GDP, investment and consumption (all experiments)

Logs

Time
(MC runs = 10)

Benchmark

GDP
Investment
Consumption
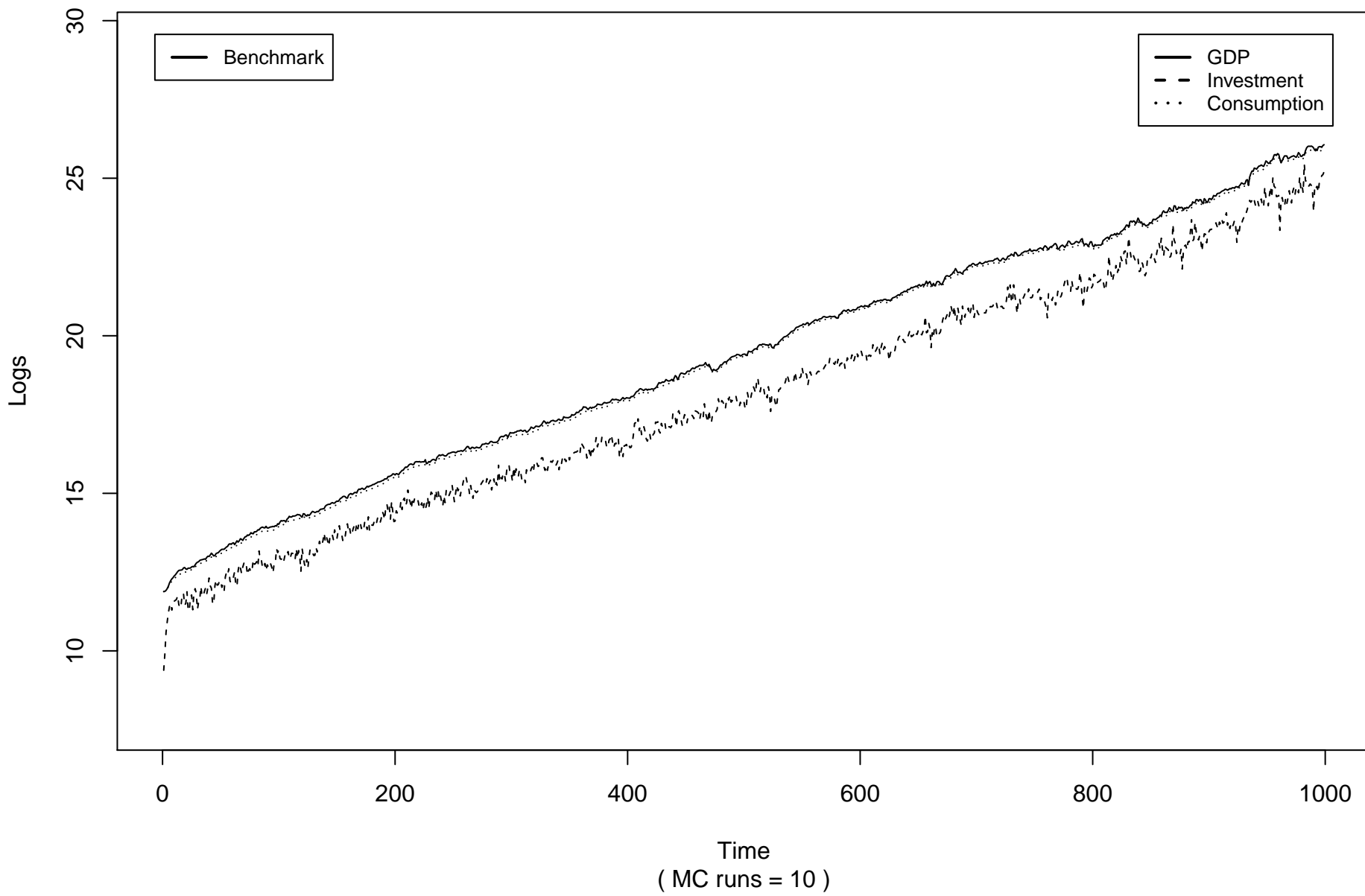
GDP, investment and consumption (Benchmark)

Logs

GDP
Investment
Consumption

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)

GDP (all experiments)

Time
(MC runs = 10)

GDP (Benchmark)

Log GDP

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)

Legend:
— Effective GDP
– – GDP @ 100% utilization
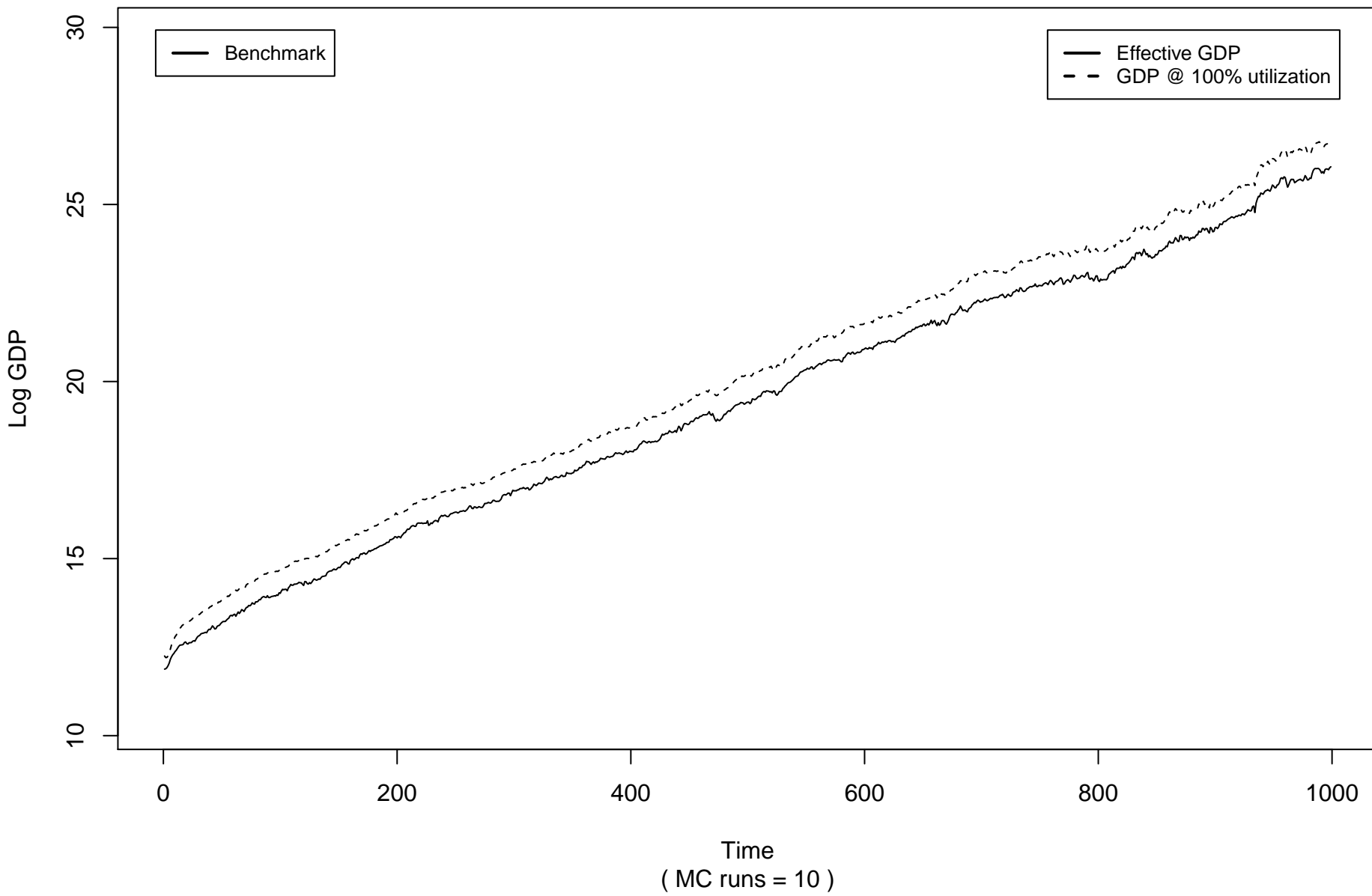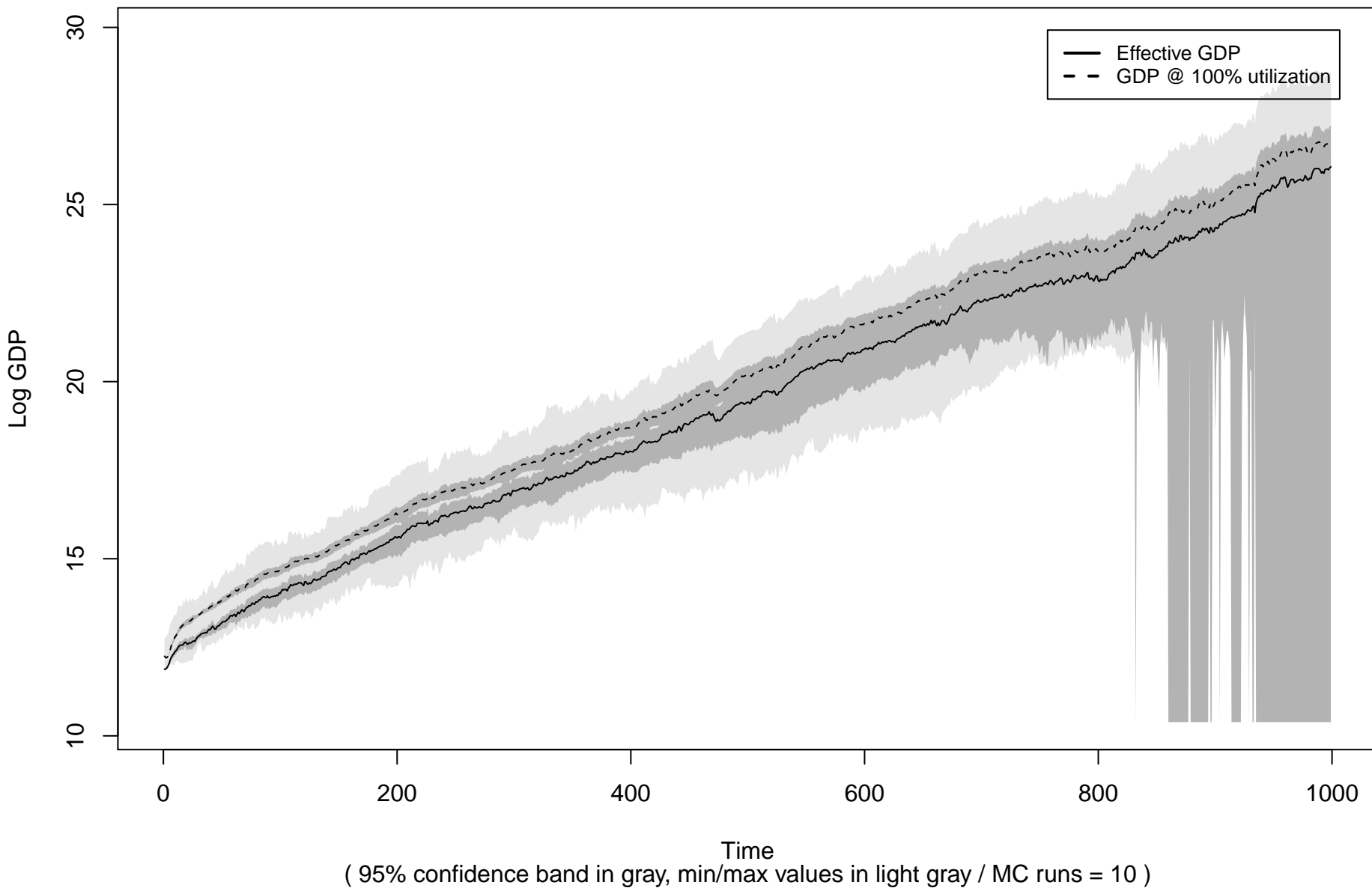
Government income and expenditure on GDP (all experiments)

Log government tax income and expenditure over GDP

Benchmark

Tax
Total expenditure

Time
(MC runs = 10)
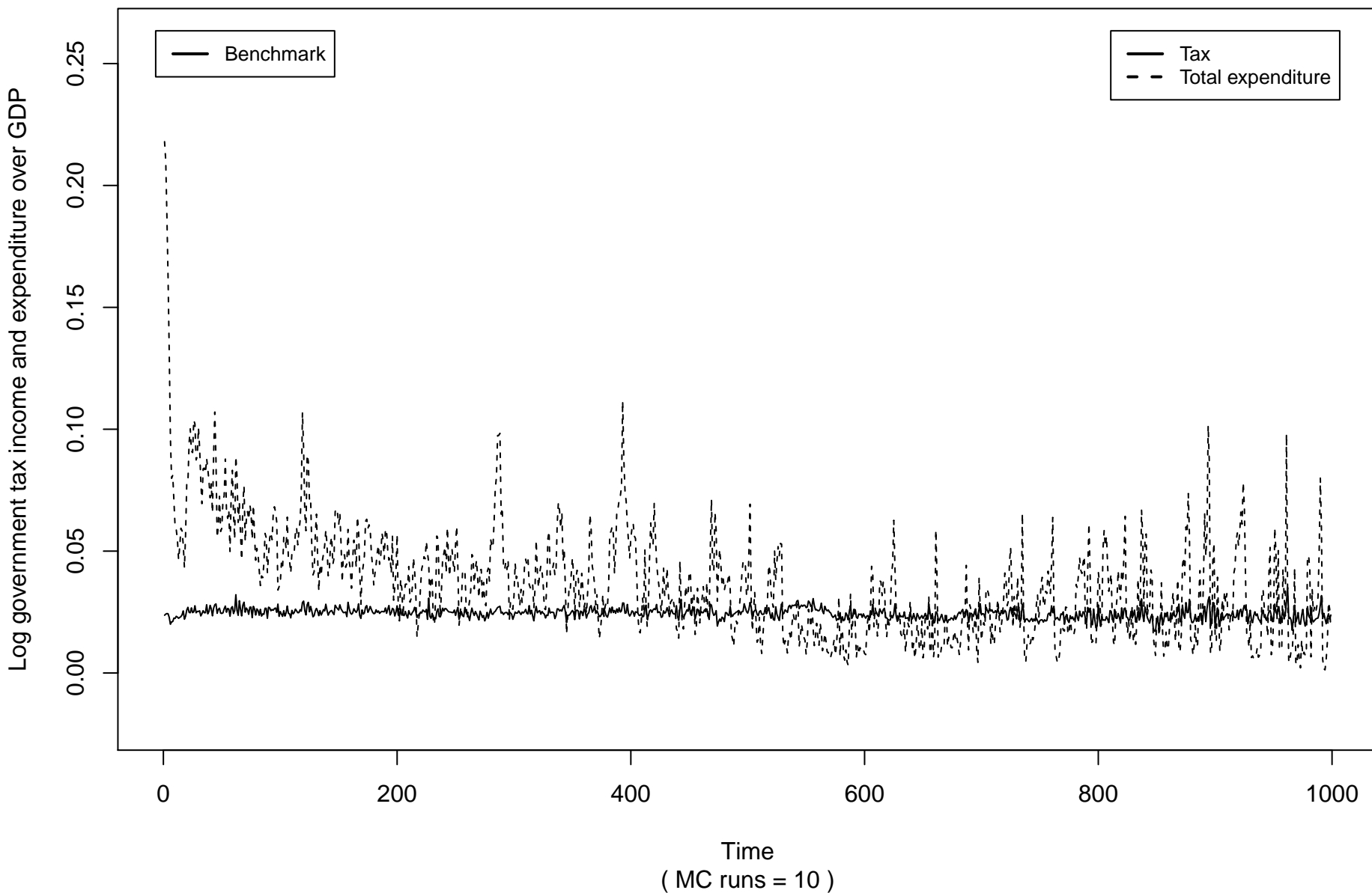
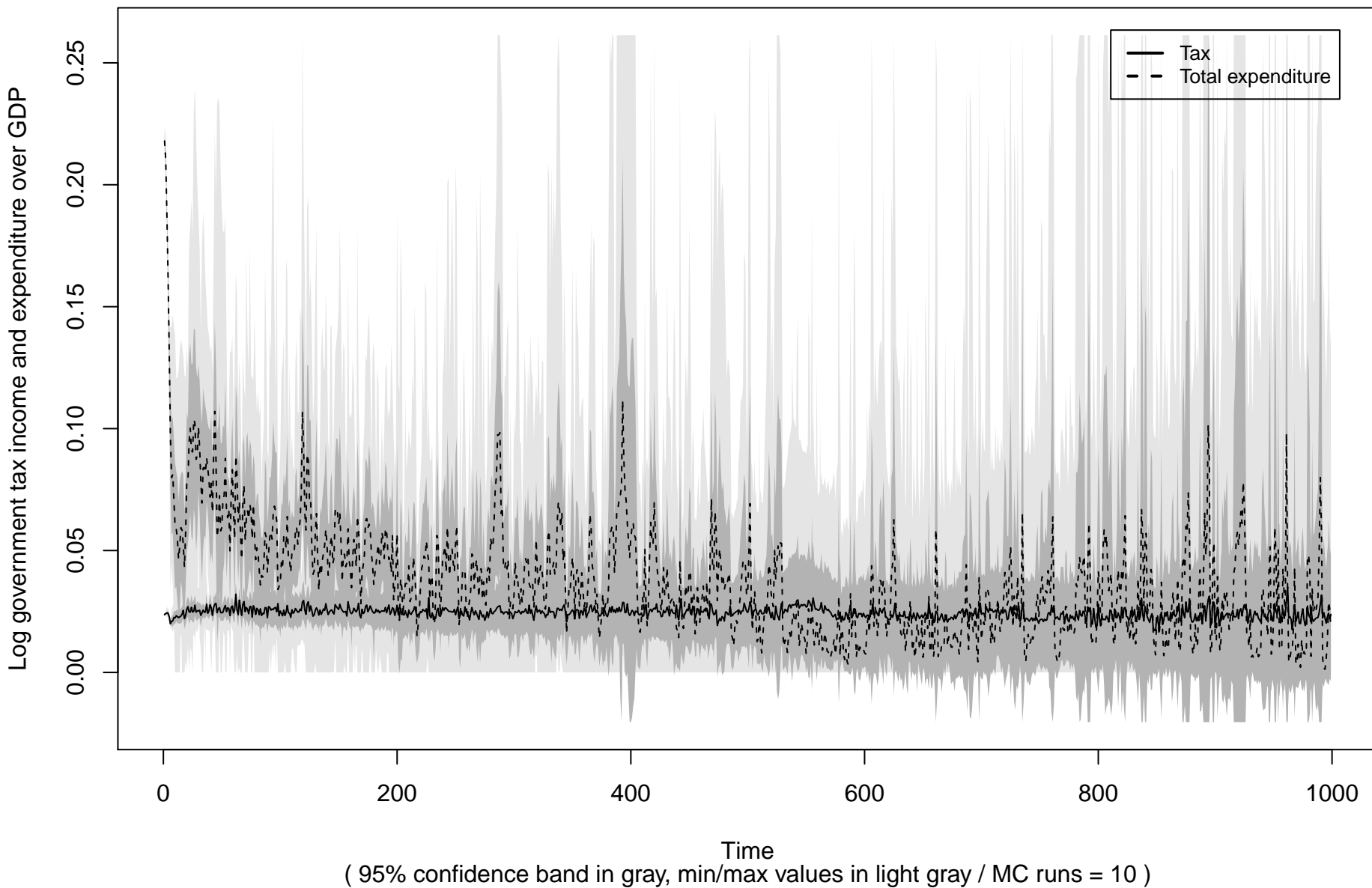**Government income and expenditure on GDP (Benchmark)**

Log government tax income and expenditure over GDP

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)

Legend:
— Tax
- - Total expenditure

Government deficit on GDP (all experiments)

Government deficit over GDP

Benchmark

Time
(MC runs = 10)
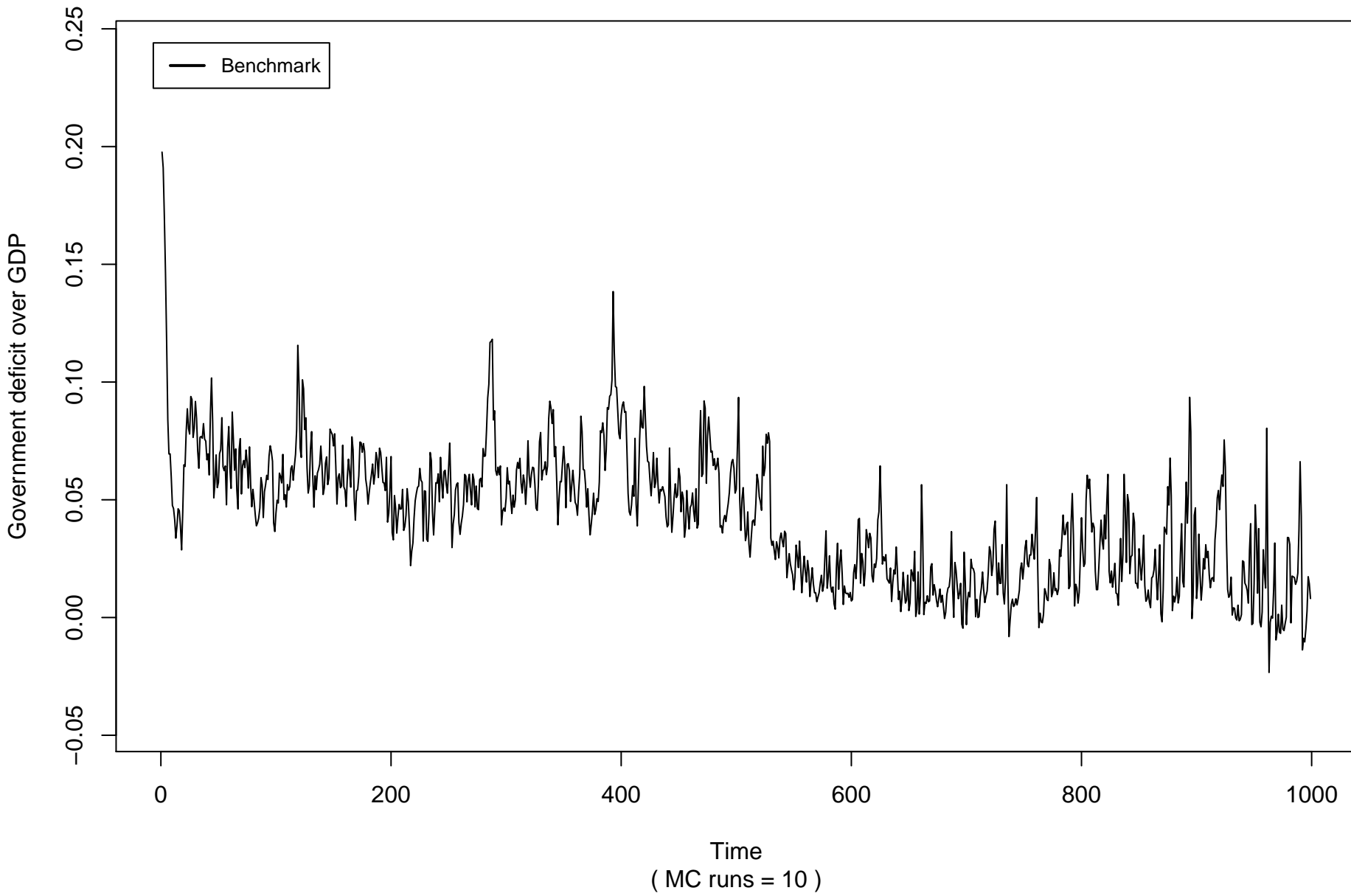
Government deficit on GDP (Benchmark)

Government deficit over GDP

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)
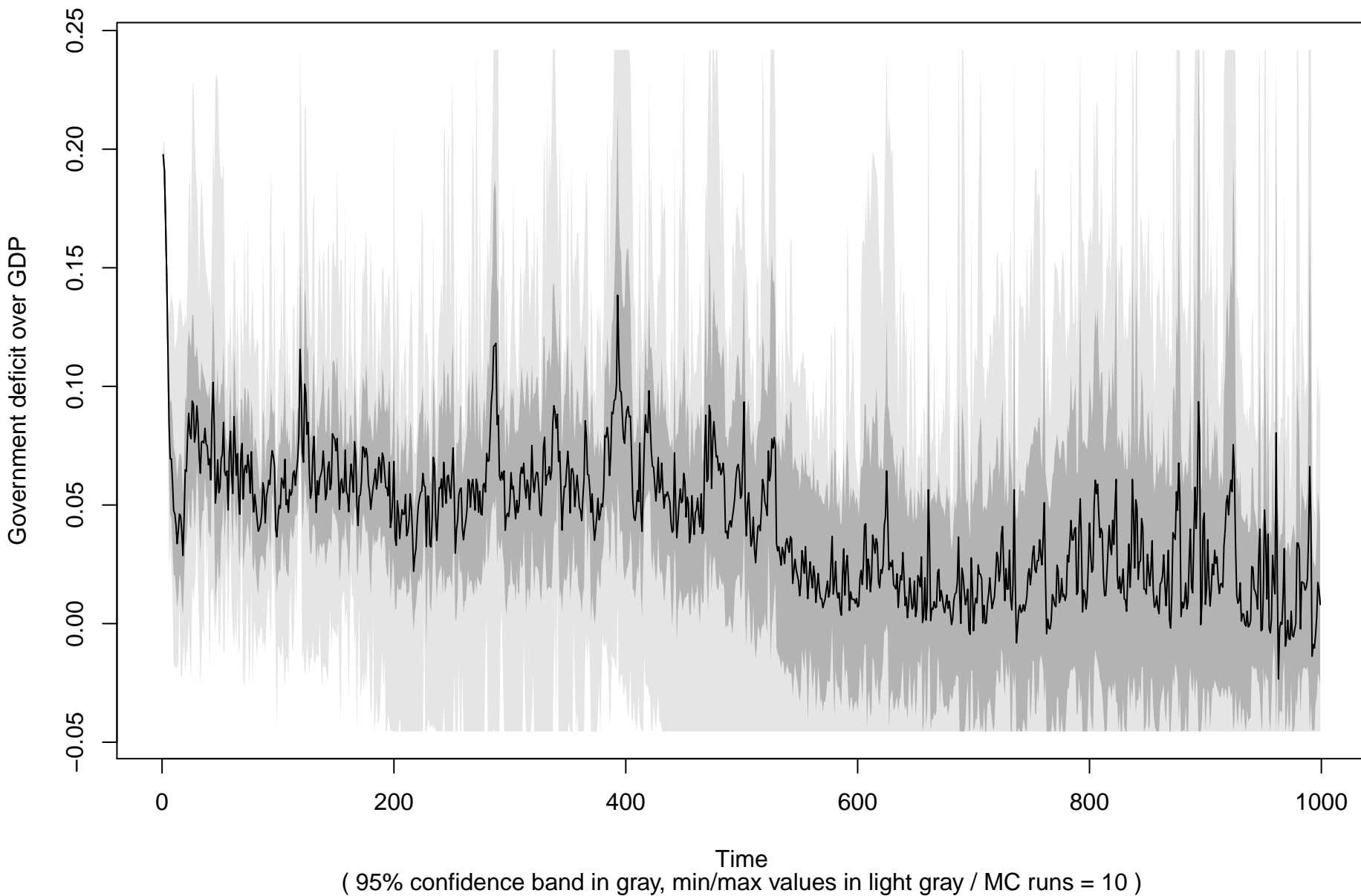
Government debt on GDP (all experiments)

Benchmark

Government debt over GDP

Time
(MC runs = 10)
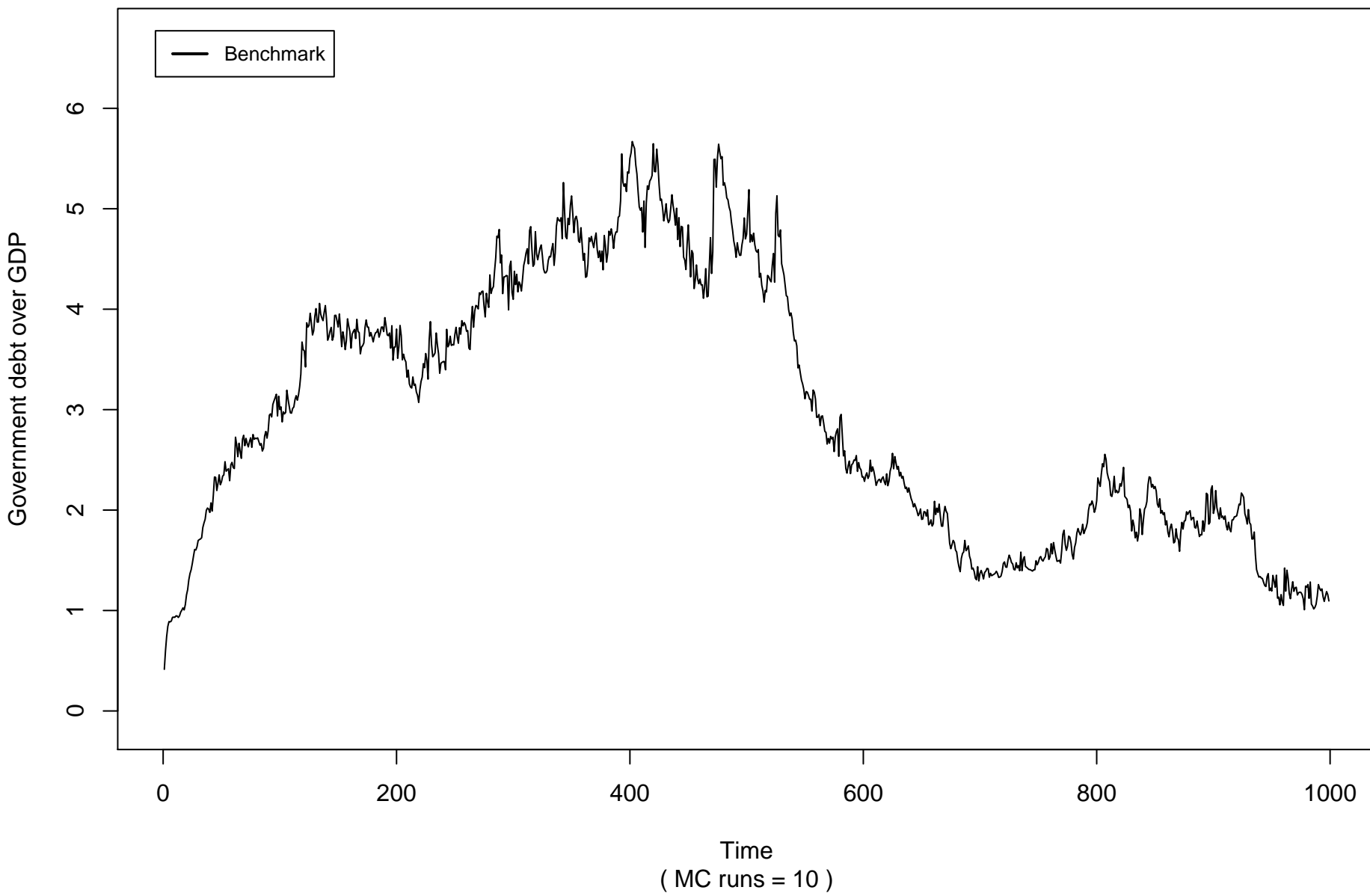
Government debt on GDP (Benchmark)

Government debt over GDP

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)
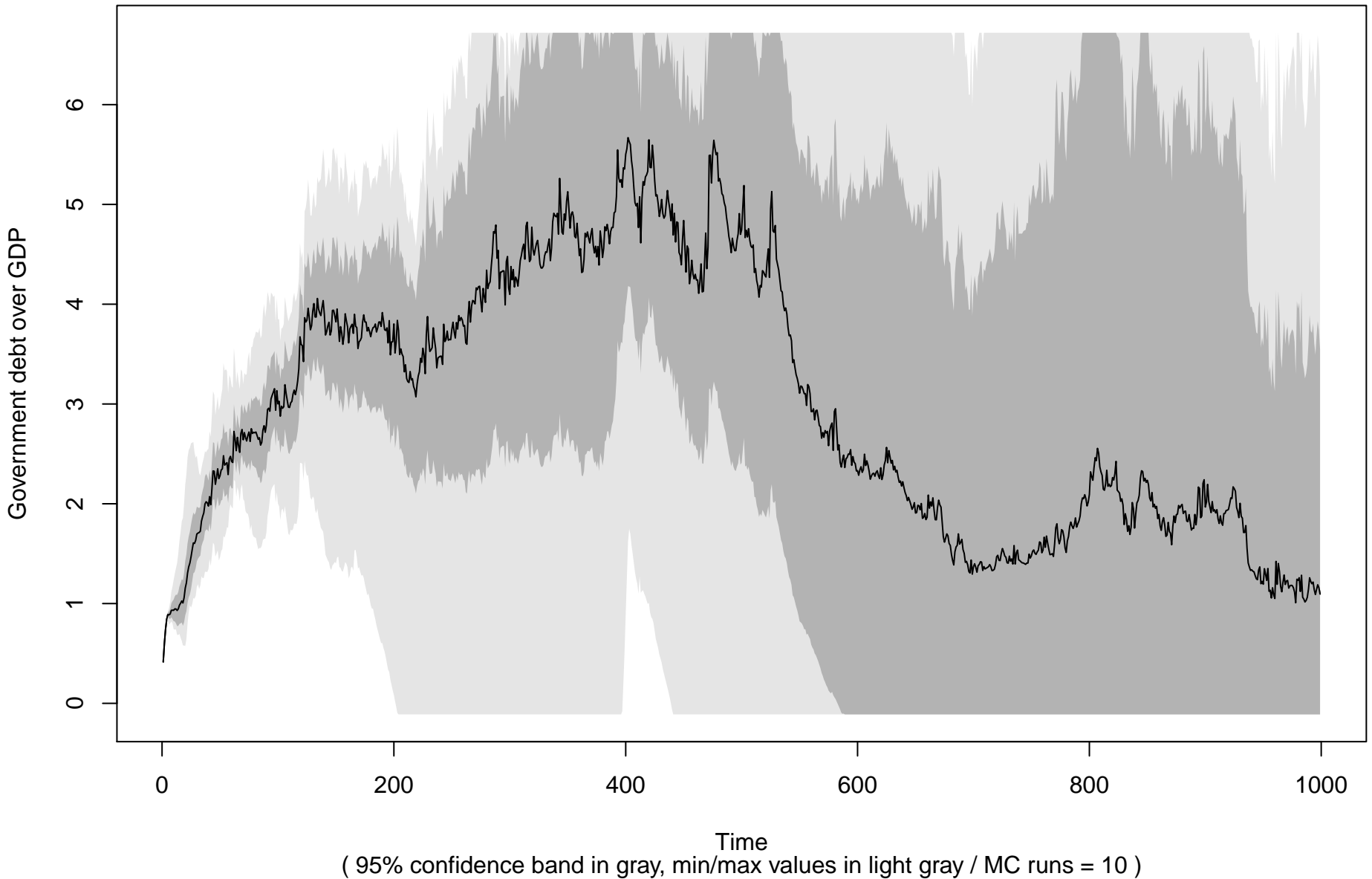
Unemployment and vacancy rates (all experiments)

Rate

Benchmark

Unemployment
Vacancy

Time
(MC runs = 10)
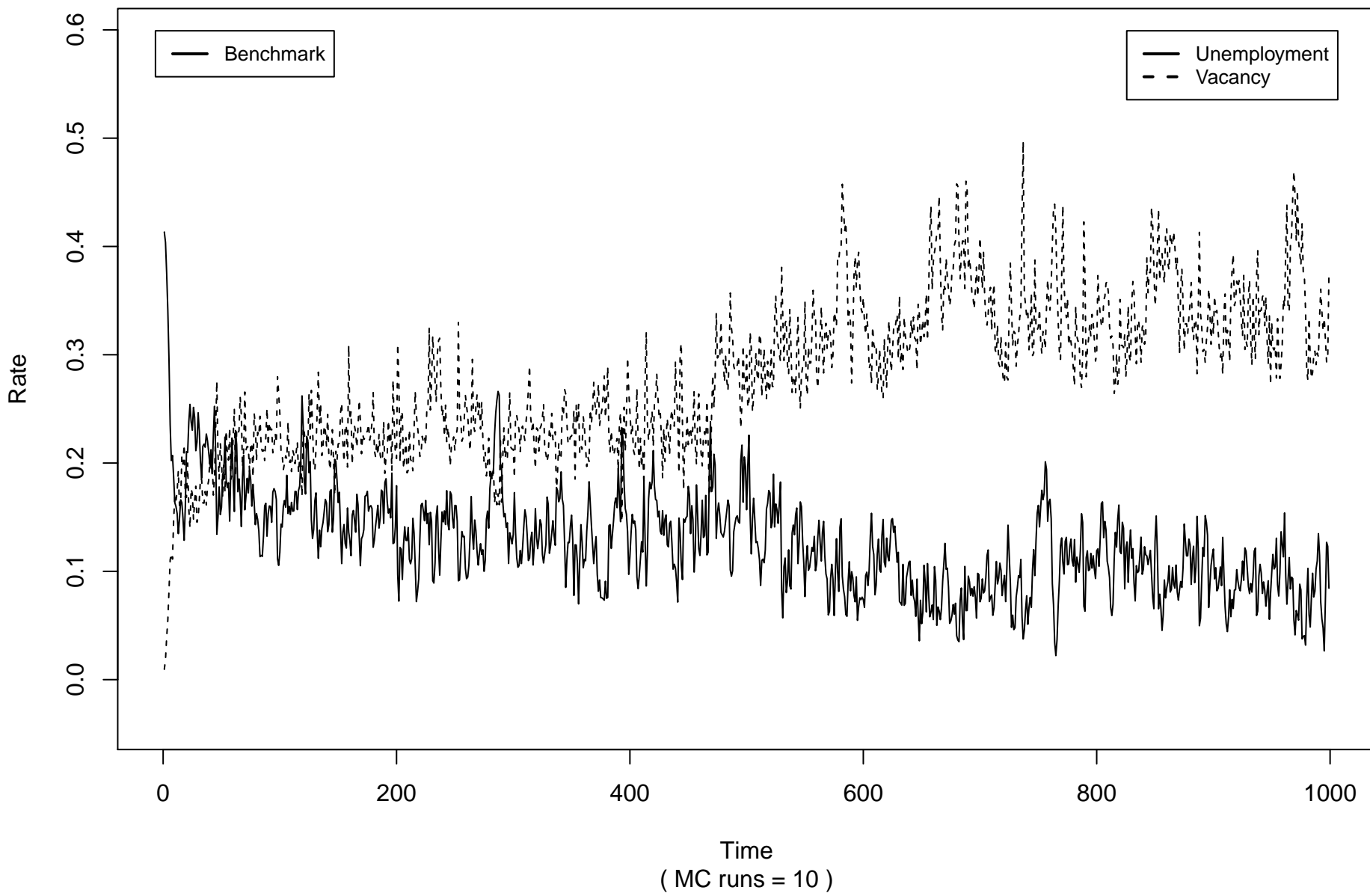
Unemployment and vacancy rates (Benchmark)

Rate

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)

Legend:
— Unemployment
-- Vacancy
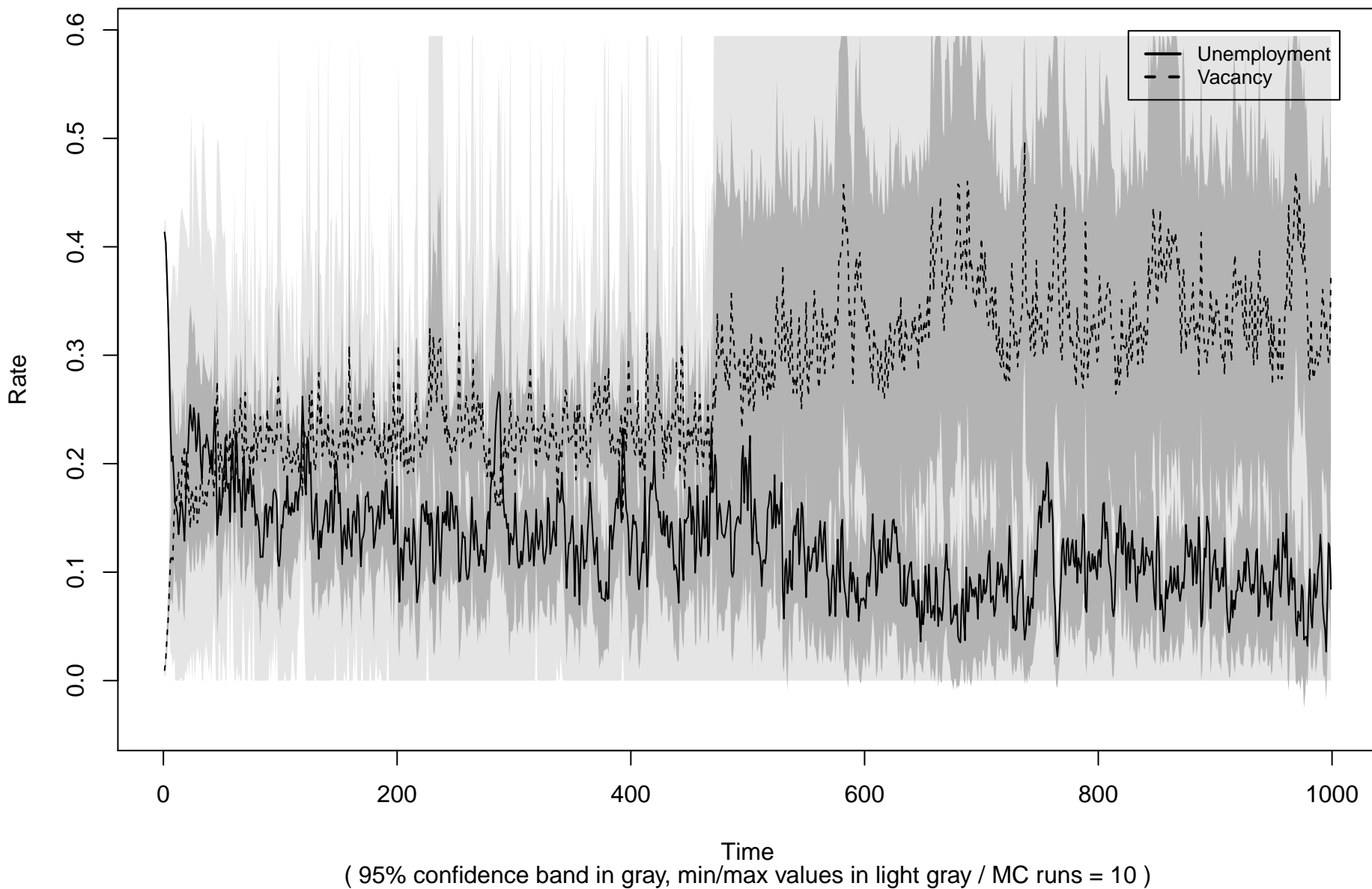
Real wages average (all experiments)

Legend: Benchmark

Log wages

Time
(MC runs = 10)
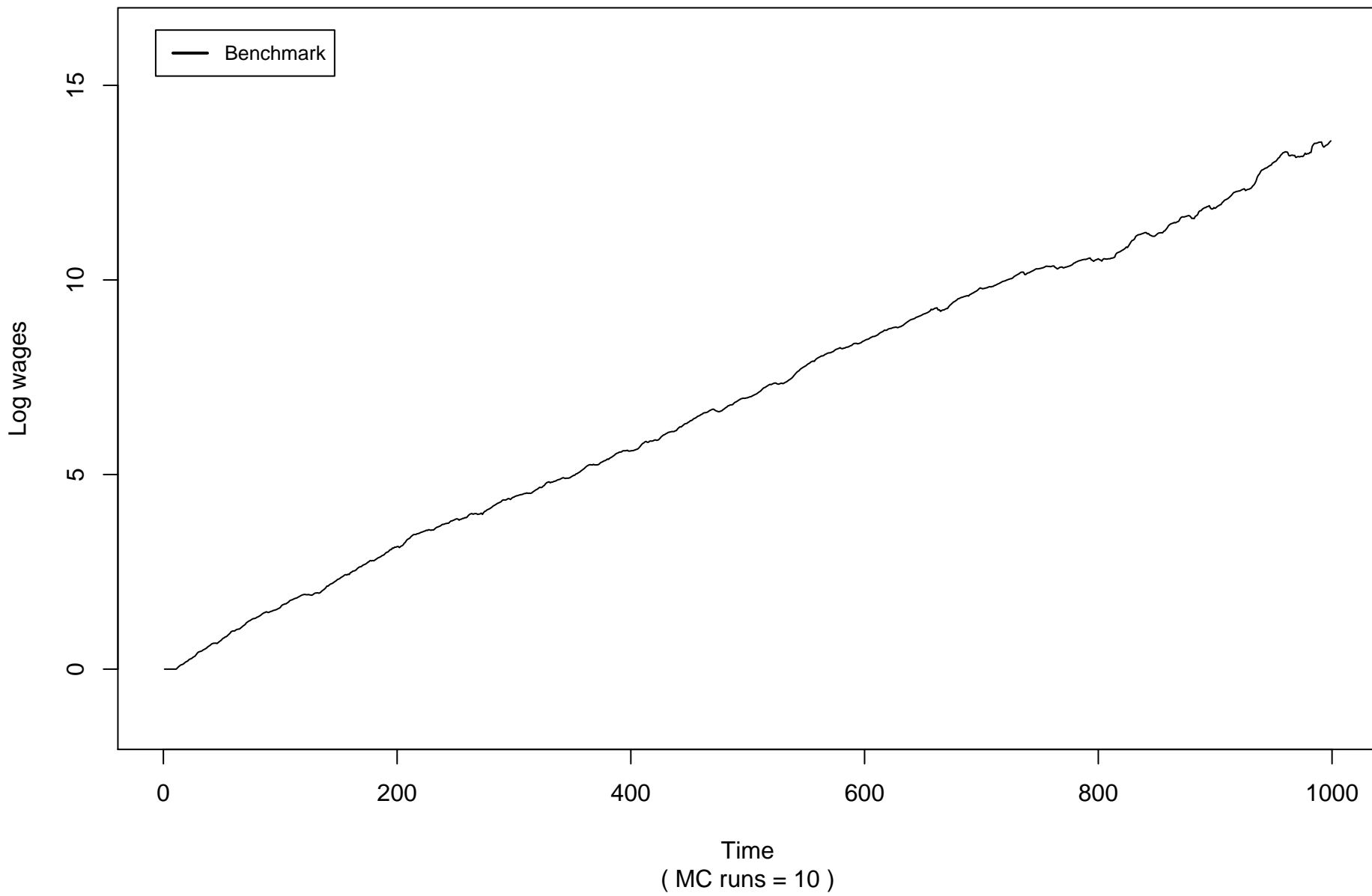
Real wages average (Benchmark)

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)
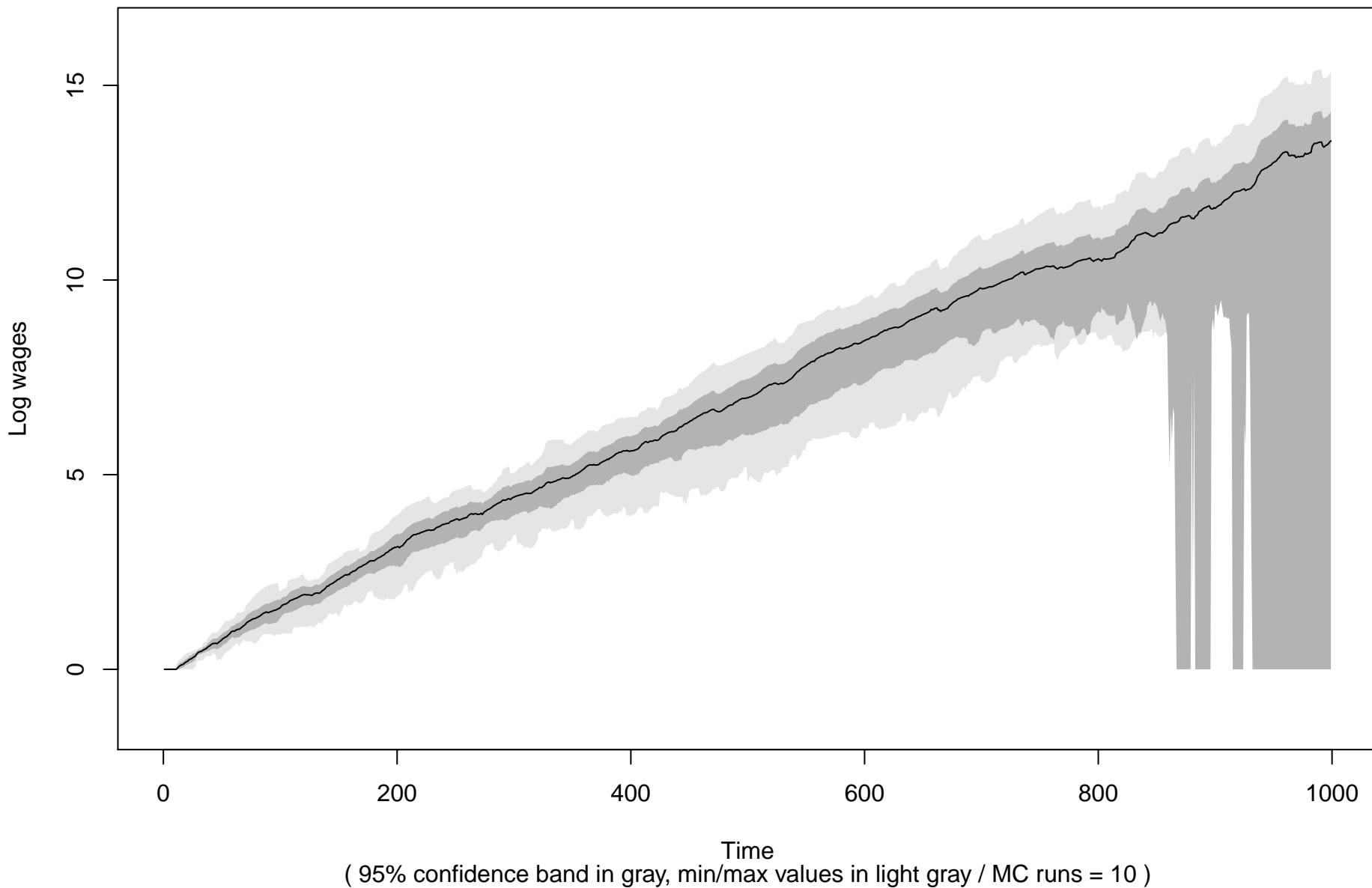
Wage share (all experiments)

Total real wages on GDP

Benchmark

Time
(MC runs = 10)

Wage share (Benchmark)

Total real wages on GDP

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)
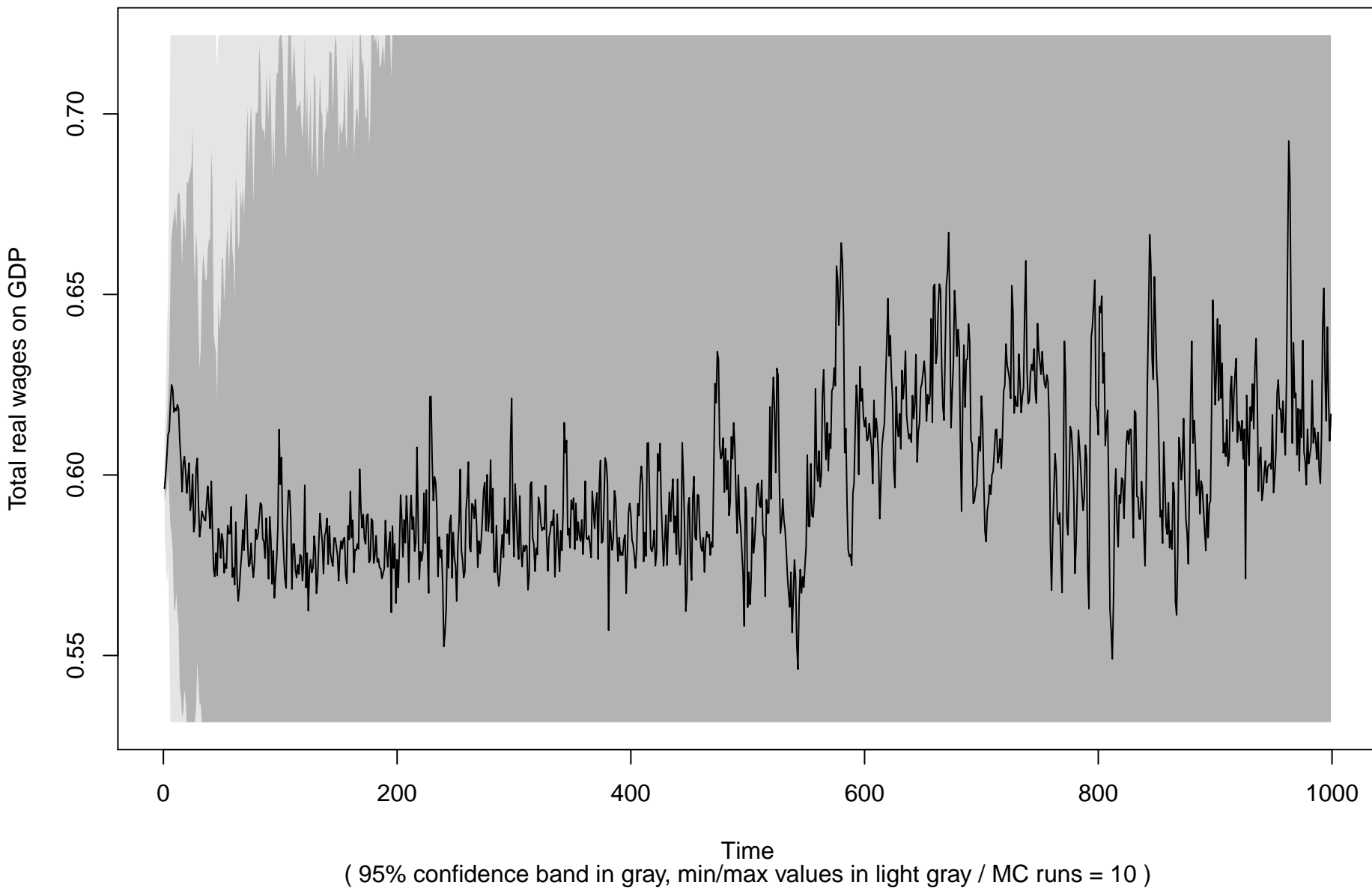
Innovation and imitation (all experiments)

Share of innovating and imitating firms

Benchmark

Innovation
Imitation

Time
(sector 1 only / MC runs = 10)
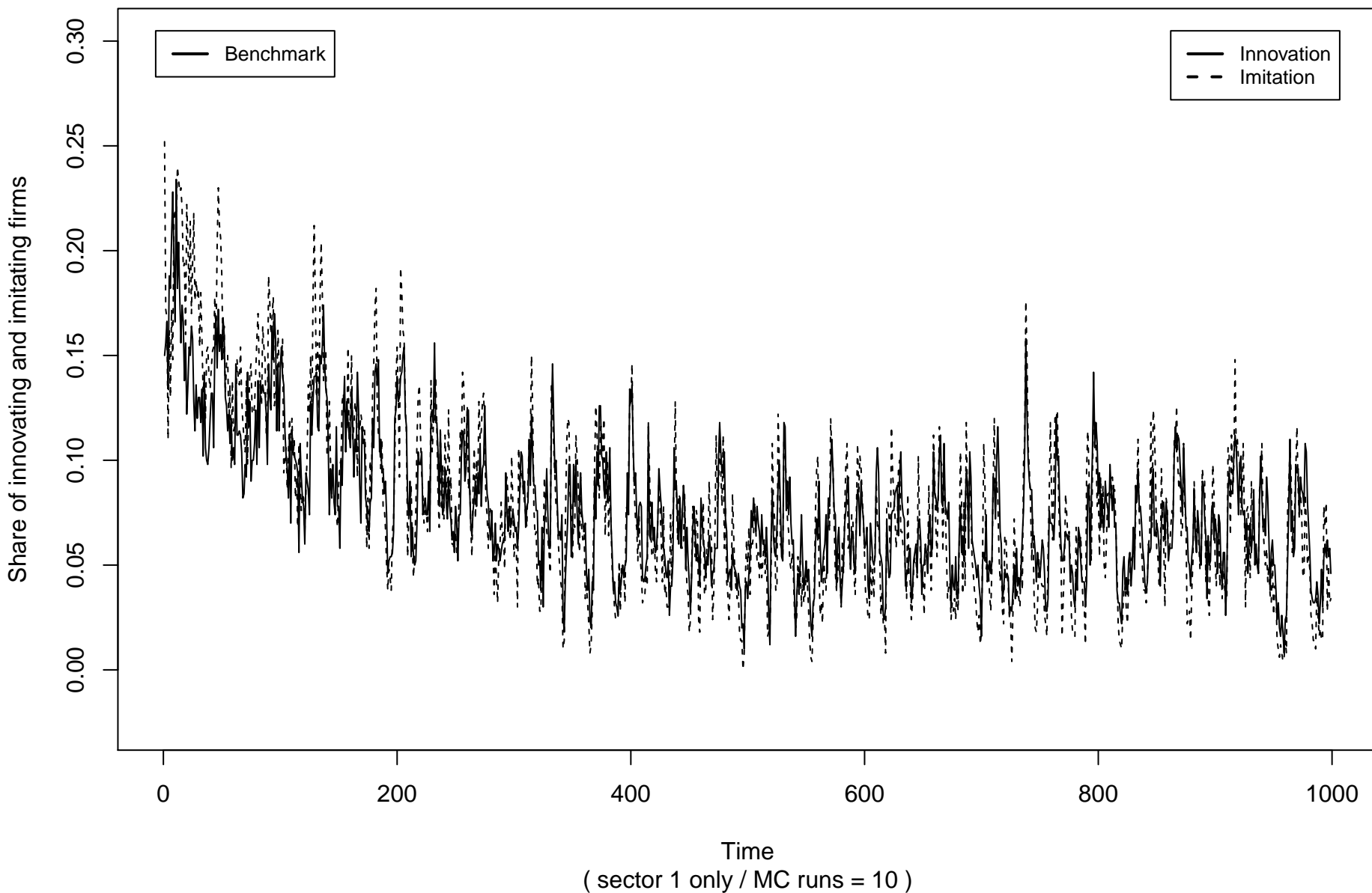
Innovation and imitation (Benchmark)

Share of innovating and imitating firms

Time
(95% confidence band in gray, min/max values in light gray / sector 1 only / MC runs = 10)
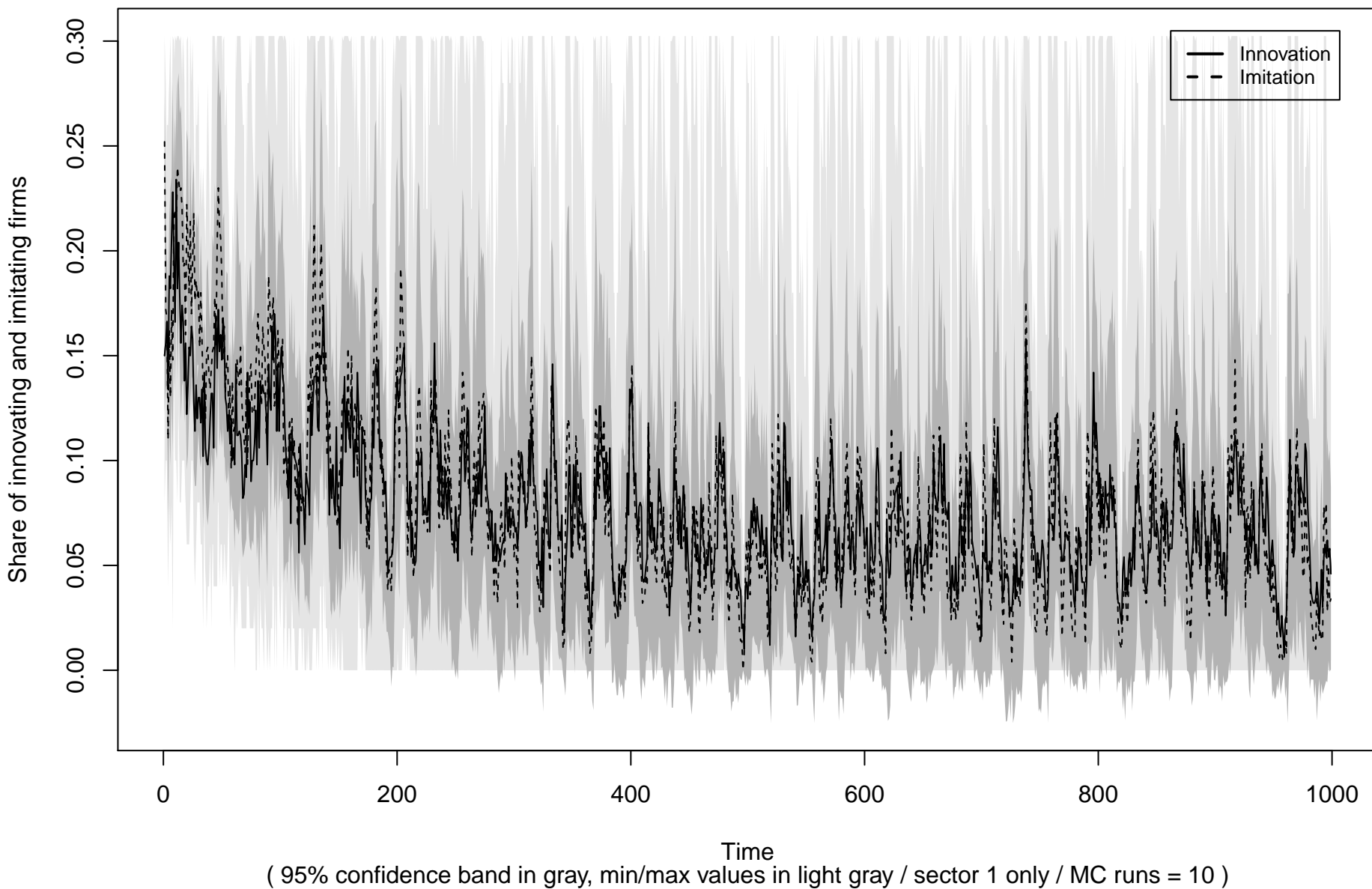
Market concentration (all experiments)

Standardized Herfindahl–Hirschman index

— Benchmark

Time
(Sector 2 only / MC runs = 10)
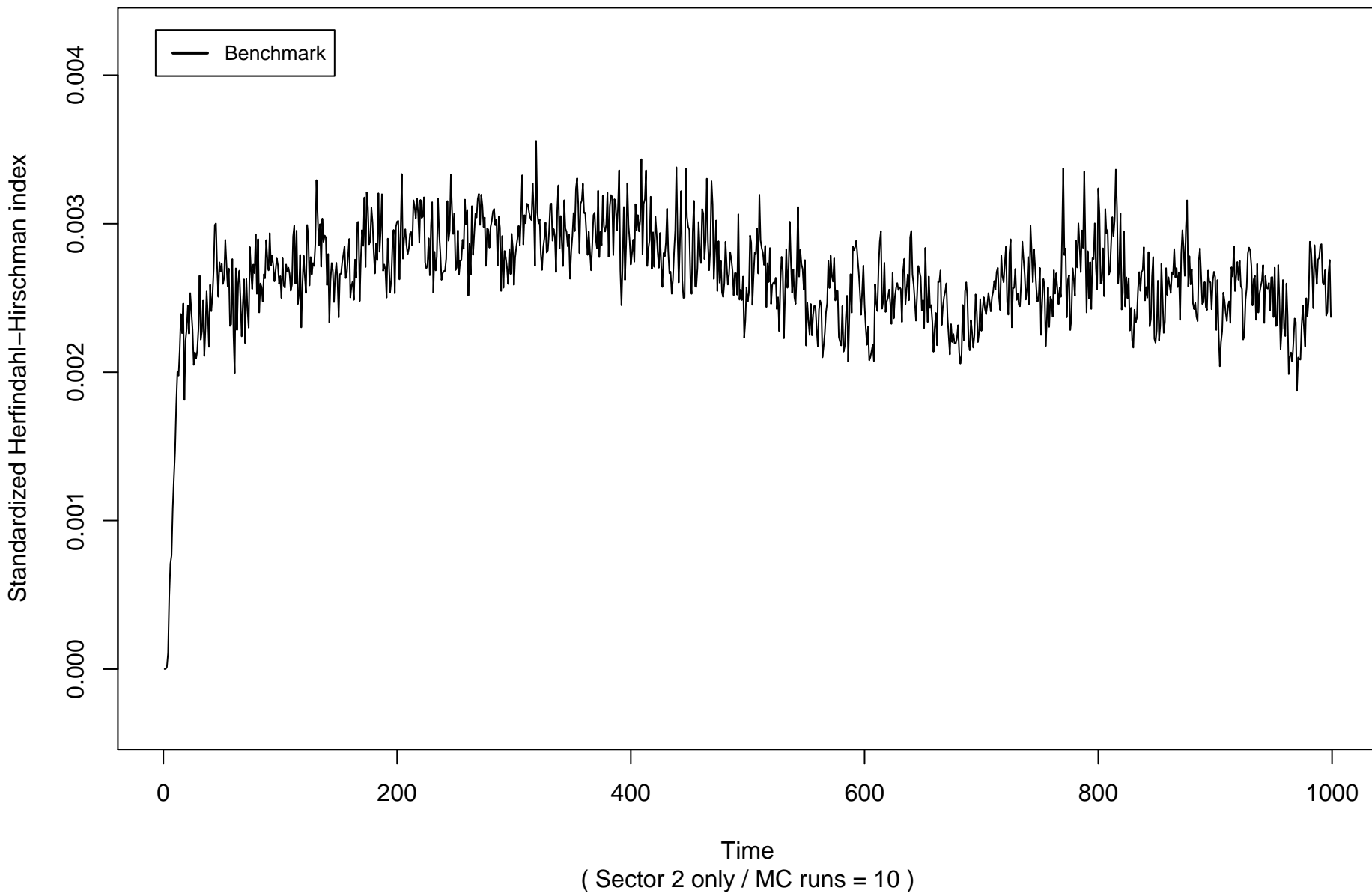
Market concentration (Benchmark)

Standardized Herfindahl–Hirschman index

Time
(95% confidence band in gray, min/max values in light gray / Sector 2 only / MC runs = 10)
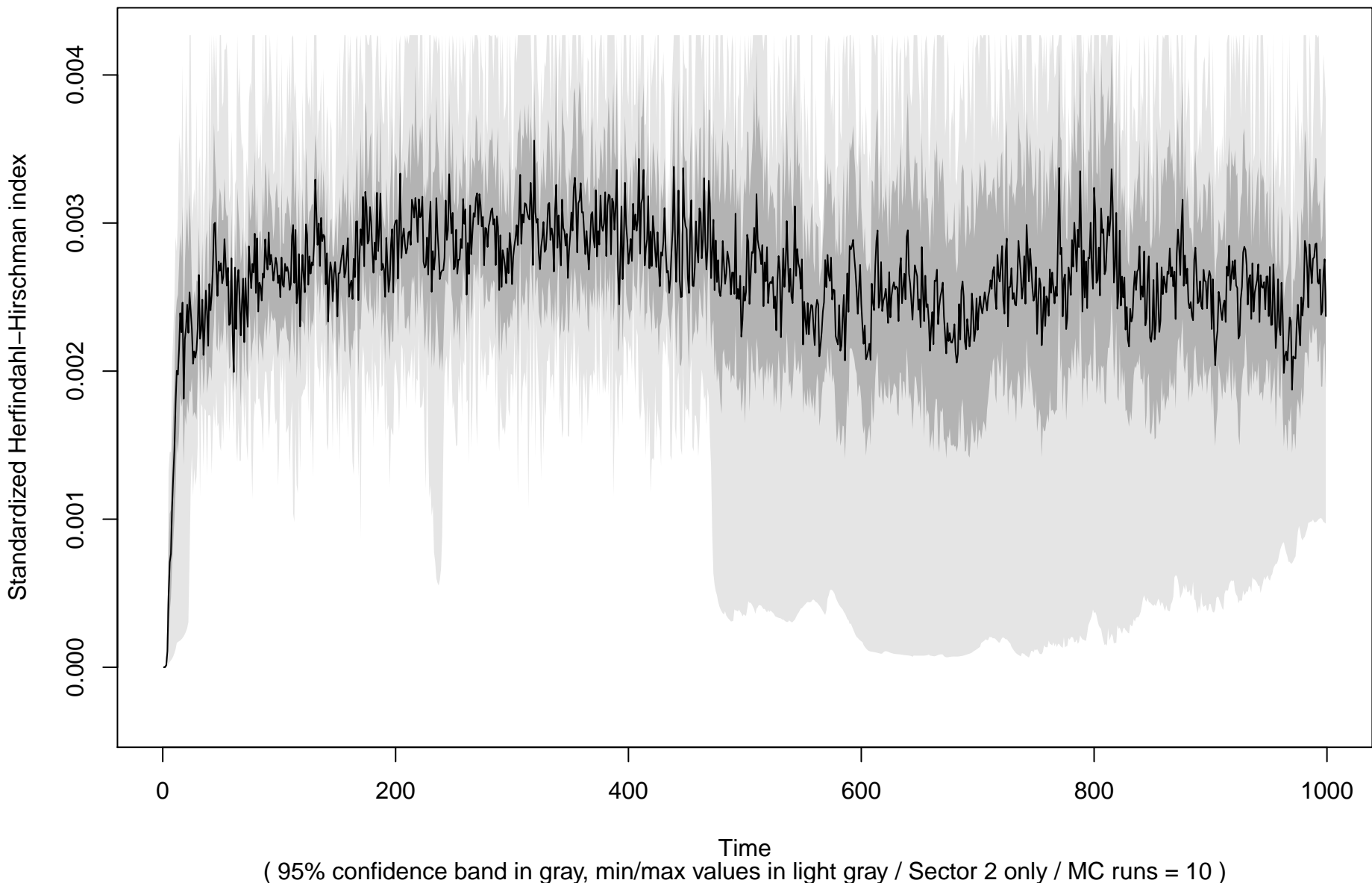
Mark−up average (all experiments)

Weighted average mark−up rate

0.35
0.34
0.33
0.32
0.31
0.30

0   200   400   600   800   1000

Time
(Sector 2 only / MC runs = 10)
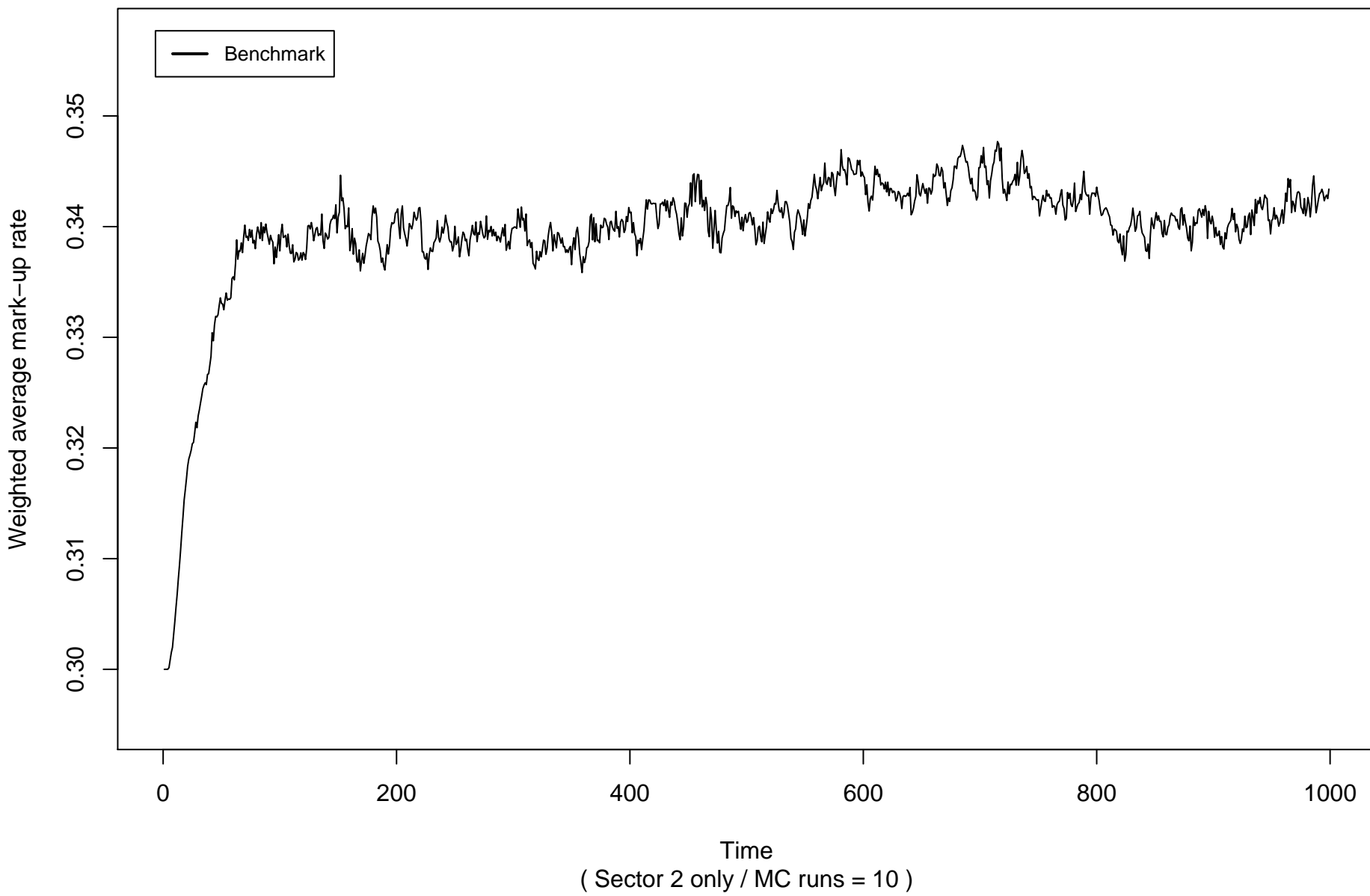
Benchmark

Mark−up average (Benchmark)

Weighted average mark-up rate

Time
(95% confidence band in gray, min/max values in light gray / Sector 2 only / MC runs = 10)

GDP cycles (Benchmark)

Legend:
- GDP
- Consumption
- Investment
- Productivity

Filtered series

Time
(Baxter−King bandpass−filtered, low = 6Q / high = 32Q / order = 12 / MC runs = 10)
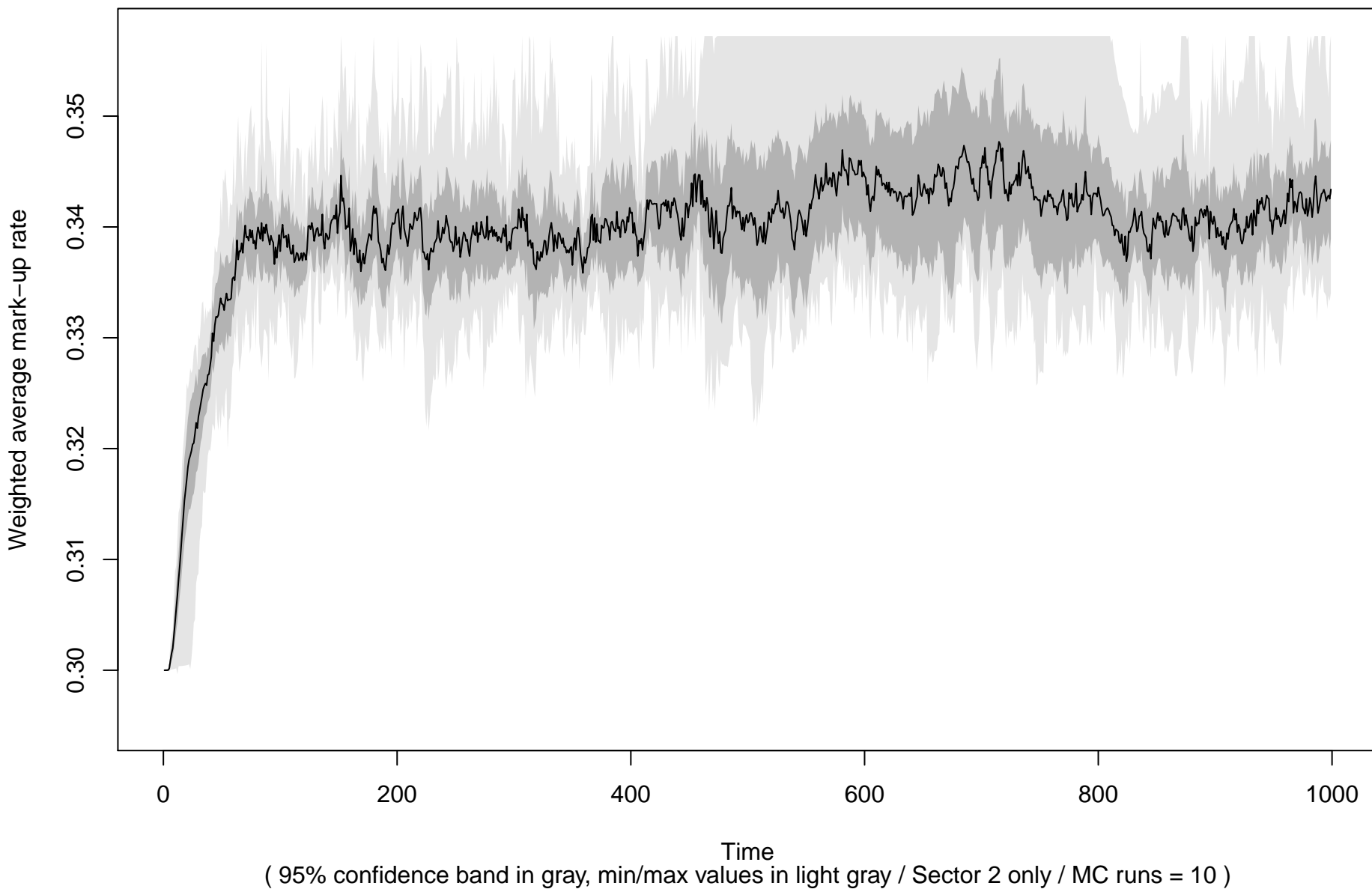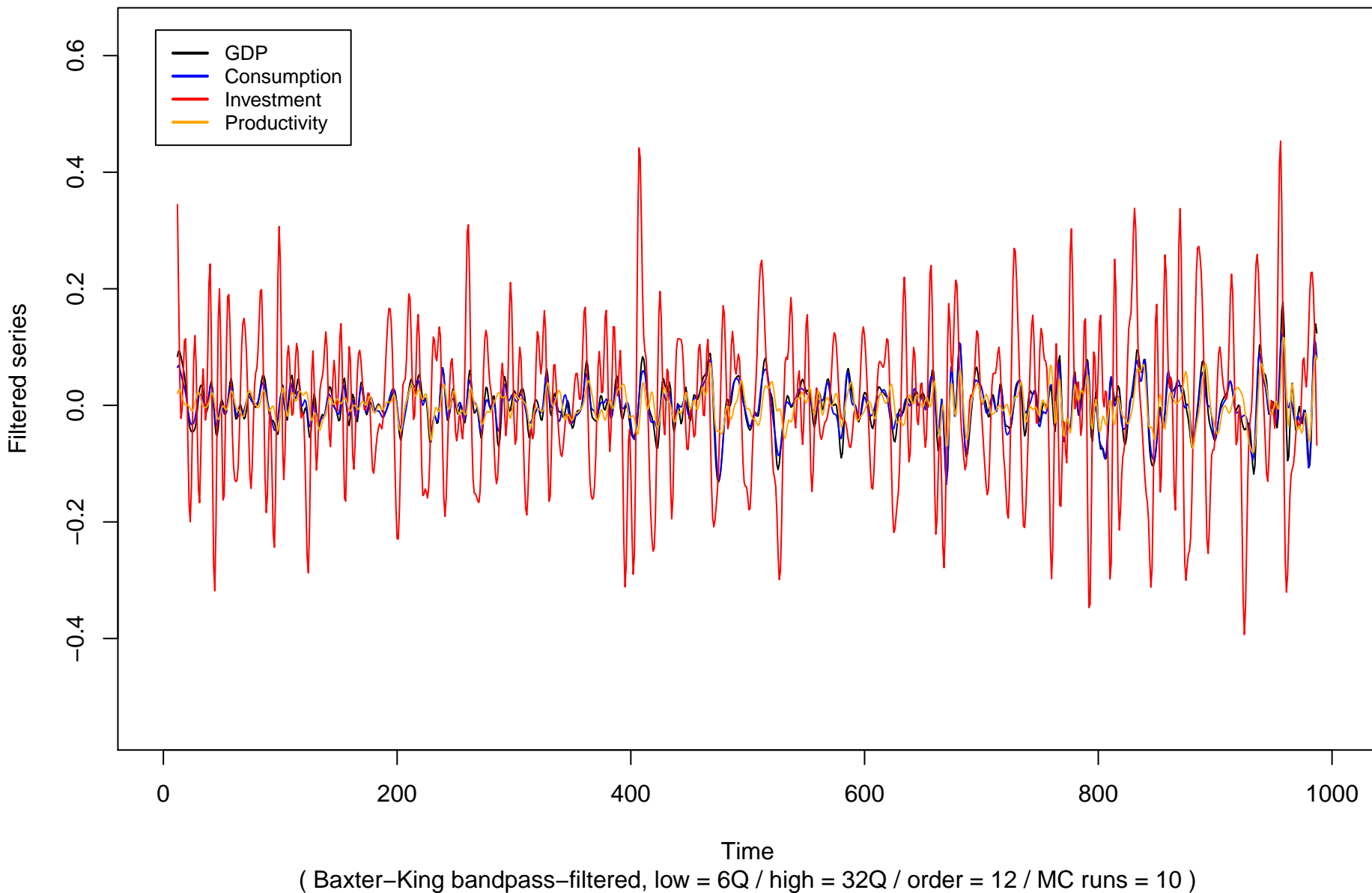
Shimer puzzle (Benchmark)

Legend:
- Productivity
- Unemployment
- Vacancy

Filtered series

Time
(Baxter–King bandpass–filtered, low = 6Q / high = 32Q / order = 12 / MC runs = 10)
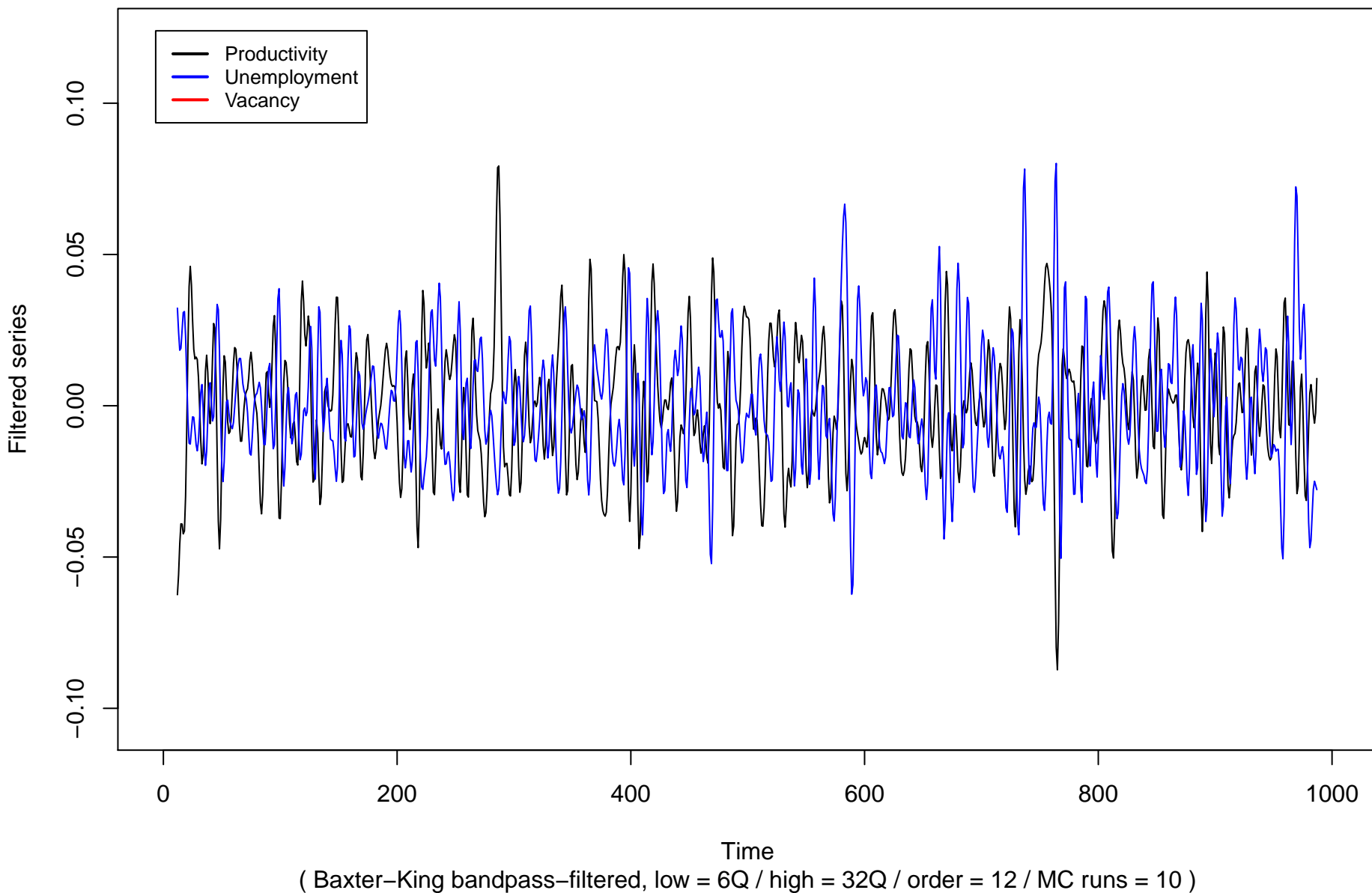
Key statistics and unit roots tests for cycles (Benchmark)

	GDP (output)	Consumption	Investment	Product.	Real wage
avg. growth rate	0.01187	0.01189	0.01241	0.01178	0.01188
(s.e.)	0.0005074	0.0005104	0.0005629	0.0005147	0.0005135
ADF test (logs)	−2.842	−2.634	−9.514	−2.688	−2.61
(s.e.)	0.3577	0.3293	0.2819	0.3134	0.3159
(p−val.)	0.3461	0.3814	0.01	0.3615	0.3807
(s.e.)	0.1045	0.1128	0	0.1029	0.11
ADF test (bpf)	−10.22	−9.95	−12.87	−9.878	−9.607
(s.e.)	0.2214	0.2178	0.2199	0.2255	0.1695
(p−val.)	0.01	0.01	0.01	0.01	0.01
(s.e.)	0	0	0	0	0
s.d. (bpf)	0.09419	0.07848	1.728	0.06488	0.07157
(s.e.)	0.003732	0.004245	0.0888	0.002598	0.005025
relative s.d. (GDP)	1	0.8332	18.35	0.6888	0.7598

(bpf: Baxter−King bandpass−filtered series, low = 6Q / high = 32Q / order = 12 / MC runs = 10 / period = 200 − 1000)
(ADF test H0: there are unit roots / non−stationary at 5% level)

Correlation structure for GDP (Benchmark)

	−4	−3	−2	−1	0	1	2	3	4
GDP (output)	−0.0245	0.2451	0.5889	0.883	1	0.883	0.5889	0.2451	−0.0245
(s.e.)	0.01941	0.01766	0.01081	0.003176	3.511e−17	0.003176	0.01081	0.01766	0.01941
(p−val.)	0.7481	1.322e−06	1.618e−12	4.931e−19	NA	4.931e−19	1.618e−12	1.322e−06	0.7481
Consumption	0.08632	0.3081	0.5861	0.831	0.9412	0.859	0.6147	0.3018	0.02552
(s.e.)	0.02745	0.02225	0.01269	0.006951	0.006047	0.004241	0.0131	0.02158	0.0234
(p−val.)	0.02147	7.665e−07	7.127e−12	1.022e−15	8.755e−17	8.691e−18	5.875e−12	7.383e−07	0.3043
Investment	−0.3055	−0.3764	−0.3636	−0.2321	−0.006897	0.2309	0.3897	0.4204	0.342
(s.e.)	0.02474	0.03088	0.03219	0.03093	0.02992	0.0255	0.01582	0.01074	0.01472
(p−val.)	2.037e−06	1.538e−06	3.061e−06	0.0001896	0.2246	4.823e−05	3.339e−09	4.82e−11	7.063e−09
Net investment	−0.2545	−0.3174	−0.305	−0.1867	0.01367	0.2217	0.3552	0.3722	0.2931
(s.e.)	0.0224	0.02525	0.02727	0.03059	0.0327	0.02806	0.01719	0.01189	0.01591
(p−val.)	6.207e−06	1.625e−06	4.626e−06	0.001387	0.05684	0.0001486	1.834e−08	4.292e−10	7.426e−08
Change in inventories	−0.2112	−0.1492	−0.004182	0.1546	0.245	0.2234	0.1226	0.01462	−0.03797
(s.e.)	0.01682	0.01595	0.01726	0.02185	0.02183	0.01816	0.01983	0.02288	0.02067
(p−val.)	4.806e−06	0.0001976	0.9589	0.001087	7.606e−06	4.733e−06	0.006832	0.5261	0.4381
Unemployment rate	0.273	0.2781	0.1806	0.003713	−0.1808	−0.2916	−0.2888	−0.1937	−0.0712
(s.e.)	0.0303	0.03145	0.03366	0.03622	0.03884	0.03964	0.03814	0.03609	0.03377
(p−val.)	3.294e−05	3.651e−05	0.001577	0.1073	0.0008447	0.0001307	0.000108	0.002663	0.1881
Productivity	0.2048	0.3865	0.5838	0.7276	0.7524	0.6346	0.4155	0.1722	−0.0237
(s.e.)	0.05018	0.0509	0.03921	0.02295	0.01639	0.02163	0.02888	0.03358	0.03086
(p−val.)	0.0004308	6.446e−05	1.588e−07	1.677e−10	5.979e−12	3.788e−10	3.246e−07	0.004754	0.09534
Mark−up (sector 2)	0.2126	0.1546	0.05642	−0.05979	−0.1602	−0.2169	−0.2221	−0.1896	−0.1445
(s.e.)	0.02949	0.02513	0.02037	0.01517	0.01373	0.01794	0.02247	0.02463	0.02472
(p−val.)	0.0003192	0.00251	0.4693	0.3839	2.66e−05	5.971e−06	2.764e−05	0.0002893	0.004344
Total firm debt	0.1732	0.08524	−0.01369	−0.1022	−0.1641	−0.1947	−0.2038	−0.2034	−0.2009
(s.e.)	0.0289	0.03	0.03275	0.03367	0.032	0.03025	0.03089	0.03299	0.03448
(p−val.)	0.001963	0.04305	0.3943	0.02239	0.003683	0.0008754	0.0006548	0.001013	0.001487
Liquidity−to−sales ratio	0.04984	−0.1309	−0.3501	−0.5506	−0.6669	−0.658	−0.5357	−0.3515	−0.1692
(s.e.)	0.02313	0.01566	0.02262	0.0289	0.02826	0.02587	0.02694	0.02851	0.02735
(p−val.)	0.5419	0.0008634	2.309e−07	1.988e−08	2.49e−09	1.3e−09	1.407e−08	1.575e−06	0.001752
Bankruptcy rate	0.3019	0.3158	0.2368	0.08624	−0.07065	−0.1646	−0.1707	−0.1183	−0.06408
(s.e.)	0.02897	0.02954	0.03209	0.03527	0.03695	0.03558	0.0303	0.0224	0.01885
(p−val.)	8.395e−06	6.228e−06	0.0002037	0.04143	0.1322	0.009041	0.002933	0.01658	0.4241

(non−rate/ratio series are Baxter−King bandpass−filtered, low = 6Q / high = 32Q / order = 12 / MC runs = 10 / period = 200 − 1000)
(test H0: lag coefficient is not significant at 5% level)

Correlation structure for GDP (Benchmark)

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GDP (output)	−0.0245	0.2451	0.5889	0.883	1	0.883	0.5889	0.2451	−0.0245
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(p−val.)	0.7481	1.322e−06	1.618e−12	4.931e−19	NA	4.931e−19	1.618e−12	1.322e−06	0.7481
Consumption	0.08632	0.3081	0.5861	0.831	0.9412	0.859	0.6147	0.3018	0.02552
(s.e.)	0.02745	0.02225	0.01269	0.006951	0.006047	0.004241	0.0131	0.02158	0.0234
(p−val.)	0.02147	7.665e−07	7.127e−12	1.022e−15	8.755e−17	8.691e−18	5.875e−12	7.383e−07	0.3043
Investment	−0.3055	−0.3764	−0.3636	−0.2321	−0.006897	0.2309	0.3897	0.4204	0.342
(s.e.)	0.02474	0.03088	0.03219	0.03093	0.02992	0.0255	0.01582	0.01074	0.01472
(p−val.)	2.037e−06	1.538e−06	3.061e−06	0.0001896	0.2246	4.823e−05	3.339e−09	4.82e−11	7.063e−09
Productivity	0.2048	0.3865	0.5838	0.7276	0.7524	0.6346	0.4155	0.1722	−0.0237
(s.e.)	0.05018	0.0509	0.03921	0.02295	0.01639	0.02163	0.02888	0.03358	0.03086
(p−val.)	0.0004308	6.446e−05	1.588e−07	1.677e−10	5.979e−12	3.788e−10	3.246e−07	0.004754	0.09534
Entry	−0.1344	0.04496	0.249	0.4204	0.5096	0.4987	0.413	0.2978	0.1932
(s.e.)	0.02787	0.03741	0.03911	0.0311	0.01775	0.01238	0.01934	0.02351	0.02362
(p−val.)	0.008149	0.06445	0.0001195	5.426e−07	5.83e−10	2.933e−11	1.068e−08	1.744e−06	0.0001772
Wage	0.3241	0.5016	0.6473	0.714	0.6745	0.5358	0.3423	0.1465	−0.01296
(s.e.)	0.02494	0.02319	0.02807	0.03662	0.04264	0.04281	0.03794	0.03069	0.02372
(p−val.)	1.179e−06	7.282e−09	3.139e−09	1.264e−08	8.196e−08	7.638e−07	2.079e−05	0.00132	0.6224
Unemployment rate	0.273	0.2781	0.1806	0.003713	−0.1808	−0.2916	−0.2888	−0.1937	−0.0712
(s.e.)	0.0303	0.03145	0.03366	0.03622	0.03884	0.03964	0.03814	0.03609	0.03377
(p−val.)	3.294e−05	3.651e−05	0.001577	0.1073	0.0008447	0.0001307	0.000108	0.002663	0.1881
Vacancy rate	0.1703	−0.03243	−0.2597	−0.416	−0.4375	−0.3311	−0.1702	−0.04232	0.004165
(s.e.)	0.03856	0.0339	0.03366	0.03641	0.03519	0.02783	0.01895	0.01739	0.02229
(p−val.)	0.0102	0.1436	0.0001184	2.26e−06	1.04e−06	2.363e−06	0.0001454	0.8067	0.7504

(non−rate/ratio series are Baxter−King bandpass−filtered, low = 6Q / high = 32Q / order = 12 / MC runs = 10 / period = 200 − 1000)
(test H0: lag coefficient is not significant at 5% level)

Stationarity, i.i.d. and ergodicity tests (Benchmark)

	avg.ADF	rej.ADF	avg.PP	rej.PP	avg.KPSS	rej.KPSS	avg.BDS	rej.BDS	avg.KS	rej.KS	AD	V
dGDP	0.01	1.00	0.01	1.00	0.10	0.00	0.02	0.80	0.24	0.38	0.00	0
dA	0.01	1.00	0.01	1.00	0.10	0.00	0.00	1.00	0.13	0.78	0.00	0
dw	0.01	1.00	0.01	1.00	0.10	0.00	0.00	1.00	0.13	0.78	0.00	0
V	0.06	0.90	0.01	1.00	0.05	0.50	0.00	1.00	0.06	0.78	0.00	0
U	0.01	1.00	0.01	1.00	0.02	0.90	0.00	1.00	0.02	0.93	0.00	0
mu2avg	0.09	0.90	0.08	0.90	0.03	0.80	0.00	1.00	0.02	0.93	0.00	0
HH1	0.01	1.00	0.01	1.00	0.09	0.10	0.00	1.00	0.19	0.56	0.00	0
HH2	0.07	0.90	0.01	1.00	0.04	0.60	0.00	1.00	0.06	0.89	0.00	0

(average p−values for testing H0 and rate of rejection of H0 / MC runs = 10 / period = 200 − 1000)
(ADF/PP H0: non−stationary, KPSS H0: stationary, BDS H0: i.i.d., KS/AD/WW H0: ergodic)
(significance = 0.05)

GDP growth
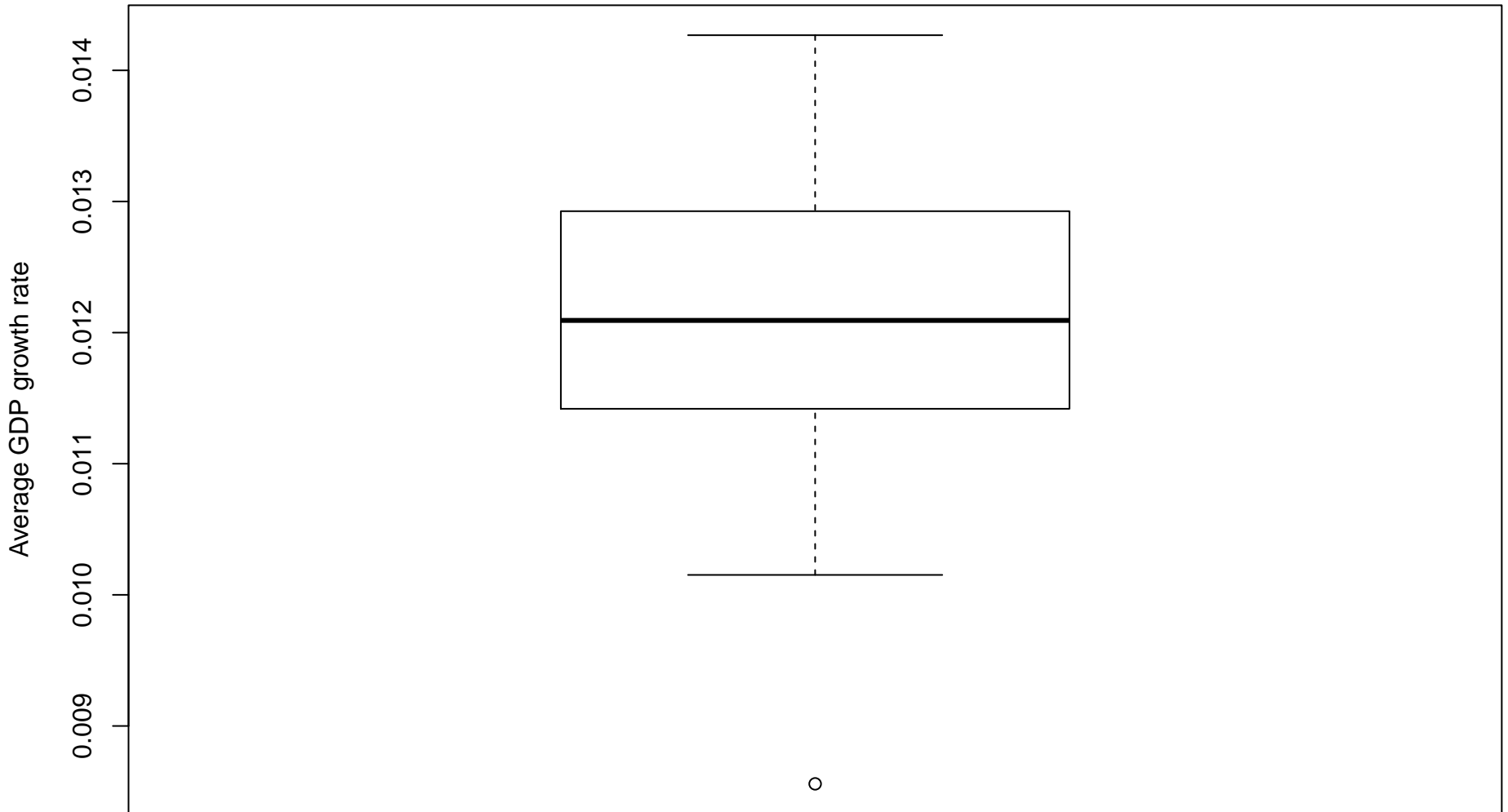
Average GDP growth rate

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)
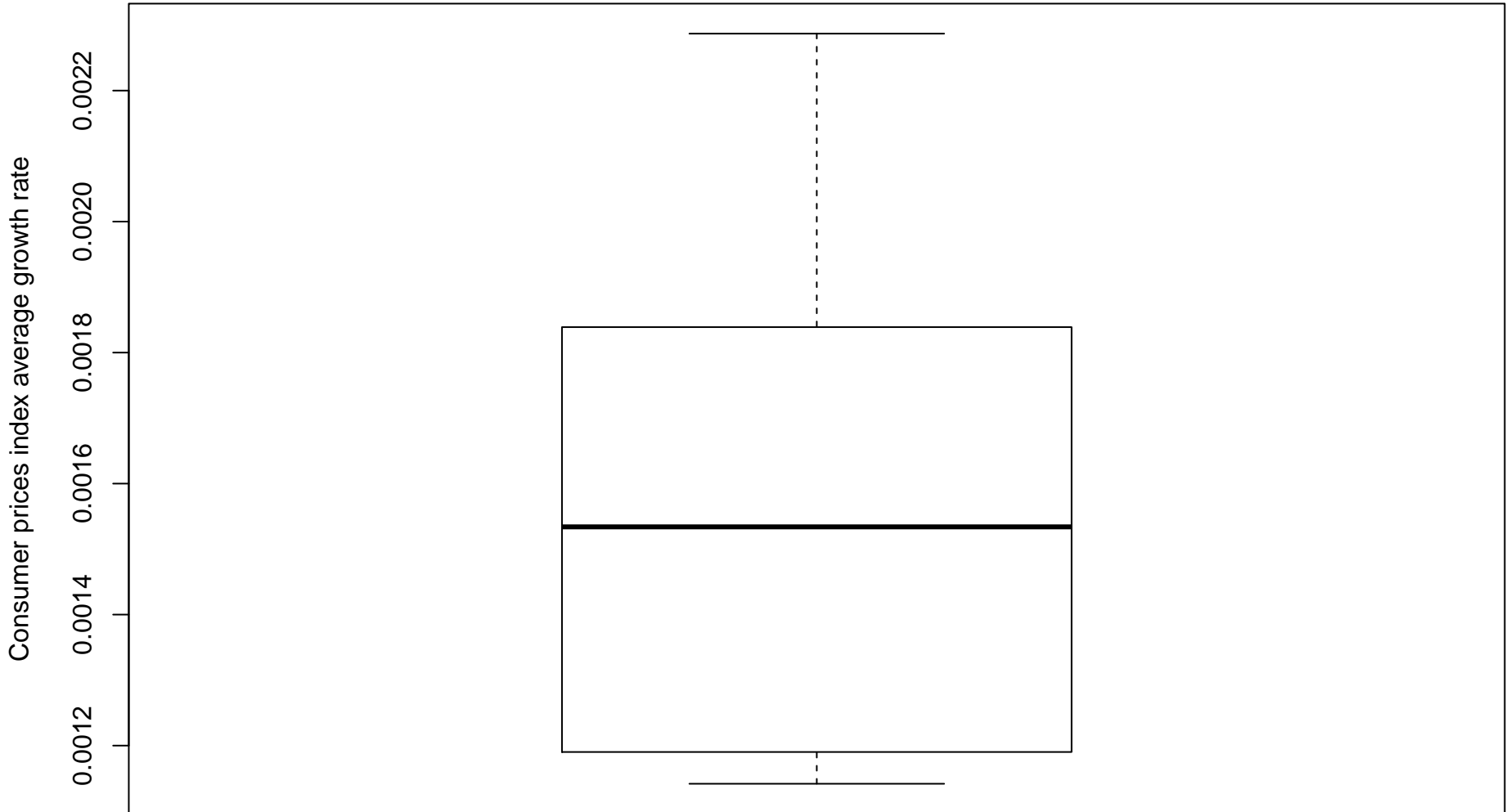
Volatility of GDP growth
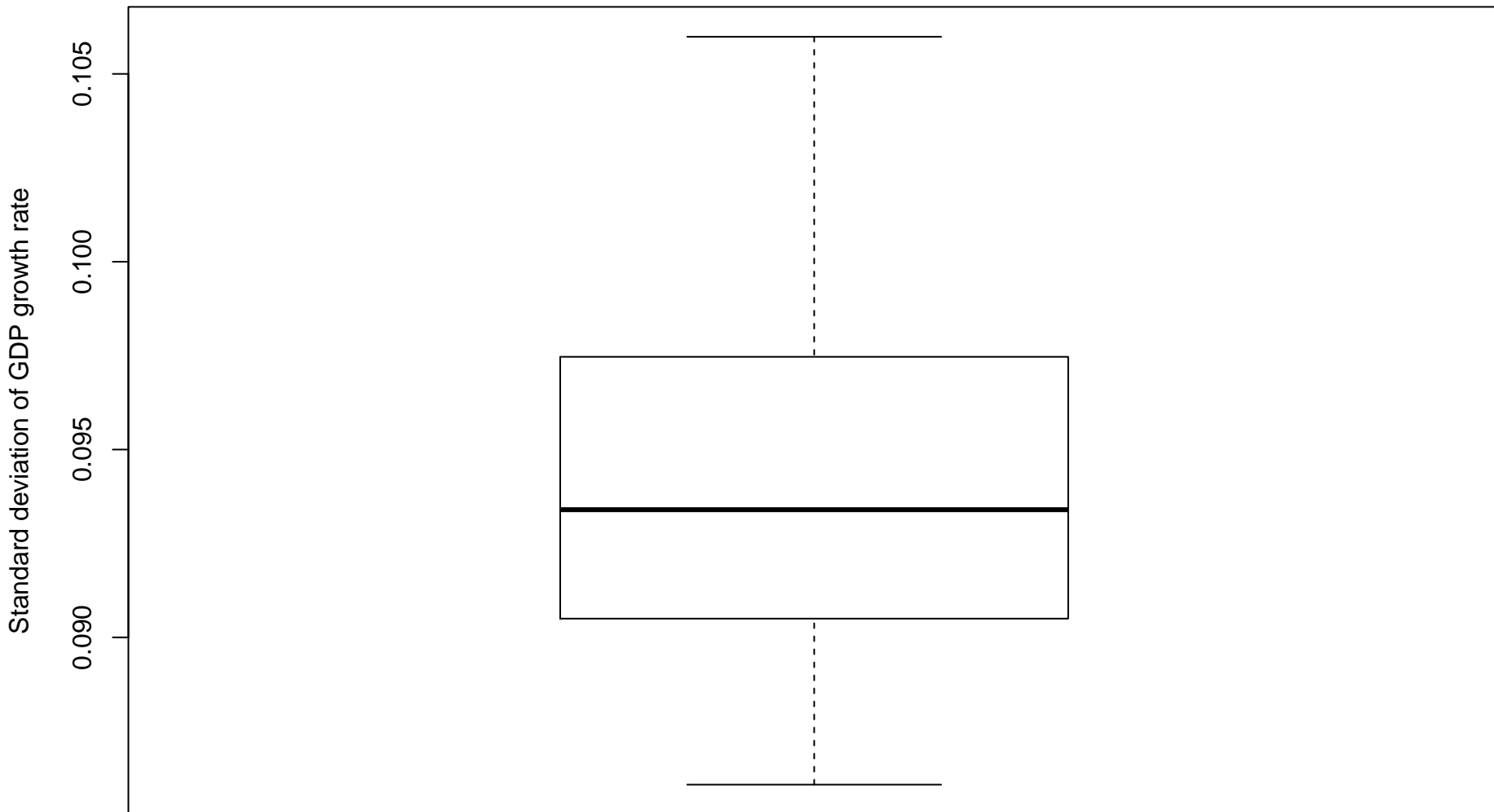
(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 200 – 1000)

Likelihood of GDP crises
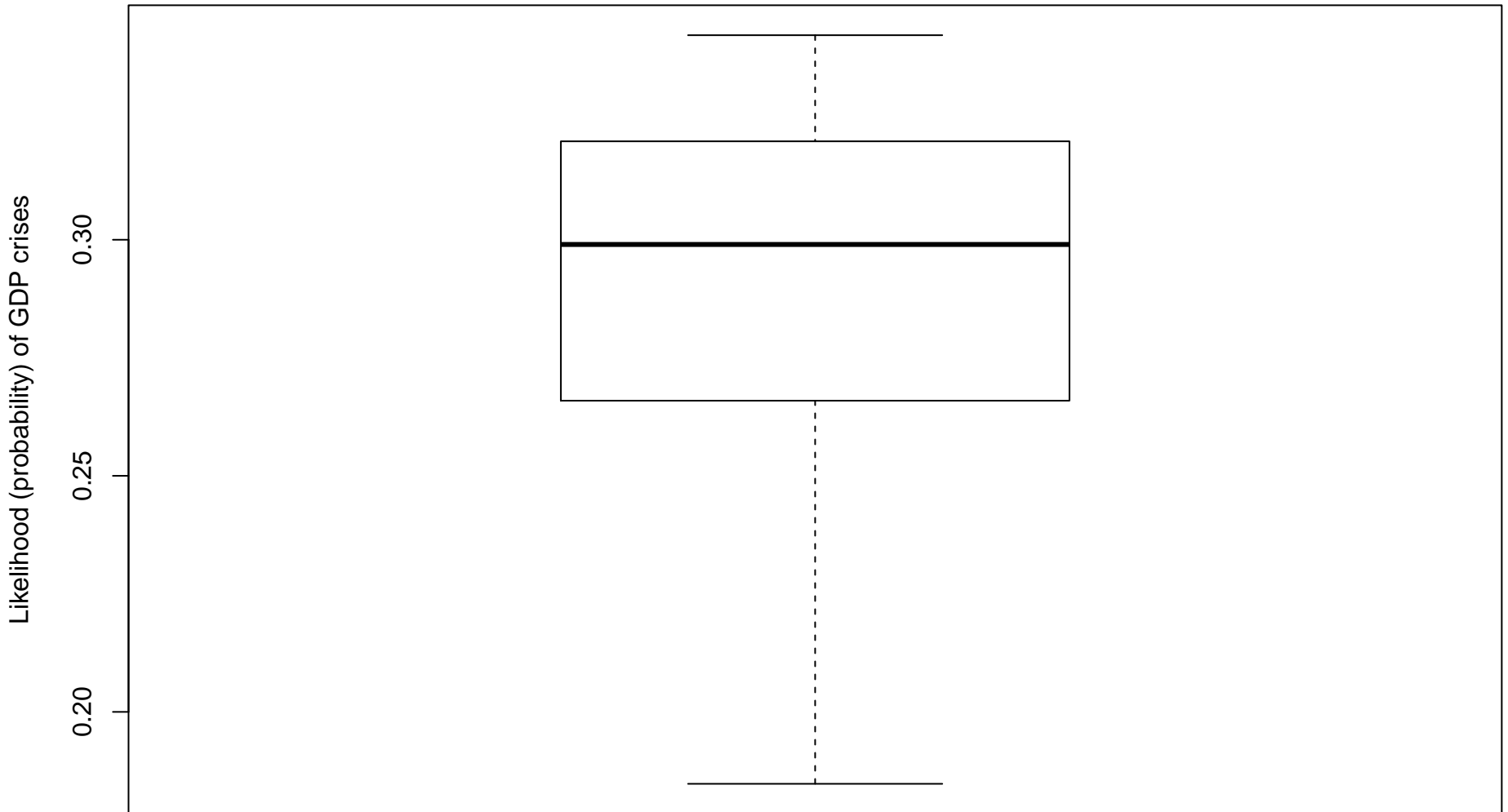
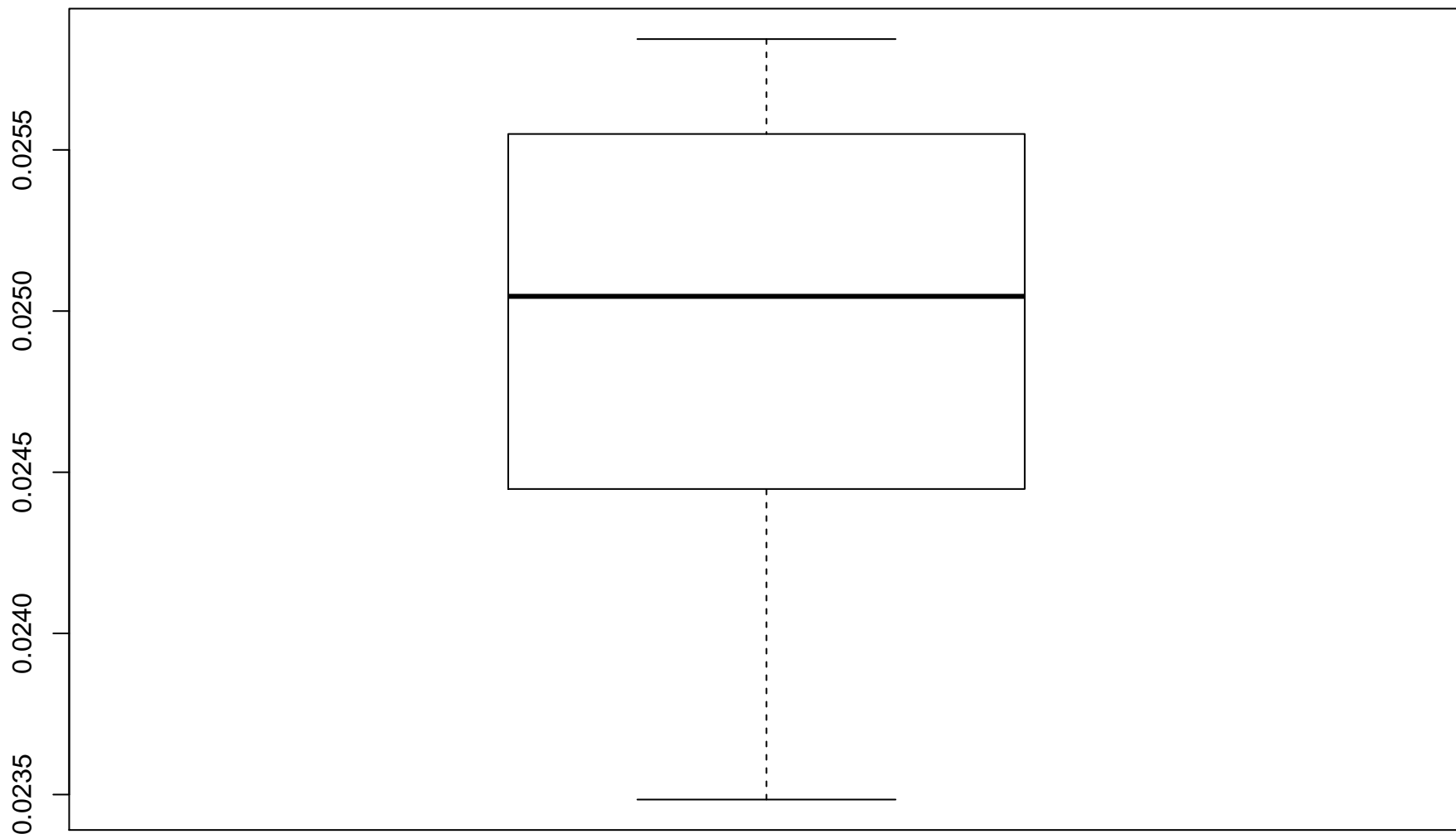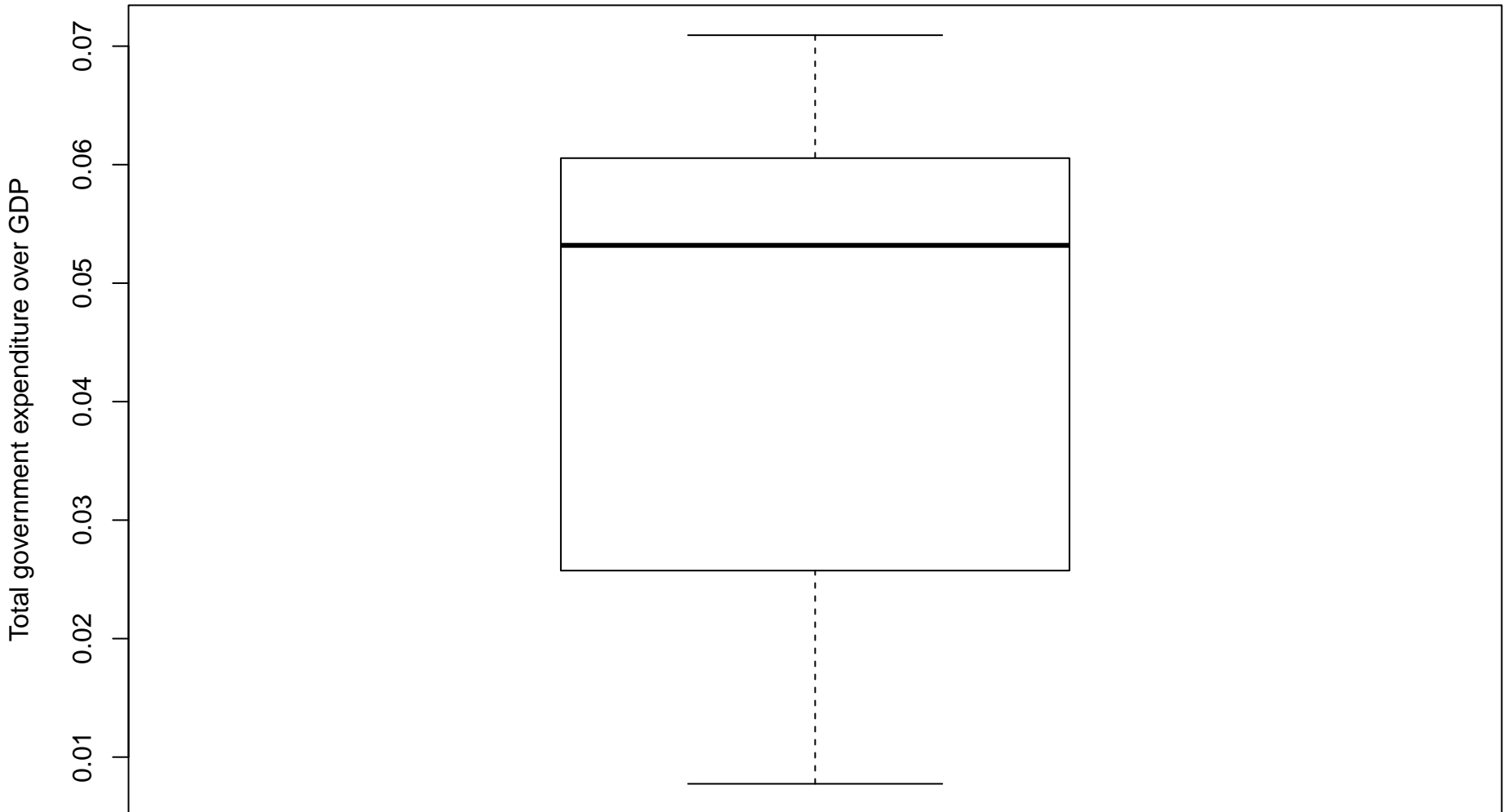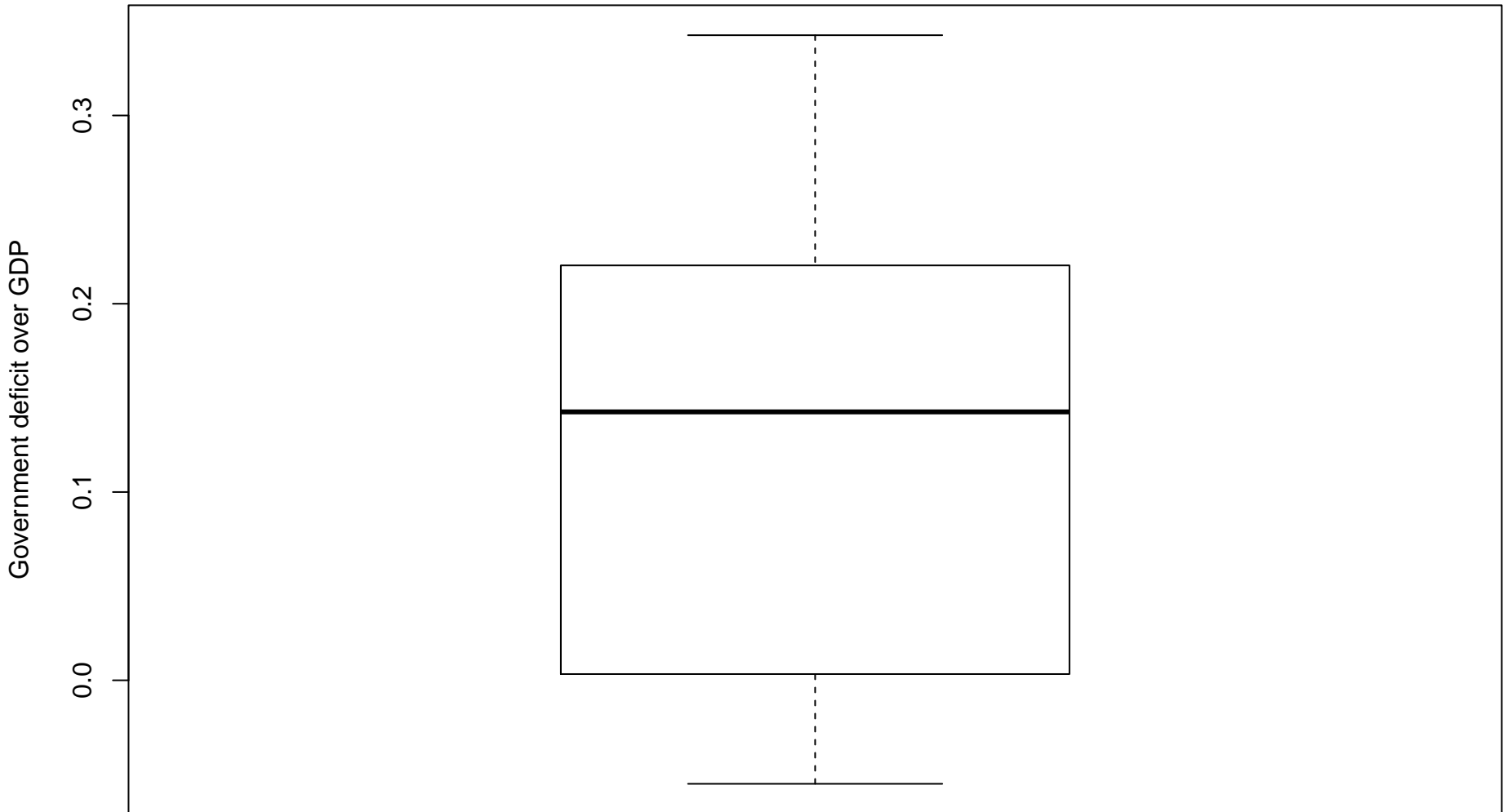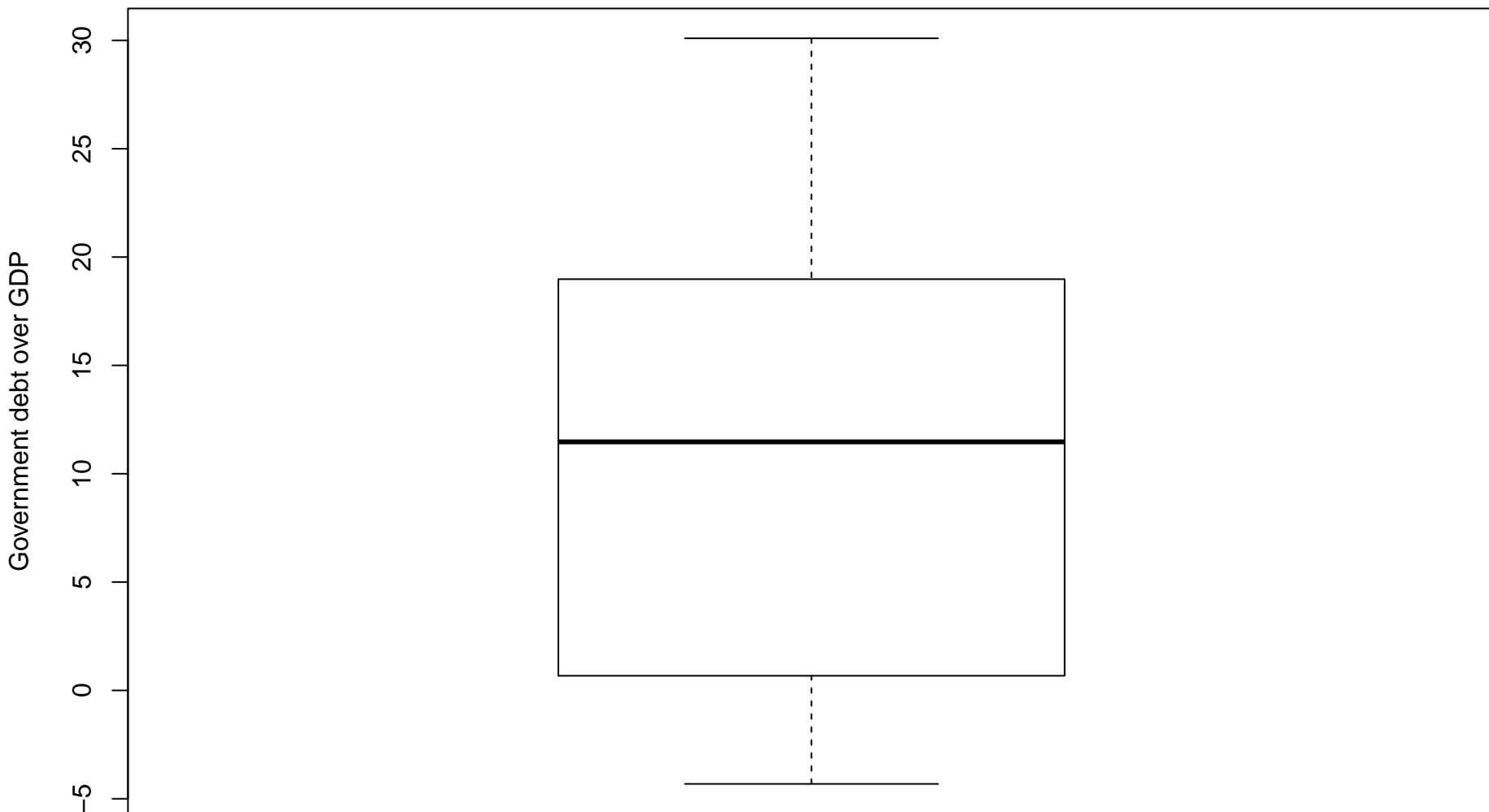(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)

Inflation

Consumer prices index average growth rate
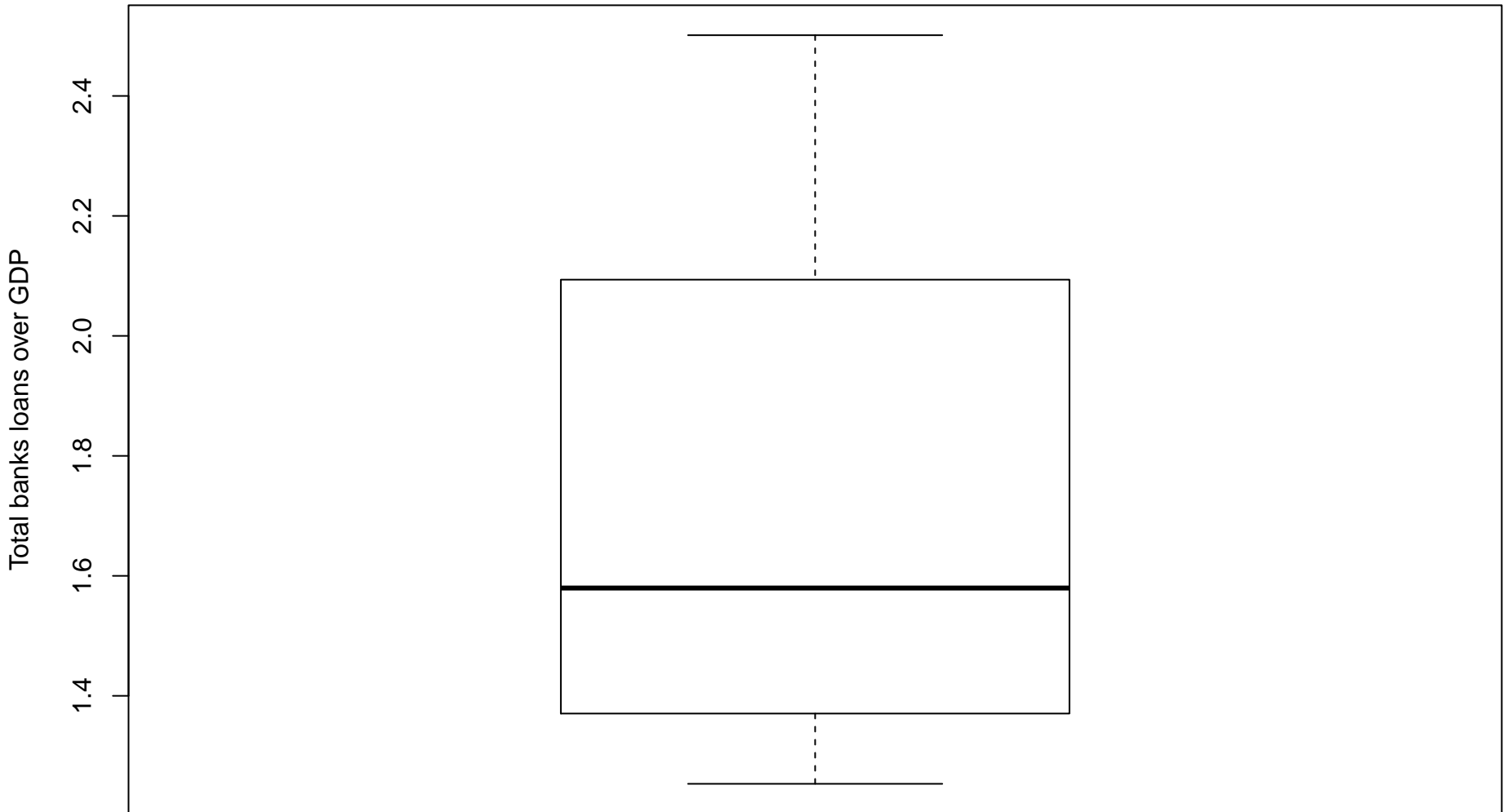
(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 200 – 1000)

Tax

Government tax income over GDP
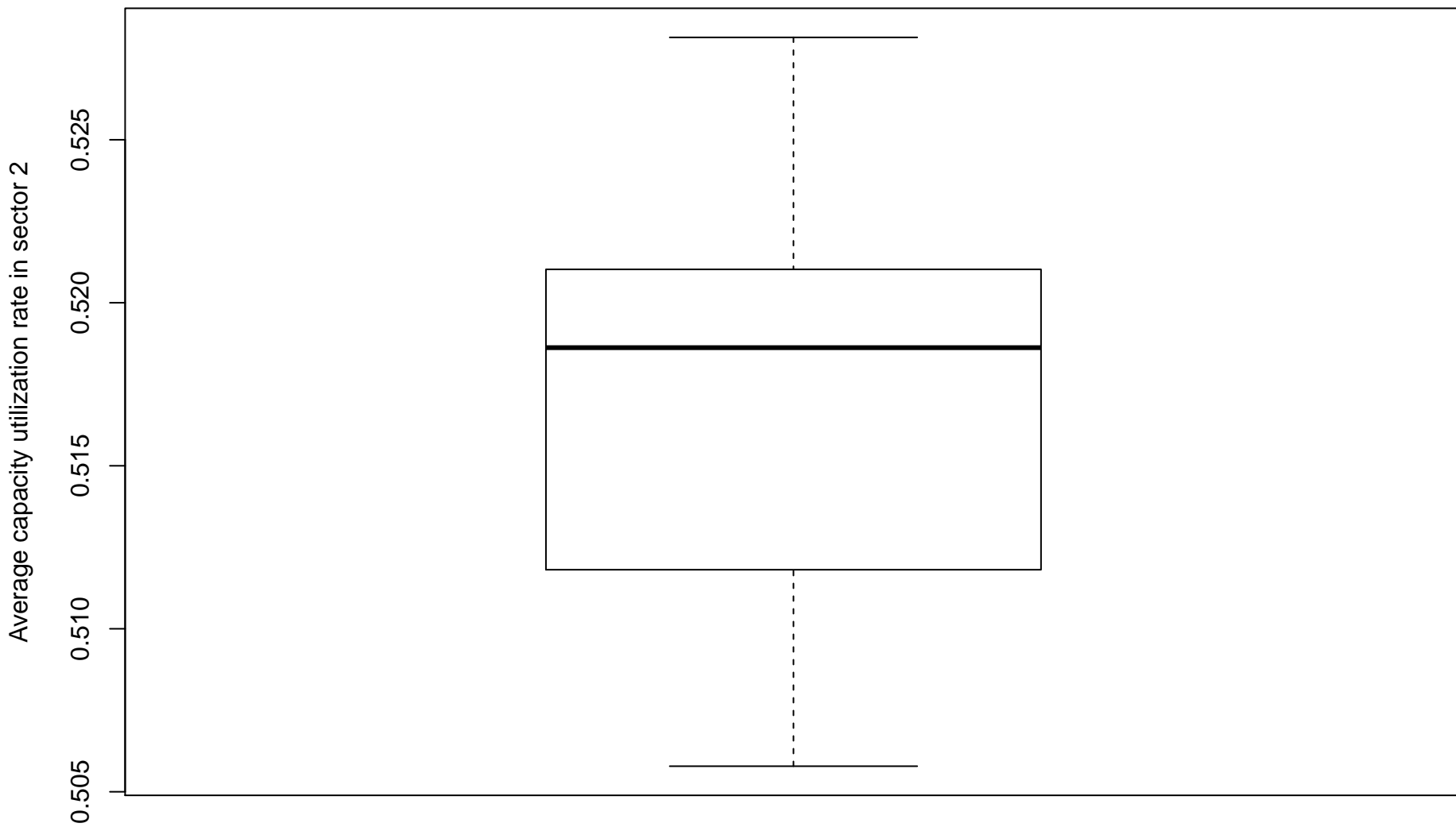
0.0255
0.0250
0.0245
0.0240
0.0235

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)

Government total expenditure

Total government expenditure over GDP

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)

Government deficit

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)
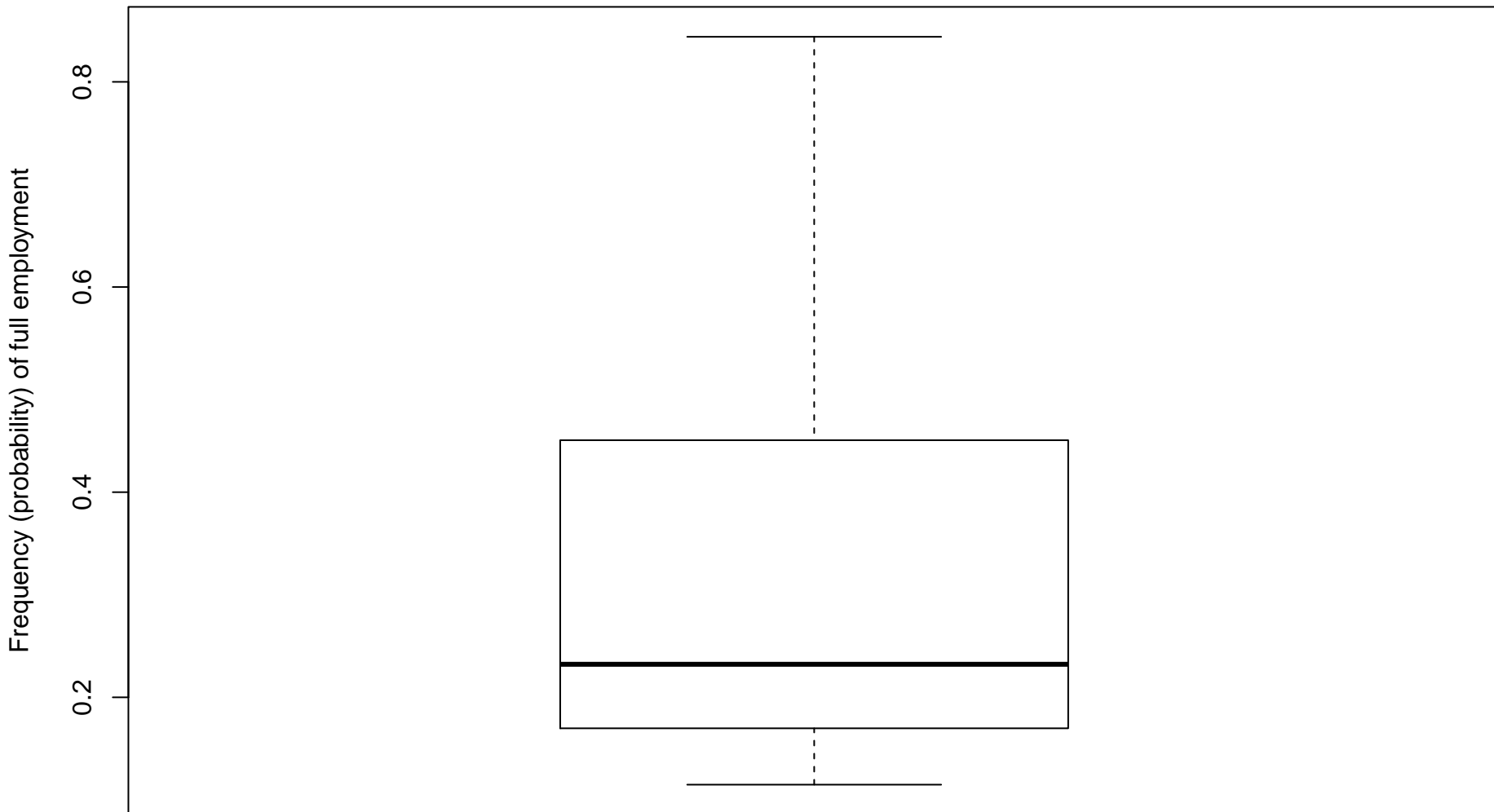
Government debt

Government debt over GDP

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)

Loans

(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 200 − 1000)
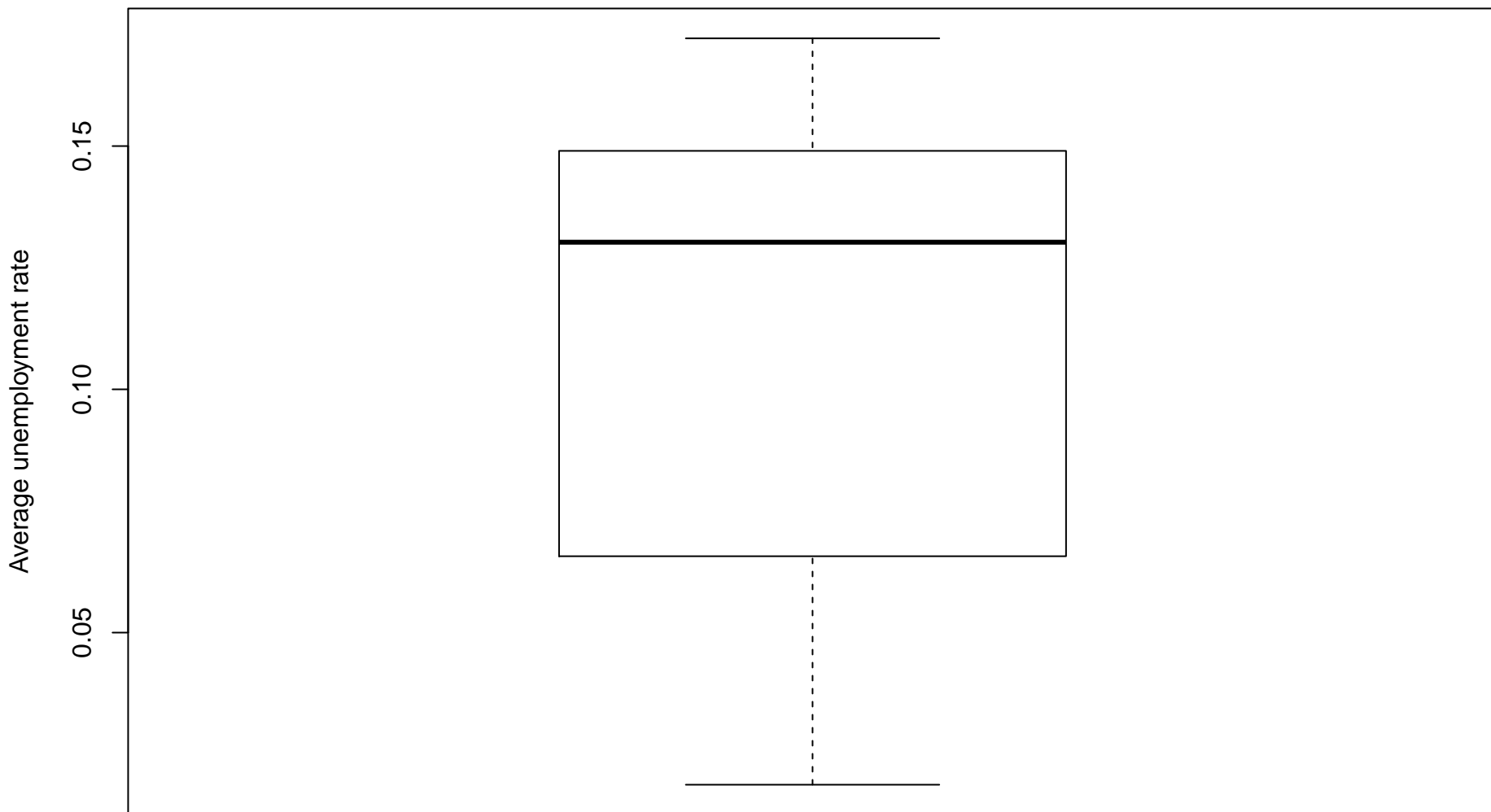
Capacity utilization

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)
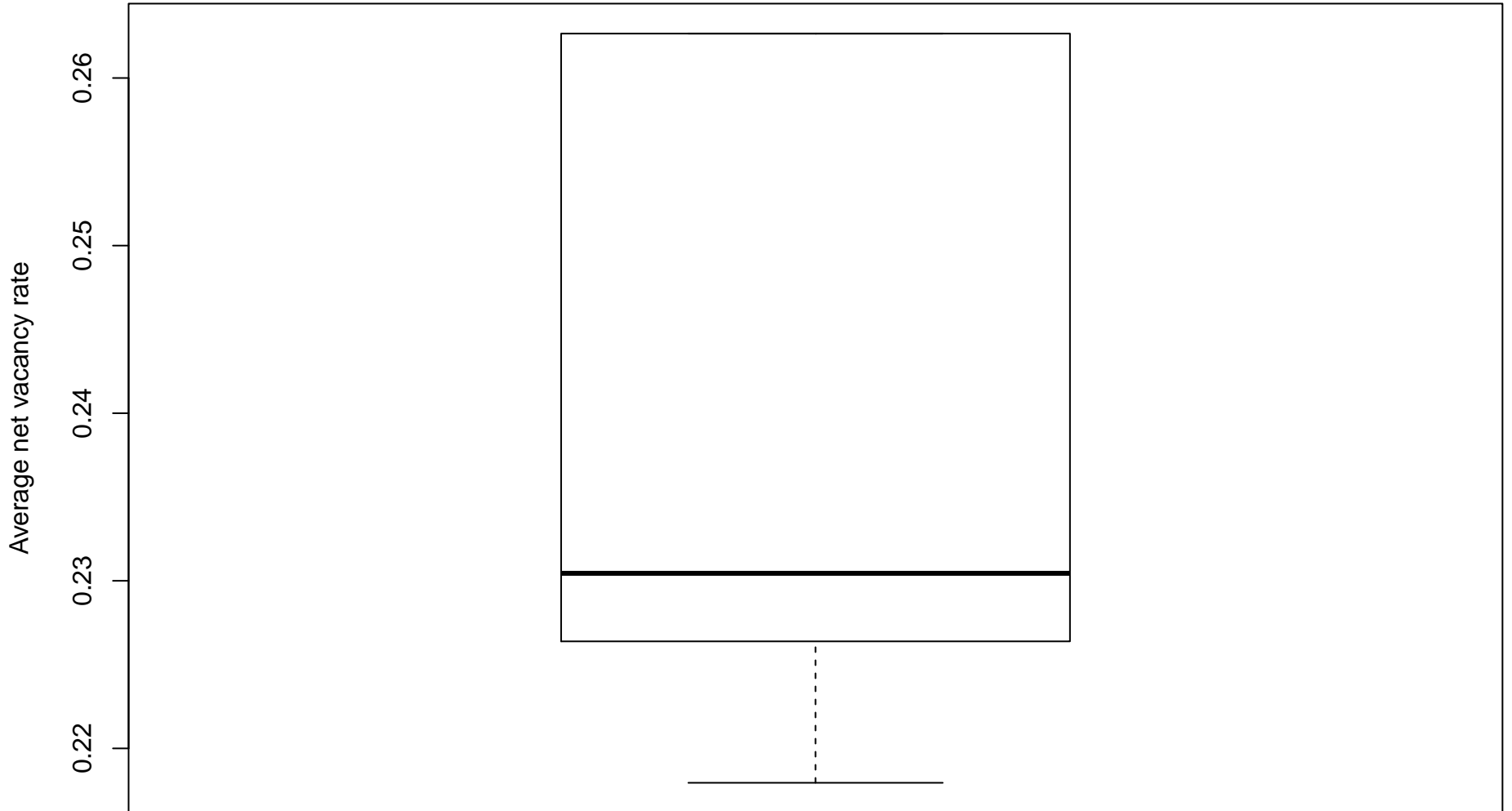
Full employment frequency

Frequency (probability) of full employment

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)

Unemployment

Average unemployment rate

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)
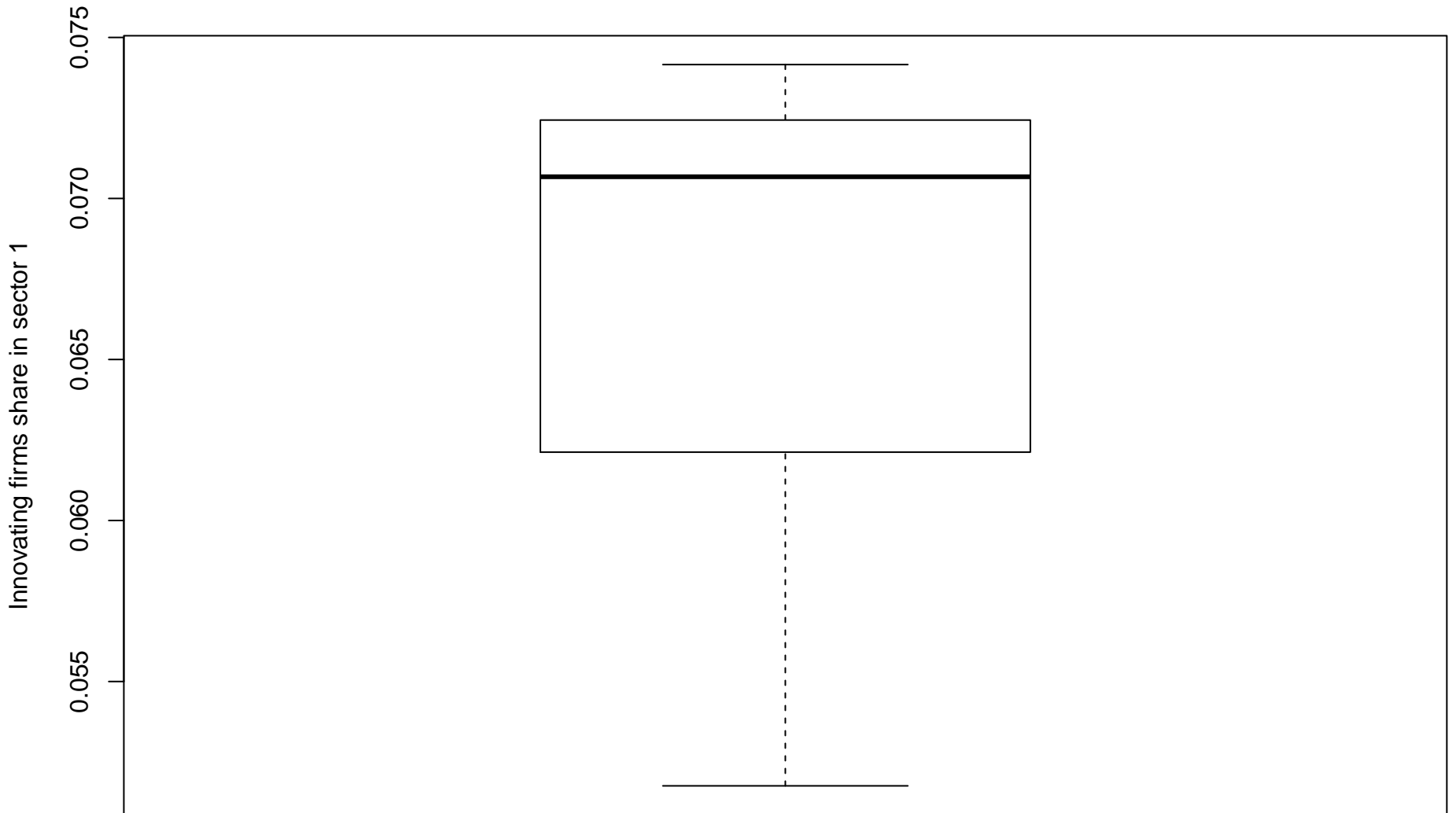
Vacancy

Average net vacancy rate

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)
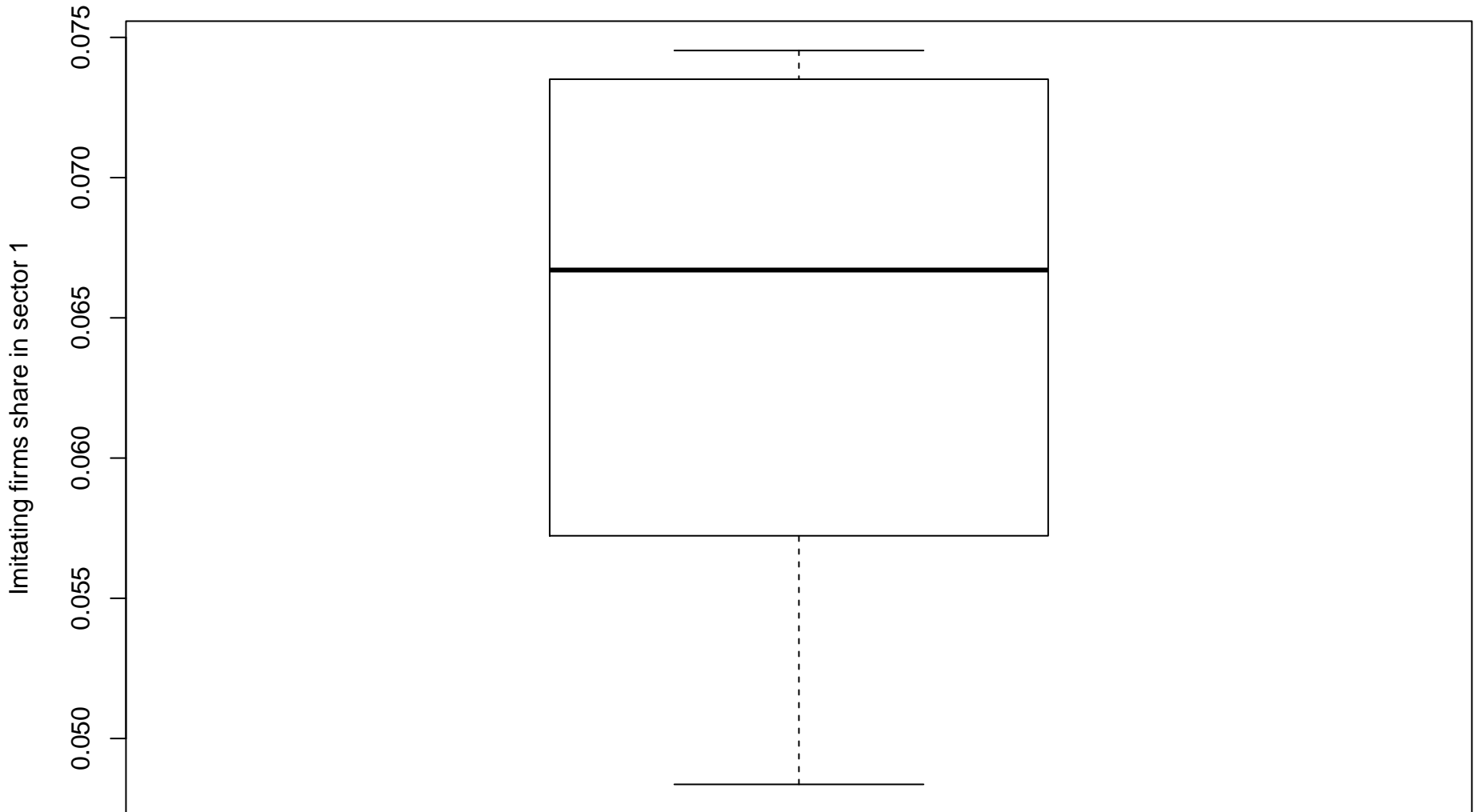
Productivity growth
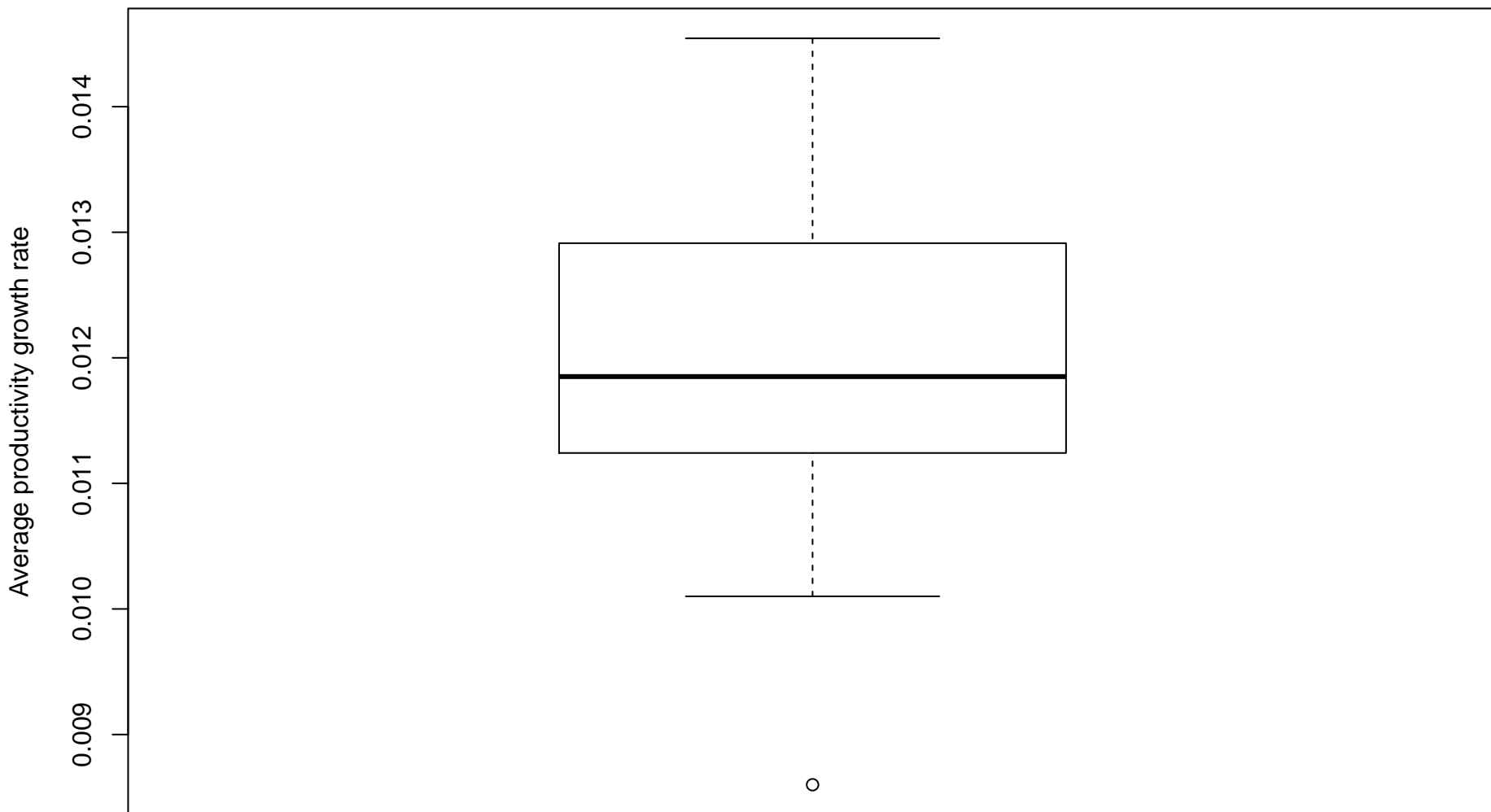
Average productivity growth rate

(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 200 − 1000)
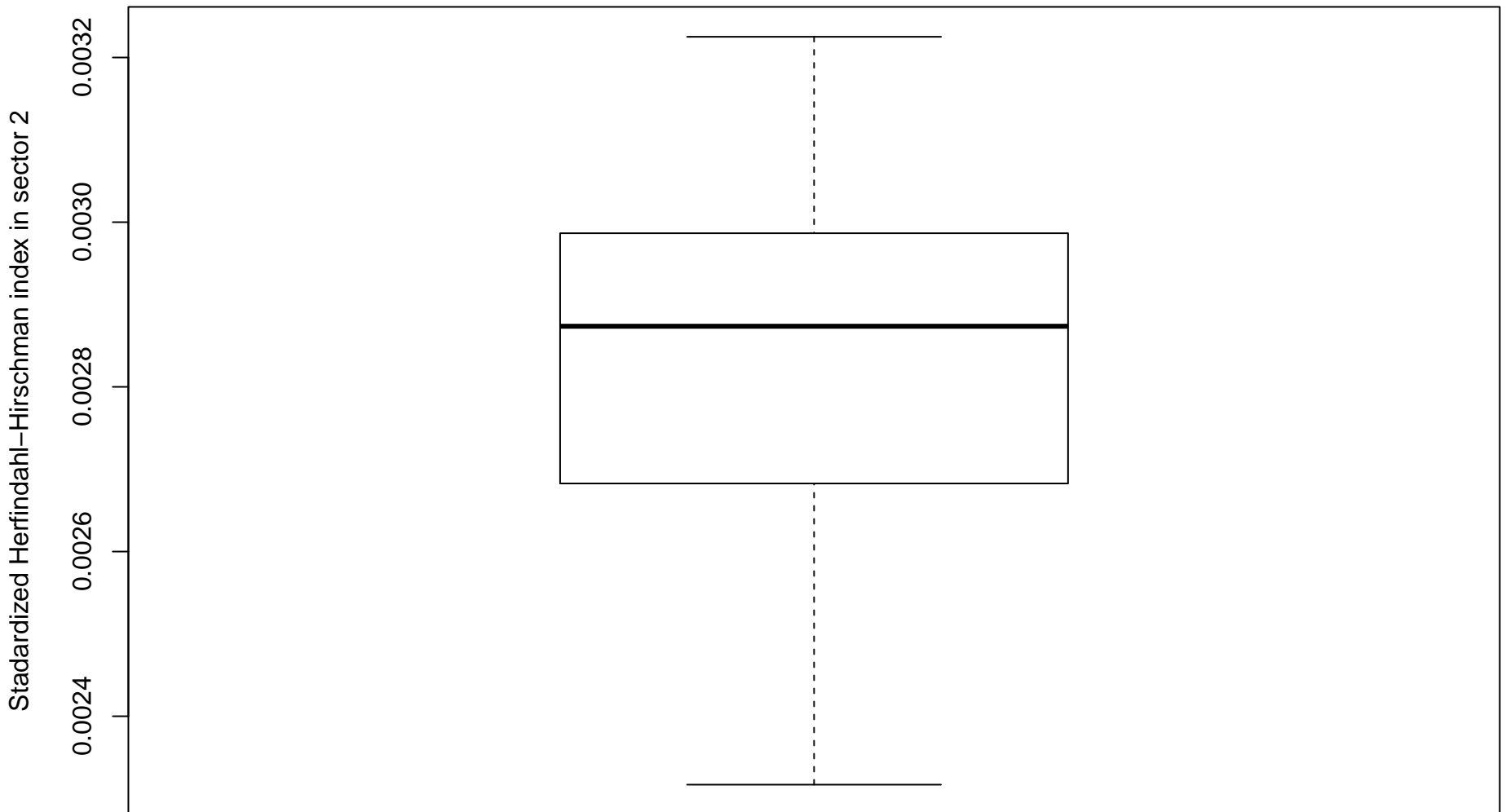
Innovation

Innovating firms share in sector 1

(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 200 – 1000)
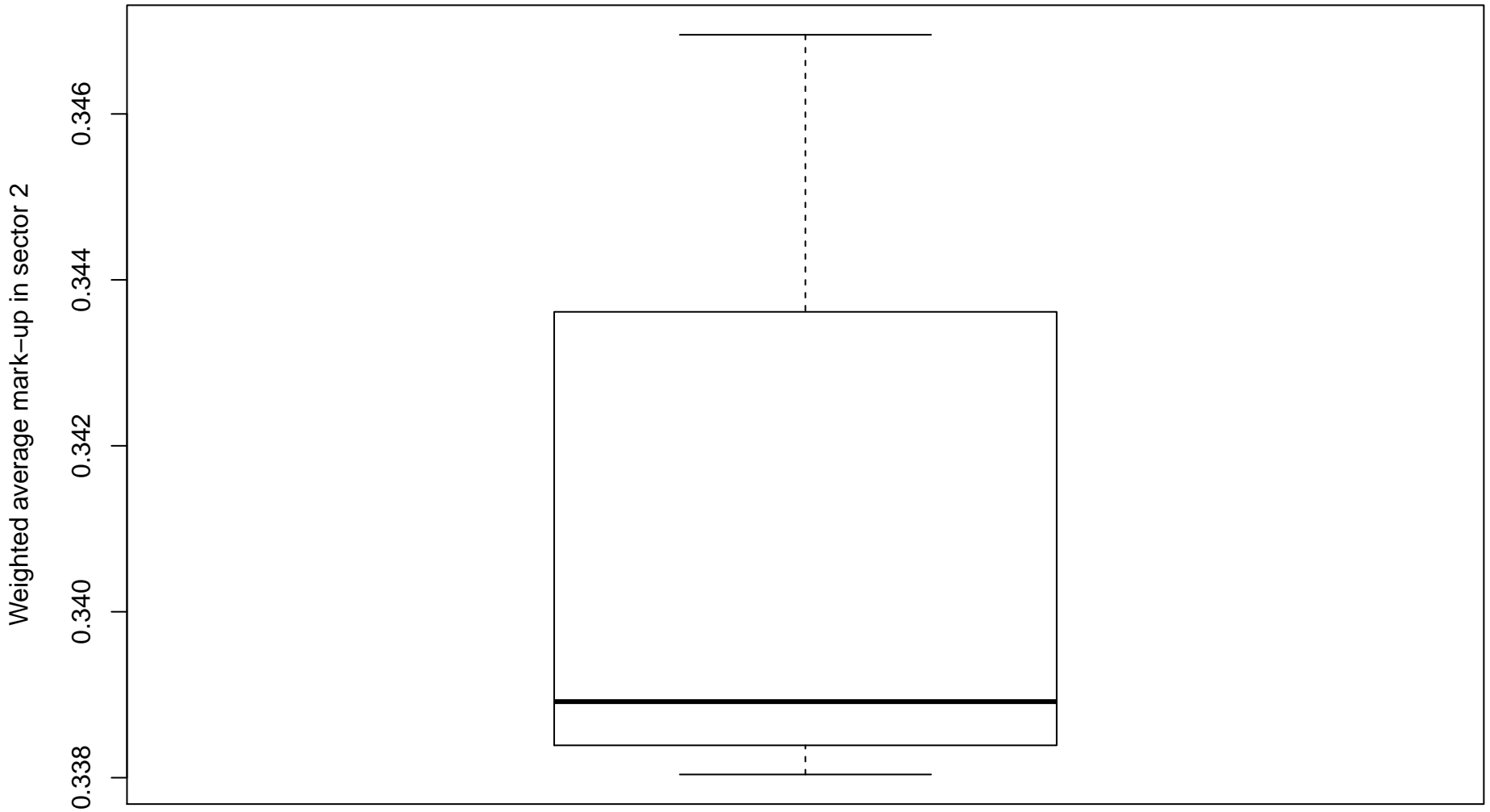
Imitation

Imitating firms share in sector 1

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)

Market concentration

Stadardized Herfindahl–Hirschman index in sector 2

(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 200 – 1000)

Mark−ups

Weighted average mark−up in sector 2

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 200 − 1000)

Monte Carlo descriptive statistics (all experiments)

	Avg[1]	SD[1]	Min[1]	Max[1]
GDP growth	0.01184	0.001602	0.008559	0.01427
Volatility of GDP growth	0.09448	0.006524	0.08608	0.106
Likelihood of GDP crises	0.2888	0.04592	0.1848	0.3433
Inflation	0.001664	0.0005863	0.001142	0.002994
Tax	0.02455	0.001657	0.02026	0.02584
Government total expenditure	0.04676	0.02169	0.007745	0.07093
Government deficit	0.1371	0.1264	−0.05498	0.3426
Government debt	11.6	10.88	−4.315	30.09
Loans	3.204	4.97	1.253	17.31
Capacity utilization	0.491	0.08575	0.2476	0.5281
Full employment frequency	0.3326	0.2475	0.1149	0.8439
Unemployment	0.1145	0.05263	0.01874	0.1721
Vacancy	0.2984	0.1657	0.2179	0.7511
Productivity growth	0.01178	0.001634	0.0086	0.01454
Innovation	0.06769	0.007395	0.05176	0.07416
Imitation	0.06489	0.008965	0.04836	0.07453
Market concentration	0.00268	0.000612	0.001076	0.003225
Mark−ups	0.3413	0.004791	0.338	0.3522

Experiments: [1] Benchmark
(numbers in brackets indicate the experiment number / MC runs = 10 / period = 200 − 1000)