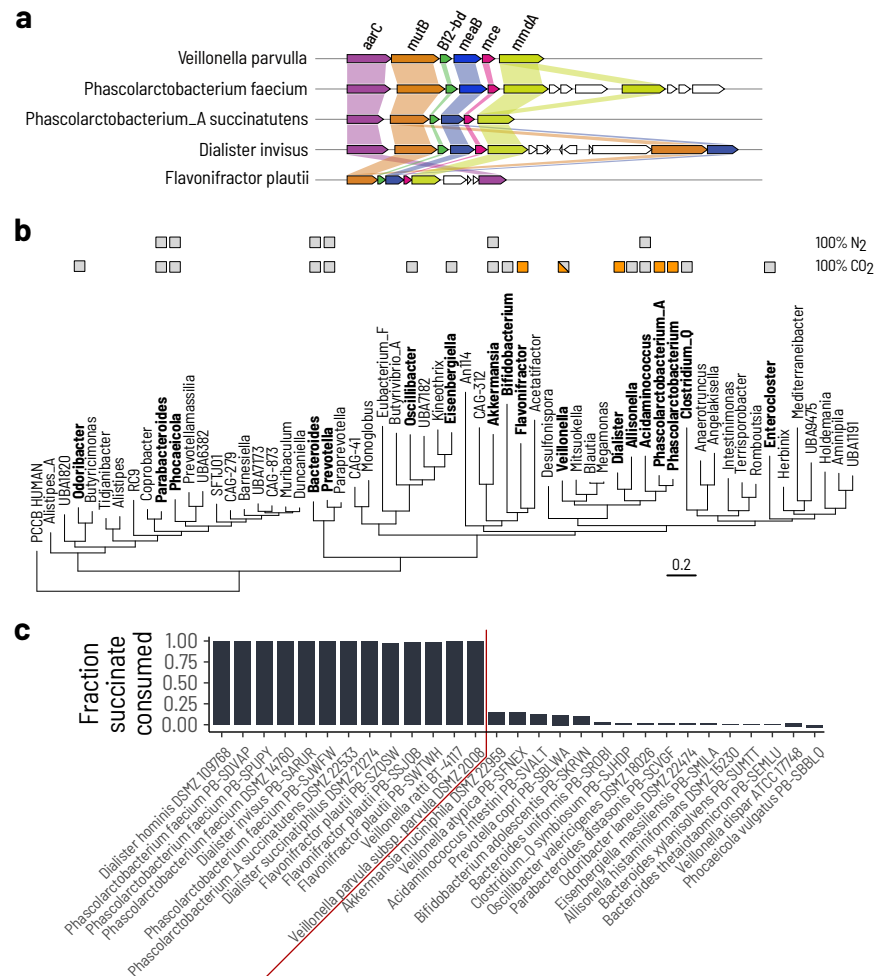
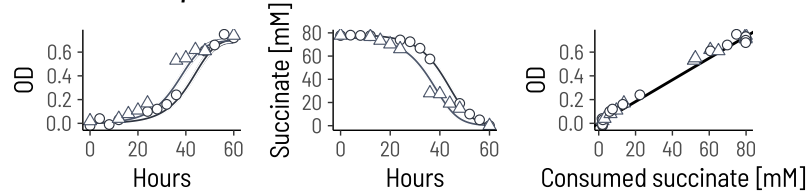


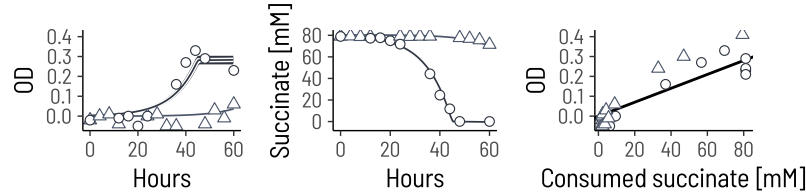


**Figure S1: Extracellular succinate consumption is restricted to few bacterial taxa.** **a.** The gene cluster associated with succinate to propionate conversion occurs in all succinate consumers. **b.** Phylogenetic tree based on the *mmdA* gene. Isolates that were screened for succinate consumption are indicated in bold. Succinate consumption is indicated with an orange box, and non-consumption with a grey box. Partial consumption is indicated by both colors. Consumption was also tested under a 100% N<sub>2</sub> atmosphere for a subset of isolates. **c.** Maximum percentage of supplemented succinate that was consumed by each tested isolate.

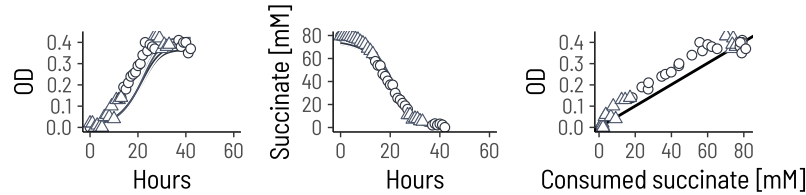
***Dialister succinatiphilus* DSMZ 21274**



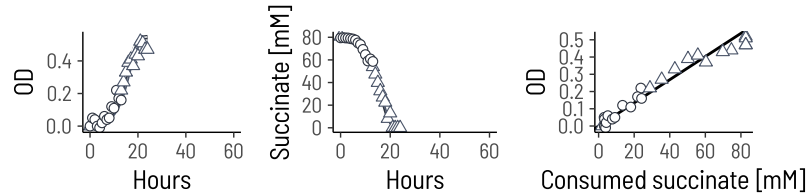
***Dialister invisus* PB-SARUR**



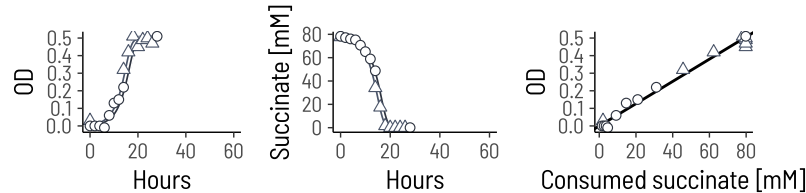
***Phascolarctobacterium succinatutens* DSMZ 22533**



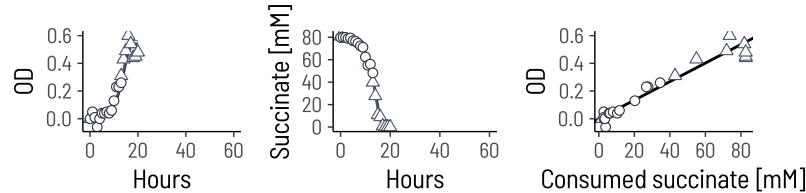
***Phascolarctobacterium faecium* PB-SJFWF**



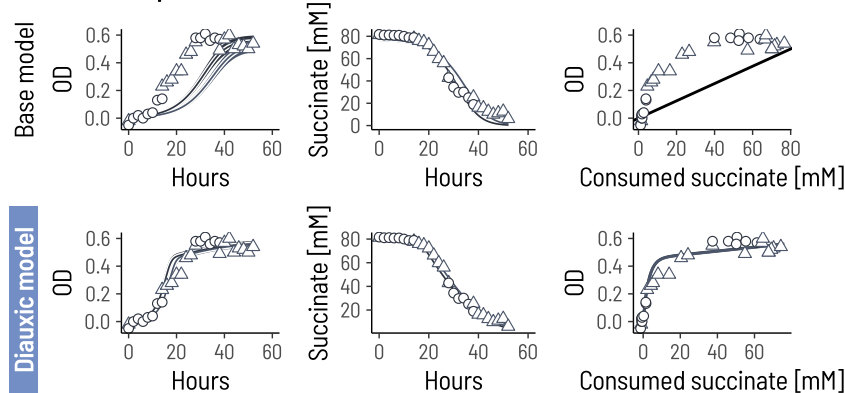
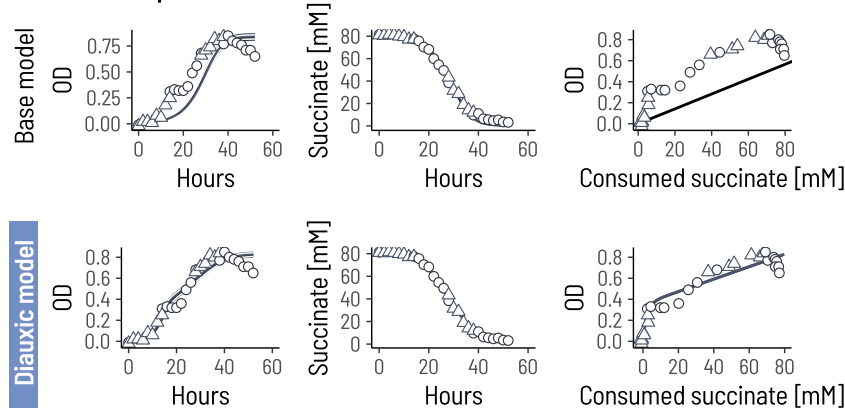
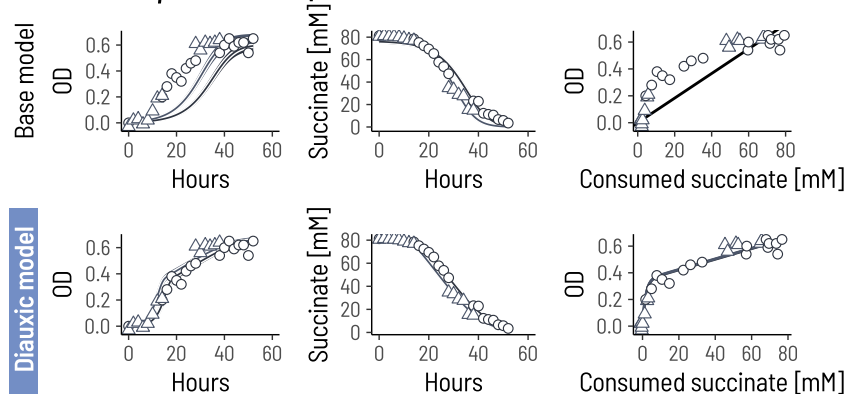
***Phascolarctobacterium faecium* PB-SPUPY**



***Phascolarctobacterium faecium* PB-SDVAP**



**Figure S2: A mathematical model of substrate uptake fits well to the genera *Phascolarctobacterium* and *Dialister*.** Each point is an independent culture destructively sampled at the specified time to measure optical density (OD) and succinate concentration. Two independent inoculum cultures were prepared for each strain (circles and triangles). The lines show the posterior median curve across all samples from the posterior distribution. The shaded area (where visible) show the 95% HPD interval across the posterior samples. We population size of the inoculum cultures were estimated independently, resulting in two lines. The slope of the line in the rightmost panels is the posterior mean of the OD yield per unit succinate parameter,  $\phi$ .

**Flavonifractor plautii DSMZ 24814****Flavonifractor plautii PB-SCBYV****Flavonifractor plautii PB-SSJQB**

**Figure S3: A mathematical model with diauxie is a better fit for the genus *Flavonifractor*.** Each point is an independent culture destructively sampled at the specified time to measure optical density (OD) and succinate concentration. Two independent inoculum cultures were prepared for each strain (circles and triangles). The lines show the posterior median curve across all samples from the posterior distribution. The shaded area (where visible) show the 95% HPD interval across the posterior samples. We population size of the inoculum cultures were estimated independently, resulting in two lines. For the base model, the slope of the line in the rightmost panels is the posterior mean of the OD yield per unit succinate parameter,  $\phi$ . For the diauxic model, the lines show the median across the samples from the posterior.

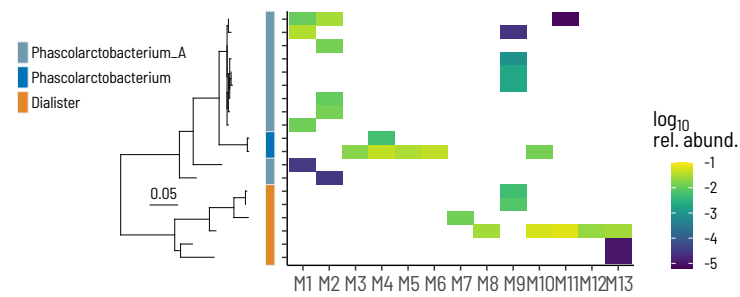


Figure S4: Relative abundances of all ASVs classified as *Phascolarctobacterium*, *Phascolarctobacterium\_A*, or *Dialister*.

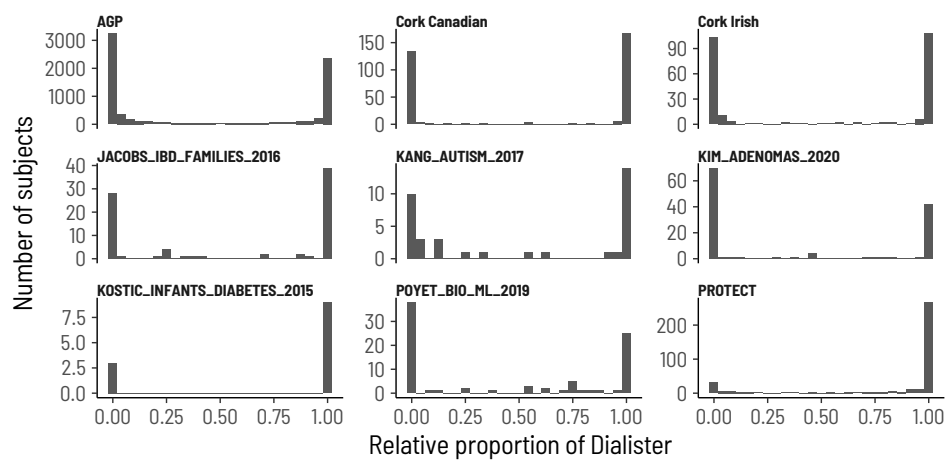


Figure S5: Distribution of the succinotype ratio across cohorts. The ratio of abundances  $r = x_D / (x_D + x_P)$  is strongly bimodal across all cohorts.

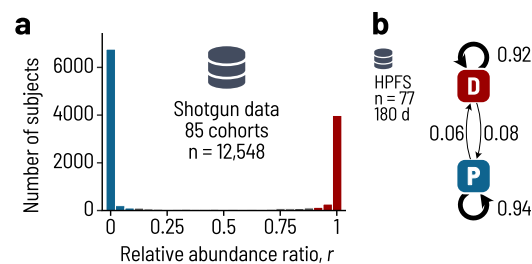
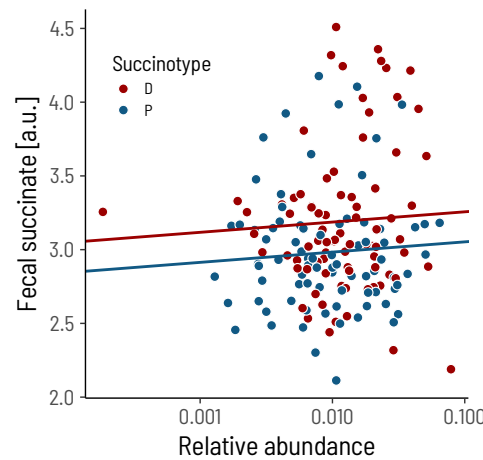
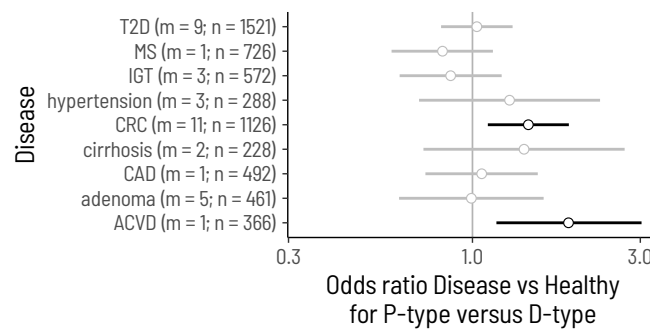


Figure S6: Succinotypes in cohorts with shotgun metagenomic data. **a.** The ratio of abundances  $r = x_D / (x_D + x_P)$  is strongly bimodal across all cohorts. **b.** Probability of transitioning from one succinotype to another in the Health Professionals Follow-up Study (HPFS).



**Figure S7: Fecal succinate concentrations do not depend on the relative abundance of the succinate consumers.** BIO-ML cohort,  $n = 146$ . The slopes are estimated from a linear model with succinotype and  $\log_{10}$  relative abundance as fixed effects.



**Figure S8: Association of succinotypes with diseases other than IBD.** Estimates are from logistic regressions of disease *versus* healthy on succinotype, including the study as a random effect if there were more than 1 study.  $m$ , number of studies;  $n$ , number of subjects. T2D, type 2 diabetes; MS, multiple sclerosis; IGT, impaired glucose tolerance; CRC, colorectal cancer; CAD, cardiovascular disease; ACVD, atherosclerotic cardiovascular disease.

## Supplementary Text S1

The following pages show the summary statistics and convergence diagnostics for the MCMC sampling.

# MCMC diagnostics

## Model 1

### DSMZ-109768

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat      | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|-----------|----------|----------|
| mu       | 34.7509092 | 34.7418000 | 0.4856588 | 0.4936317 | 33.9751950 | 35.5691050 | 1.0001827 | 1613.460 | 2082.911 |
| phi      | 0.0062487  | 0.0062482  | 0.0000528 | 0.0000522 | 0.0061617  | 0.0063356  | 0.9997776 | 2676.228 | 2657.301 |
| K        | 18.1060745 | 18.0934000 | 0.8382852 | 0.8213604 | 16.7242700 | 19.5050600 | 1.0007634 | 2159.976 | 2380.518 |
| x0[1]    | 0.0021026  | 0.0021022  | 0.0000499 | 0.0000492 | 0.0020222  | 0.0021847  | 1.0009495 | 1468.333 | 1903.701 |
| x0[2]    | 0.0015465  | 0.0015463  | 0.0000366 | 0.0000364 | 0.0014897  | 0.0016055  | 1.0006927 | 1604.488 | 1918.743 |
| A0[1]    | 79.5593256 | 79.5590500 | 0.1249837 | 0.1274295 | 79.3504650 | 79.7614050 | 1.0010087 | 4312.672 | 3009.044 |
| A0[2]    | 80.5740936 | 80.5748500 | 0.1398890 | 0.1398833 | 80.3465900 | 80.8047200 | 1.0004467 | 5035.483 | 3481.443 |
| sigma_x  | 0.0125187  | 0.0125148  | 0.0004846 | 0.0004812 | 0.0117340  | 0.0133440  | 1.0015677 | 2520.255 | 2503.346 |
| sigma_A  | 0.2541012  | 0.2540980  | 0.0050948 | 0.0051365 | 0.2457976  | 0.2626041  | 1.0008895 | 3162.743 | 2463.265 |

### DSMZ-14760

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat     | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|----------|----------|----------|
| mu       | 62.5320384 | 62.5122000 | 0.9972682 | 0.9823708 | 60.8695300 | 64.1819450 | 1.003269 | 1539.203 | 2066.769 |
| phi      | 0.0070694  | 0.0070703  | 0.0000816 | 0.0000824 | 0.0069354  | 0.0072025  | 1.002387 | 2451.617 | 2435.264 |
| K        | 29.5683240 | 29.5656000 | 1.1605252 | 1.1877850 | 27.6627050 | 31.4686700 | 1.001700 | 1879.551 | 2318.341 |
| x0[1]    | 0.0037724  | 0.0037702  | 0.0000837 | 0.0000837 | 0.0036390  | 0.0039152  | 1.001952 | 1690.710 | 1888.570 |
| x0[2]    | 0.0026357  | 0.0026343  | 0.0000632 | 0.0000631 | 0.0025358  | 0.0027407  | 1.001331 | 1605.779 | 2291.942 |
| A0[1]    | 78.9294750 | 78.9233500 | 0.3008203 | 0.2948150 | 78.4420900 | 79.4440050 | 1.000457 | 2867.034 | 2894.066 |
| A0[2]    | 80.5835657 | 80.5830000 | 0.1155592 | 0.1143085 | 80.3914750 | 80.7696100 | 1.000584 | 5288.592 | 3243.726 |
| sigma_x  | 0.0148894  | 0.0148916  | 0.0005190 | 0.0005076 | 0.0140295  | 0.0157414  | 1.001297 | 2797.613 | 2390.575 |
| sigma_A  | 0.3187308  | 0.3187125  | 0.0051672 | 0.0051076 | 0.3101488  | 0.3273776  | 1.000550 | 3127.520 | 2437.707 |

### DSMZ-21274

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat     | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|----------|----------|----------|
| mu       | 29.3693966 | 29.3803500 | 0.5140788 | 0.5223200 | 28.5100800 | 30.2277250 | 1.001576 | 1871.567 | 2269.861 |
| phi      | 0.0091525  | 0.0091537  | 0.0000933 | 0.0000918 | 0.0089979  | 0.0093078  | 1.000370 | 2775.502 | 2456.631 |
| K        | 78.0779022 | 78.0308500 | 2.0410570 | 2.0913556 | 74.7759800 | 81.4455450 | 1.000474 | 2242.412 | 2490.401 |
| x0[1]    | 0.0017213  | 0.0017205  | 0.0000482 | 0.0000495 | 0.0016421  | 0.0018003  | 1.000803 | 1766.489 | 2153.531 |
| x0[2]    | 0.0038656  | 0.0038651  | 0.0000825 | 0.0000839 | 0.0037321  | 0.0040025  | 1.001171 | 1639.284 | 2101.449 |
| A0[1]    | 78.4312216 | 78.4330500 | 0.1657818 | 0.1696836 | 78.1593950 | 78.6969050 | 1.000606 | 4814.000 | 3311.872 |
| A0[2]    | 75.9353760 | 75.9342000 | 0.1969456 | 0.1939982 | 75.6110850 | 76.2584050 | 1.000424 | 4851.169 | 3128.147 |
| sigma_x  | 0.0233122  | 0.0233146  | 0.0005440 | 0.0005437 | 0.0224221  | 0.0241935  | 1.001099 | 2614.637 | 2748.456 |
| sigma_A  | 0.4006084  | 0.4006225  | 0.0051806 | 0.0052447 | 0.3919497  | 0.4091731  | 1.000296 | 3038.007 | 2443.670 |

## DSMZ-22533

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat     | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|----------|----------|----------|
| mu       | 63.9625270 | 63.9511000 | 1.1097415 | 1.0965310 | 62.1544250 | 65.8275900 | 1.001161 | 1724.880 | 1692.565 |
| phi      | 0.0050362  | 0.0050391  | 0.0000920 | 0.0000907 | 0.0048815  | 0.0051848  | 1.000675 | 1736.281 | 2022.507 |
| K        | 73.8043799 | 73.8004500 | 1.7922418 | 1.8036570 | 70.8919200 | 76.8054300 | 1.001117 | 1952.675 | 2215.765 |
| x0[1]    | 0.0095479  | 0.0095484  | 0.0001973 | 0.0002000 | 0.0092279  | 0.0098747  | 1.001078 | 1337.776 | 1976.595 |
| x0[2]    | 0.0083520  | 0.0083501  | 0.0002096 | 0.0002138 | 0.0080054  | 0.0087015  | 1.000905 | 1371.646 | 2043.519 |
| A0[1]    | 73.4892622 | 73.4903500 | 0.2585845 | 0.2589361 | 73.0612850 | 73.9148200 | 1.000339 | 2092.760 | 3009.016 |
| A0[2]    | 79.1389619 | 79.1380500 | 0.1343712 | 0.1352873 | 78.9155000 | 79.3575050 | 1.001127 | 2394.460 | 2795.482 |
| sigma_x  | 0.0245272  | 0.0245221  | 0.0006288 | 0.0006269 | 0.0235207  | 0.0255835  | 1.001823 | 1993.568 | 2469.755 |
| sigma_A  | 0.3783880  | 0.3784780  | 0.0058623 | 0.0059482 | 0.3688561  | 0.3881982  | 1.000926 | 1954.785 | 2595.854 |

## DSMZ-24814

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat      | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|-----------|----------|----------|
| mu       | 42.2652199 | 42.2234000 | 1.1217051 | 1.1162495 | 40.4657700 | 44.1563000 | 1.0002915 | 1640.635 | 1986.899 |
| phi      | 0.0067231  | 0.0067269  | 0.0002057 | 0.0002073 | 0.0063786  | 0.0070611  | 1.0010669 | 1579.719 | 2077.161 |
| K        | 89.4844345 | 89.4710500 | 2.1338514 | 2.1433948 | 85.9959100 | 93.0136450 | 1.0006271 | 2373.401 | 2341.376 |
| x0[1]    | 0.0066060  | 0.0066024  | 0.0001591 | 0.0001569 | 0.0063484  | 0.0068750  | 1.0034752 | 1741.996 | 2147.414 |
| x0[2]    | 0.0045008  | 0.0044993  | 0.0001214 | 0.0001187 | 0.0043034  | 0.0047068  | 1.0029807 | 1597.383 | 2270.807 |
| A0[1]    | 81.9605948 | 81.9570000 | 0.1898141 | 0.1894021 | 81.6541550 | 82.2738300 | 1.0007350 | 4444.723 | 2901.587 |
| A0[2]    | 77.5739450 | 77.5713500 | 0.2705390 | 0.2773945 | 77.1404900 | 78.0154250 | 0.9997288 | 2108.617 | 2515.373 |
| sigma_x  | 0.0353289  | 0.0353098  | 0.0006237 | 0.0006220 | 0.0343319  | 0.0363913  | 1.0001487 | 1991.155 | 2369.209 |
| sigma_A  | 0.5083501  | 0.5083660  | 0.0058919 | 0.0060601 | 0.4988665  | 0.5180164  | 1.0013341 | 2056.236 | 2498.502 |

## PB-SARUR

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat      | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|-----------|----------|----------|
| mu       | 28.1266089 | 28.1179000 | 0.6491801 | 0.6656133 | 27.0818400 | 29.2003100 | 1.0012577 | 1621.421 | 2089.412 |
| phi      | 0.0034977  | 0.0034967  | 0.0000931 | 0.0000920 | 0.0033476  | 0.0036540  | 1.0015549 | 1687.955 | 1936.752 |
| K        | 0.2500943  | 0.1874790  | 0.2169896 | 0.1884488 | 0.0159445  | 0.6790079  | 1.0018849 | 1683.368 | 1362.333 |
| x0[1]    | 0.0001035  | 0.0001036  | 0.0000045 | 0.0000044 | 0.0000961  | 0.0001108  | 1.0014100 | 1735.267 | 1984.098 |
| x0[2]    | 0.0034598  | 0.0034587  | 0.0000844 | 0.0000828 | 0.0033222  | 0.0036023  | 1.0011736 | 1644.962 | 2161.432 |
| A0[1]    | 80.3749952 | 80.3754000 | 0.1114772 | 0.1114915 | 80.1939900 | 80.5600250 | 1.0007970 | 4096.310 | 2316.685 |
| A0[2]    | 79.5229914 | 79.5222500 | 0.1752327 | 0.1764294 | 79.2390650 | 79.8141150 | 1.0000152 | 4101.038 | 2909.671 |
| sigma_x  | 0.0219825  | 0.0219814  | 0.0005212 | 0.0005143 | 0.0211322  | 0.0228398  | 0.9997679 | 2674.910 | 2789.782 |
| sigma_A  | 0.3412309  | 0.3413015  | 0.0052117 | 0.0052640 | 0.3325613  | 0.3496548  | 1.0009202 | 2891.384 | 2356.799 |

## PB-SCBYV

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat     | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|----------|----------|----------|
| mu       | 32.8331798 | 32.8334000 | 0.5498072 | 0.5679841 | 31.9467750 | 33.7384350 | 1.000523 | 1856.177 | 2171.334 |
| phi      | 0.0103116  | 0.0103113  | 0.0001236 | 0.0001239 | 0.0101047  | 0.0105108  | 1.001662 | 2692.683 | 2615.042 |
| K        | 88.2649888 | 88.2407000 | 2.1005906 | 2.1308669 | 84.8203000 | 91.6876700 | 1.002180 | 2110.795 | 2311.319 |
| x0[1]    | 0.0061185  | 0.0061172  | 0.0001191 | 0.0001213 | 0.0059185  | 0.0063122  | 1.000923 | 1573.290 | 2165.977 |
| x0[2]    | 0.0055325  | 0.0055324  | 0.0001283 | 0.0001273 | 0.0053177  | 0.0057382  | 1.000954 | 1629.972 | 2158.675 |
| A0[1]    | 80.2987214 | 80.2958000 | 0.2317382 | 0.2297289 | 79.9148450 | 80.6755500 | 1.000589 | 4586.545 | 3065.033 |

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat     | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|----------|----------|----------|
| A0[2]    | 81.3093830 | 81.3080500 | 0.1464601 | 0.1467774 | 81.0669950 | 81.5484500 | 1.000479 | 6368.718 | 3156.686 |
| sigma_x  | 0.0306303  | 0.0306292  | 0.0005185 | 0.0005082 | 0.0297917  | 0.0314976  | 1.000993 | 2936.100 | 2744.984 |
| sigma_A  | 0.3974329  | 0.3972985  | 0.0055257 | 0.0056420 | 0.3886542  | 0.4065757  | 1.000837 | 2385.970 | 2659.632 |

## PB-SDVAP

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat     | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|----------|----------|----------|
| mu       | 65.0072534 | 65.0152000 | 0.9424787 | 0.9557581 | 63.4368250 | 66.5292700 | 1.001938 | 1869.036 | 2369.149 |
| phi      | 0.0066987  | 0.0066995  | 0.0000779 | 0.0000788 | 0.0065722  | 0.0068269  | 1.002560 | 2803.120 | 2590.320 |
| K        | 22.2369412 | 22.2304500 | 0.9774926 | 0.9552392 | 20.6391700 | 23.8884200 | 1.001933 | 2042.293 | 2439.202 |
| x0[1]    | 0.0031794  | 0.0031791  | 0.0000722 | 0.0000731 | 0.0030627  | 0.0032990  | 1.002026 | 1533.057 | 2364.353 |
| x0[2]    | 0.0038449  | 0.0038465  | 0.0000869 | 0.0000888 | 0.0037015  | 0.0039862  | 1.001551 | 1642.397 | 2461.269 |
| A0[1]    | 79.3913281 | 79.3909500 | 0.1089834 | 0.1083039 | 79.2122000 | 79.5715050 | 1.001690 | 5299.491 | 2917.276 |
| A0[2]    | 80.8765930 | 80.8777000 | 0.2914804 | 0.2877727 | 80.3876800 | 81.3556200 | 1.000968 | 3092.791 | 2675.625 |
| sigma_x  | 0.0161790  | 0.0161640  | 0.0005255 | 0.0005194 | 0.0153238  | 0.0170815  | 1.002377 | 2768.253 | 2529.524 |
| sigma_A  | 0.3129388  | 0.3128115  | 0.0050221 | 0.0052232 | 0.3048049  | 0.3211286  | 1.001997 | 3261.594 | 2783.637 |

## PB-SJFWF

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat      | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|-----------|----------|----------|
| mu       | 67.4920334 | 67.4820500 | 1.1277088 | 1.1530922 | 65.6682900 | 69.3655350 | 1.001167  | 1481.358 | 1462.517 |
| phi      | 0.0067171  | 0.0067182  | 0.0000898 | 0.0000898 | 0.0065676  | 0.0068624  | 1.0020941 | 2242.021 | 1975.709 |
| K        | 45.5279726 | 45.5280000 | 1.5017989 | 1.5015032 | 43.0855550 | 48.0423250 | 1.0019275 | 1714.446 | 1758.058 |
| x0[1]    | 0.0040609  | 0.0040612  | 0.0001016 | 0.0001013 | 0.0038928  | 0.0042283  | 1.0005976 | 1698.993 | 2203.352 |
| x0[2]    | 0.0047412  | 0.0047418  | 0.0001143 | 0.0001133 | 0.0045525  | 0.0049287  | 1.0014925 | 1678.768 | 2057.444 |
| A0[1]    | 77.0064920 | 77.0054500 | 0.3150782 | 0.3102341 | 76.4702800 | 77.5311800 | 1.0010833 | 2842.831 | 3161.117 |
| A0[2]    | 79.5181174 | 79.5171500 | 0.1365040 | 0.1306912 | 79.2941000 | 79.7452200 | 0.9999431 | 5442.039 | 2958.696 |
| sigma_x  | 0.0178895  | 0.0178825  | 0.0005661 | 0.0005655 | 0.0169772  | 0.0188234  | 1.0016043 | 2549.964 | 2425.966 |
| sigma_A  | 0.3733407  | 0.3732310  | 0.0052719 | 0.0052454 | 0.3647999  | 0.3822072  | 1.0020198 | 2531.738 | 2641.495 |

## PB-SPUPY

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat      | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|-----------|----------|----------|
| mu       | 59.2841231 | 59.2828500 | 0.8746658 | 0.8848157 | 57.8310850 | 60.7565300 | 1.0016851 | 1646.626 | 1989.842 |
| phi      | 0.0063315  | 0.0063307  | 0.0000665 | 0.0000668 | 0.0062234  | 0.0064405  | 1.0015368 | 2646.877 | 2433.222 |
| K        | 24.5210095 | 24.5282500 | 1.0301174 | 1.0287020 | 22.8468600 | 26.2351650 | 1.0008388 | 1983.403 | 2389.381 |
| x0[1]    | 0.0059946  | 0.0059911  | 0.0001293 | 0.0001296 | 0.0057845  | 0.0062120  | 0.9998119 | 1774.364 | 2348.892 |
| x0[2]    | 0.0039506  | 0.0039497  | 0.0000889 | 0.0000893 | 0.0038078  | 0.0041019  | 1.0002608 | 1610.042 | 2343.163 |
| A0[1]    | 77.5003594 | 77.5009500 | 0.2023349 | 0.2022266 | 77.1663700 | 77.8340450 | 1.0020316 | 4478.333 | 2658.752 |
| A0[2]    | 77.1270053 | 77.1277000 | 0.0951279 | 0.0945899 | 76.9711850 | 77.2816150 | 1.0007736 | 4264.951 | 3100.926 |
| sigma_x  | 0.0129983  | 0.0130046  | 0.0005369 | 0.0005327 | 0.0121290  | 0.0139122  | 1.0008532 | 2209.255 | 2164.781 |
| sigma_A  | 0.2037247  | 0.2037395  | 0.0051985 | 0.0052017 | 0.1950968  | 0.2121761  | 1.0021472 | 2950.317 | 2579.972 |

## PB-SSJQB

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat     | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|----------|----------|----------|
| mu       | 38.0671042 | 38.0624500 | 0.8699528 | 0.8638369 | 36.6803750 | 39.5398100 | 1.002388 | 1656.544 | 1825.423 |
| phi      | 0.0078834  | 0.0078894  | 0.0001885 | 0.0001860 | 0.0075681  | 0.0081869  | 1.002370 | 1803.847 | 2029.734 |
| K        | 88.6392096 | 88.6650000 | 2.1131475 | 2.0969153 | 85.1171350 | 92.0992250 | 1.001670 | 2048.691 | 2447.895 |
| x0[1]    | 0.0040742  | 0.0040716  | 0.0001054 | 0.0001057 | 0.0039032  | 0.0042474  | 1.003933 | 1448.427 | 2014.783 |
| x0[2]    | 0.0070930  | 0.0070900  | 0.0001571 | 0.0001605 | 0.0068398  | 0.0073515  | 1.003282 | 1579.399 | 2003.844 |
| A0[1]    | 75.9330331 | 75.9323500 | 0.2427746 | 0.2472977 | 75.5380300 | 76.3378250 | 1.002558 | 2318.624 | 2662.199 |
| A0[2]    | 81.2745600 | 81.2780000 | 0.1775958 | 0.1815444 | 80.9800950 | 81.5627100 | 1.001505 | 4674.038 | 2987.650 |
| sigma_x  | 0.0341382  | 0.0341277  | 0.0006036 | 0.0006121 | 0.0331840  | 0.0351560  | 1.001816 | 2003.229 | 1899.752 |
| sigma_A  | 0.4694522  | 0.4693675  | 0.0058128 | 0.0057592 | 0.4598969  | 0.4790814  | 1.002598 | 2250.525 | 2523.170 |

## Model 2

### DSMZ-24814

| variable | mean       | median     | sd        | mad       | q5         | q95        | rhat      | ess_bulk | ess_tail |
|----------|------------|------------|-----------|-----------|------------|------------|-----------|----------|----------|
| mu       | 12.4578546 | 12.4583500 | 0.2947238 | 0.2911826 | 11.9734900 | 12.9461450 | 1.0012667 | 2555.423 | 2622.631 |
| phi      | 0.0014204  | 0.0014167  | 0.0001311 | 0.0001350 | 0.0012106  | 0.0016377  | 1.0013102 | 2237.722 | 2598.371 |
| K        | 55.4279843 | 55.3966000 | 2.0013997 | 1.9983224 | 52.1136500 | 58.7198450 | 1.0002784 | 2689.050 | 2528.263 |
| mu2      | 91.3383973 | 91.2727500 | 2.2224156 | 2.1999560 | 87.7950950 | 95.1448400 | 1.0022282 | 2266.863 | 2434.473 |
| phi2     | 0.0044903  | 0.0044931  | 0.0000769 | 0.0000765 | 0.0043603  | 0.0046138  | 1.0014151 | 2115.389 | 2714.317 |
| K2       | 35.6677337 | 35.6422500 | 2.3639028 | 2.3363552 | 31.7553900 | 39.6394500 | 1.0003332 | 3265.636 | 2675.488 |
| x0[1]    | 0.0036464  | 0.0036474  | 0.0000890 | 0.0000876 | 0.0034987  | 0.0037932  | 0.9995410 | 3121.885 | 2633.438 |
| x0[2]    | 0.0020883  | 0.0020899  | 0.0000714 | 0.0000726 | 0.0019697  | 0.0022041  | 1.0002947 | 2754.908 | 2257.442 |
| A0[1]    | 80.6813264 | 80.6823500 | 0.1194130 | 0.1201647 | 80.4832950 | 80.8785150 | 0.9998932 | 5821.417 | 3395.289 |
| A0[2]    | 79.8959982 | 79.8994500 | 0.2006775 | 0.2041540 | 79.5685900 | 80.2218150 | 1.0006110 | 4076.876 | 3475.659 |
| sigma_x  | 0.0178874  | 0.0178874  | 0.0005053 | 0.0004884 | 0.0170505  | 0.0187348  | 1.0010506 | 3849.580 | 2561.786 |
| sigma_A  | 0.3275759  | 0.3275460  | 0.0051208 | 0.0051417 | 0.3191967  | 0.3361212  | 1.0010588 | 4405.287 | 2388.663 |

### PB-SCBYV

| variable | mean        | median      | sd        | mad       | q5          | q95         | rhat      | ess_bulk | ess_tail |
|----------|-------------|-------------|-----------|-----------|-------------|-------------|-----------|----------|----------|
| mu       | 11.1899534  | 11.1796000  | 0.2938624 | 0.2958528 | 10.7160800  | 11.6945350  | 1.0016780 | 2075.715 | 2257.250 |
| phi      | 0.0059236   | 0.0059267   | 0.0001757 | 0.0001781 | 0.0056300   | 0.0062054   | 1.0011842 | 1904.726 | 2449.120 |
| K        | 41.2279974  | 41.1751500  | 1.7655031 | 1.7522849 | 38.3304900  | 44.1698150  | 1.0014193 | 2199.143 | 2457.095 |
| mu2      | 106.3820994 | 106.3505000 | 3.6302076 | 3.6027180 | 100.4576500 | 112.3920500 | 1.0012945 | 2014.978 | 2444.193 |
| phi2     | 0.0035055   | 0.0035028   | 0.0001066 | 0.0001058 | 0.0033365   | 0.0036821   | 1.0013390 | 1796.219 | 2321.114 |
| K2       | 31.9677349  | 31.9601000  | 2.6348501 | 2.6219040 | 27.6349100  | 36.3320150  | 1.0008010 | 3352.031 | 2546.642 |
| x0[1]    | 0.0039724   | 0.0039717   | 0.0000899 | 0.0000909 | 0.0038249   | 0.0041223   | 1.0003016 | 3161.437 | 3043.678 |
| x0[2]    | 0.0047753   | 0.0047762   | 0.0000972 | 0.0000959 | 0.0046153   | 0.0049332   | 1.0010805 | 3401.187 | 3143.707 |
| A0[1]    | 79.7747086  | 79.7742000  | 0.2275675 | 0.2284687 | 79.4028200  | 80.1570050  | 1.0019512 | 3521.253 | 3244.725 |
| A0[2]    | 80.5357060  | 80.5357500  | 0.1164228 | 0.1160876 | 80.3425900  | 80.7260150  | 0.9999303 | 5246.264 | 3553.522 |
| sigma_x  | 0.0194494   | 0.0194428   | 0.0004828 | 0.0004981 | 0.0186759   | 0.0202615   | 1.0004661 | 3870.444 | 2735.458 |
| sigma_A  | 0.3121337   | 0.3121110   | 0.0051310 | 0.0050779 | 0.3036693   | 0.3205572   | 1.0012656 | 3990.732 | 2466.391 |

### PB-SSJQB

| variable | mean        | median      | sd        | mad       | q5          | q95         | rhat      | ess_bulk | ess_tail |
|----------|-------------|-------------|-----------|-----------|-------------|-------------|-----------|----------|----------|
| mu       | 10.8089404  | 10.8037000  | 0.2793707 | 0.2755412 | 10.3547550  | 11.2835050  | 1.0004861 | 1957.430 | 2476.664 |
| phi      | 0.0039730   | 0.0039740   | 0.0001540 | 0.0001516 | 0.0037196   | 0.0042309   | 0.9999424 | 1914.839 | 1967.771 |
| K        | 41.5173065  | 41.4756500  | 1.8119793 | 1.8097357 | 38.6404650  | 44.5094000  | 1.0006654 | 2092.014 | 2457.911 |
| mu2      | 133.8975512 | 133.8380000 | 4.0850327 | 4.0400850 | 127.1798500 | 140.8407500 | 1.0002956 | 2187.607 | 2636.377 |
| phi2     | 0.0034129   | 0.0034140   | 0.0000856 | 0.0000850 | 0.0032674   | 0.0035530   | 1.0006044 | 1874.257 | 1976.615 |
| K2       | 33.5031737  | 33.4698000  | 2.5114189 | 2.5479964 | 29.3962750  | 37.7073700  | 1.0019368 | 2961.051 | 2396.859 |
| x0[1]    | 0.0014556   | 0.0014548   | 0.0000629 | 0.0000618 | 0.0013541   | 0.0015611   | 1.0001717 | 2857.669 | 2205.682 |
| x0[2]    | 0.0042749   | 0.0042731   | 0.0001036 | 0.0001028 | 0.0041074   | 0.0044459   | 1.0007601 | 3329.335 | 2791.551 |
| A0[1]    | 80.2111927  | 80.2074000  | 0.2333630 | 0.2317304 | 79.8297850  | 80.5999450  | 1.0001299 | 3926.406 | 2850.345 |
| A0[2]    | 80.1582466  | 80.1576500  | 0.1232057 | 0.1223886 | 79.9564000  | 80.3639050  | 1.0004059 | 4281.315 | 3464.883 |
| sigma_x  | 0.0189369   | 0.0189256   | 0.0005429 | 0.0005224 | 0.0180630   | 0.0198435   | 1.0003841 | 3833.573 | 2600.213 |
| sigma_A  | 0.3139960   | 0.3138770   | 0.0052837 | 0.0051913 | 0.3054359   | 0.3228022   | 1.0007950 | 3179.629 | 2547.788 |