

TABLE S12

o/e ratio of the synonymous codon pairs in archaeal genomes

Species	repeats	A/T			C/G			A/T/C/G
		o	e_{nor}	o/e_{nor}	o	e_{nor}	o/e_{nor}	o/e_{nor}
<i>A. pernix</i>	2	1086	981	1.107	3045	2874	1.060	1.072
	3	170	186	0.916	1393	1287	1.082	1.061
	5	149	186	0.803	1268	1287	0.985	0.962
	6	35	88	0.397	555	813	0.683	0.655
<i>A. fulgidus</i>	2	2103	2094	1.004	2945	2878	1.023	1.015
	3	838	1008	0.831	1243	819	1.518	1.139
	5	1322	1008	1.311	505	819	0.617	1.000
<i>A. profundus</i>	2	1690	1454	1.162	2333	2195	1.063	1.103
	3	967	834	1.159	335	292	1.147	1.156
	5	771	834	0.924	165	292	0.565	0.831
<i>C. maquilingensis</i>	2	1064	883	1.205	3304	3159	1.046	1.081
	3	278	222	1.254	769	713	1.079	1.121
	5	60	222	0.271	681	713	0.956	0.793
<i>C. Korarchaeum</i>	2	1405	1301	1.080	2051	1790	1.146	1.118
	3	337	282	1.196	981	835	1.175	1.180
	5	166	282	0.589	722	835	0.865	0.795
<i>C. Methanoregula</i>	2	1014	1312	0.773	2816	2878	0.978	0.914
	3	1068	1038	1.029	1551	1176	1.319	1.183
	5	1253	1038	1.207	1173	1176	0.997	1.096
<i>D. kamchatkensis</i>	2	1381	1328	1.040	330	640	0.516	0.869
	2	1033	806	1.281	1968	1859	1.059	1.126
	3	438	375	1.168	570	522	1.092	1.124
<i>H. salinarum</i>	2	527	593	0.888	4032	3140	1.284	1.221
	3	79	74	1.071	1334	1129	1.182	1.175
	5	159	74	2.155	446	1129	0.395	0.503
<i>H. sp. NRC-1</i>	2	19	43	0.440	174	588	0.296	0.306
	2	521	583	0.894	4009	3122	1.284	1.223
	3	78	74	1.058	1310	1118	1.171	1.164
<i>H. mukohataei</i>	2	156	74	2.116	449	1118	0.401	0.507
	3	17	42	0.406	167	576	0.290	0.298
	2	893	918	0.973	5936	5163	1.150	1.123
	3	131	136	0.963	2035	1489	1.367	1.333
	5	207	136	1.521	655	1489	0.440	0.530
	6	28	69	0.408	141	626	0.225	0.243

<i>H. walsbyi</i>	2	333	335	0.995	4795	4450	1.077	1.072
	3	446	307	1.453	1003	824	1.218	1.282
	5	287	307	0.935	437	824	0.531	0.640
	6	347	464	0.747	85	223	0.382	0.629
<i>H. utahensis</i>	2	800	857	0.933	5634	4811	1.171	1.135
	3	177	177	0.998	2269	1620	1.400	1.361
	5	299	177	1.685	705	1620	0.435	0.558
	6	25	89	0.281	165	721	0.229	0.235
<i>H. turkmenica</i>	2	1231	1205	1.022	7353	5946	1.237	1.200
	3	170	159	1.068	1881	1641	1.146	1.139
	5	172	159	1.080	533	1641	0.325	0.392
	6	13	63	0.207	148	686	0.216	0.215
<i>H. butylicus</i>	2	1080	920	1.174	2971	2577	1.153	1.159
	3	209	203	1.032	560	598	0.937	0.961
	5	116	203	0.573	397	598	0.664	0.641
	6	19	99	0.192	80	235	0.340	0.296
<i>I. hospitalis</i>	2	2101	2039	1.030	1361	1434	0.949	0.997
	3	344	292	1.176	994	768	1.295	1.262
	5	213	292	0.728	926	768	1.206	1.074
	6	43	77	0.561	255	566	0.450	0.464
<i>M. sedula</i>	2	1678	1641	1.023	3188	2764	1.153	1.105
	3	916	644	1.422	987	832	1.187	1.290
	5	535	644	0.831	535	832	0.643	0.725
	6	212	412	0.514	81	364	0.223	0.378
<i>M. smithii</i>	2	144	167	0.860	2565	2614	0.981	0.974
	3	732	546	1.340	151	132	1.141	1.302
	5	821	546	1.503	174	132	1.315	1.467
	6	3032	3469	0.874	7	18	0.388	0.871
<i>M. fervens</i>	2	444	469	0.947	1750	1812	0.966	0.962
	3	1059	1018	1.040	398	282	1.411	1.120
	5	1301	1018	1.278	250	282	0.886	1.193
	6	2708	3007	0.901	58	80	0.725	0.896
<i>M. jannaschii</i>	2	580	593	0.978	2088	2090	0.999	0.995
	3	1208	1150	1.051	403	289	1.395	1.120
	5	1460	1150	1.270	206	289	0.713	1.158
	6	2786	3141	0.887	45	74	0.607	0.880
<i>M. vulcanius</i>	2	396	442	0.896	2073	2098	0.988	0.972
	3	983	1081	0.910	407	312	1.303	0.998
	5	1455	1081	1.346	279	312	0.893	1.245
	6	3546	3777	0.939	40	76	0.525	0.931
<i>M. paludicola</i>	2	2548	3136	0.812	4215	3980	1.059	0.950
	3	755	947	0.797	1274	988	1.289	1.049
	5	1563	947	1.651	799	988	0.809	1.221
	6	796	632	1.259	120	452	0.265	0.845
<i>M. burtonii</i>	2	978	1024	0.955	3256	3108	1.047	1.025

	3	1248	985	1.268	455	420	1.083	1.212
	5	1063	985	1.080	284	420	0.676	0.959
	6	1223	1519	0.805	57	103	0.551	0.789
<i>M. aeolicus</i>	2	71	122	0.582	1773	1898	0.934	0.913
	3	590	521	1.132	268	305	0.878	1.038
	5	782	521	1.500	475	305	1.556	1.521
	6	3284	3562	0.922	70	78	0.900	0.921
<i>M. maripaludis C5</i>	2	159	167	0.951	2150	2174	0.989	0.986
	3	650	614	1.059	203	235	0.865	1.006
	5	963	614	1.569	303	235	1.291	1.492
	6	3643	4021	0.906	37	49	0.750	0.904
<i>M. maripaludis C6</i>	2	136	166	0.818	2106	2144	0.982	0.971
	3	628	592	1.061	212	230	0.924	1.022
	5	906	592	1.530	290	230	1.263	1.456
	6	3474	3793	0.916	40	45	0.882	0.915
<i>M. maripaludis C7</i>	2	145	168	0.865	2134	2187	0.976	0.968
	3	615	595	1.034	227	235	0.965	1.014
	5	960	595	1.614	318	235	1.351	1.539
	6	3467	3829	0.905	26	48	0.546	0.901
<i>M. maripaludis S2</i>	2	131	131	0.998	2176	2166	1.004	1.004
	3	560	528	1.061	193	219	0.883	1.009
	5	820	528	1.553	260	219	1.189	1.447
	6	3554	3878	0.917	17	42	0.401	0.911
<i>M. vannieli</i>	2	100	160	0.627	1835	1863	0.985	0.957
	3	484	672	0.720	271	298	0.910	0.778
	5	1038	672	1.544	367	298	1.233	1.448
	6	3921	4038	0.971	58	73	0.796	0.968
<i>M. labreanum</i>	2	617	629	0.981	2574	2541	1.013	1.007
	3	567	626	0.905	765	526	1.456	1.156
	5	822	626	1.312	354	526	0.674	1.021
	6	1110	1234	0.899	80	181	0.443	0.841
<i>M. marisnigri</i>	2	1662	1504	1.105	3477	2946	1.180	1.155
	3	437	407	1.075	1828	1417	1.290	1.242
	5	284	407	0.698	976	1417	0.689	0.691
	6	188	253	0.742	408	909	0.449	0.513
<i>M. kandleri</i>	2	902	870	1.036	2745	2306	1.190	1.148
	3	183	156	1.173	1048	819	1.280	1.263
	5	129	156	0.827	500	819	0.611	0.645
	6	42	74	0.570	61	411	0.149	0.213
<i>M. thermophila</i>	2	1119	1079	1.037	2773	2494	1.112	1.089
	3	231	256	0.902	842	645	1.306	1.191
	5	245	256	0.957	317	645	0.492	0.624
	6	136	139	0.976	73	222	0.329	0.579
<i>M. acetivorans</i>	2	1403	1706	0.822	5348	4855	1.102	1.029
	3	2438	2313	1.054	1651	1431	1.153	1.092

	5	2986	2313	1.291	1085	1431	0.758	1.087
	6	4096	4591	0.892	243	610	0.399	0.834
<i>M. barkeri str.</i>	2	1003	1127	0.890	4670	4318	1.082	1.042
<i>Fusaro_1</i>	3	2041	1807	1.130	989	877	1.128	1.129
	5	2254	1807	1.248	605	877	0.690	1.065
	6	3467	4024	0.862	70	262	0.267	0.825
<i>M. mazei</i>	2	922	1099	0.839	4158	3745	1.110	1.049
	3	1765	1669	1.057	1166	1001	1.165	1.098
	5	2194	1669	1.314	686	1001	0.685	1.079
	6	3226	3669	0.879	122	386	0.316	0.826
<i>M. stadmanae</i>	2	193	170	1.135	2246	2255	0.996	1.006
	3	861	511	1.684	58	66	0.875	1.591
	5	572	511	1.119	88	66	1.327	1.143
	6	2453	2887	0.850	3	8	0.384	0.849
<i>M. palustris</i>	2	1923	1744	1.103	3508	3200	1.096	1.099
	3	728	662	1.100	1784	1351	1.320	1.248
	5	408	662	0.616	934	1351	0.691	0.667
	6	602	594	1.014	477	801	0.596	0.774
<i>M. hungatei</i>	2	1093	1034	1.057	4192	4191	1.000	1.012
	3	1404	1302	1.079	1278	1083	1.180	1.125
	5	1504	1302	1.155	1021	1083	0.943	1.059
	6	2271	2635	0.862	261	396	0.659	0.835
<i>N. equitans</i>	2	101	105	0.959	335	415	0.808	0.838
	3	483	314	1.540	64	90	0.712	1.356
	5	470	314	1.499	199	90	2.213	1.658
	6	974	1296	0.752	26	29	0.883	0.755
<i>N. pharaonis</i>	2	642	709	0.905	5867	4880	1.202	1.165
	3	225	194	1.162	1228	1167	1.053	1.068
	5	273	194	1.410	407	1167	0.349	0.500
	6	63	107	0.591	115	404	0.285	0.349
<i>N. maritimus</i>	2	304	310	0.982	2543	2538	1.002	1.000
	3	1431	823	1.739	120	119	1.009	1.647
	5	819	823	0.995	120	119	1.009	0.997
	6	2752	3350	0.821	9	16	0.562	0.820
<i>P. torridus</i>	2	622	790	0.787	2103	2023	1.039	0.969
	3	822	869	0.945	156	153	1.017	0.956
	5	1373	869	1.579	90	153	0.587	1.430
	6	1238	1526	0.811	3	22	0.137	0.802
<i>P. aerophilum</i>	2	742	808	0.918	3839	3394	1.131	1.090
	3	581	714	0.814	1473	1395	1.056	0.974
	5	1036	714	1.452	1191	1395	0.853	1.056
	6	790	914	0.865	466	784	0.594	0.740
<i>P. arsenaticum</i>	2	1431	1357	1.054	3787	3211	1.179	1.142
	3	457	566	0.807	1413	1298	1.088	1.003

	5	648	566	1.144	926	1298	0.713	0.844
	6	387	433	0.894	441	759	0.581	0.695
<i>P. calidifontis</i>	2	1376	1214	1.134	3712	3125	1.188	1.173
	3	287	439	0.654	1444	1468	0.984	0.908
	5	560	439	1.275	1329	1468	0.905	0.991
	6	195	326	0.598	602	1026	0.587	0.589
<i>P. islandicum</i>	2	823	709	1.161	3483	3169	1.099	1.110
	3	587	560	1.048	956	957	0.999	1.017
	5	644	560	1.149	783	957	0.818	0.940
	6	582	807	0.721	340	478	0.712	0.718
<i>P. abyssi</i>	2	2190	1984	1.104	2372	2253	1.053	1.077
	3	1014	785	1.292	634	576	1.101	1.211
	5	612	785	0.780	552	576	0.959	0.856
	6	263	526	0.500	55	208	0.264	0.433
<i>P. furiosus</i>	2	1698	1494	1.136	2679	2601	1.030	1.069
	3	1489	1157	1.287	638	587	1.087	1.220
	5	1166	1157	1.008	578	587	0.985	1.000
	6	830	1376	0.603	82	202	0.406	0.578
<i>P. horikoshii</i>	2	1780	1628	1.093	2367	2271	1.042	1.063
	3	1272	998	1.274	678	586	1.157	1.231
	5	948	998	0.950	549	586	0.937	0.945
	6	538	913	0.589	69	220	0.314	0.536
<i>S. marinus</i>	2	887	598	1.483	2396	2384	1.005	1.101
	3	1279	737	1.736	336	297	1.130	1.562
	5	496	737	0.673	268	297	0.901	0.739
	6	699	1289	0.542	43	64	0.667	0.548
<i>S. acidocaldarius</i>	2	1241	1043	1.190	3219	3094	1.040	1.078
	3	1596	1056	1.512	469	440	1.066	1.381
	5	877	1056	0.831	353	440	0.803	0.822
	6	924	1483	0.623	39	106	0.368	0.606
<i>S. islandicus</i> <i>L.S.2.15</i>	2	1483	1247	1.189	3694	3604	1.025	1.067
	3	1911	1305	1.464	618	510	1.212	1.393
	5	1255	1305	0.962	394	510	0.773	0.909
	6	1087	1879	0.579	32	114	0.280	0.561
<i>S. islandicus</i> <i>M.14.25</i>	2	1383	1168	1.184	3638	3520	1.034	1.071
	3	1819	1237	1.470	590	496	1.190	1.390
	5	1185	1237	0.958	365	496	0.736	0.894
	6	1055	1799	0.586	31	113	0.275	0.568
<i>S. islandicus</i> <i>M.16.27</i>	2	1403	1195	1.174	3691	3599	1.026	1.063
	3	1852	1262	1.468	621	503	1.235	1.401
	5	1228	1262	0.973	373	503	0.742	0.907
	6	1092	1857	0.588	32	113	0.284	0.571

<i>S. islandicus</i> <i>M.16.4</i>	2	1456	1234	1.180	3710	3618	1.025	1.065
	3	1911	1289	1.482	630	510	1.235	1.412
	5	1231	1289	0.955	378	510	0.741	0.894
	6	1090	1875	0.581	36	115	0.313	0.566
<i>S. islandicus</i> <i>Y.G.57.14</i>	2	1561	1349	1.157	3606	3534	1.020	1.058
	3	1984	1332	1.489	653	509	1.283	1.432
	5	1273	1332	0.955	379	509	0.745	0.897
	6	1057	1861	0.568	33	119	0.277	0.550
<i>S. islandicus</i> <i>Y.N.15.51</i>	2	1503	1309	1.149	3623	3550	1.021	1.055
	3	1928	1312	1.469	621	496	1.251	1.409
	5	1293	1312	0.985	378	496	0.762	0.924
	6	1086	1877	0.579	35	115	0.305	0.563
<i>S. solfataricus</i>	2	1872	1601	1.169	3805	3705	1.027	1.070
	3	2076	1414	1.468	746	572	1.303	1.420
	5	1285	1414	0.909	415	572	0.725	0.856
	6	1149	1952	0.589	32	149	0.215	0.562
<i>S. tokodaii</i>	2	1197	944	1.268	3868	3701	1.045	1.091
	3	2342	1354	1.729	419	407	1.029	1.568
	5	1288	1354	0.951	283	407	0.695	0.892
	6	1730	2904	0.596	30	85	0.352	0.589
<i>T. gammatolerans</i>	2	2294	2303	0.996	2887	2756	1.047	1.024
	3	729	665	1.096	942	821	1.147	1.124
	5	715	665	1.075	776	821	0.945	1.003
	6	289	394	0.733	171	377	0.454	0.596
<i>T. kodakarensis</i>	2	2566	2545	1.008	2871	2677	1.072	1.041
	3	761	759	1.002	785	692	1.134	1.065
	5	843	759	1.110	573	692	0.828	0.976
	6	369	475	0.776	122	289	0.422	0.642
<i>T. onnurineus</i>	2	2239	2187	1.024	2753	2612	1.054	1.040
	3	704	678	1.039	570	517	1.103	1.067
	5	761	678	1.123	419	517	0.811	0.988
	6	233	395	0.590	86	183	0.470	0.552
<i>T. sibiricus</i>	2	948	880	1.077	2483	2434	1.020	1.035
	3	1399	1092	1.281	585	534	1.095	1.220
	5	1266	1092	1.159	511	534	0.957	1.093
	6	1402	1951	0.719	99	176	0.564	0.706
<i>T. pendens</i>	2	1648	1599	1.031	2527	2151	1.175	1.113
	3	350	350	1.001	1282	1052	1.218	1.164
	5	360	350	1.030	885	1052	0.841	0.888
	6	97	157	0.619	245	683	0.359	0.407
<i>T. acidophilum</i>	2	1690	1600	1.056	2276	2137	1.065	1.061
	3	662	587	1.127	344	318	1.081	1.111
	5	498	587	0.848	205	318	0.644	0.776

	6	291	366	0.795	19	70	0.270	0.710
<i>T. volcanium</i>	2	1027	1007	1.020	2103	1979	1.063	1.048
	3	1082	843	1.283	328	306	1.072	1.227
	5	749	843	0.888	197	306	0.644	0.823
	6	807	972	0.830	31	69	0.452	0.805
<i>T. neutrophilus</i>	2	1154	1087	1.062	3361	2738	1.228	1.181
	3	199	295	0.674	1378	1395	0.988	0.933
	5	354	295	1.199	1094	1395	0.785	0.857
	6	140	170	0.824	762	1068	0.713	0.729
<i>uncultured</i>								
<i>methanogenic</i>	2	2379	2490	0.955	4571	4368	1.047	1.014
<i>archaeon RC-I</i>								
	3	884	937	0.943	1186	937	1.265	1.104
	5	1280	937	1.366	716	937	0.764	1.065
	6	532	711	0.749	134	365	0.367	0.619
geometric mean	2	-	-	1.010	-	-	1.062	1.055
	3	-	-	1.130	-	-	1.134	1.175
	5	-	-	1.080	-	-	0.789	0.922
	6	-	-	0.669	-	-	0.398	0.596

At the bottom of the table is the summary (geometric mean) of o/e_{nor} for all the 68 archaea.