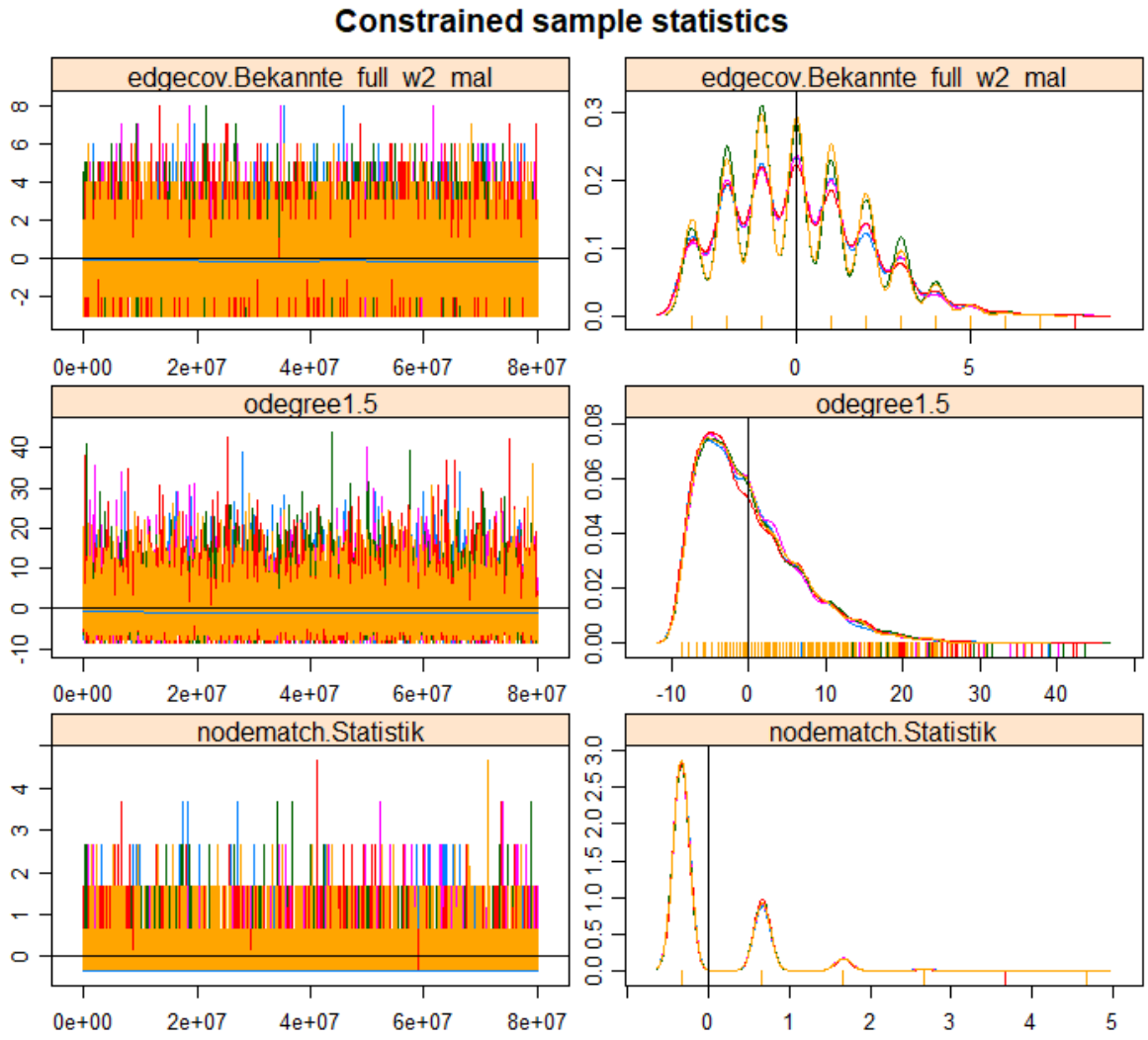

Figure 4: *MCMC Diagnostics (constrained sample statistics) for the first wave imputed by ERGM - part 2 of 2. On the left, the mixing of the chain in the parameter estimation process can be seen. Each colour represents one of the five chains. On the right is a z-standardised distribution of the parameter estimates.*

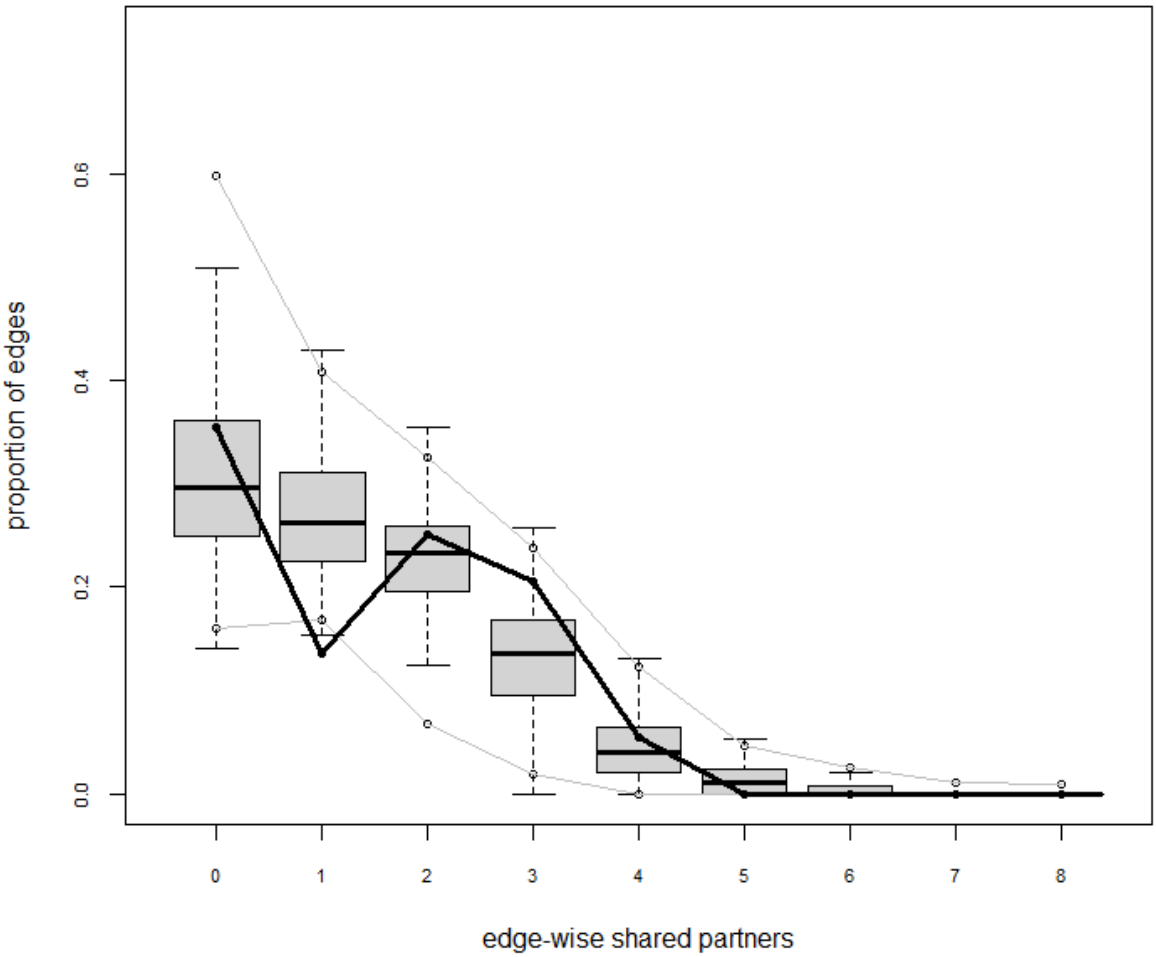

Figure 5: *Goodness of Fit for the ERGM to impute the first wave - Auxiliary statistics: Edgewise shared partners.*

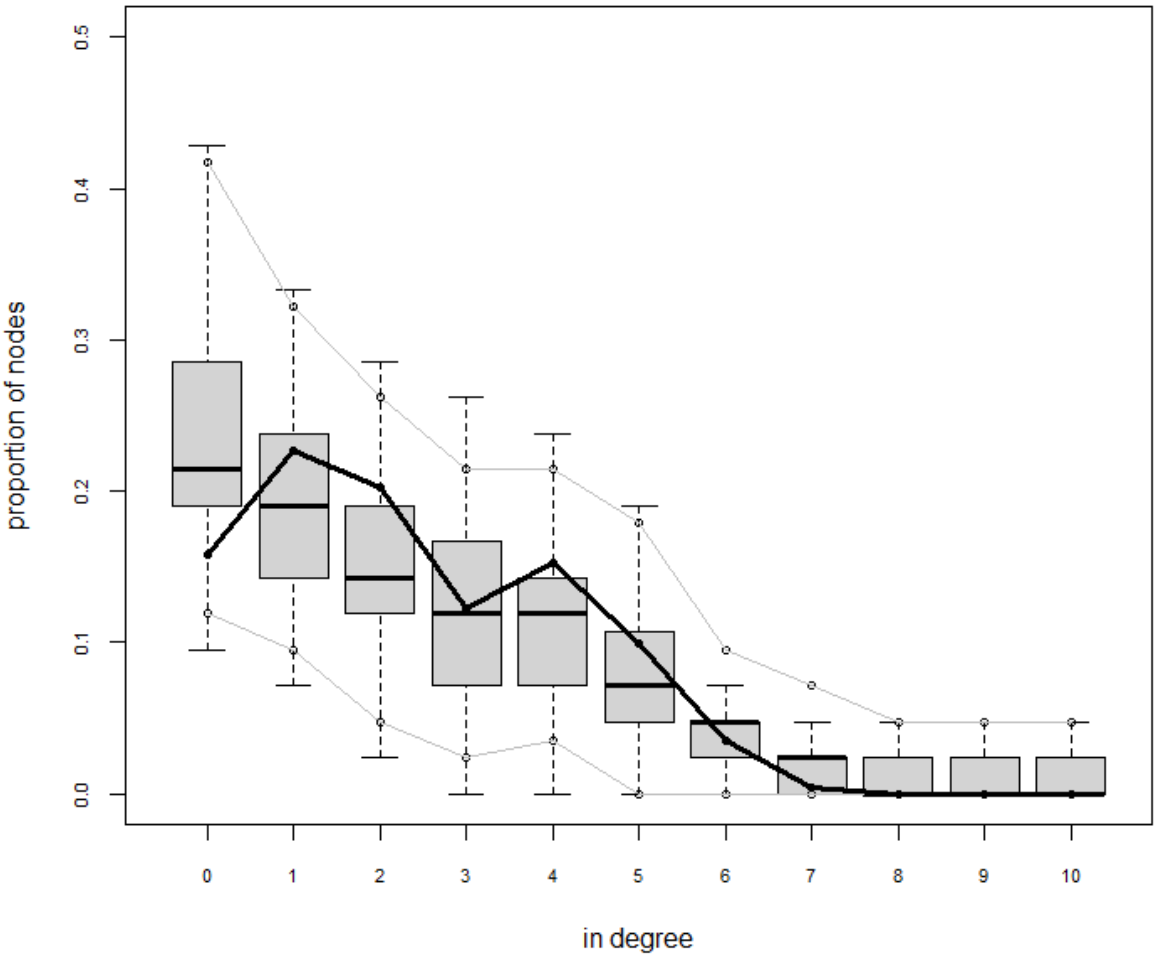

Figure 6: *Goodness of Fit for the ERGM to impute the first wave - Auxiliary statistics: Indegree.*

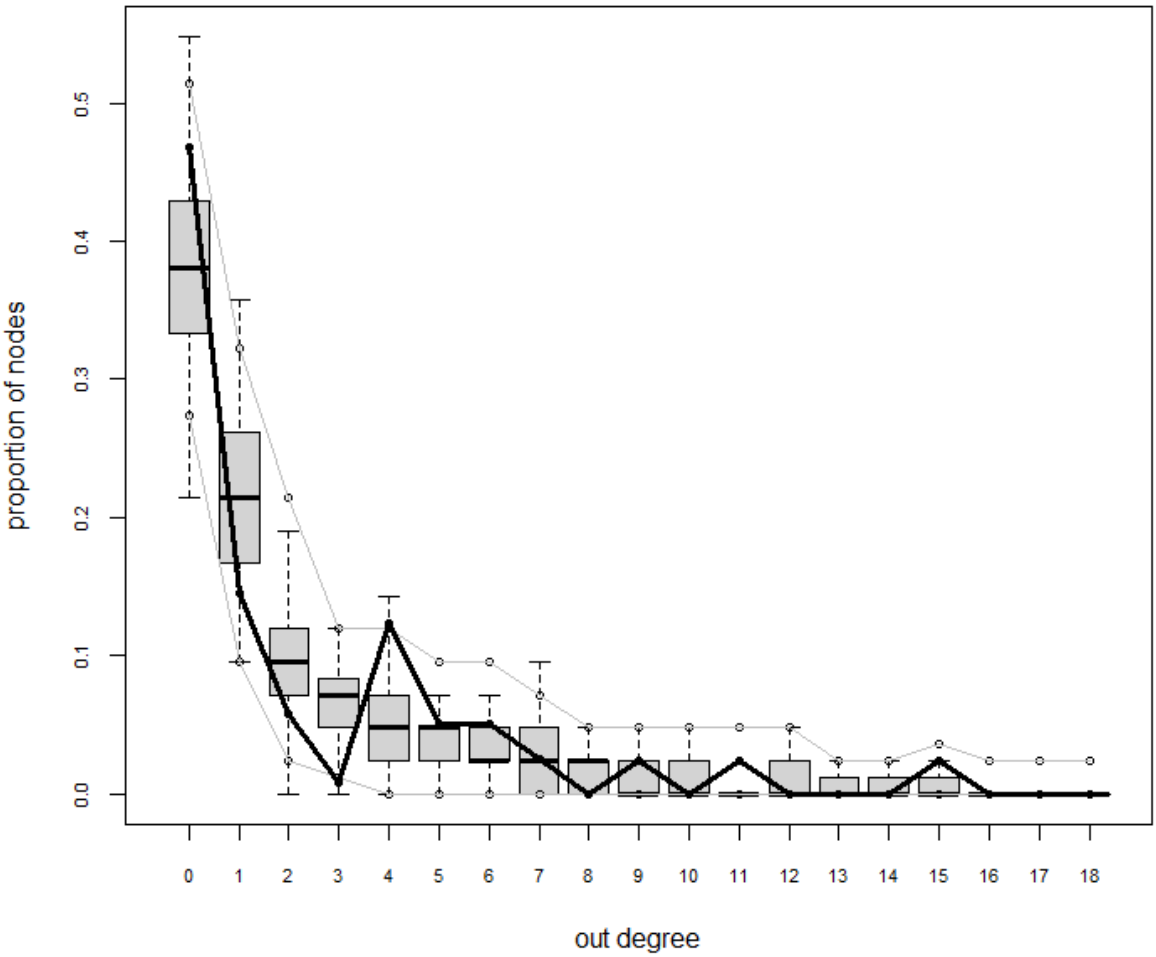

Figure 7: *Goodness of Fit for the ERGM to impute the first wave - Auxiliary statistics: Outdegree.*

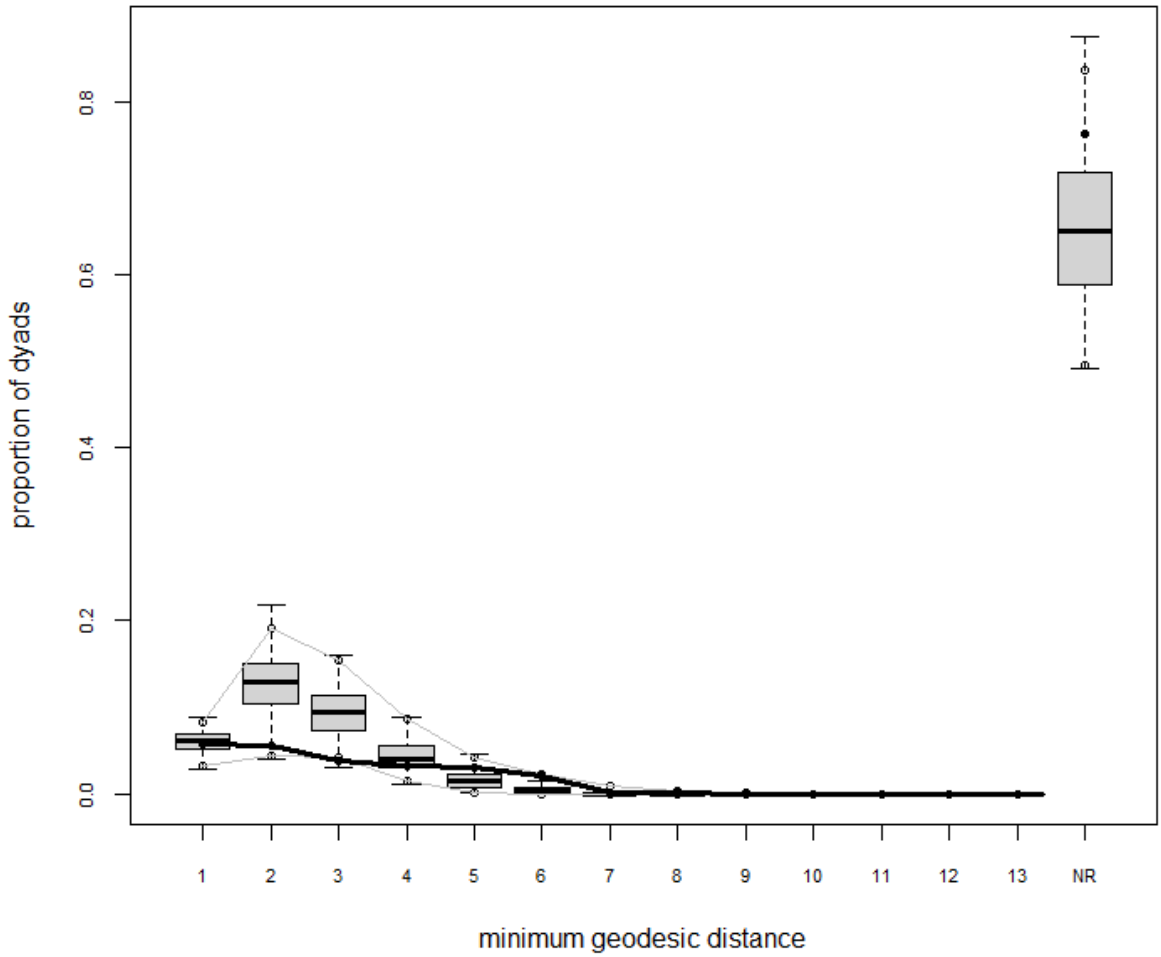

Figure 8: *Goodness of Fit for the ERGM to impute the first wave - Auxiliary statistics: Minimum Geodesic Distance.*

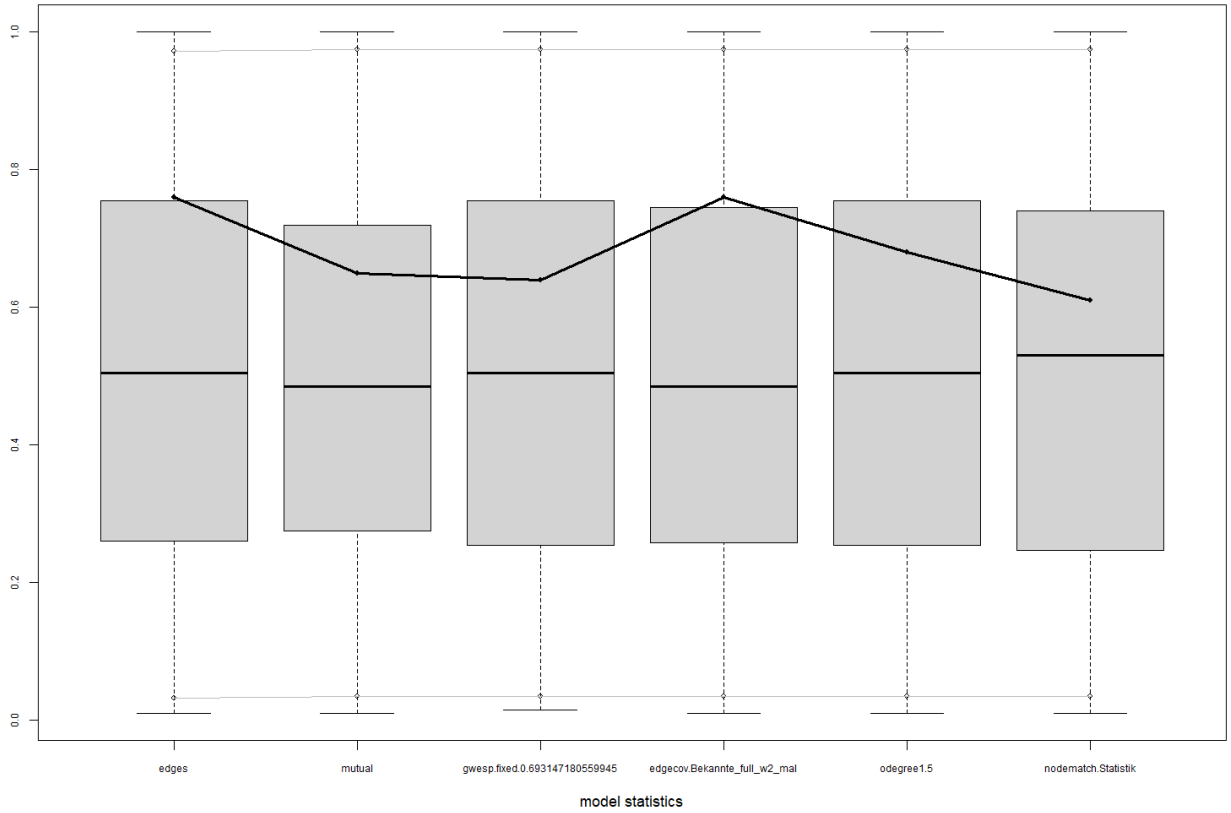

Figure 9: *[Goodness of Fit for the ERGM to impute the first wave - Model statistics.*

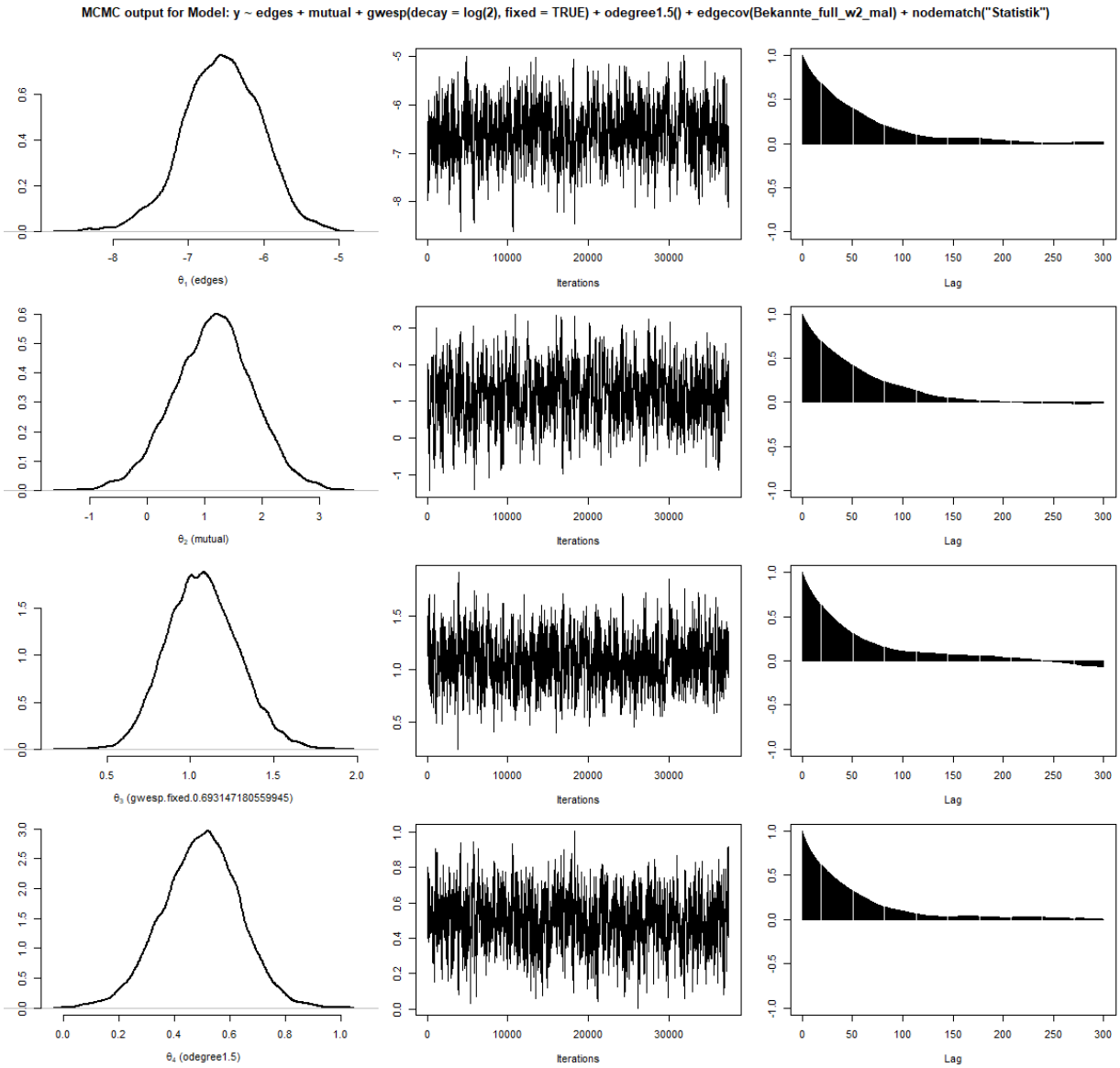

Figure 10: *MCMC Diagnostics for the BERGM to impute the first wave - part 1 of 2. On the left it can be seen that all parameter estimates are normally distributed, in the middle panel it can be seen that the chain is well mixed in the process of parameter estimation and on the right it can be seen that the autocorrelation of the parameters is negligible from a lag of 150 for (almost) all parameters.*

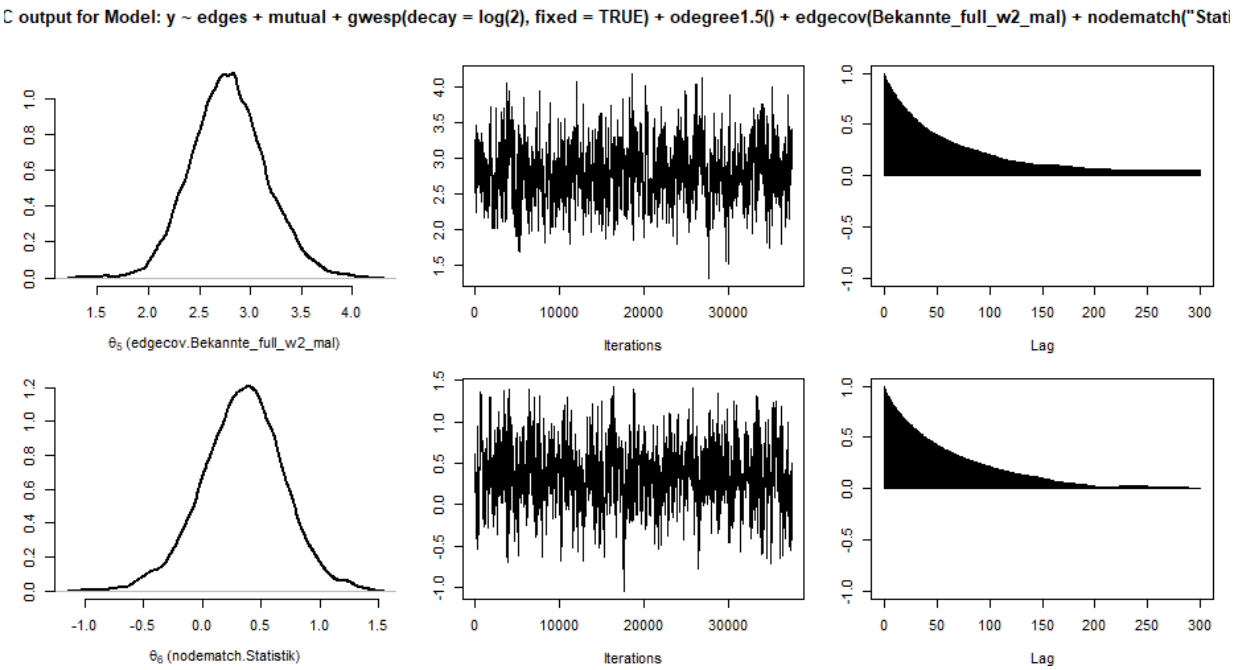

Figure 11: *MCMC Diagnostics for the BERGM to impute the first wave - part 2 of 2. On the left it can be seen that all parameter estimates are normally distributed, in the middle panel it can be seen that the chain is well mixed in the process of parameter estimation and on the right it can be seen that the autocorrelation of the parameters is negligible from a lag of 150 for (almost) all parameters.*

For both ERGM and BERGM, a small upward deviation of the observed network from the simulated networks is particularly noticeable at the outdegree of four. When looking at the MCMC diagnostic plots, it is also important to note the different representation of ERGM and BERGM. In ERGM, the deviations of the parameter values from the observed network are plotted, with the observed network always at zero. In BERGM, the distribution of all simulated parameter estimates is shown.

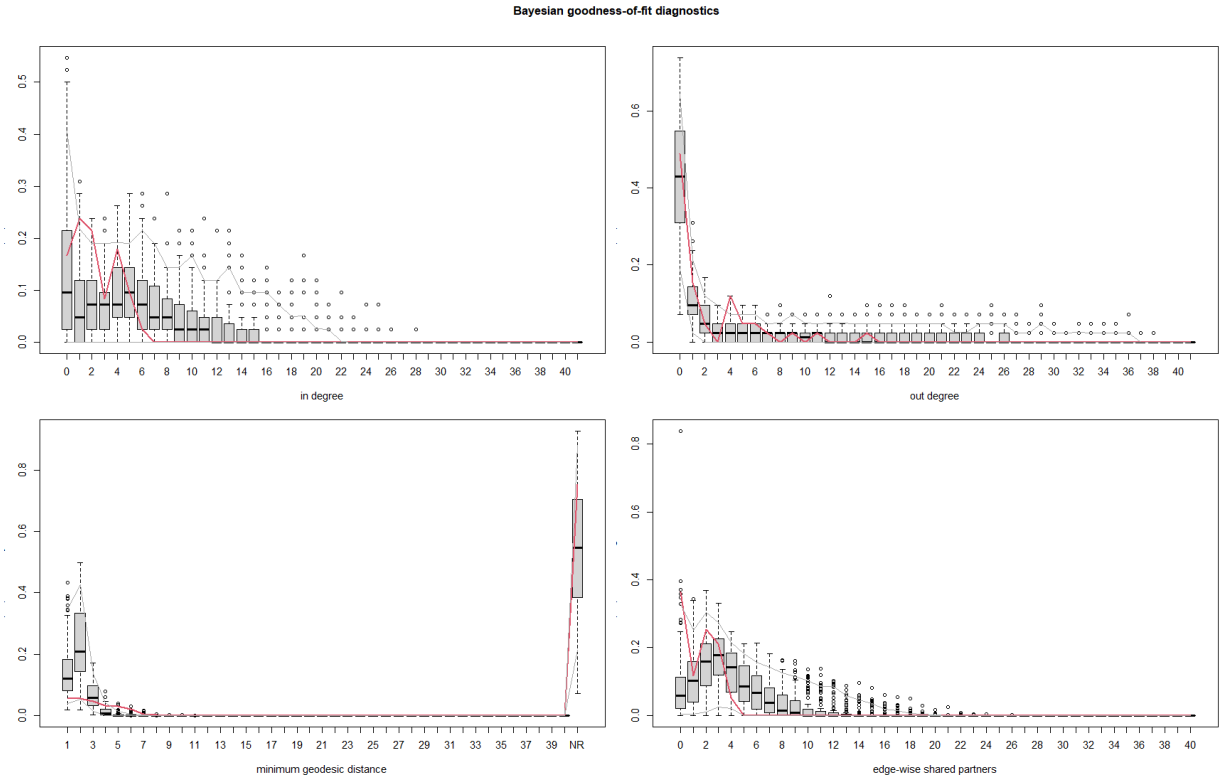

Figure 12: *Goodness of Fit Plot for the BERGM to impute the first wave. The red line represents the distributions measured in the observed network. Around it in boxed plots are those of the simulated networks. Note that this gof statistic does not refer to the imputation model used, since bgof() for bergmM() (bergm function for networks with missing data) is not yet available. In order to obtain an approximation, the model was calculated again under zero imputation and an evaluation of gof was carried out on this basis.*

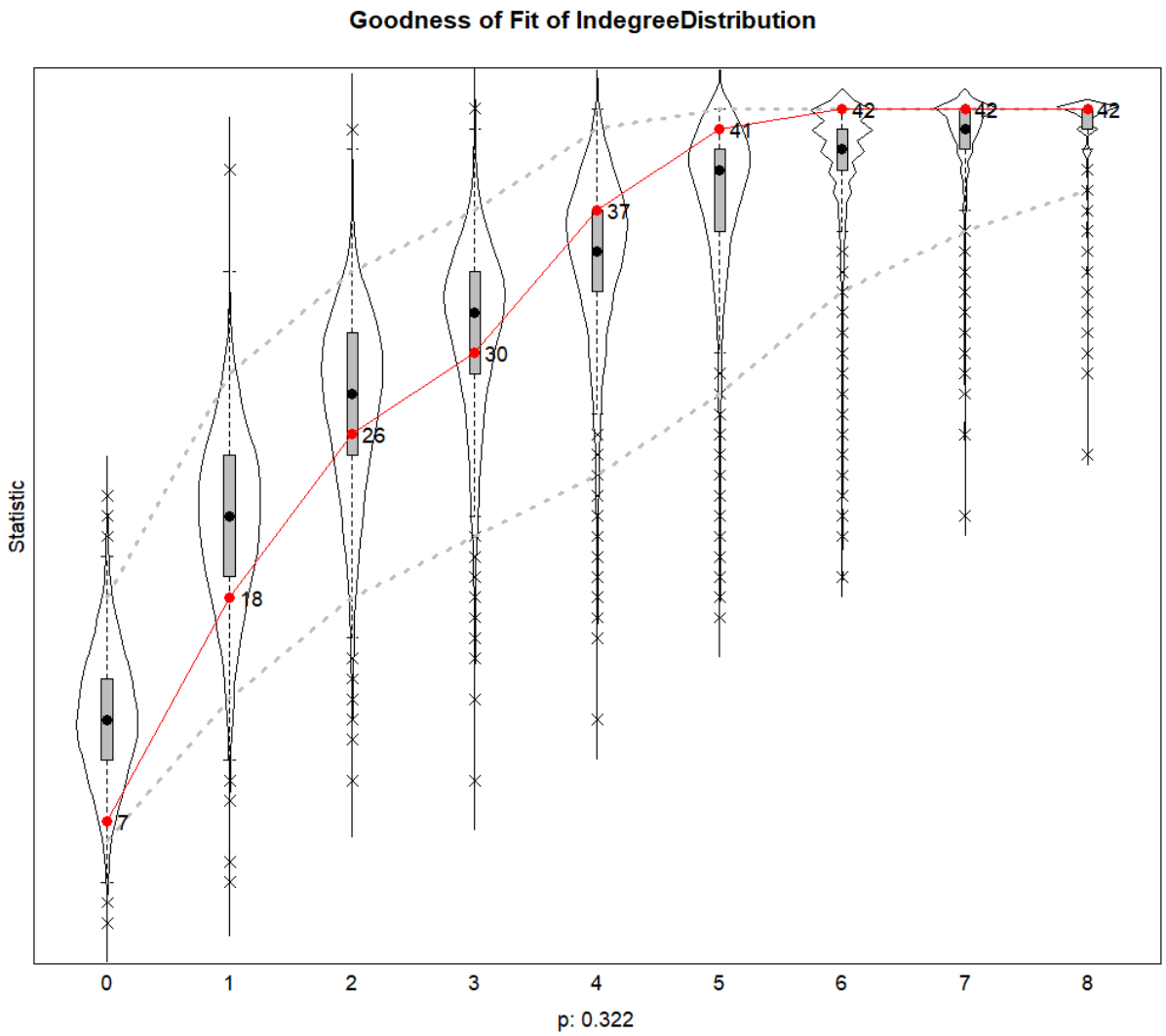

Figure 13: *Goodness of Fit Plot for the indegree distribution for the „Stationary SAOM" to impute the first wave. The red line represents the distributions measured in the observed network, around it, in violin plots, the distribution of the simulated networks.*

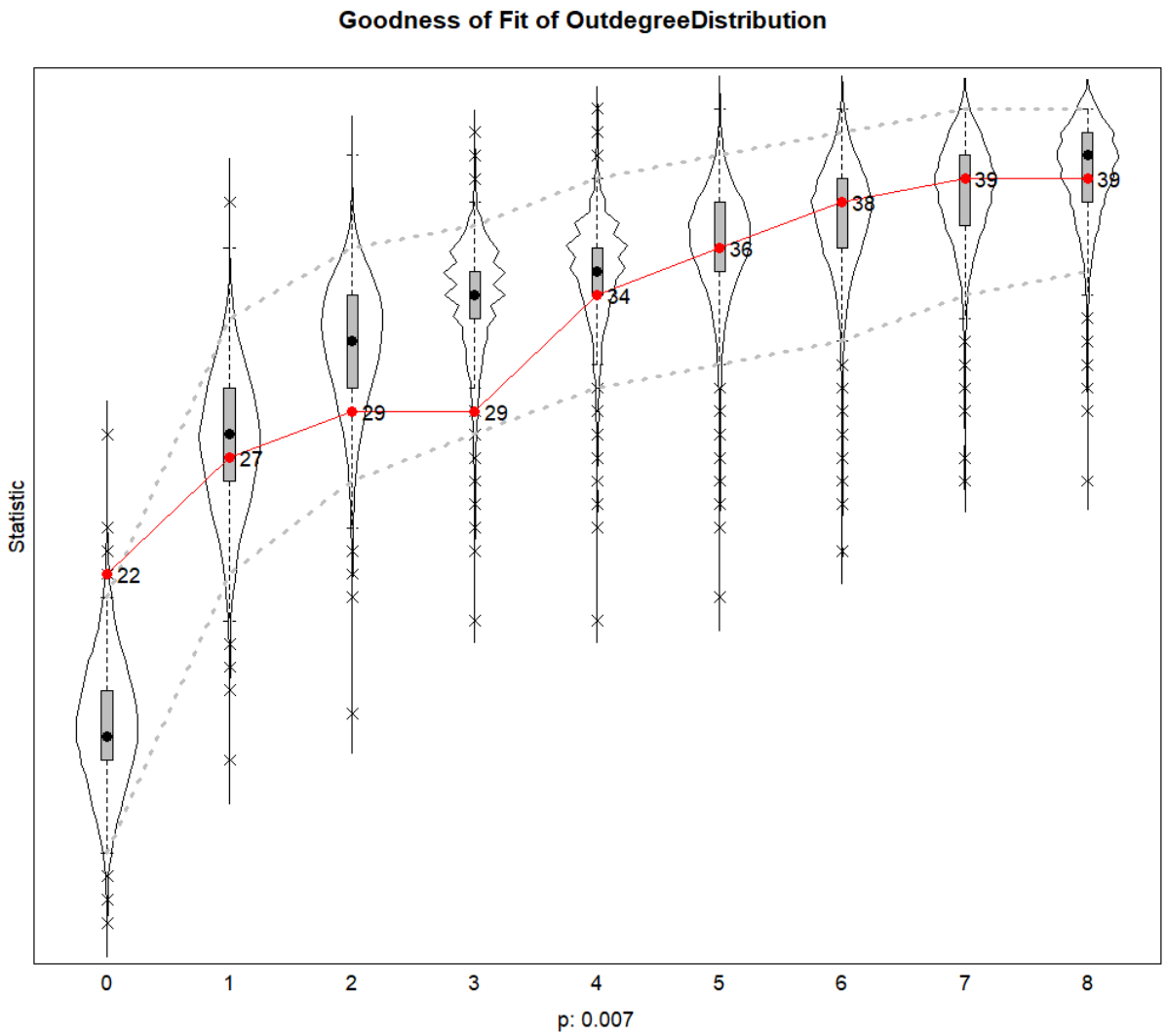

Figure 14: *Goodness of fit plot for the outdegree distribution for the „Stationary SAOM" to impute the first wave. The red line represents the distributions measured in the observed network, around it, in violin plots, the distribution of the simulated networks.*