GDP, investment and consumption (all experiments)
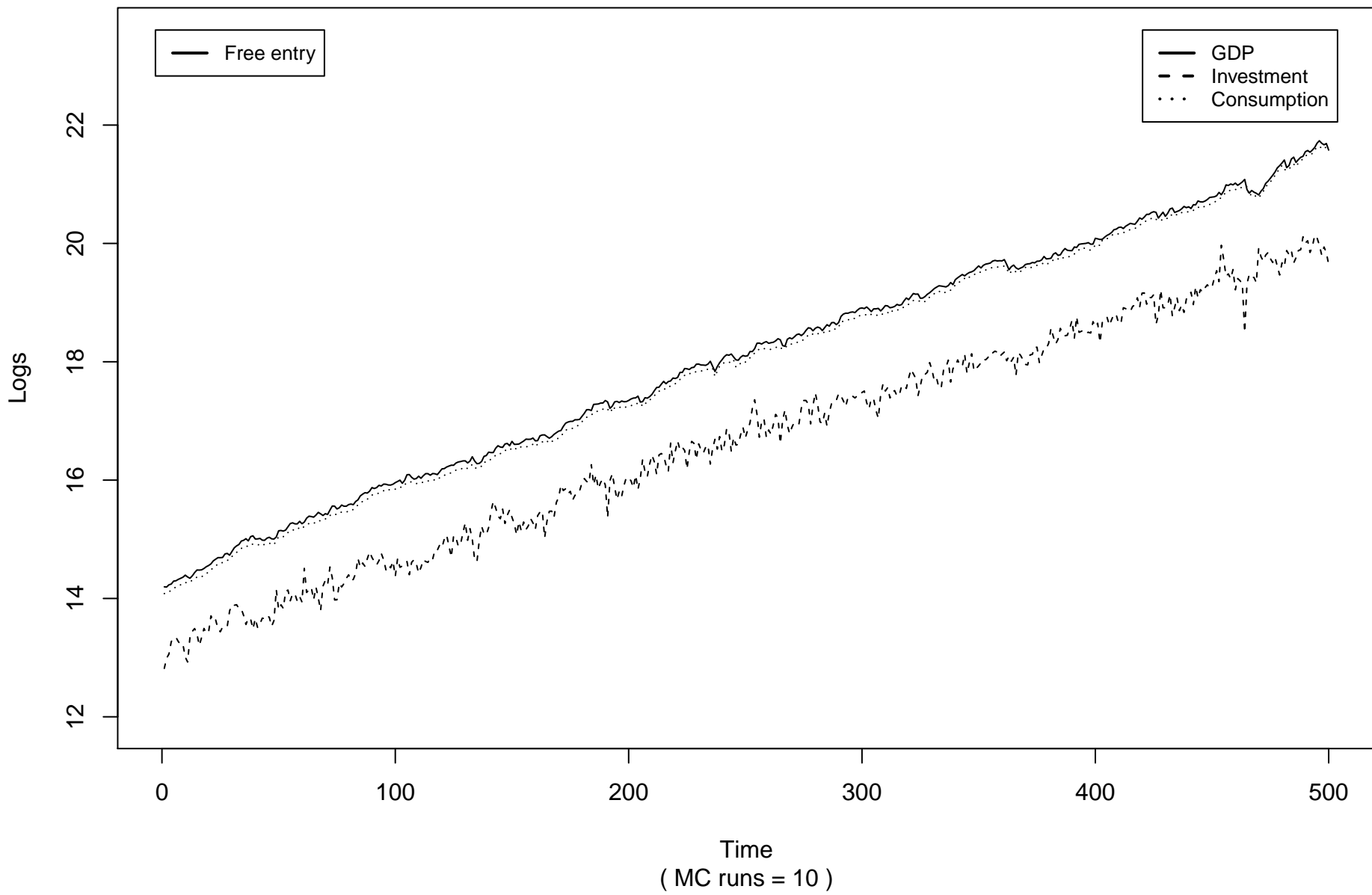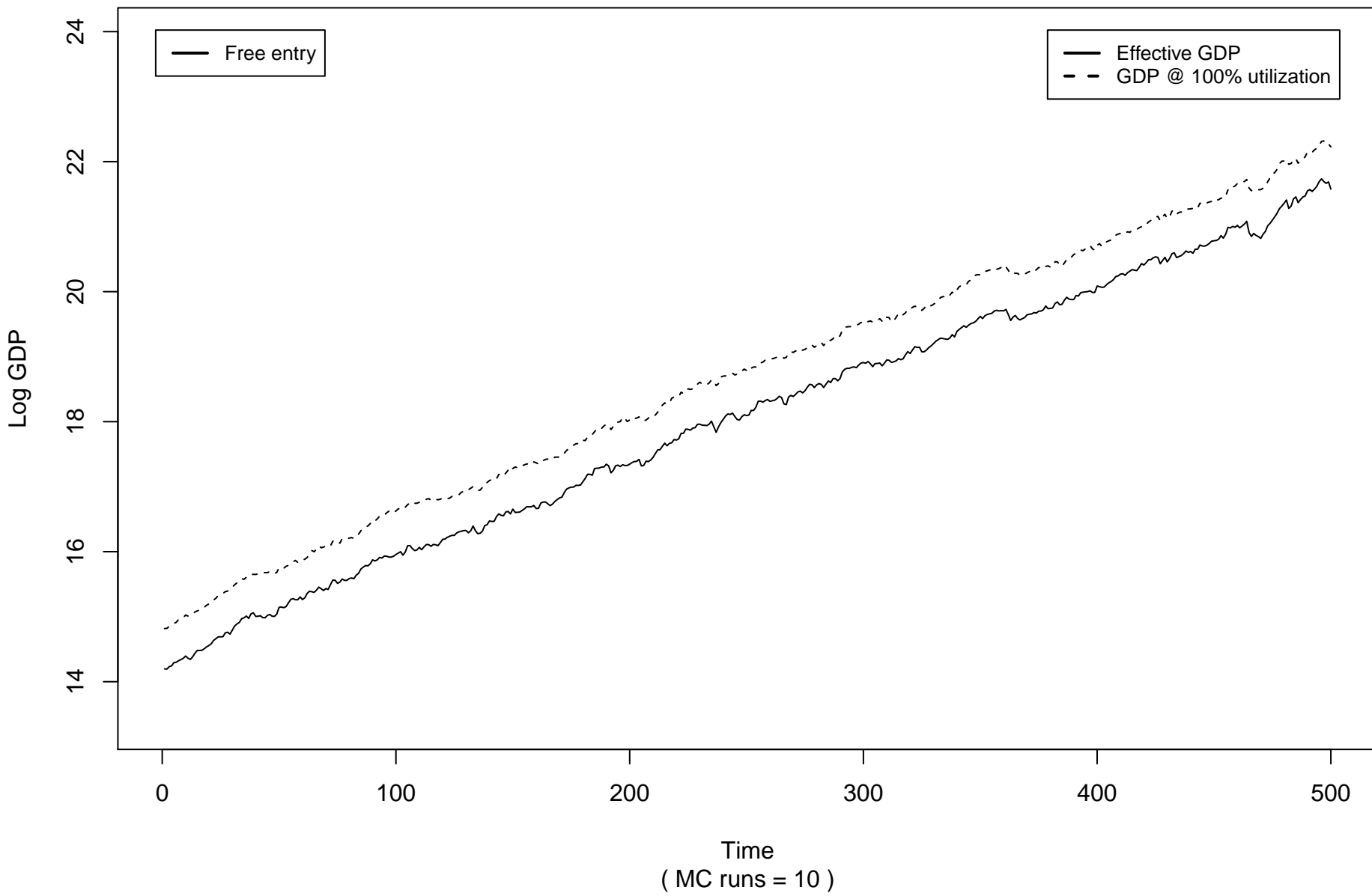

Time
(MC runs = 10)

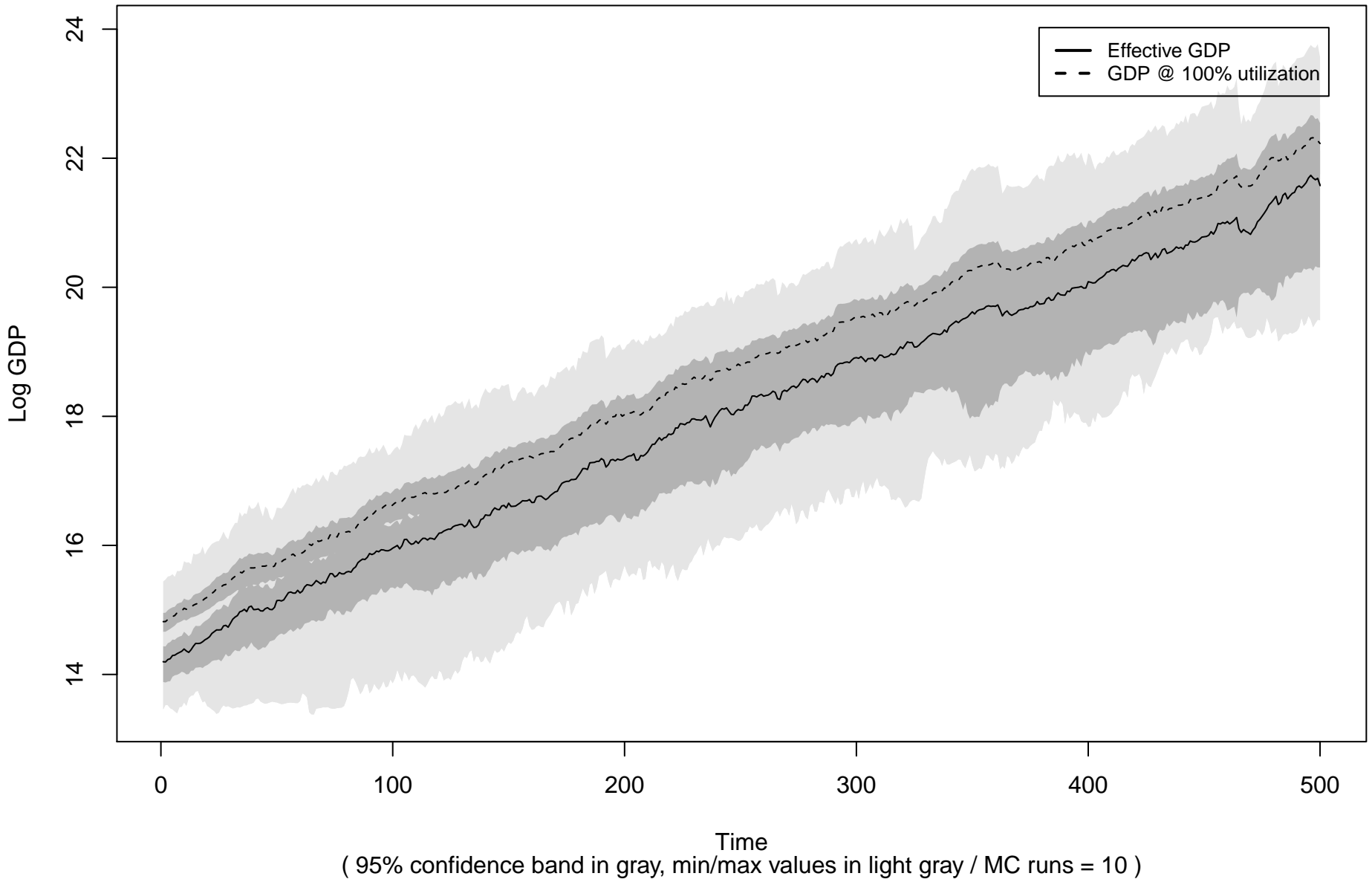# GDP, investment and consumption (Free entry)
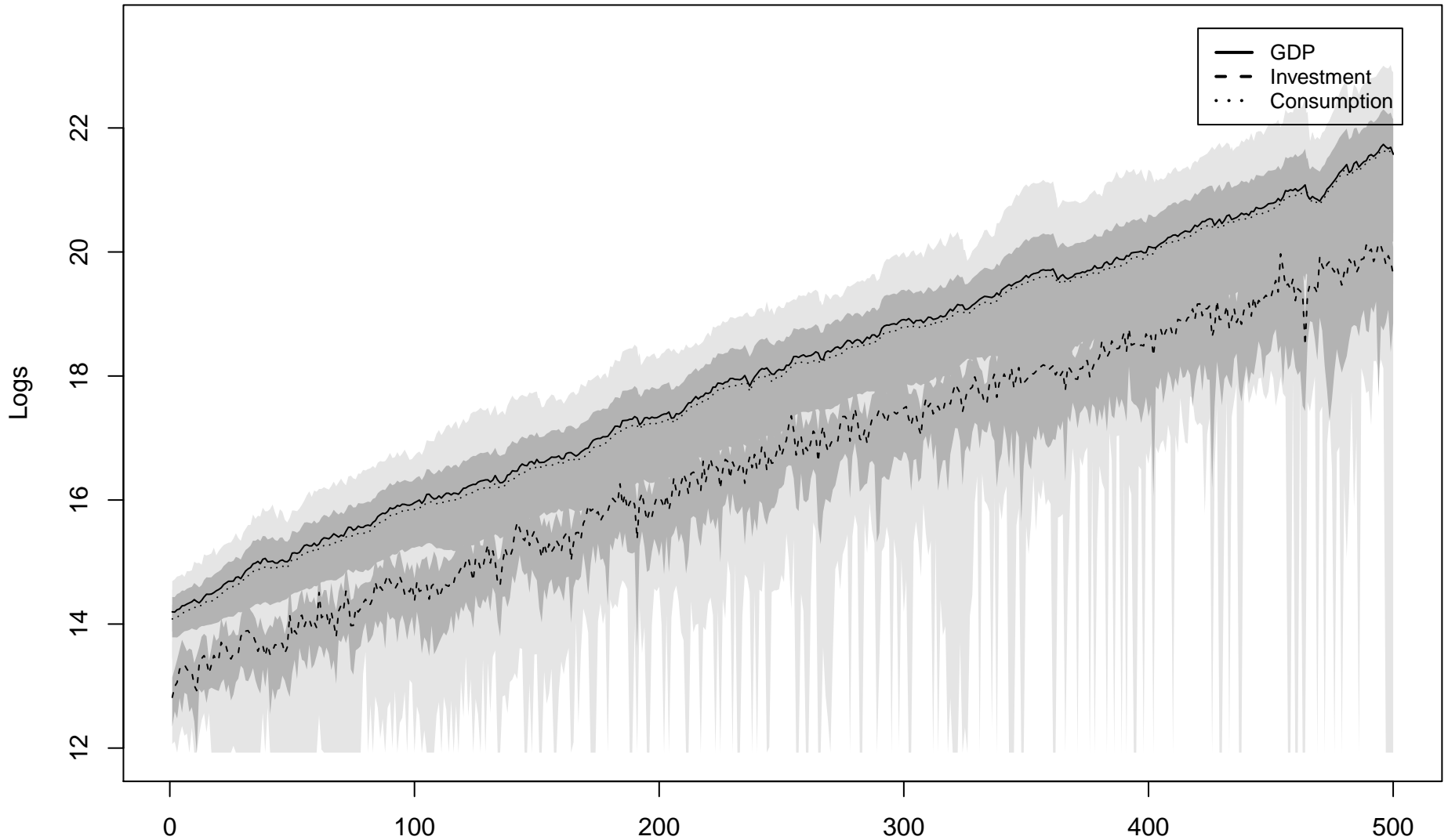
Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)

GDP (all experiments)

GDP (Free entry)

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)

Free entry

Tax
Total expenditure

Log government tax income and expenditure over GDP

Time
(MC runs = 10)
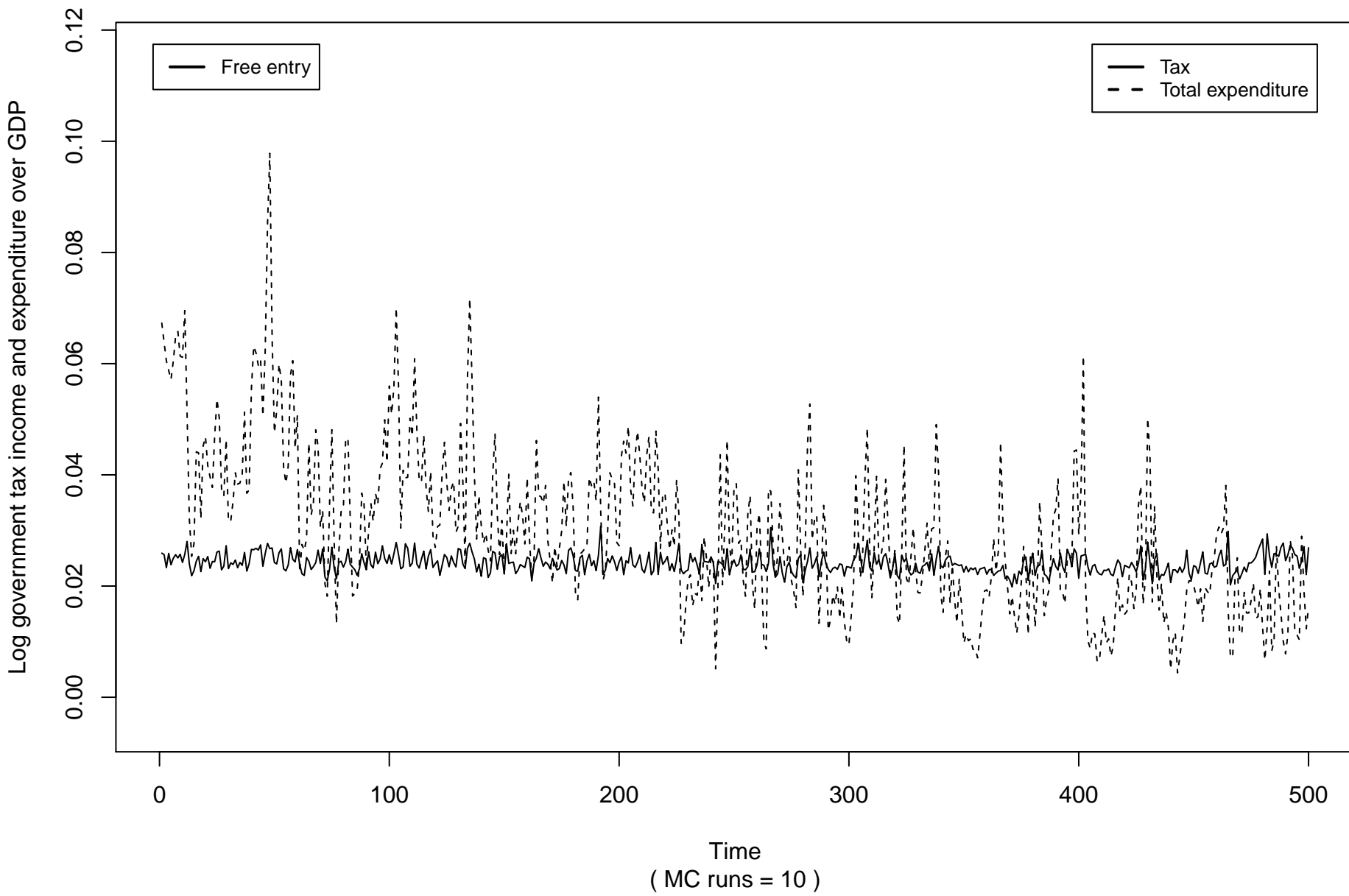
Government income and expenditure on GDP (Free entry)

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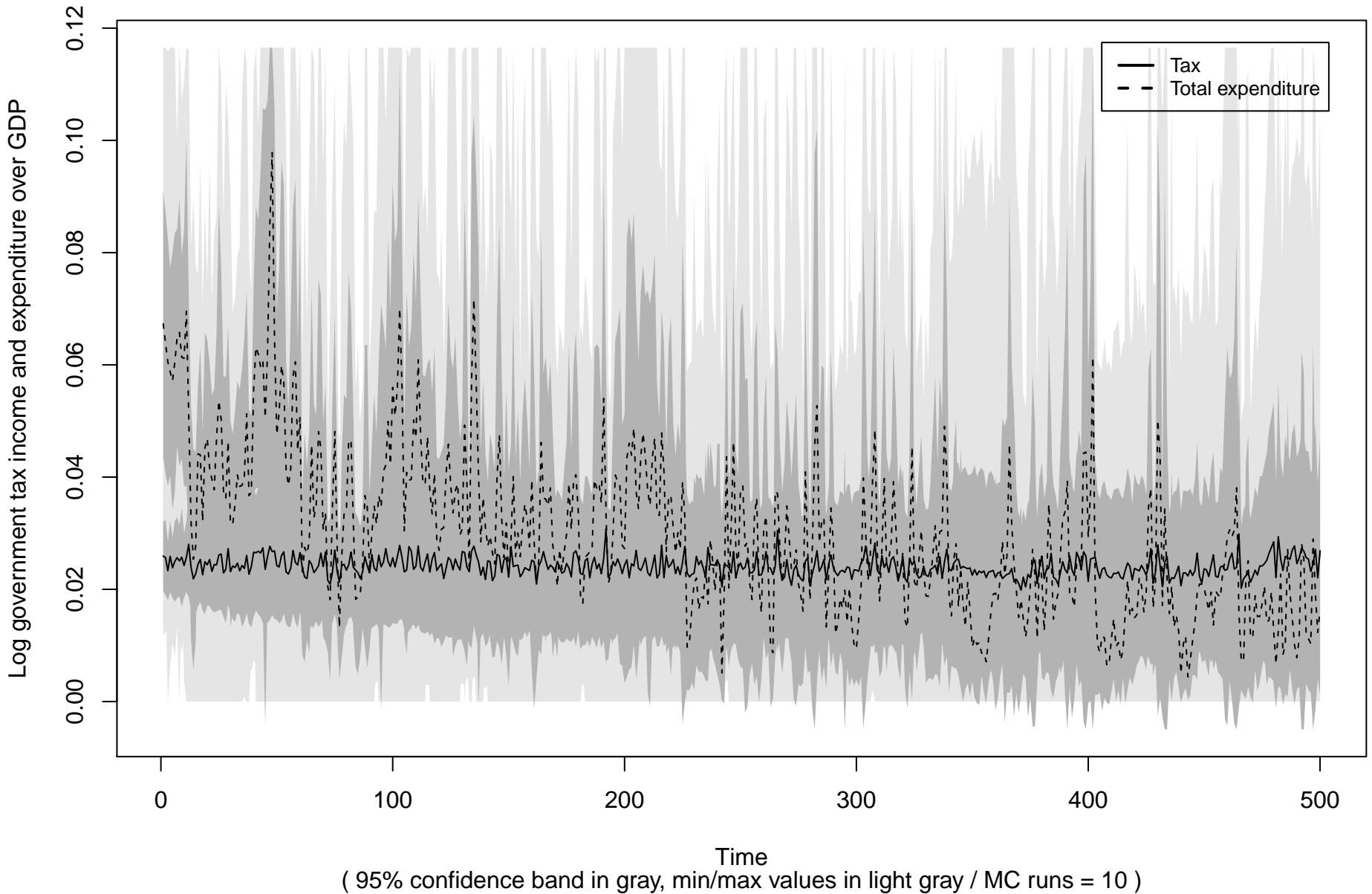
Government deficit on GDP (all experiments)

Government deficit over GDP

Free entry

Time
(MC runs = 10)
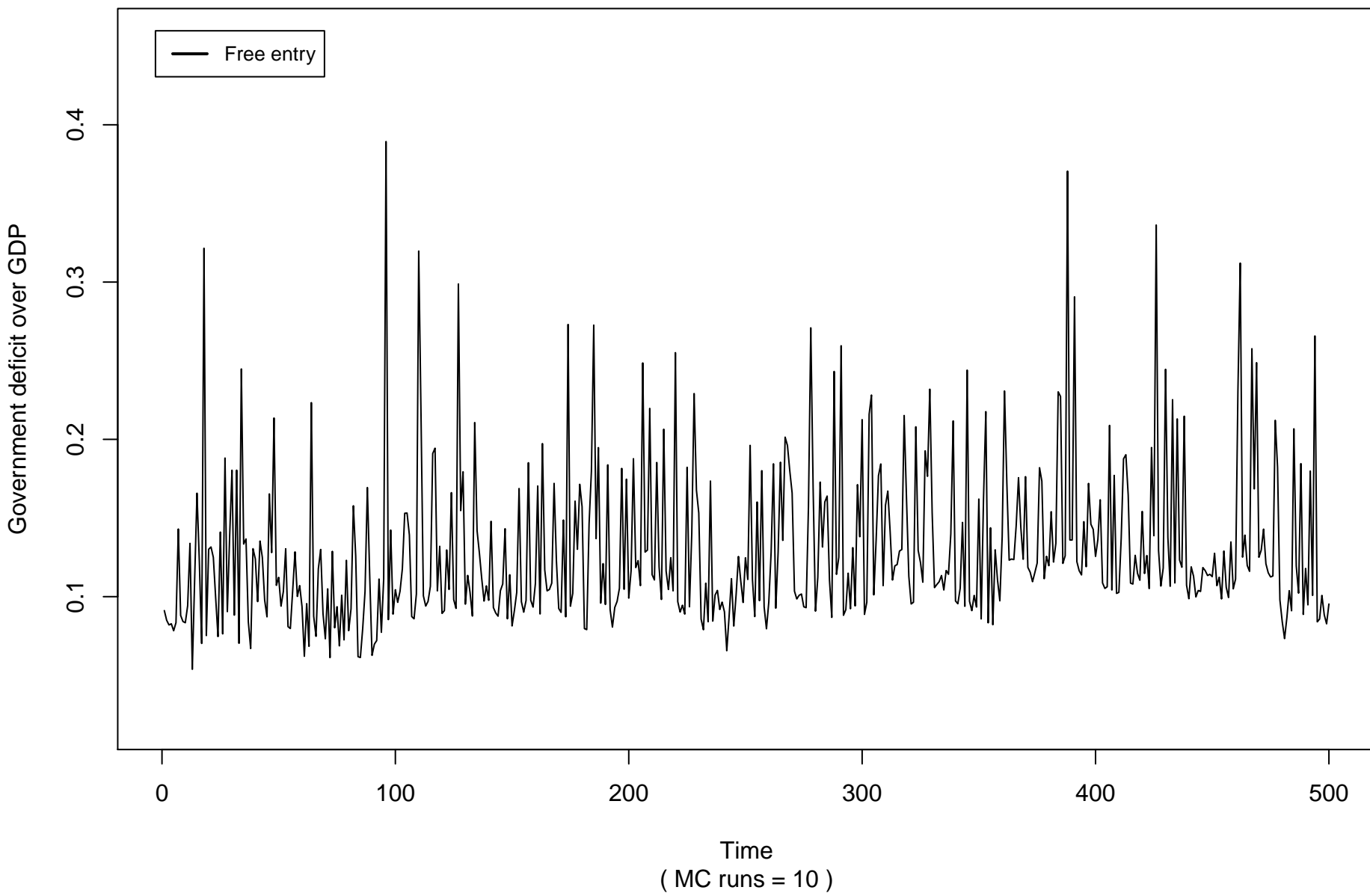
Government deficit on GDP (Free entry)

Government deficit over GDP

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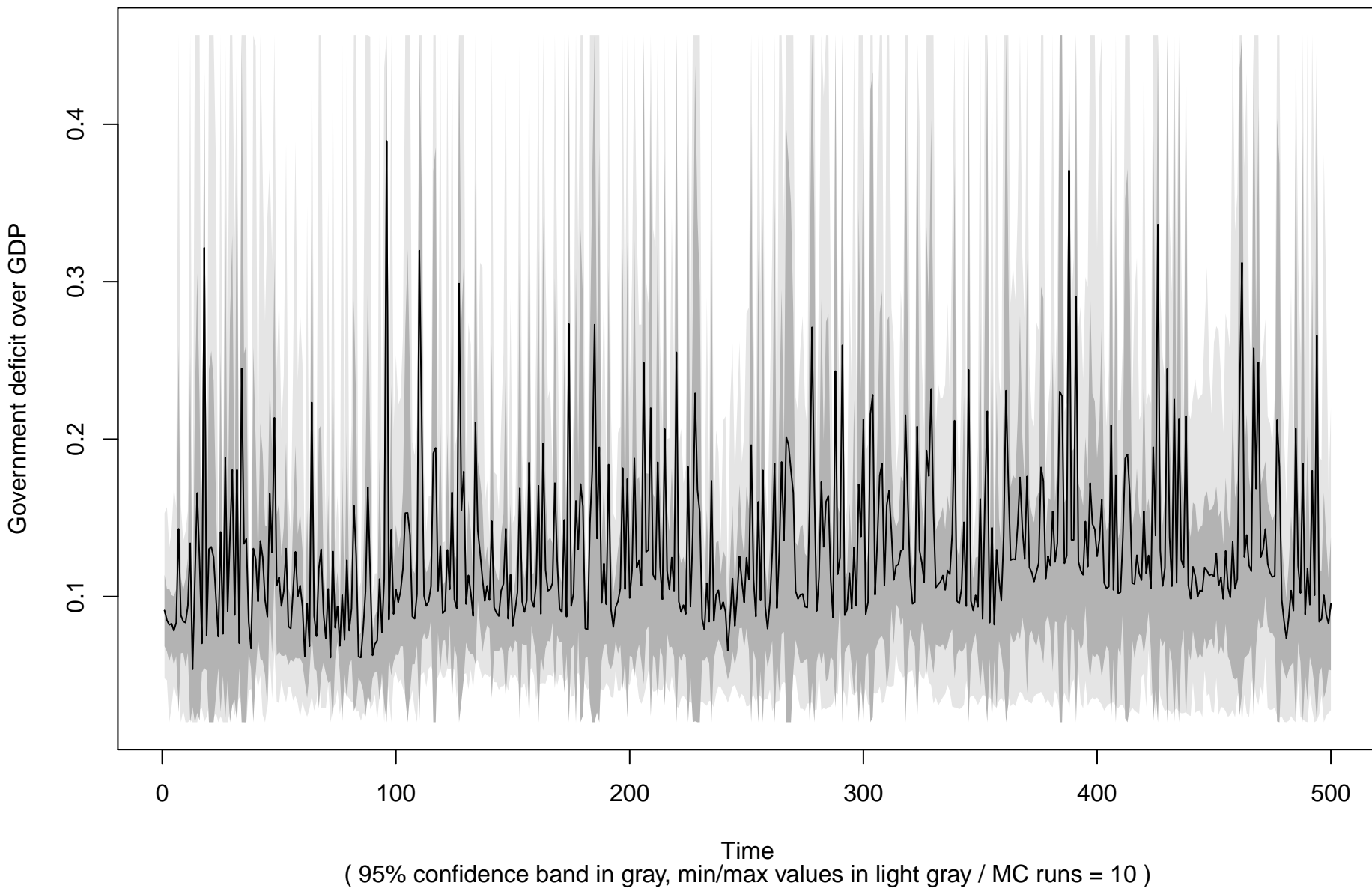
Government debt on GDP (all experiments)

Legend: Free entry

Government debt over GDP

Time
(MC runs = 10)
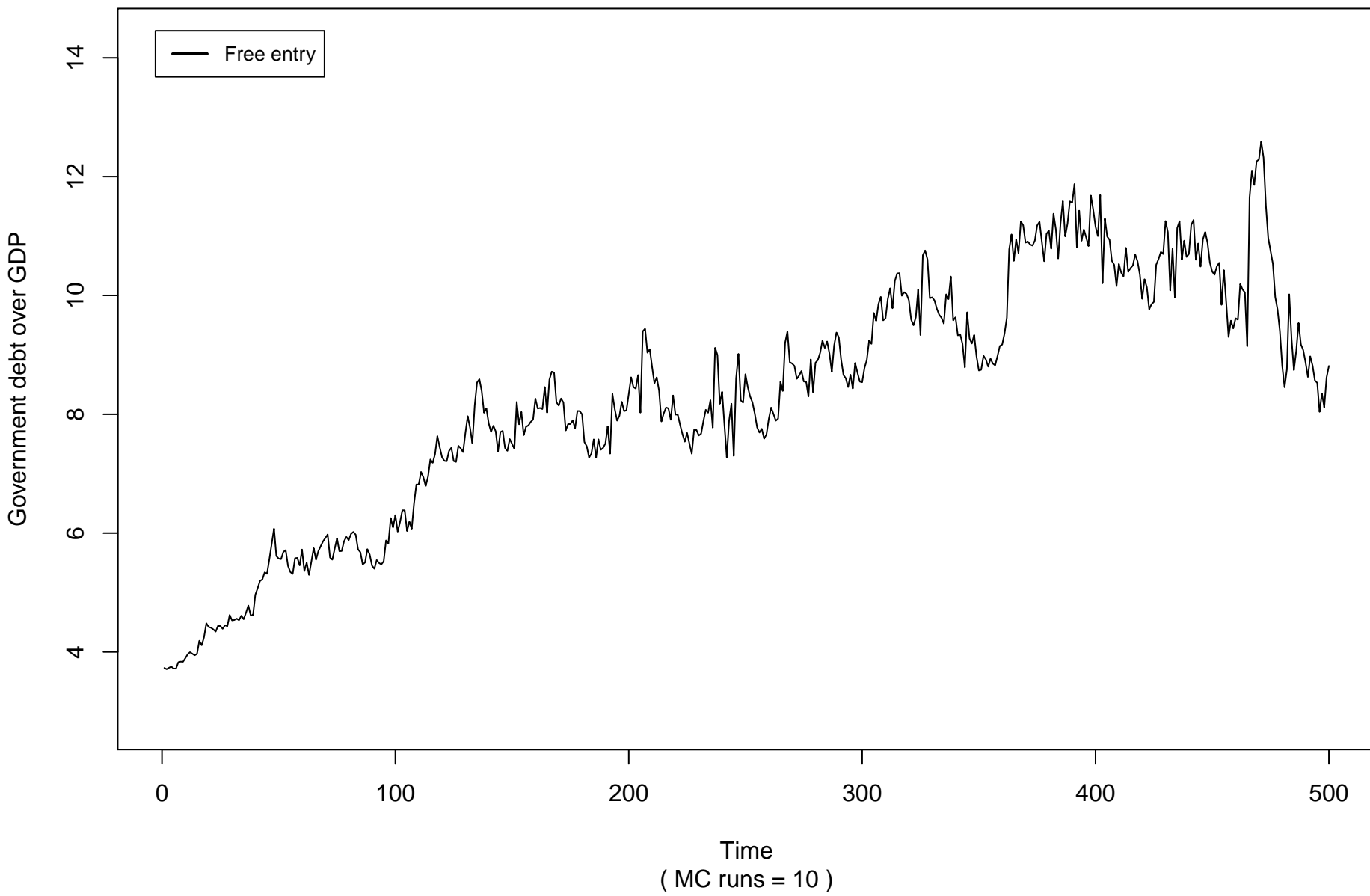
Government debt on GDP (Free entry)

Government debt over GDP

Time
(95% confidence band in gray, min/max values in light gray / MC runs = 10)
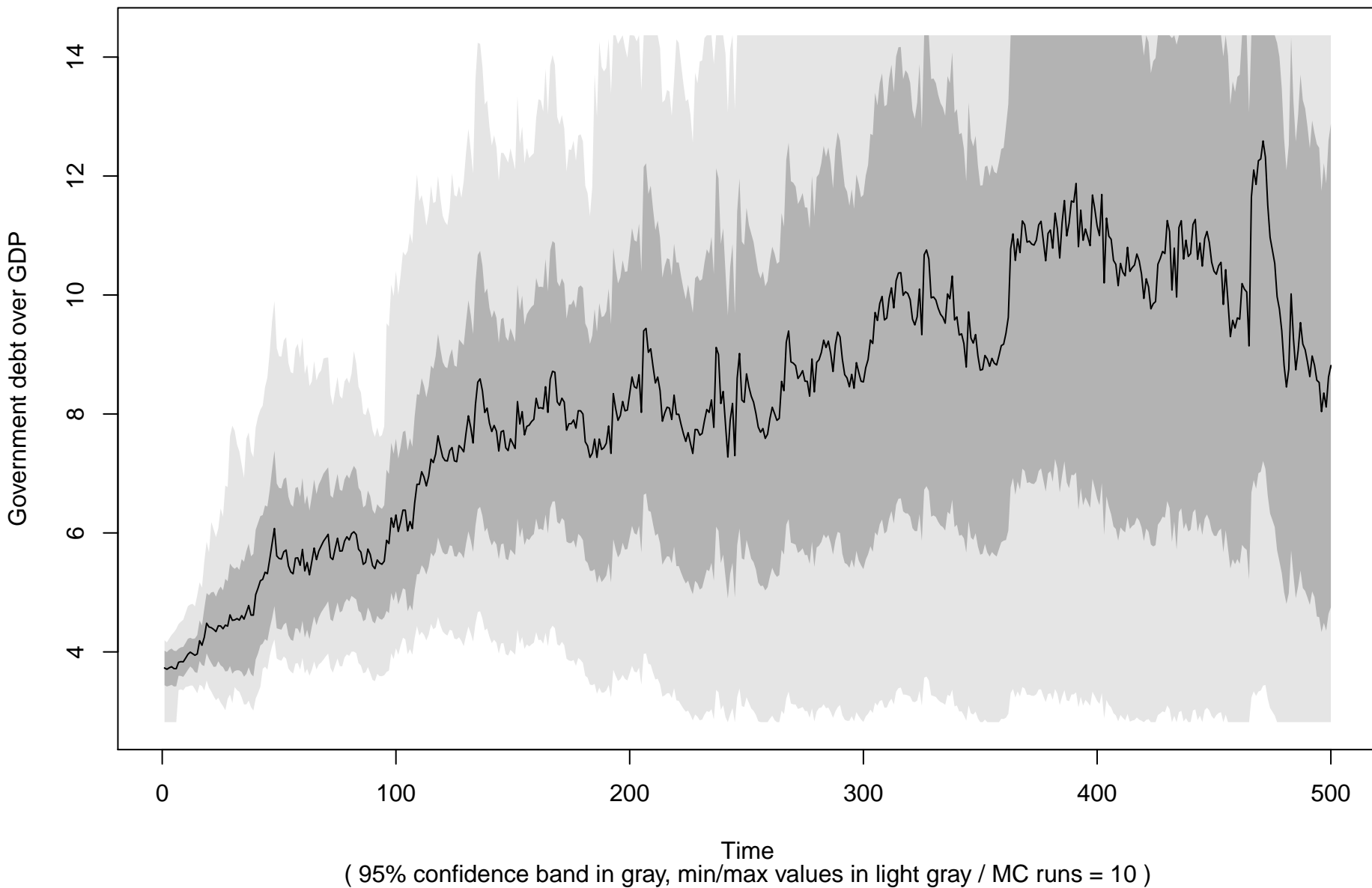
Total credit supply and loans on GDP (all experiments)

Legend (left): Free entry

Legend (right): Total credit — Loans

Y-axis: Total banks credit supply and firms loans debt over GDP

X-axis: Time
(MC runs = 10)
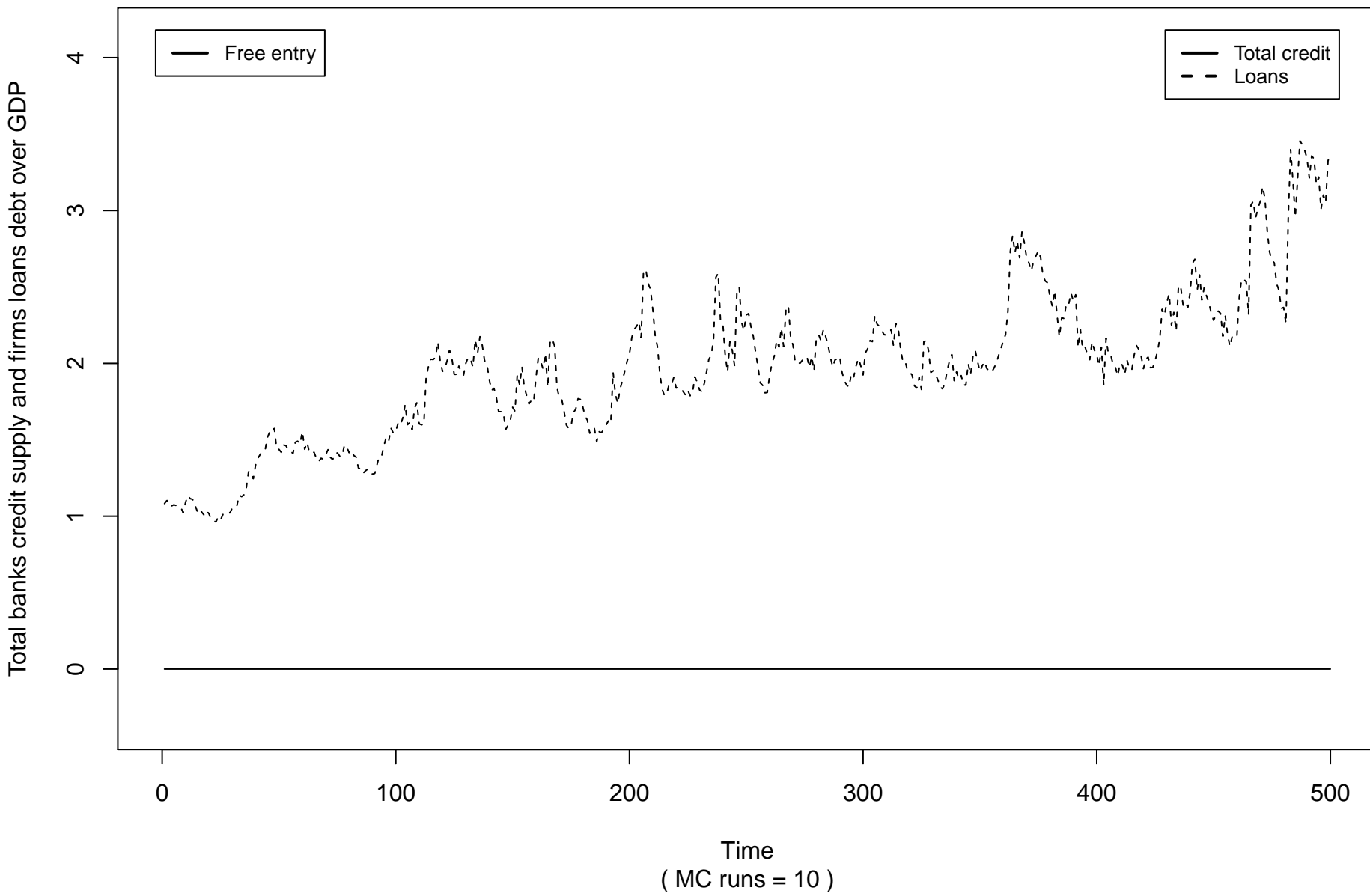
Total credit supply and loans on GDP (Free entry)

Total banks credit supply and firms loans debt over GDP

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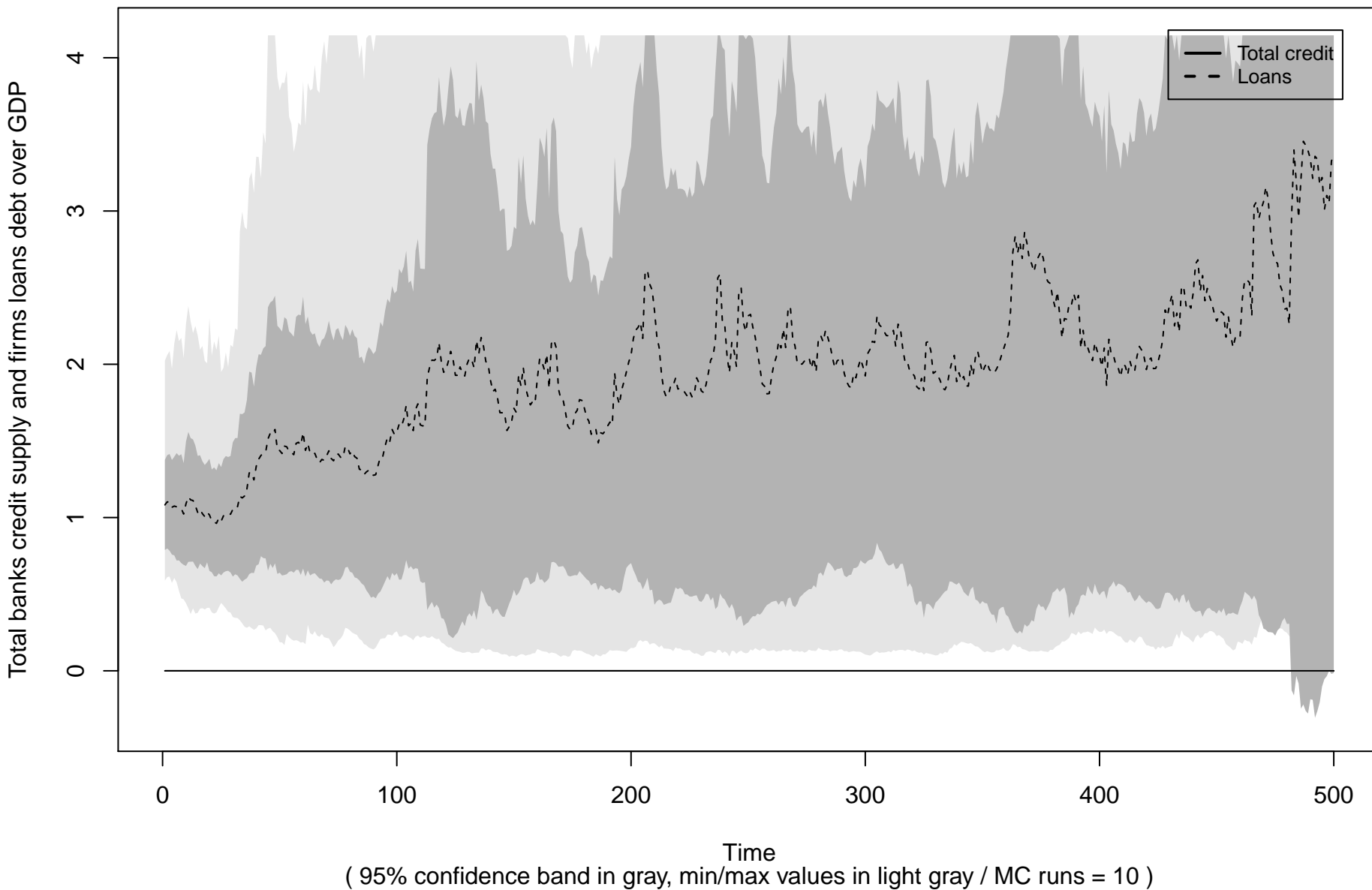
Unemployment and vacancy rates (all experiments)

Legend:
- Free entry
- —— Unemployment
- – – Vacancy

Rate

Time
(MC runs = 10)
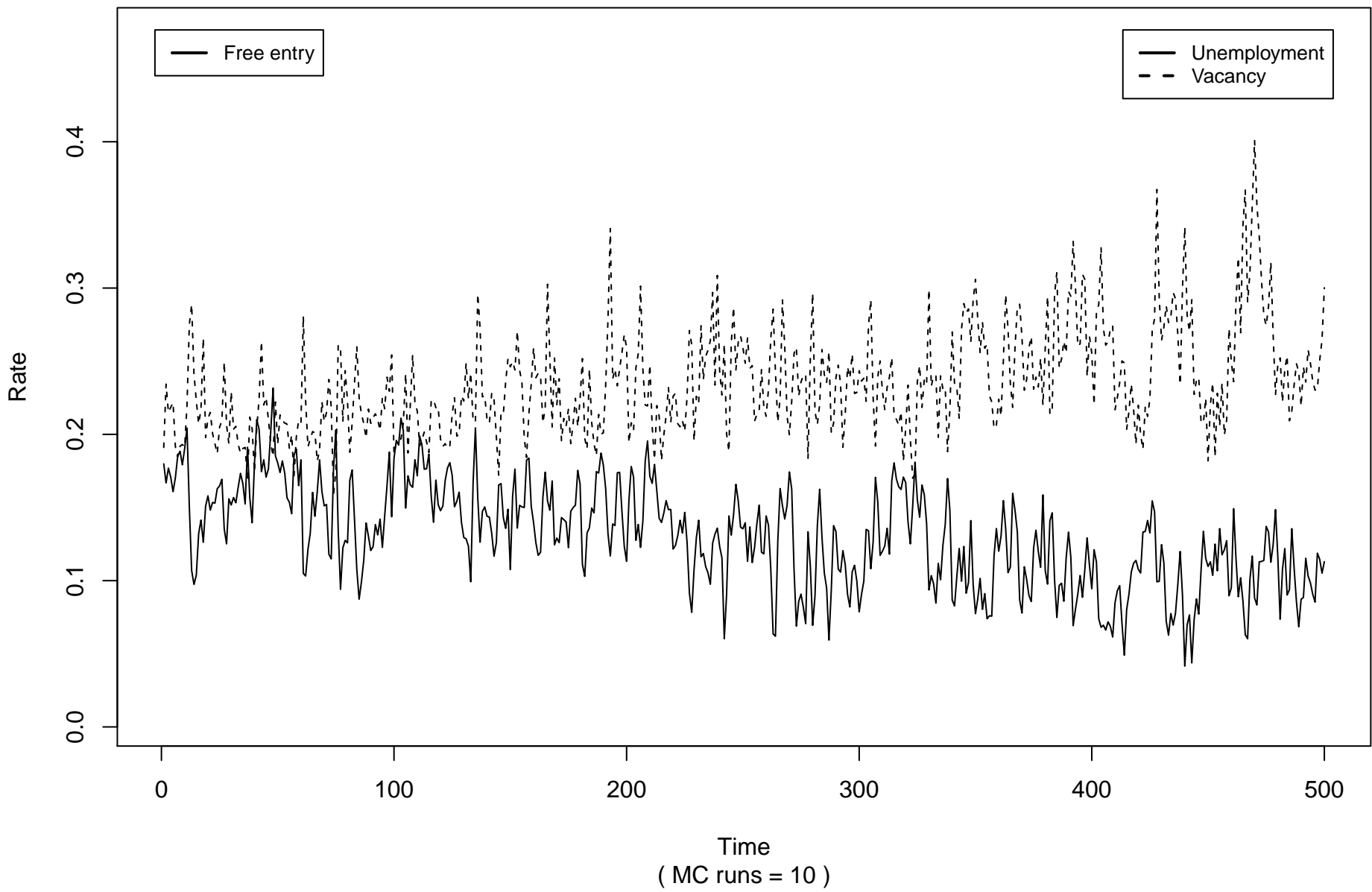
Unemployment and vacancy rates (Free entry)

Rate

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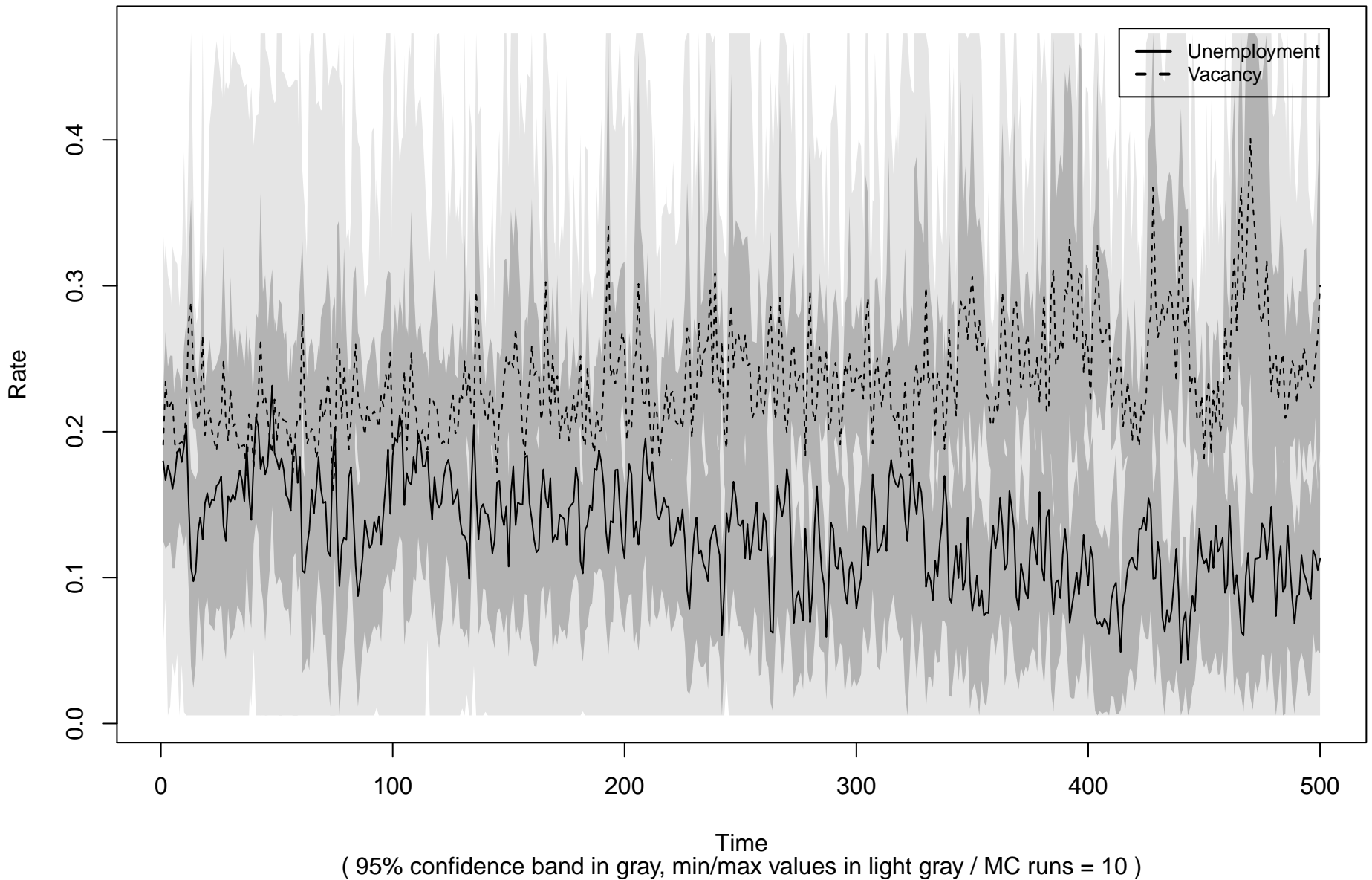
Real wages average (all experiments)

Log wages

Time
(MC runs = 10)
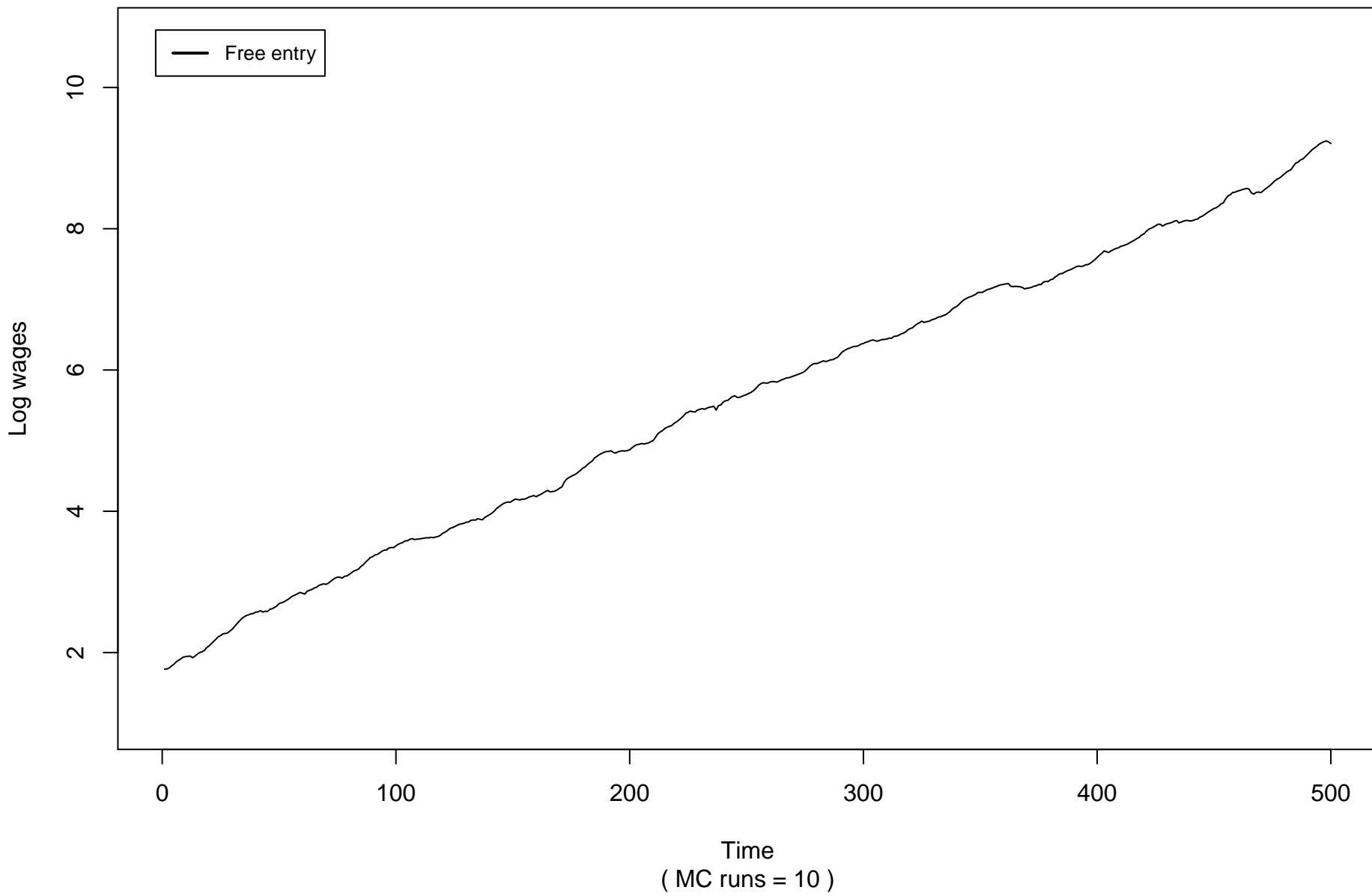
Real wages average (Free entry)

Log wages

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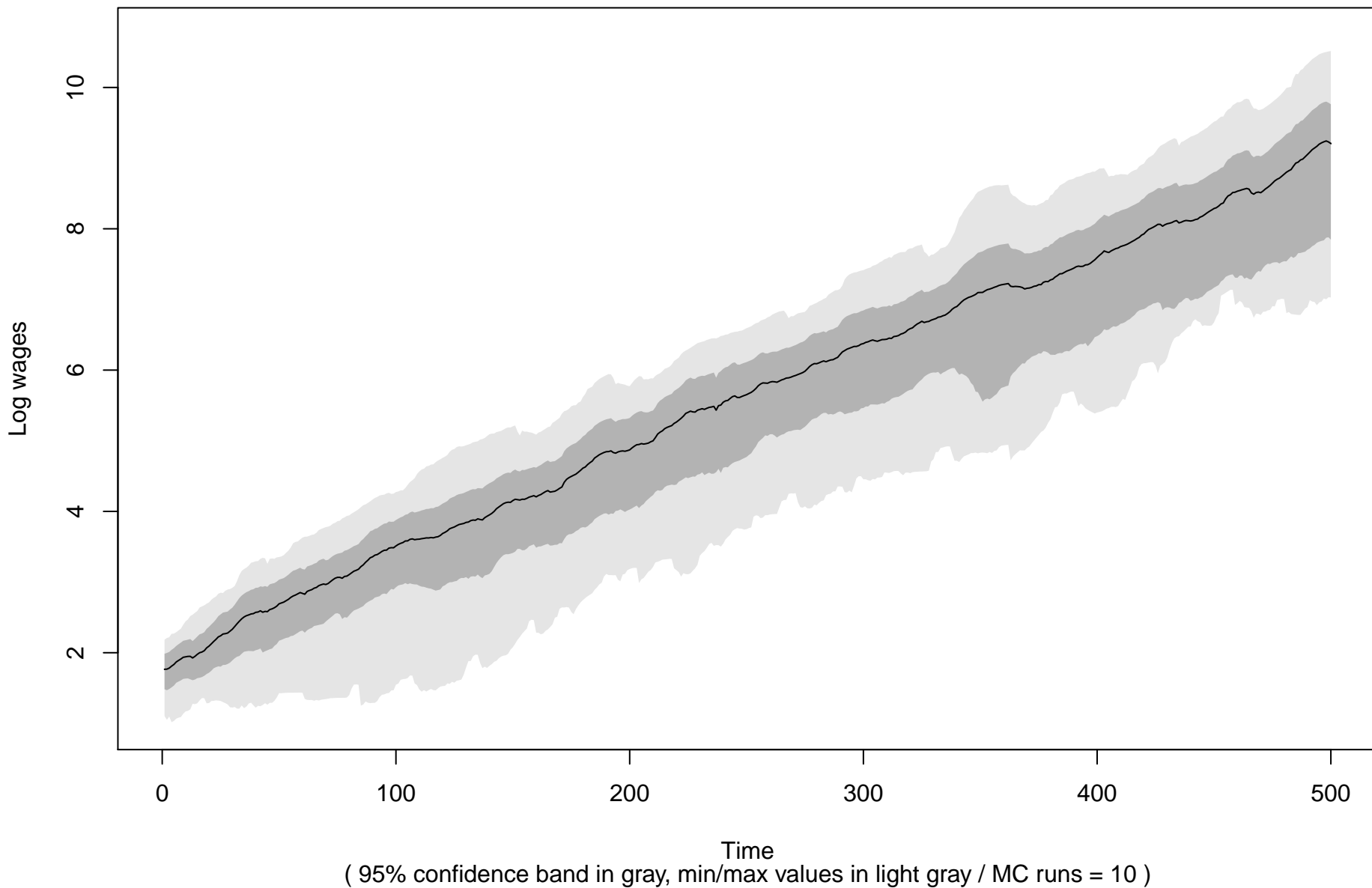
Wage share (all experiments)

Total real wages on GDP

Free entry

Time
(MC runs = 10)

Wage share (Free entry)

Total real wages on GDP

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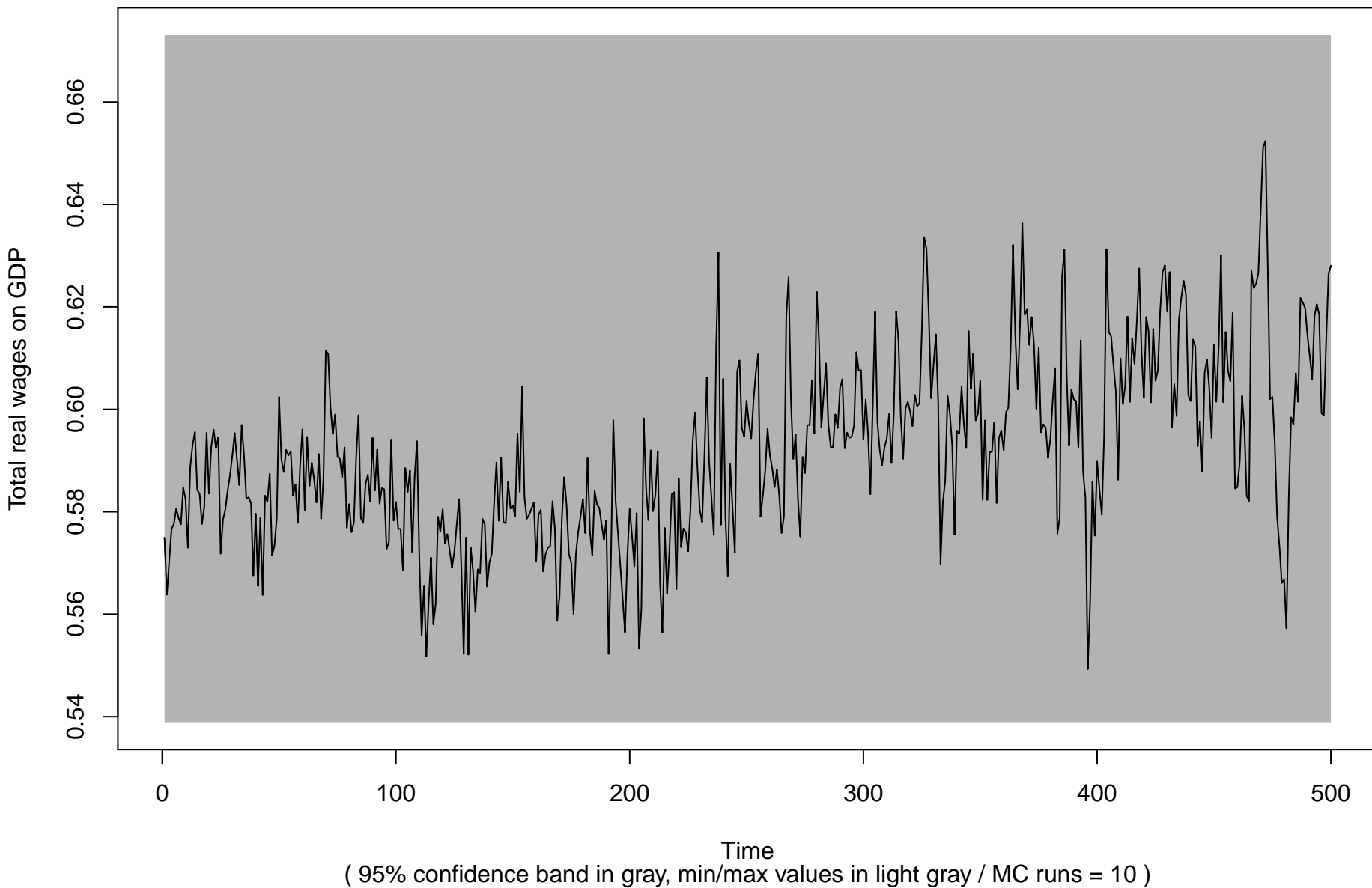
Innovation and imitation (all experiments)

Share of innovating and imitating firms

Free entry

Innovation

Imitation

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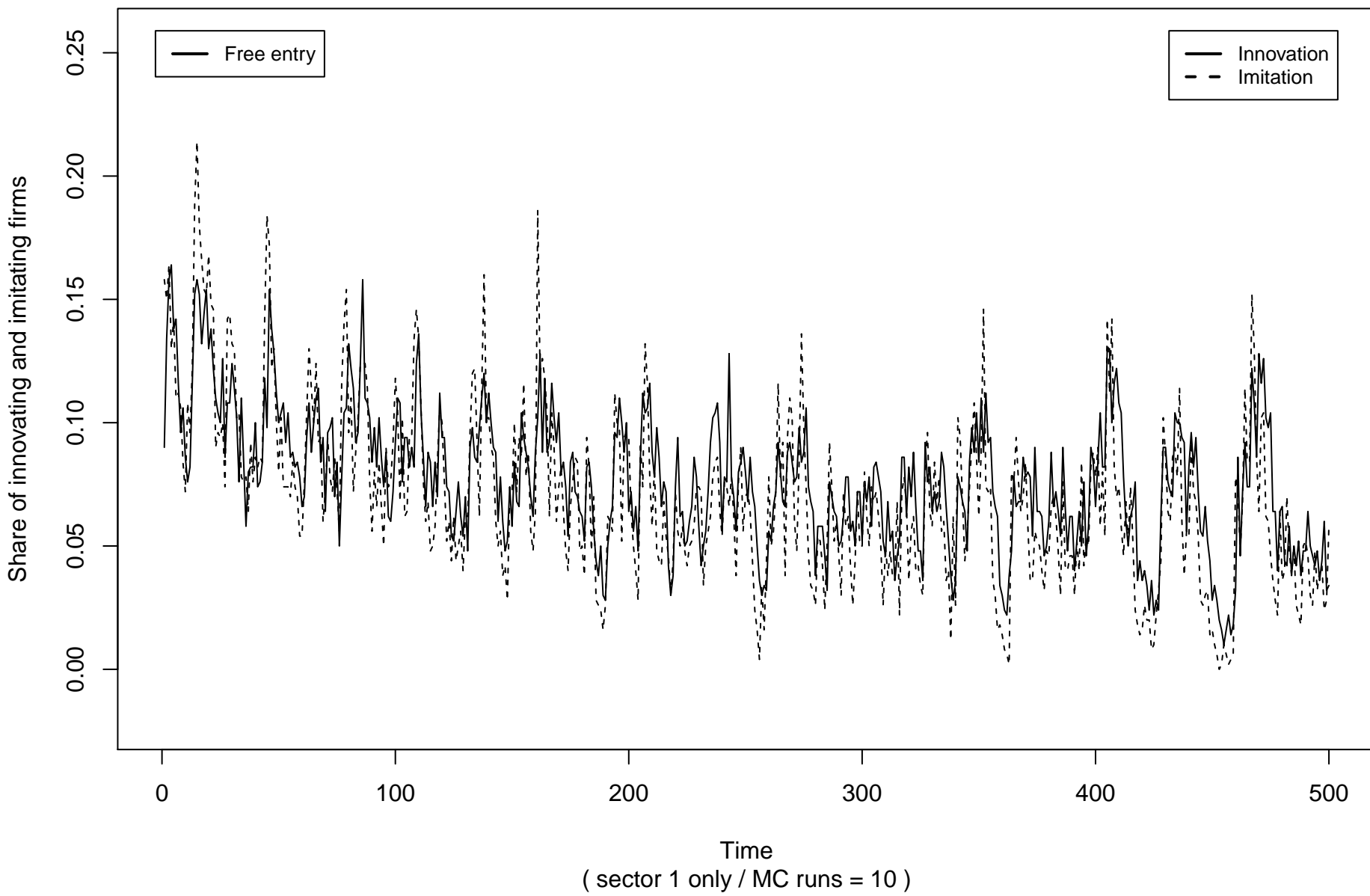
Innovation and imitation (Free entry)

Share of innovating and imitating firms

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

Legend:
— Innovation
-- Imitation
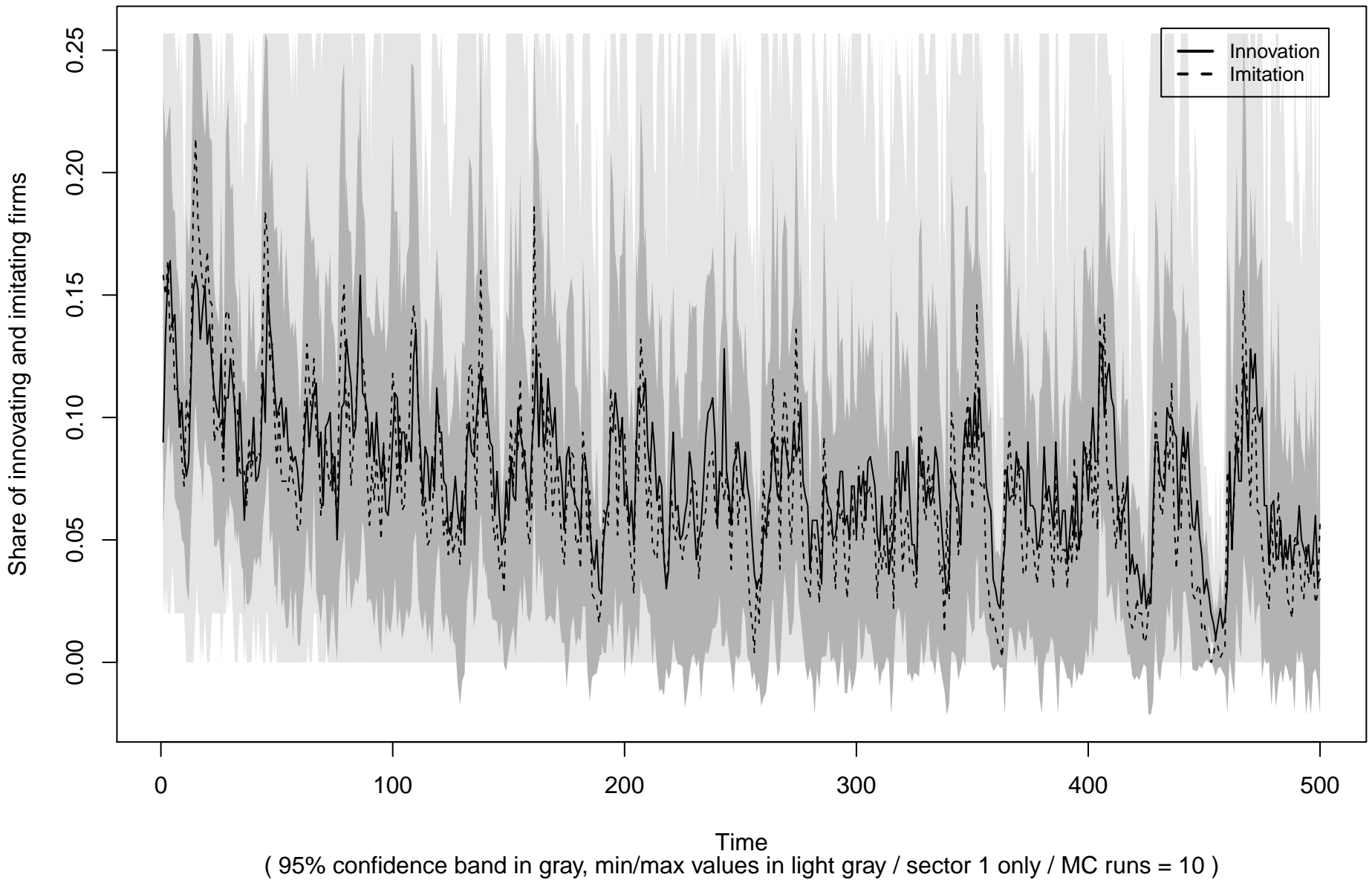
Net entry of firms trend (all experiments)

Time
(MC runs = 10)
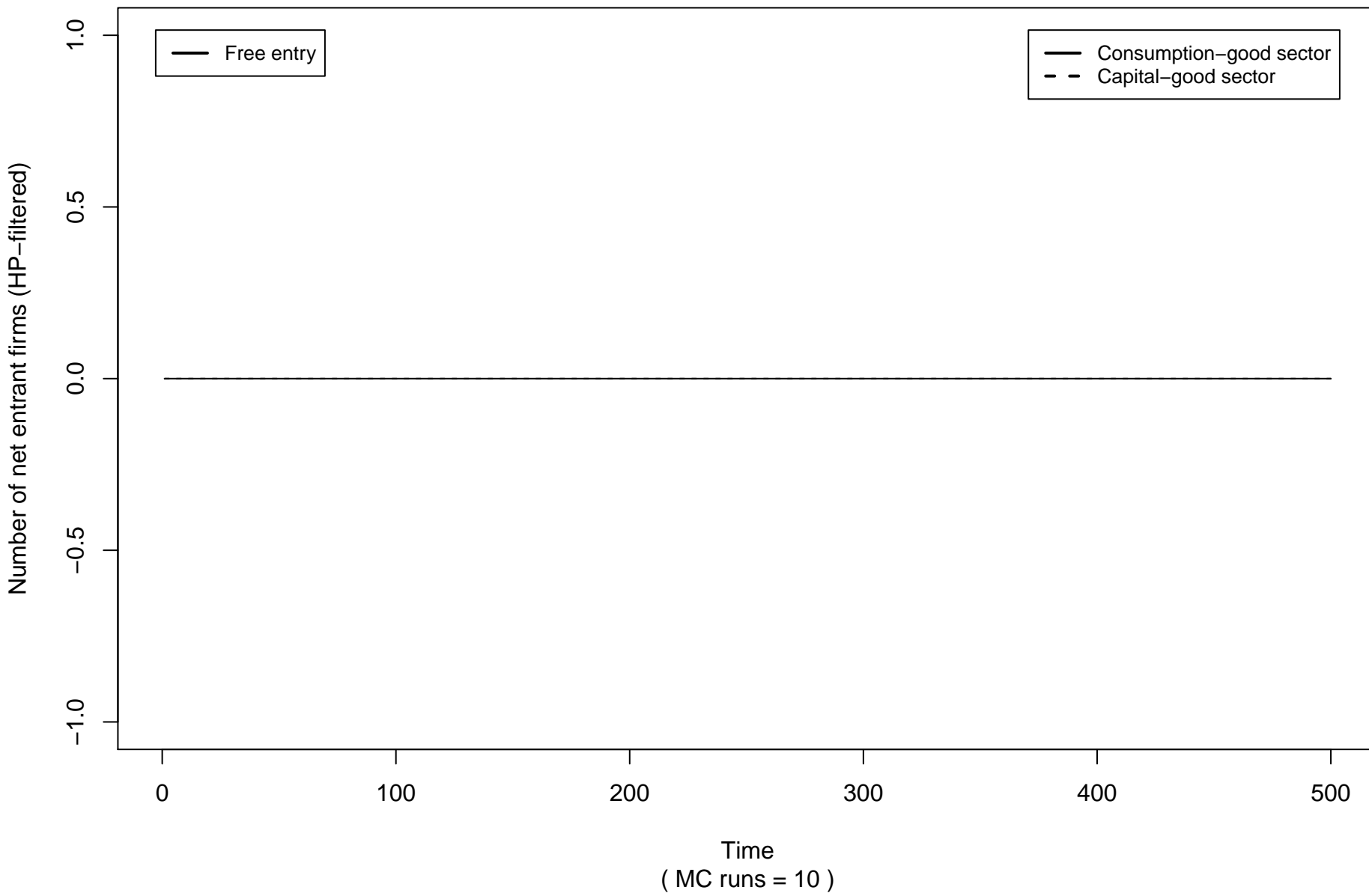
Net entry of firms trend (Free entry)

Number of net entrant firms (HP–filtered)

Consumption–good sector
Capital–good sector

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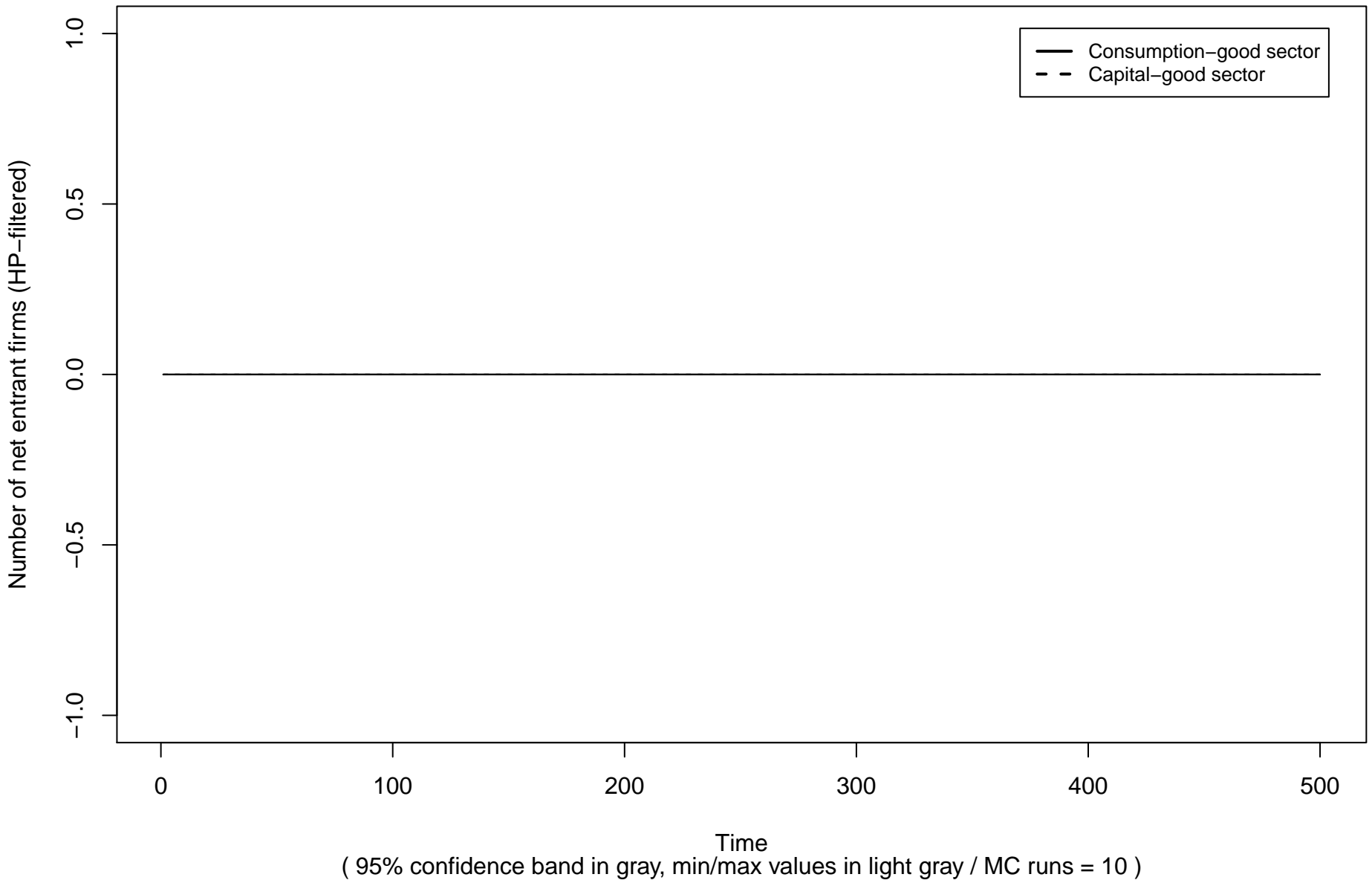
Market concentration (all experiments)

Standardized Herfindahl–Hirschman index

Time
(Sector 2 only / MC runs = 10)
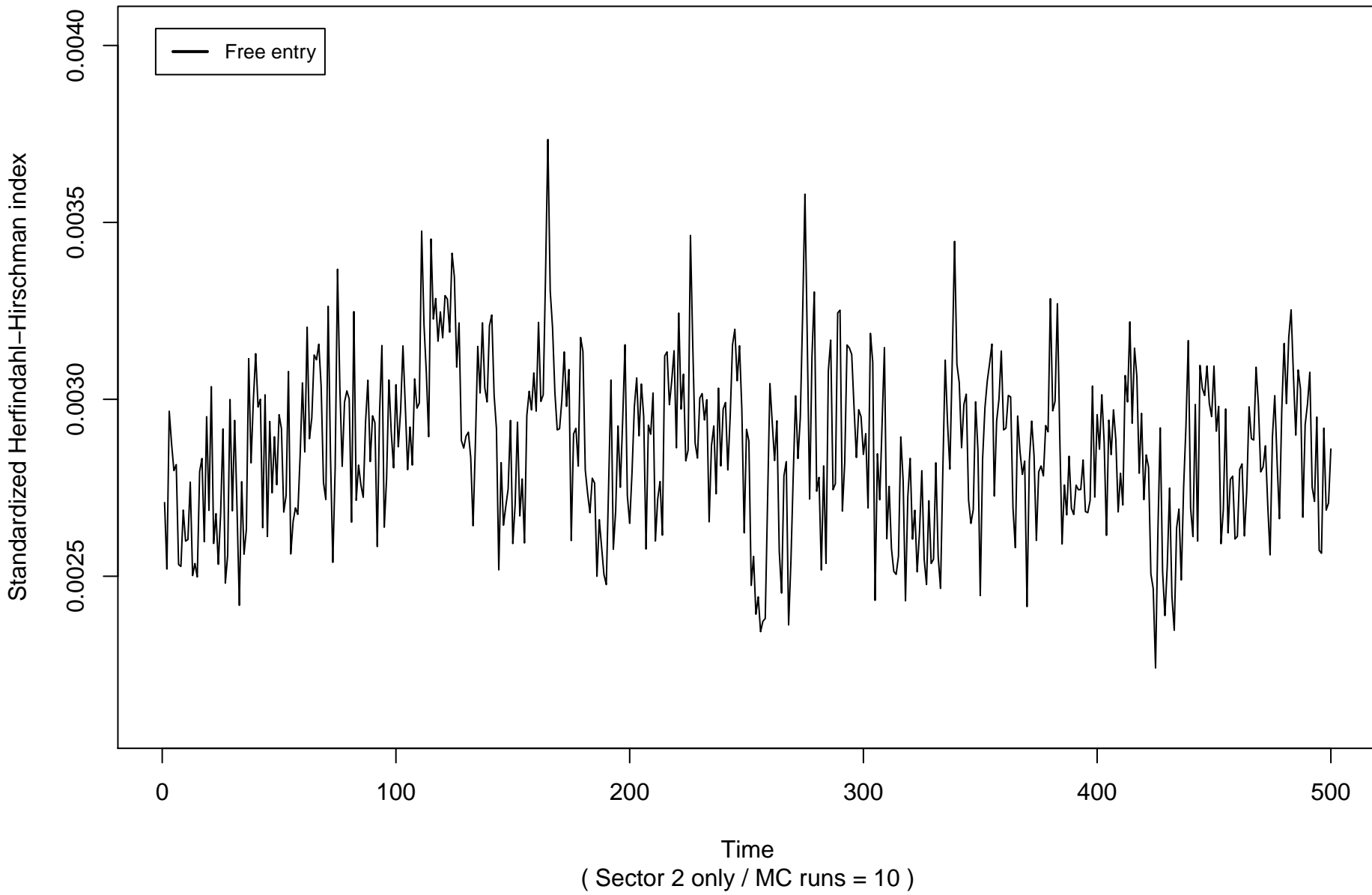
Free entry

Market concentration (Free entry)

Standardized Herfindahl–Hirschman index

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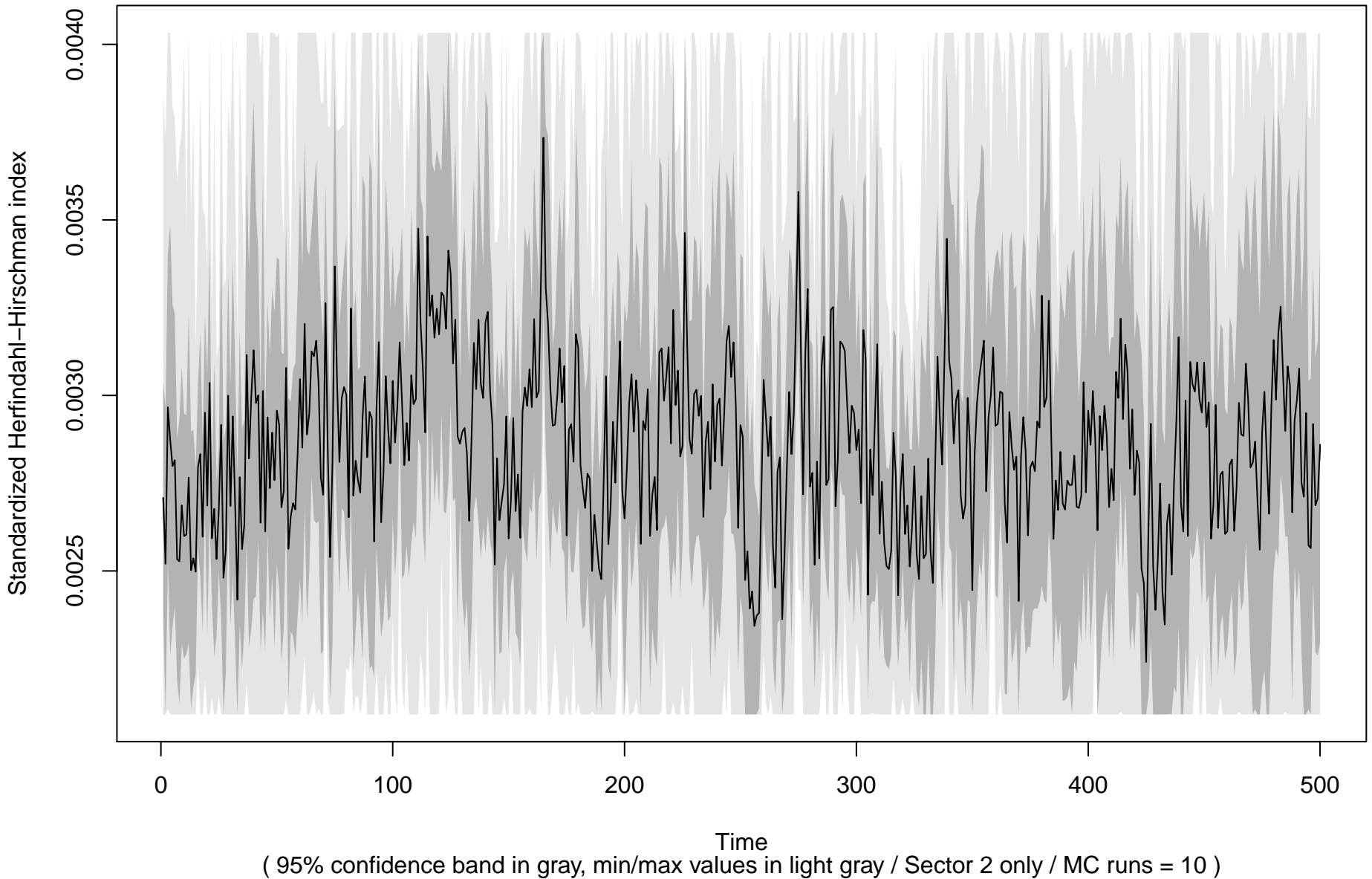
Mark−up average (all experiments)

Weighted average mark−up rate

Free entry

Time
(Sector 2 only / MC runs = 10)
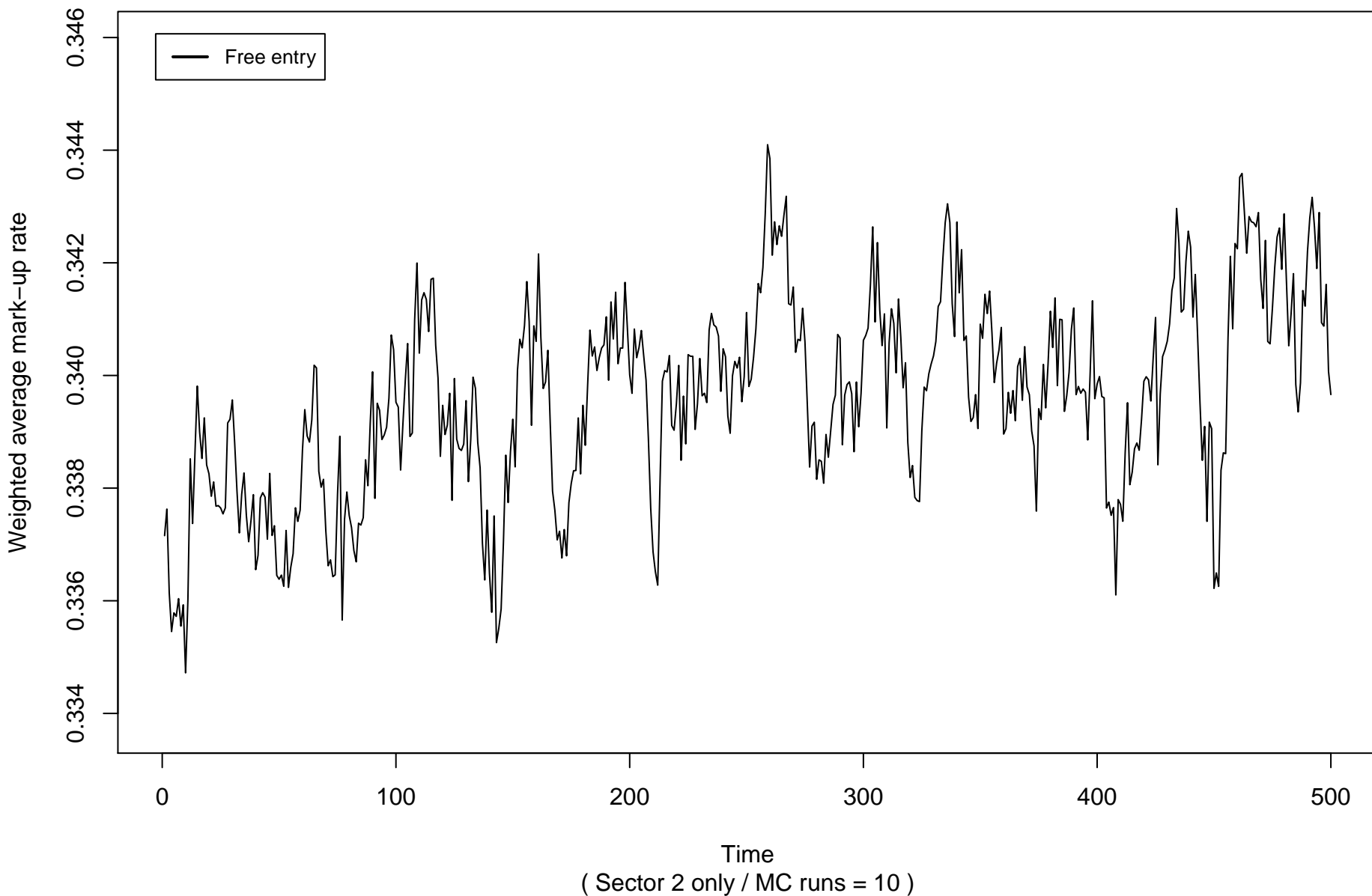
Mark−up average (Free entry)

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 (Free entry)

Filtered series vs. Time

Legend:
- GDP (black)
- Consumption (blue)
- Investment (red)
- Productivity (orange)

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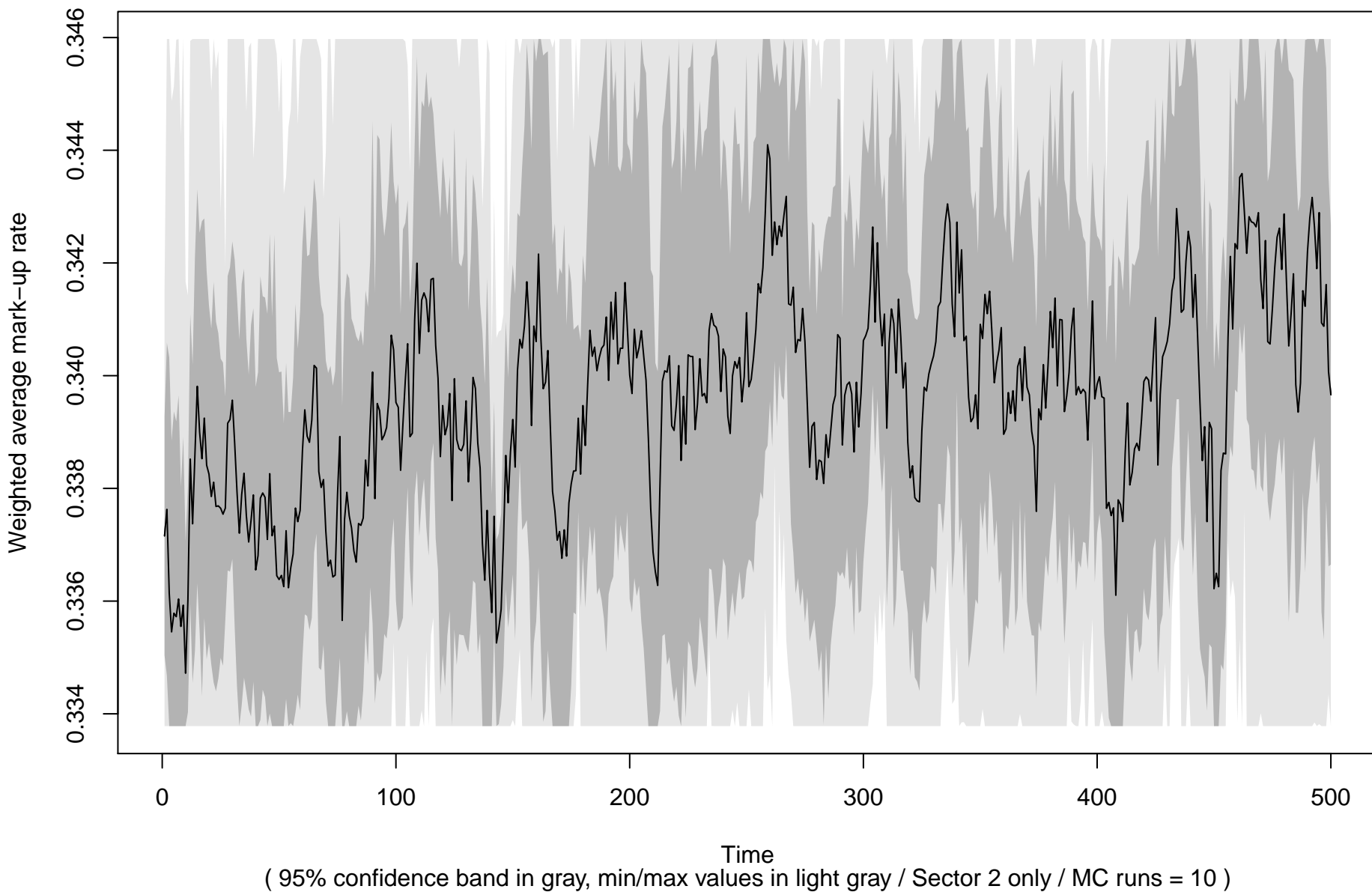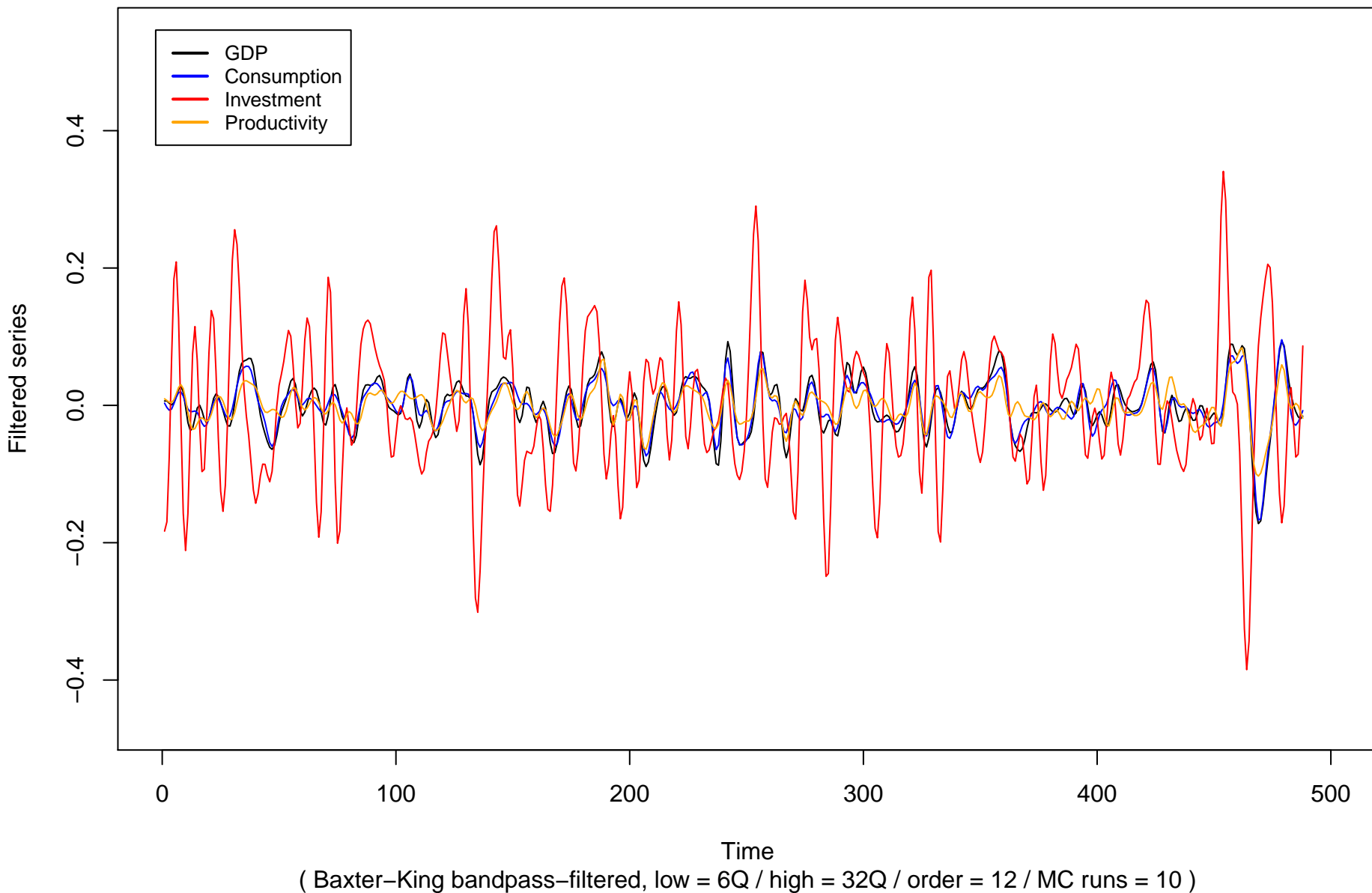
Shimer puzzle (Free entry)

Legend:
- Productivity
- Unemployment
- Vacancy

Filtered series

Time
(Baxter–King bandpass–filtered, low = 6Q / high = 32Q / order = 12 / MC runs = 10)
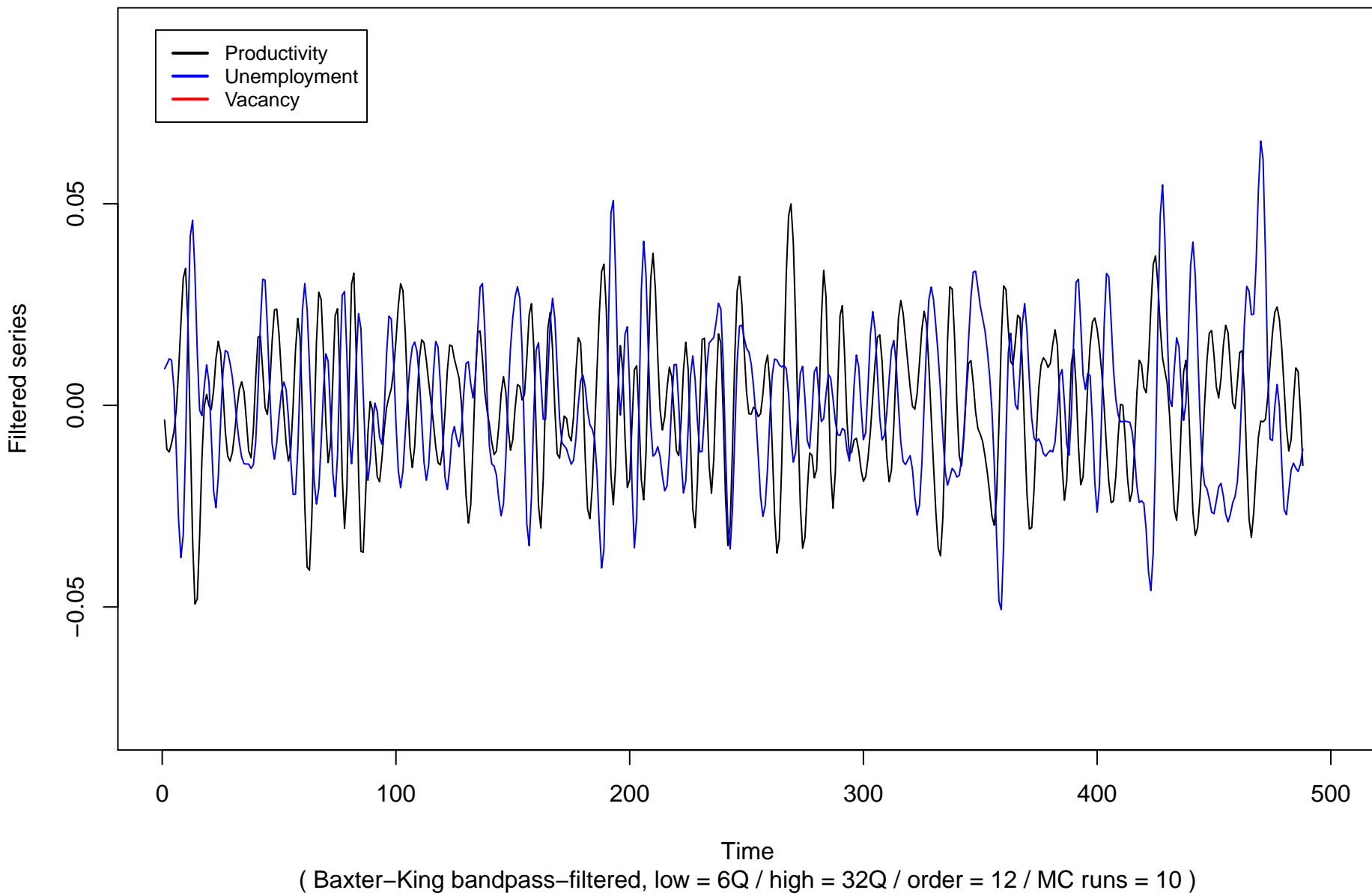
Net entry dynamics and business cycle (Free entry)

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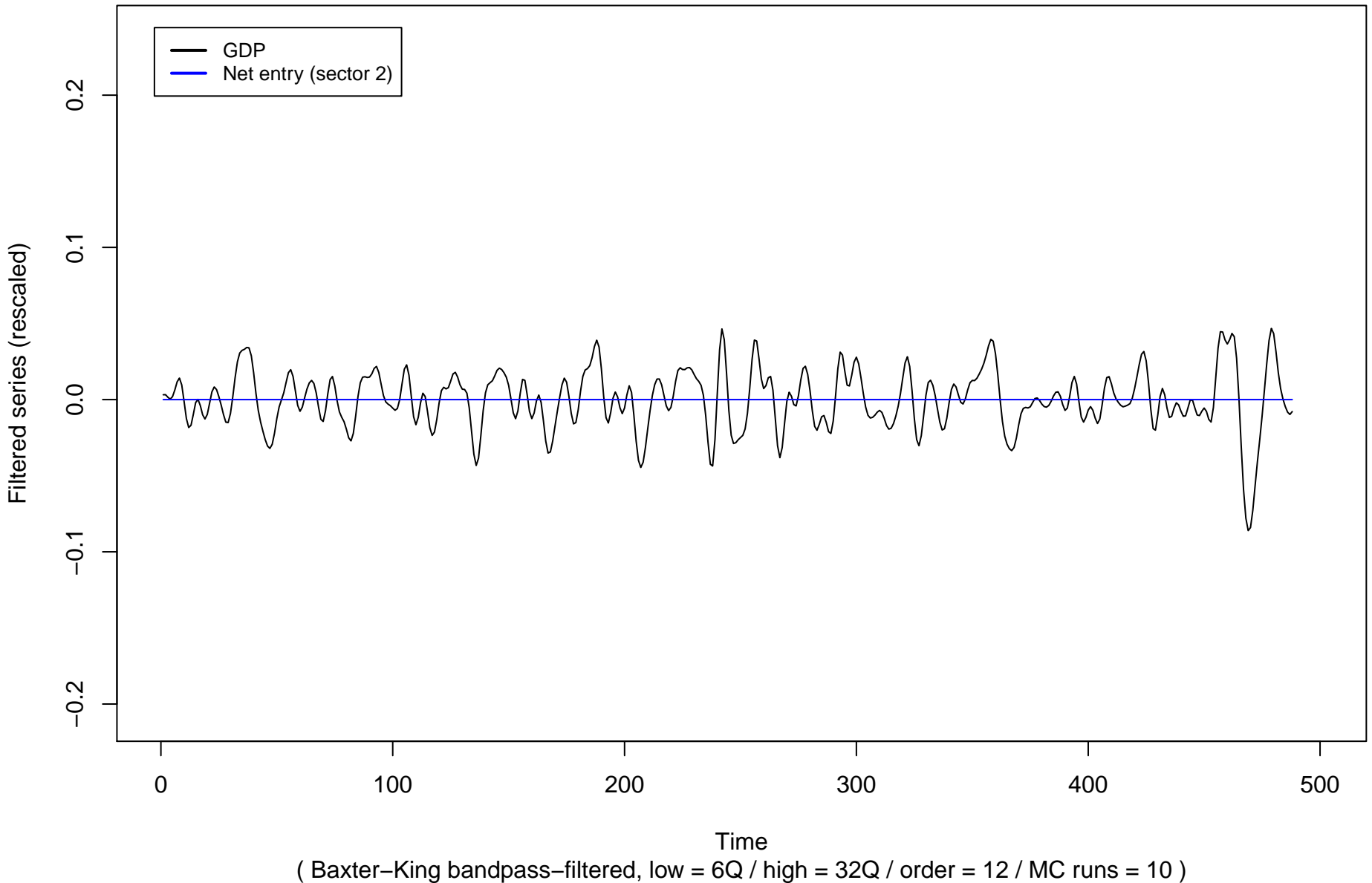
Key statistics and unit roots tests for cycles (Free entry)

	GDP (output)	Consumption	Investment	Product.	Real wage
avg. growth rate	0.01346	0.01363	0.005949	0.01325	0.01357
(s.e.)	0.0006867	0.0006873	0.006223	0.0005486	0.0006011
ADF test (logs)	−2.541	−2.306	−6.694	−2.462	−2.47
(s.e.)	0.1892	0.2185	0.1637	0.2334	0.1955
(p−val.)	0.3715	0.4698	0.01	0.4106	0.3976
(s.e.)	0.06317	0.07538	0	0.08084	0.06928
ADF test (bpf)	−5.659	−5.371	−6.775	−5.865	−6.029
(s.e.)	0.1151	0.1214	0.1248	0.1997	0.2394
(p−val.)	0.01	0.01	0.01	0.01	0.01
(s.e.)	0	0	0	0	0
s.d. (bpf)	0.09009	0.07252	1.498	0.0621	0.06929
(s.e.)	0.002544	0.002775	0.06159	0.002804	0.004369
relative s.d. (GDP)	1	0.805	16.63	0.6893	0.7691

(bpf: Baxter−King bandpass−filtered series, low = 6Q / high = 32Q / order = 12 / MC runs = 10 / period = 301 − 600)
(ADF test H0: there are unit roots / non−stationary at 5% level)

Correlation structure for GDP (Free entry)

	−4	−3	−2	−1	0	1	2	3	4
GDP (output)	−0.01771	0.2495	0.5896	0.8819	1	0.8819	0.5896	0.2495	−0.01771
(s.e.)	0.04158	0.03687	0.02246	0.00675	1.17e−17	0.00675	0.02246	0.03687	0.04158
(p−val.)	0.08245	0.0006487	1.49e−09	5.384e−16	NA	5.384e−16	1.49e−09	0.0006487	0.08245
Consumption	0.09414	0.3119	0.5846	0.8269	0.938	0.8534	0.6085	0.2964	0.02125
(s.e.)	0.0337	0.03226	0.02239	0.01017	0.003932	0.01076	0.02816	0.04466	0.05065
(p−val.)	0.09463	2.573e−05	1.581e−09	4.055e−14	2.269e−18	4.954e−14	7.941e−09	0.000457	0.1019
Investment	−0.3098	−0.3995	−0.3976	−0.259	−0.01023	0.2543	0.4274	0.455	0.3628
(s.e.)	0.02822	0.02627	0.03723	0.04981	0.0518	0.04234	0.03128	0.02782	0.02532
(p−val.)	9.624e−06	3.435e−07	6.617e−06	0.002902	0.0837	0.001305	7.412e−07	1.422e−07	7.072e−07
Net investment	−0.2382	−0.3232	−0.3271	−0.2065	0.01465	0.2477	0.3939	0.405	0.3083
(s.e.)	0.0261	0.02618	0.04216	0.05729	0.0593	0.04837	0.03812	0.03821	0.03658
(p−val.)	9.417e−05	3.297e−06	0.00012	0.005666	0.03545	0.001395	8.777e−06	6.771e−06	7.572e−05
Change in inventories	−0.2955	−0.1926	0.02848	0.268	0.4042	0.3658	0.2047	0.02702	−0.07266
(s.e.)	0.03371	0.03073	0.01691	0.02309	0.0316	0.02413	0.0169	0.02722	0.03071
(p−val.)	6.308e−05	0.002599	0.9972	9.613e−06	1.445e−06	4.308e−07	2.101e−05	0.7796	0.1582
Unemployment rate	0.2696	0.3103	0.2347	0.05352	−0.1593	−0.3034	−0.3261	−0.2419	−0.1182
(s.e.)	0.05341	0.04063	0.04169	0.05385	0.0648	0.071	0.07491	0.07577	0.06979
(p−val.)	7.826e−06	0.0001534	0.001742	0.03052	0.02866	0.0003657	4.607e−06	9.351e−06	0.007717
Productivity	0.2058	0.407	0.6156	0.7631	0.7868	0.6637	0.4398	0.1903	−0.01575
(s.e.)	0.05945	0.05481	0.04145	0.02787	0.03134	0.04499	0.05401	0.05336	0.04238
(p−val.)	0.001032	0.0001057	2.046e−07	7.499e−10	1.569e−09	1.975e−07	4.628e−05	0.01289	0.3611
Mark−up (sector 2)	0.2138	0.1751	0.09456	−0.009931	−0.1084	−0.174	−0.1973	−0.186	−0.1549
(s.e.)	0.04925	0.03569	0.02808	0.02951	0.03333	0.0348	0.03405	0.03376	0.03365
(p−val.)	0.003401	0.004447	0.1787	0.5613	0.1021	0.01219	0.003659	0.005981	0.01074
Total firm debt	0.2654	0.1646	0.04996	−0.05429	−0.1312	−0.1746	−0.1903	−0.1907	−0.1853
(s.e.)	0.03374	0.05055	0.06814	0.07825	0.07579	0.06299	0.0492	0.04379	0.04451
(p−val.)	0.0001912	0.03998	0.007017	0.00707	0.002393	0.001716	0.002582	0.00379	0.01434
Liquidity−to−sales ratio	0.1529	−0.05917	−0.3161	−0.5534	−0.6986	−0.7013	−0.5762	−0.3795	−0.1812
(s.e.)	0.05032	0.04097	0.03141	0.02512	0.0208	0.01937	0.02463	0.03318	0.04037
(p−val.)	0.01389	0.1474	1.812e−05	7.673e−09	1.341e−10	6.838e−11	4.253e−09	4.178e−06	0.01677
Bankruptcy rate	0.367	0.4035	0.3223	0.1485	−0.03955	−0.1591	−0.1788	−0.1309	−0.07657
(s.e.)	0.06293	0.06443	0.0662	0.06723	0.06791	0.06544	0.05592	0.04374	0.04243
(p−val.)	9.891e−05	0.000359	0.002622	0.006186	0.007271	0.006946	0.0002713	0.002163	0.08065

(non−rate/ratio series are Baxter−King bandpass−filtered, low = 6Q / high = 32Q / order = 12 / MC runs = 10 / period = 301 − 600)
(test H0: lag coefficient is not significant at 5% level)

Correlation structure for GDP (Free entry)

	−4	−3	−2	−1	0	1	2	3	4
GDP (output)	−0.01771	0.2495	0.5896	0.8819	1	0.8819	0.5896	0.2495	−0.01771
(s.e.)	0.04158	0.03687	0.02246	0.00675	1.17e−17	0.00675	0.02246	0.03687	0.04158
(p−val.)	0.08245	0.0006487	1.49e−09	5.384e−16	NA	5.384e−16	1.49e−09	0.0006487	0.08245
Consumption	0.09414	0.3119	0.5846	0.8269	0.938	0.8534	0.6085	0.2964	0.02125
(s.e.)	0.0337	0.03226	0.02239	0.01017	0.003932	0.01076	0.02816	0.04466	0.05065
(p−val.)	0.09463	2.573e−05	1.581e−09	4.055e−14	2.269e−18	4.954e−14	7.941e−09	0.000457	0.1019
Investment	−0.3098	−0.3995	−0.3976	−0.259	−0.01023	0.2543	0.4274	0.455	0.3628
(s.e.)	0.02822	0.02627	0.03723	0.04981	0.0518	0.04234	0.03128	0.02782	0.02532
(p−val.)	9.624e−06	3.435e−07	6.617e−06	0.002902	0.0837	0.001305	7.412e−07	1.422e−07	7.072e−07
Productivity	0.2058	0.407	0.6156	0.7631	0.7868	0.6637	0.4398	0.1903	−0.01575
(s.e.)	0.05945	0.05481	0.04145	0.02787	0.03134	0.04499	0.05401	0.05336	0.04238
(p−val.)	0.001032	0.0001057	2.046e−07	7.499e−10	1.569e−09	1.975e−07	4.628e−05	0.01289	0.3611
Net entry	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
(s.e.)	NA	NA	NA	NA	NA	NA	NA	NA	NA
(p−val.)	1	1	1	1	1	1	1	1	1
Entry	−0.1059	0.09397	0.3072	0.4732	0.5423	0.5009	0.3826	0.2418	0.1247
(s.e.)	0.05134	0.05148	0.04876	0.04368	0.03766	0.03419	0.03443	0.03622	0.03591
(p−val.)	0.1023	0.01713	0.0003381	4.268e−06	3.173e−07	3.099e−07	5.192e−06	0.0007802	0.04063
Wage	0.3467	0.5341	0.685	0.75	0.7015	0.546	0.3377	0.1348	−0.02329
(s.e.)	0.0492	0.03471	0.02121	0.0213	0.03272	0.04311	0.04819	0.04608	0.03689
(p−val.)	0.0001411	1.839e−07	1.945e−10	8.125e−11	7.145e−09	9.341e−07	0.0002318	0.0299	0.1222
Unemployment rate	0.2696	0.3103	0.2347	0.05352	−0.1593	−0.3034	−0.3261	−0.2419	−0.1182
(s.e.)	0.05341	0.04063	0.04169	0.05385	0.0648	0.071	0.07491	0.07577	0.06979
(p−val.)	7.826e−06	0.0001534	0.001742	0.03052	0.02866	0.0003657	4.607e−06	9.351e−06	0.007717
Vacancy rate	0.1923	−0.03031	−0.2811	−0.4562	−0.4846	−0.372	−0.1962	−0.05049	0.01211
(s.e.)	0.05927	0.05105	0.0524	0.06337	0.07285	0.07274	0.06379	0.05565	0.0531
(p−val.)	0.005175	0.1112	0.00199	0.0001094	0.0001772	0.001135	0.002834	0.09354	0.09098

(non−rate/ratio series are Baxter−King bandpass−filtered, low = 6Q / high = 32Q / order = 12 / MC runs = 10 / period = 301 − 600)
(test H0: lag coefficient is not significant at 5% level)

# Stationarity, i.i.d. and ergodicity tests (Free entry)

	avg.ADF	rej.ADF	avg.PP	rej.PP	avg.KPSS	rej.KPSS	avg.BDS	rej.BDS	avg.KS	rej.KS	AD	
dGDP	0.01	1.00	0.01	1.00	0.10	0.00	0.07	0.70	0.34	0.20	0.00	0
dA	0.01	1.00	0.01	1.00	0.10	0.00	0.02	0.90	0.18	0.56	0.00	0
dw	0.01	1.00	0.01	1.00	0.10	0.00	0.03	0.80	0.19	0.60	0.00	0
V	0.01	1.00	0.01	1.00	0.07	0.30	0.05	0.80	0.11	0.71	0.00	0
U	0.02	0.90	0.01	1.00	0.02	0.90	0.01	0.90	0.03	0.93	0.00	0
mu2avg	0.04	0.80	0.01	1.00	0.04	0.60	0.00	1.00	0.04	0.87	0.00	0
HH1	0.01	1.00	0.01	1.00	0.10	0.00	0.00	1.00	0.20	0.62	0.00	0
HH2	0.01	1.00	0.01	1.00	0.06	0.50	0.00	1.00	0.11	0.71	0.00	0

(average p−values for testing H0 and rate of rejection of H0 / MC runs = 10 / period = 301 − 600)
(ADF/PP H0: non−stationary, KPSS H0: stationary, BDS H0: i.i.d., KS/AD/WW H0: ergodic)
(significance = 0.05)

GDP growth
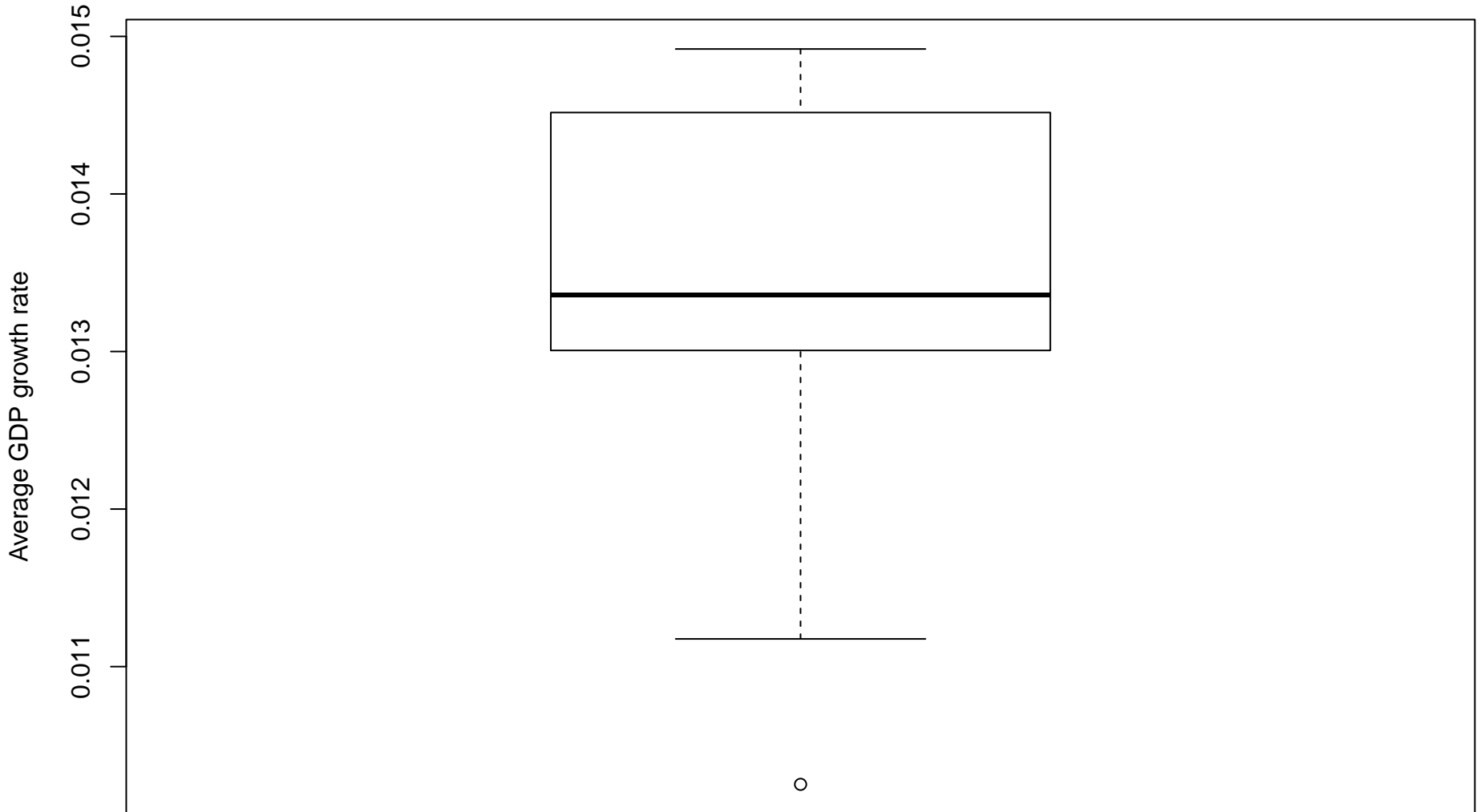
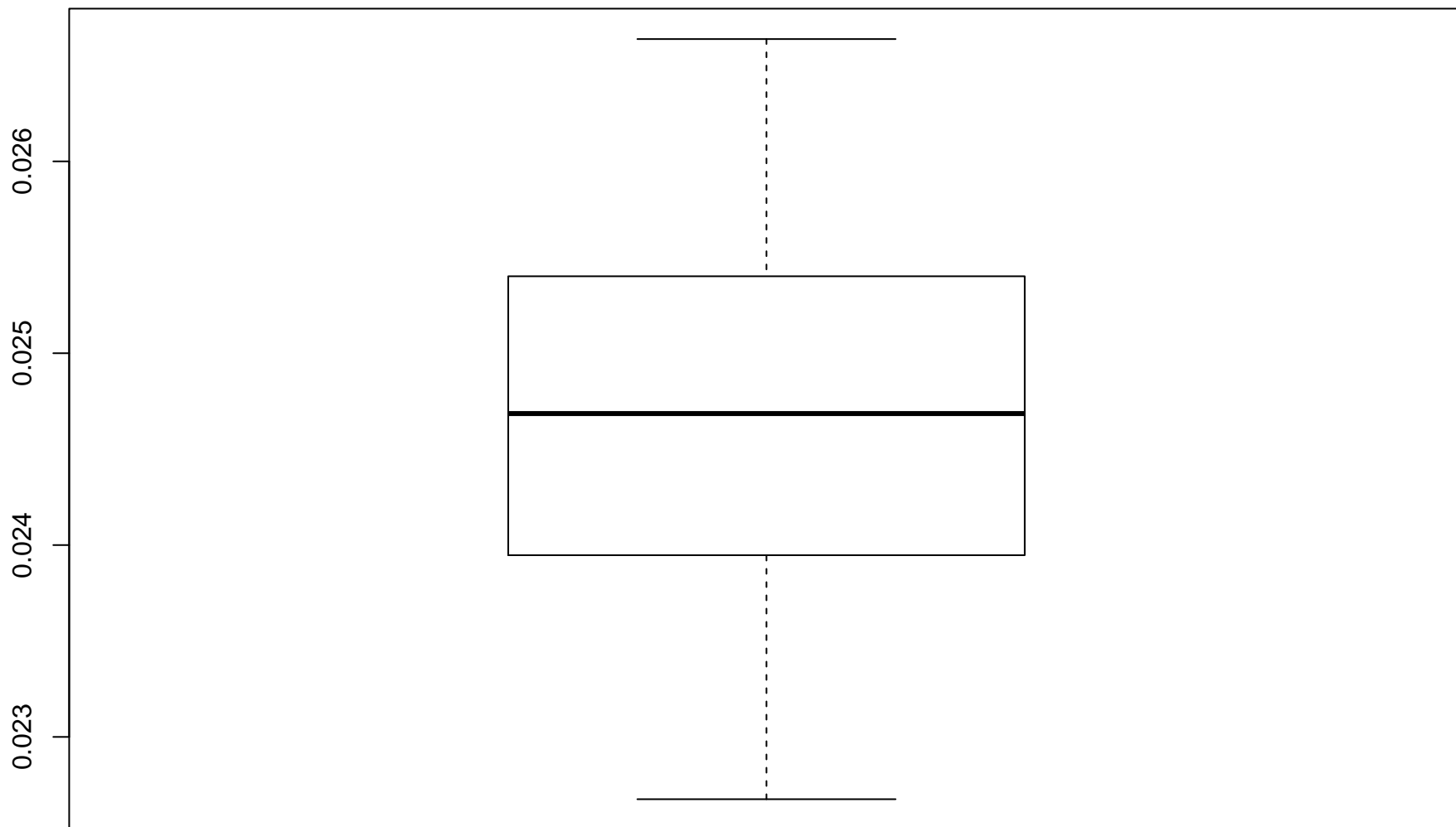(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Volatility of GDP growth

Standard deviation of GDP growth rate
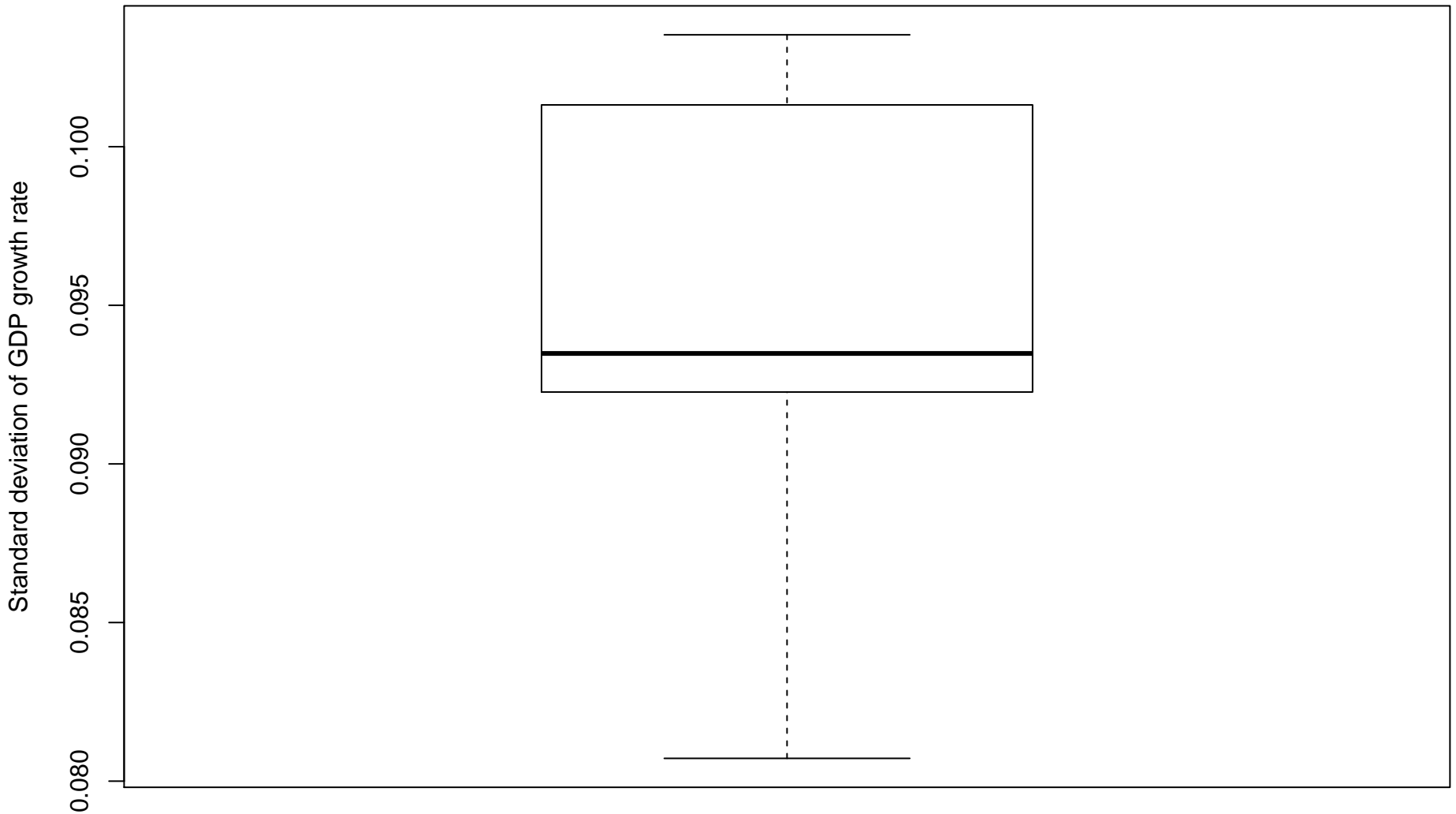
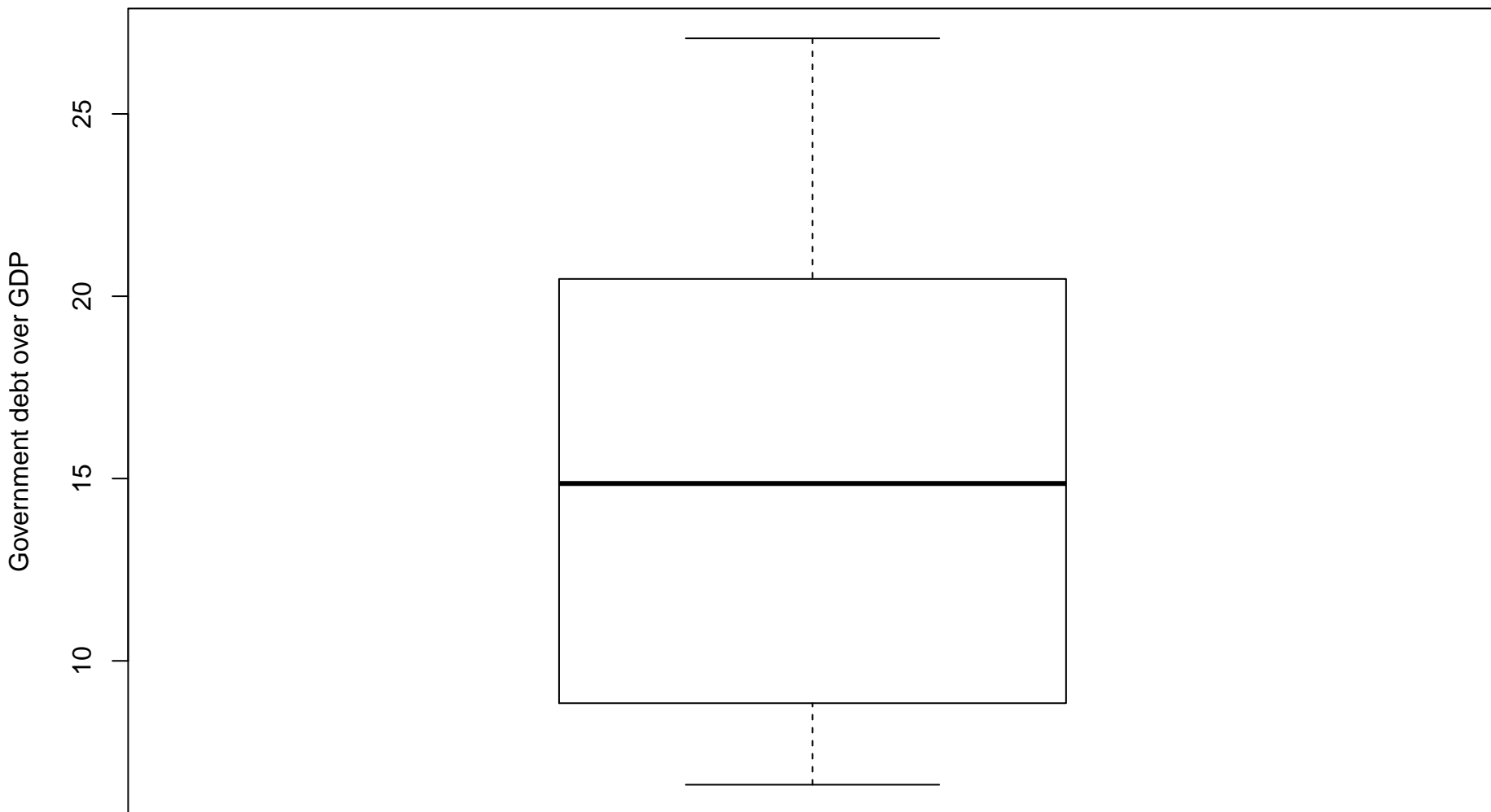(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Likelihood of GDP crises
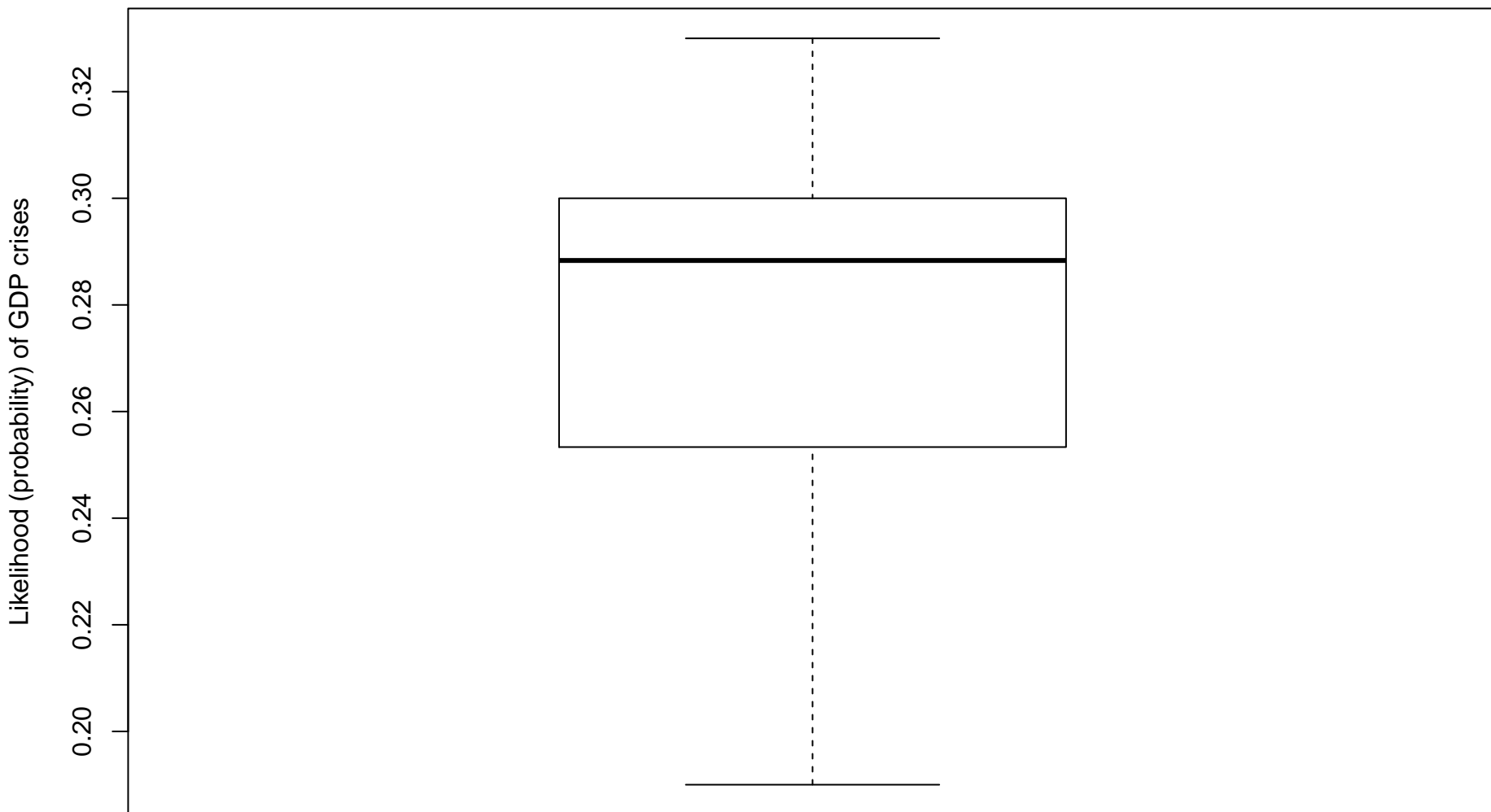
Likelihood (probability) of GDP crises

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Inflation
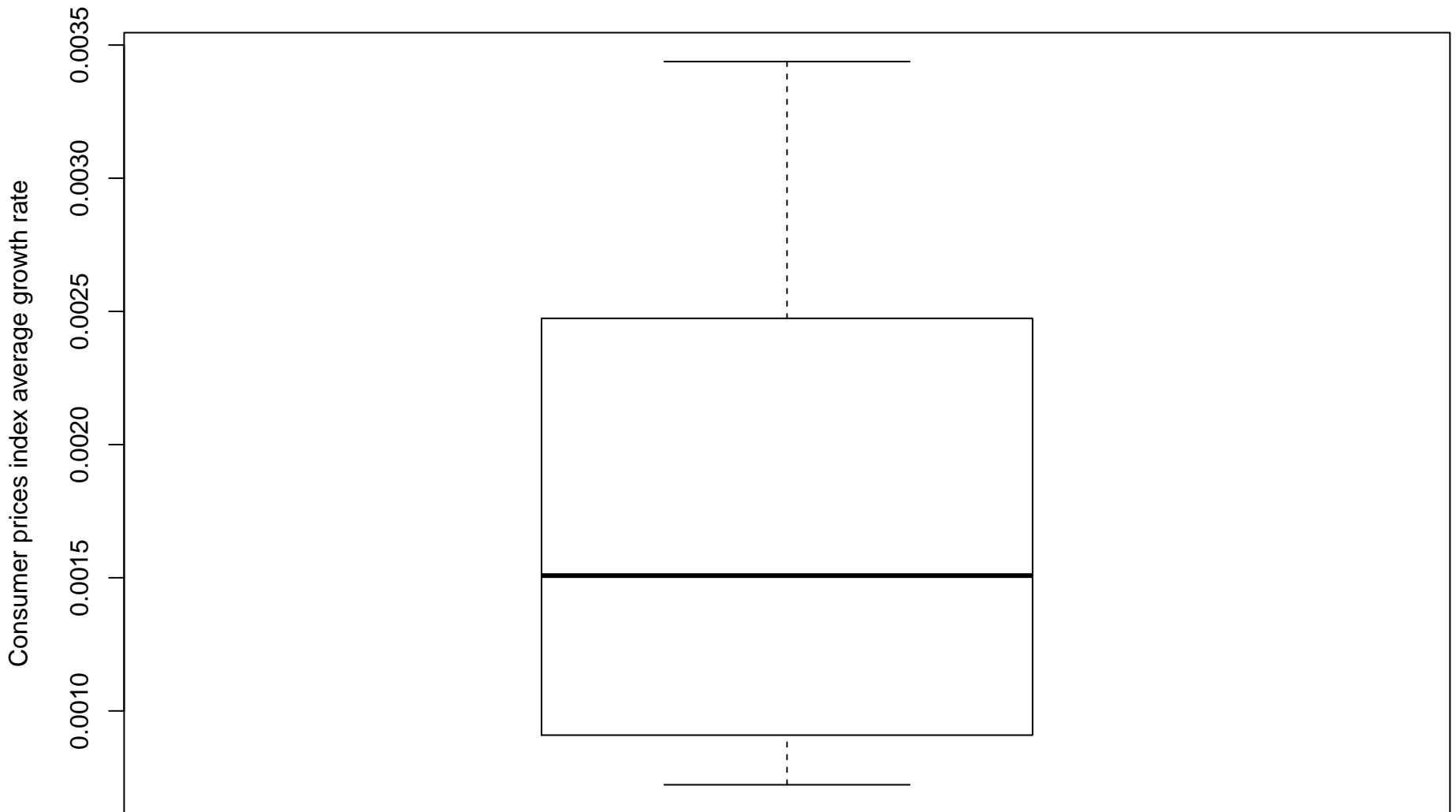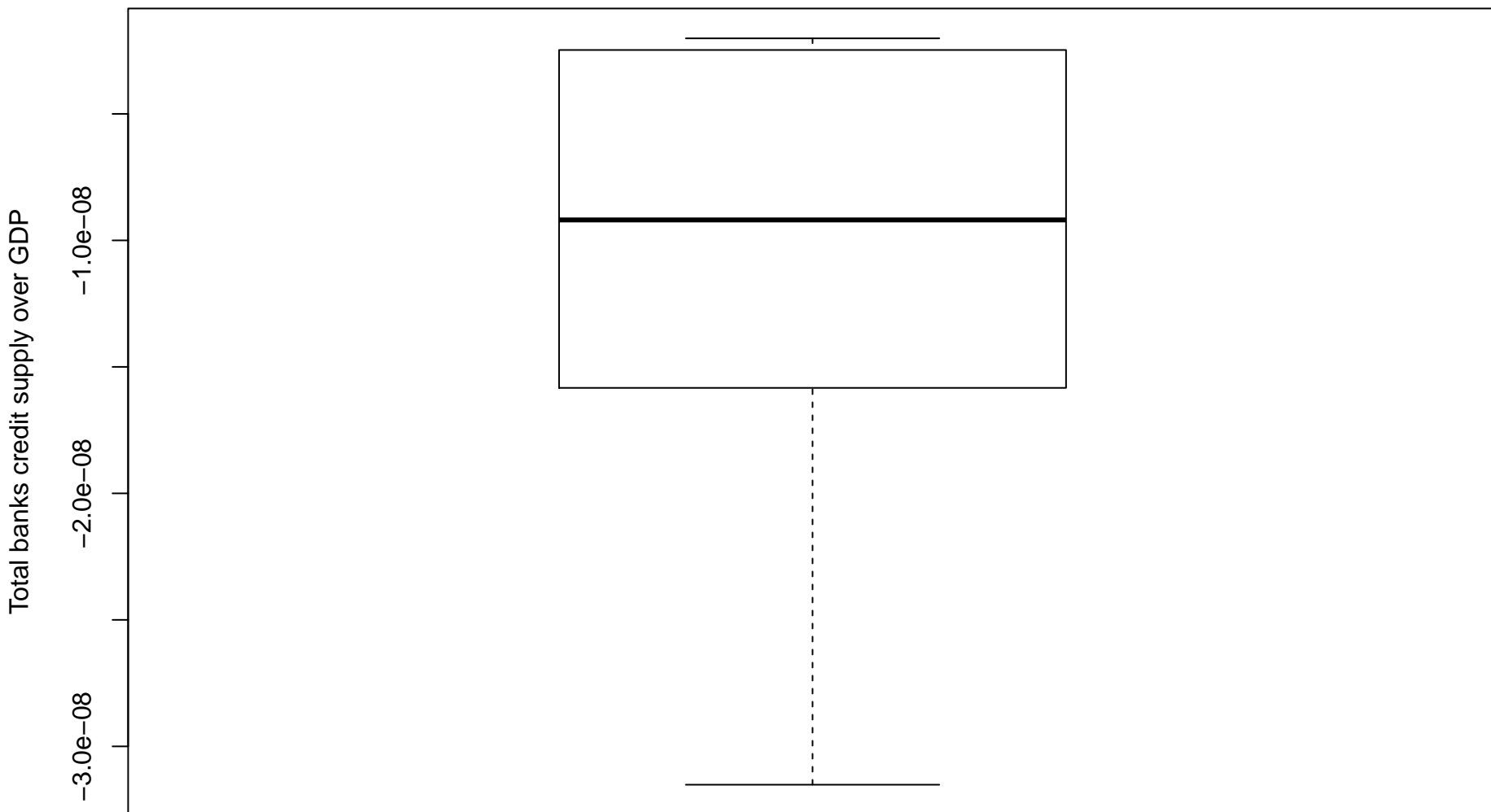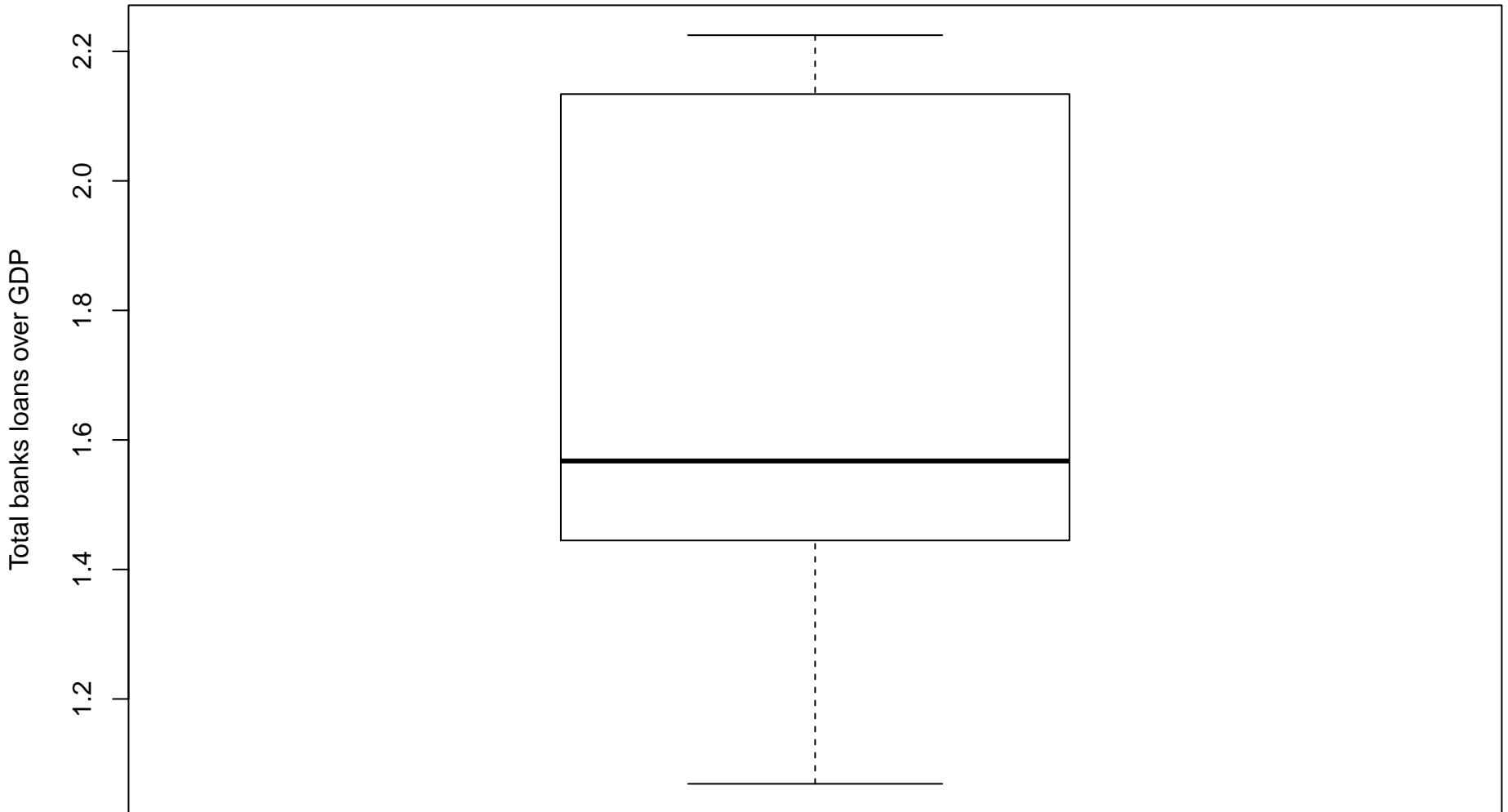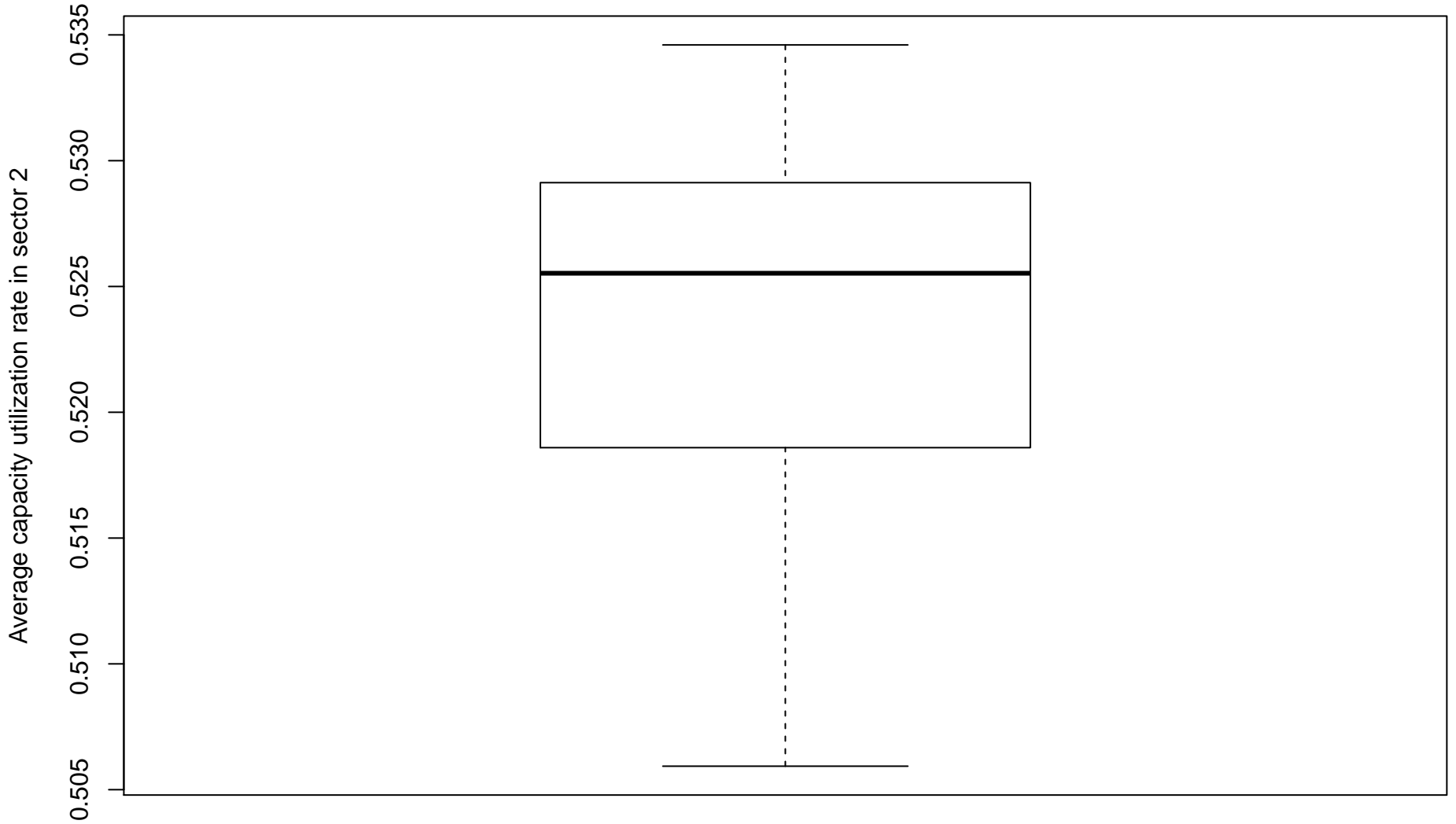

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Tax

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Government total expenditure
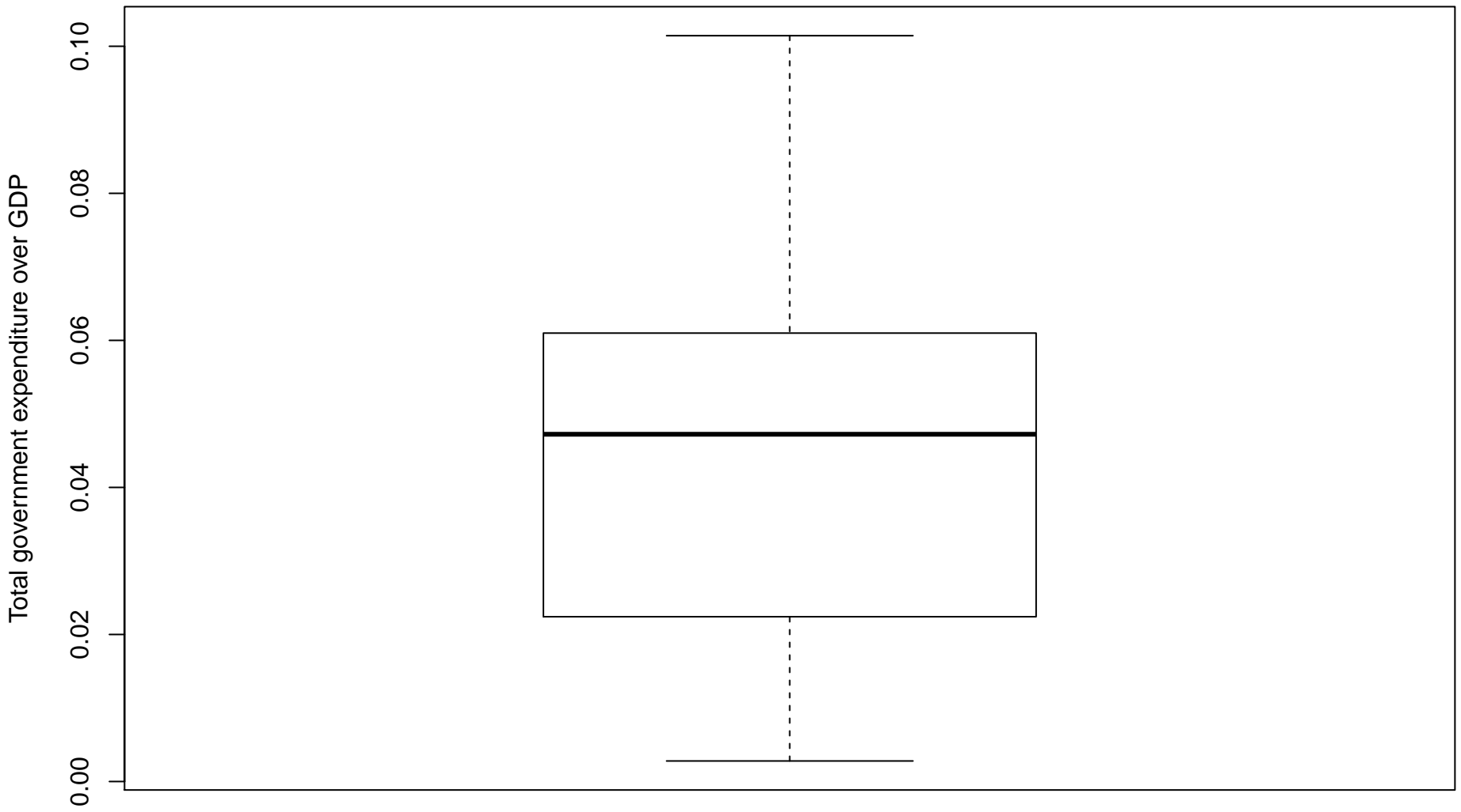
(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Government deficit
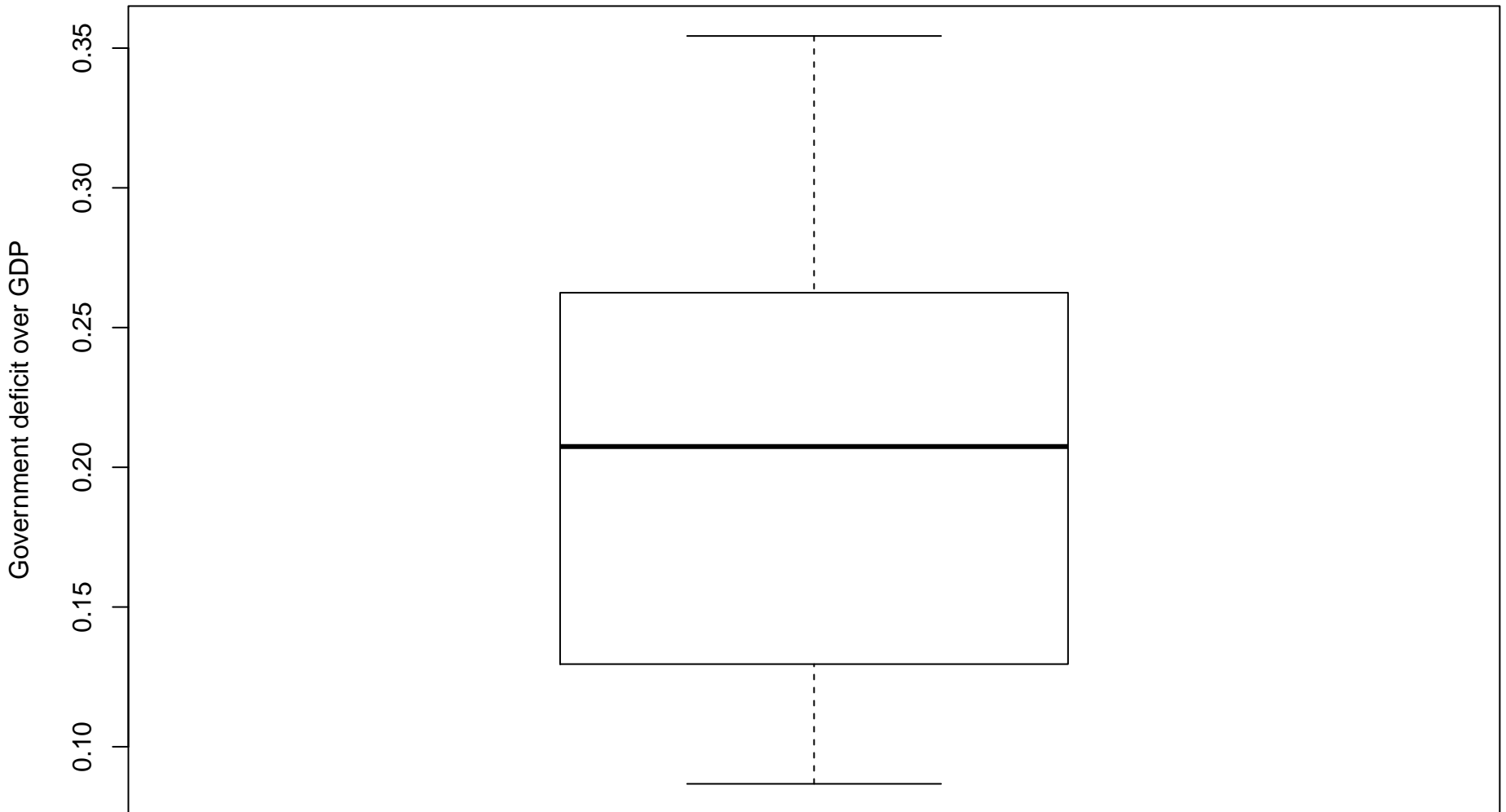
Government deficit over GDP

(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 301 – 600)

Government debt

Government debt over GDP

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Credit supply

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)
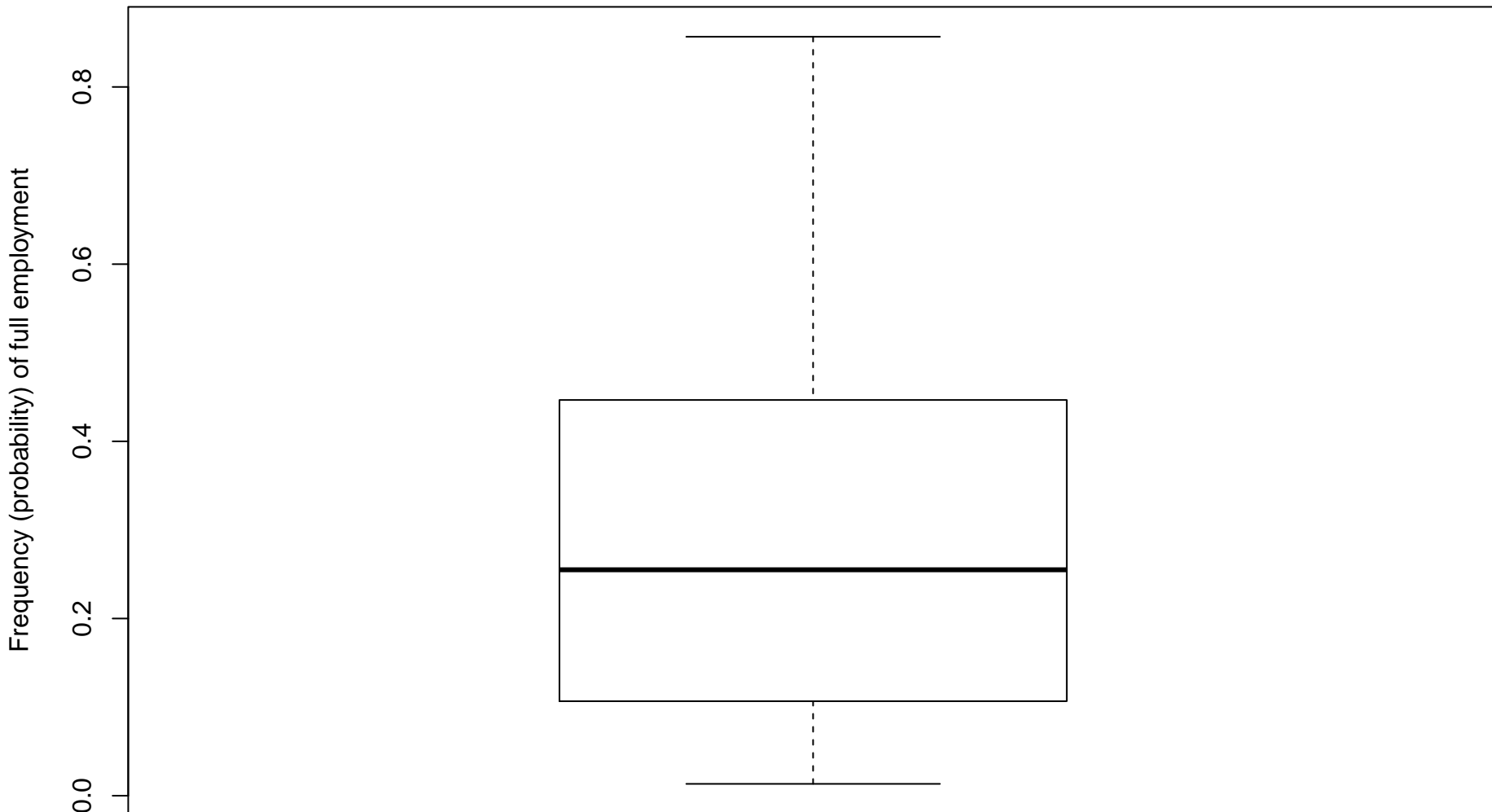
Loans

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)
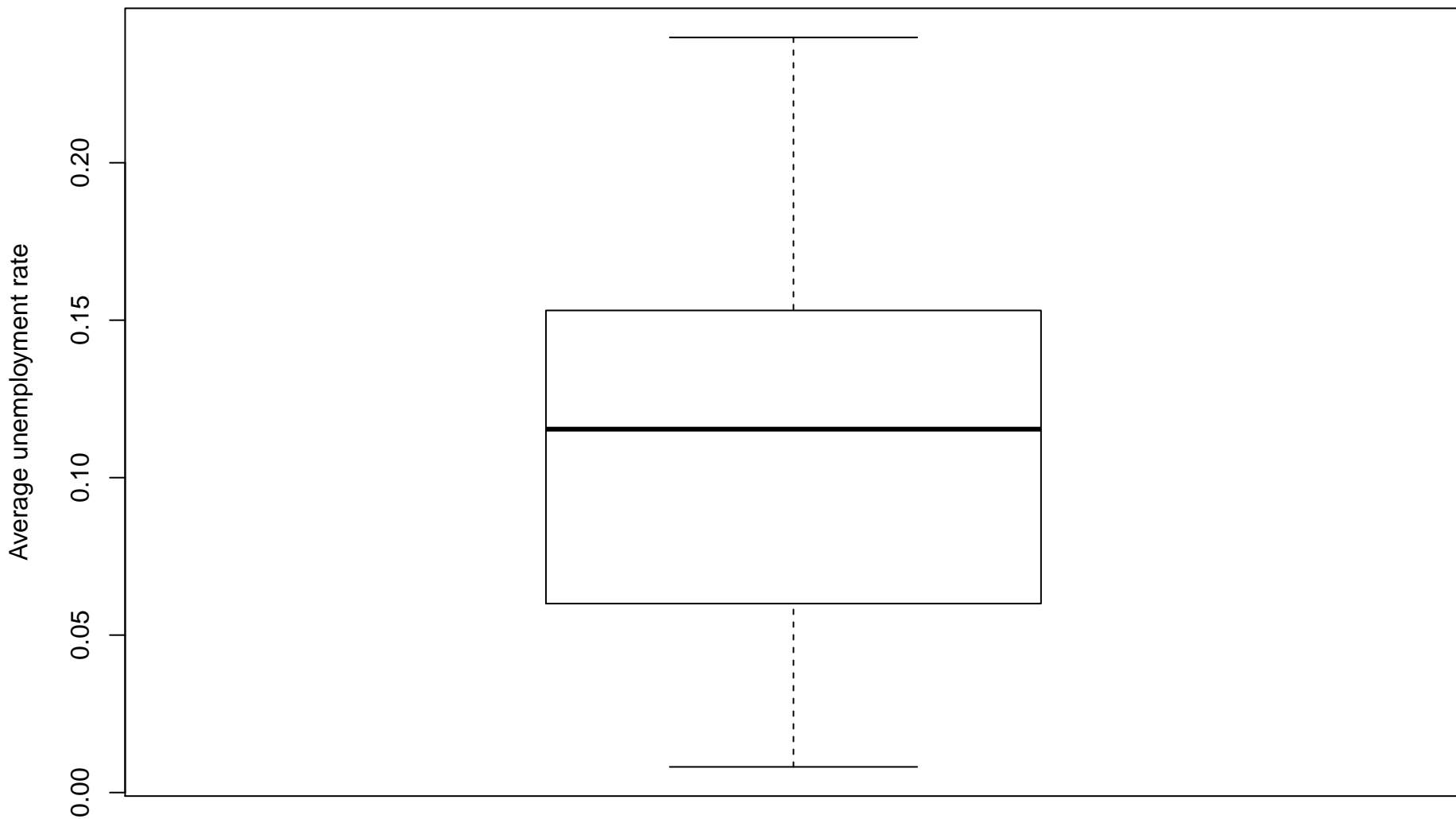
Capacity utilization

Average capacity utilization rate in sector 2

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)
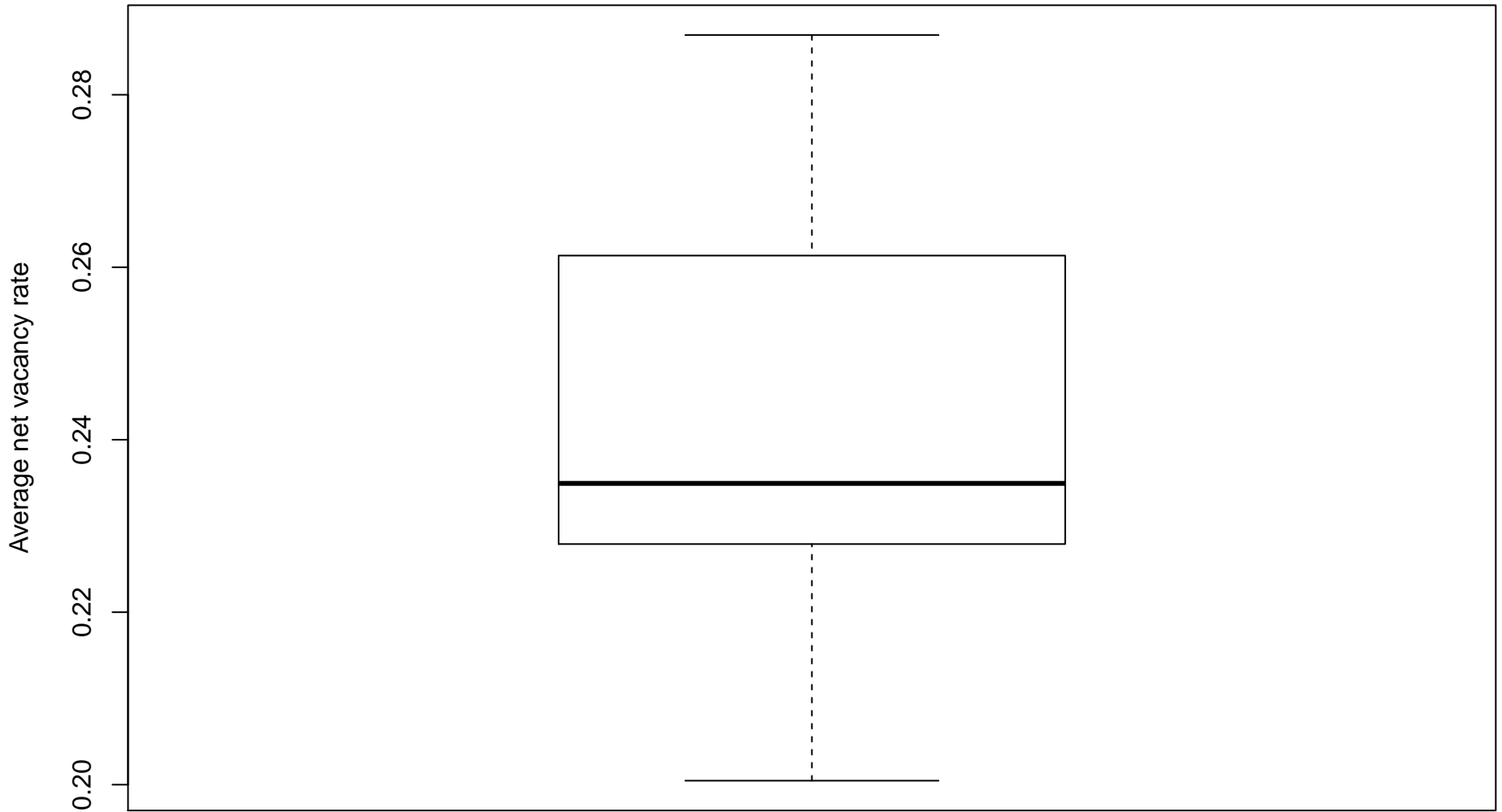
Full employment frequency

Frequency (probability) of full employment

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Unemployment
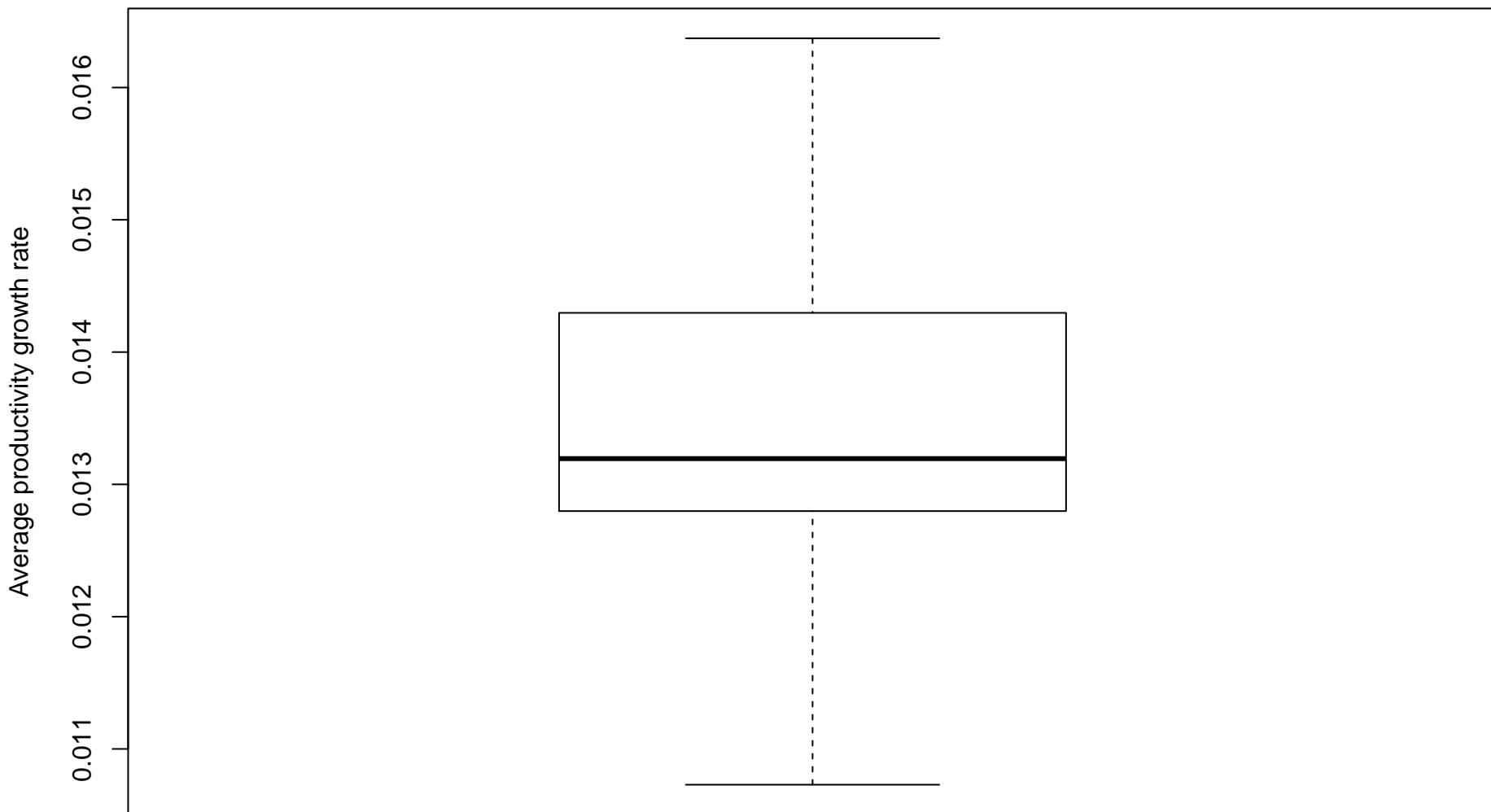

Average unemployment rate

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)
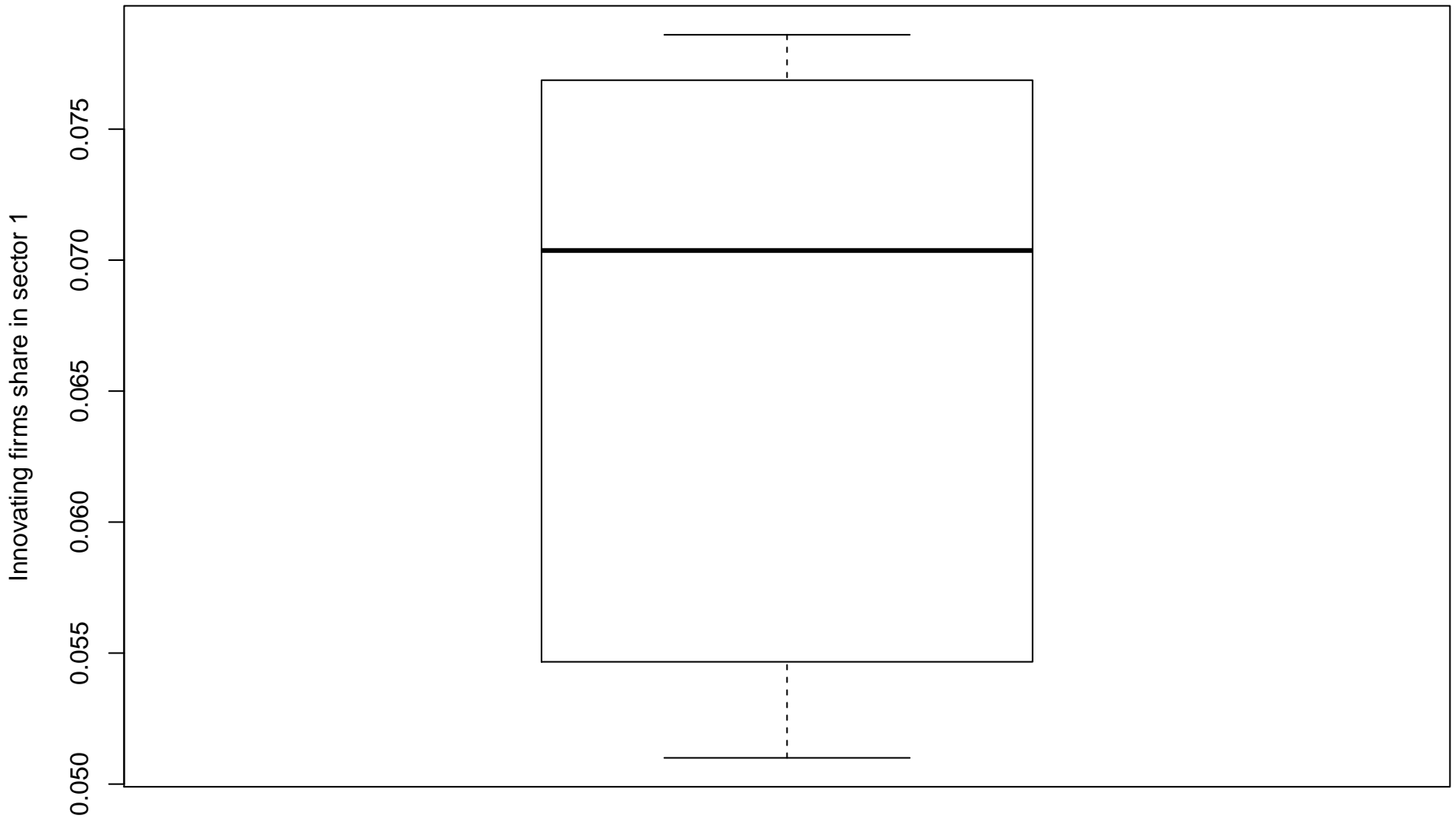
Vacancy

(bar: median / box: 2nd–3rd quartile / whiskers: max–min / points: outliers / MC runs = 10 / period = 301 – 600)
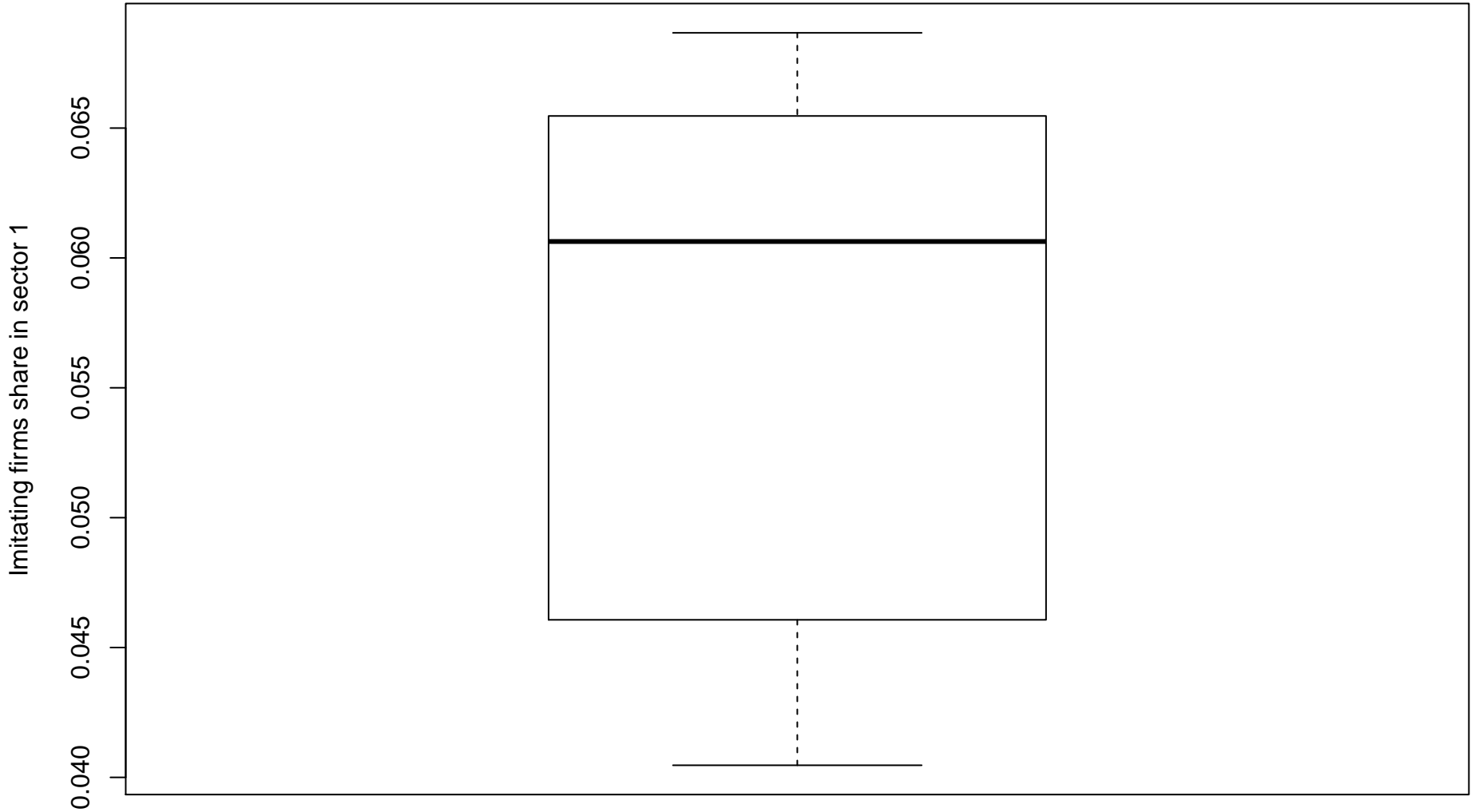
Productivity growth

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)
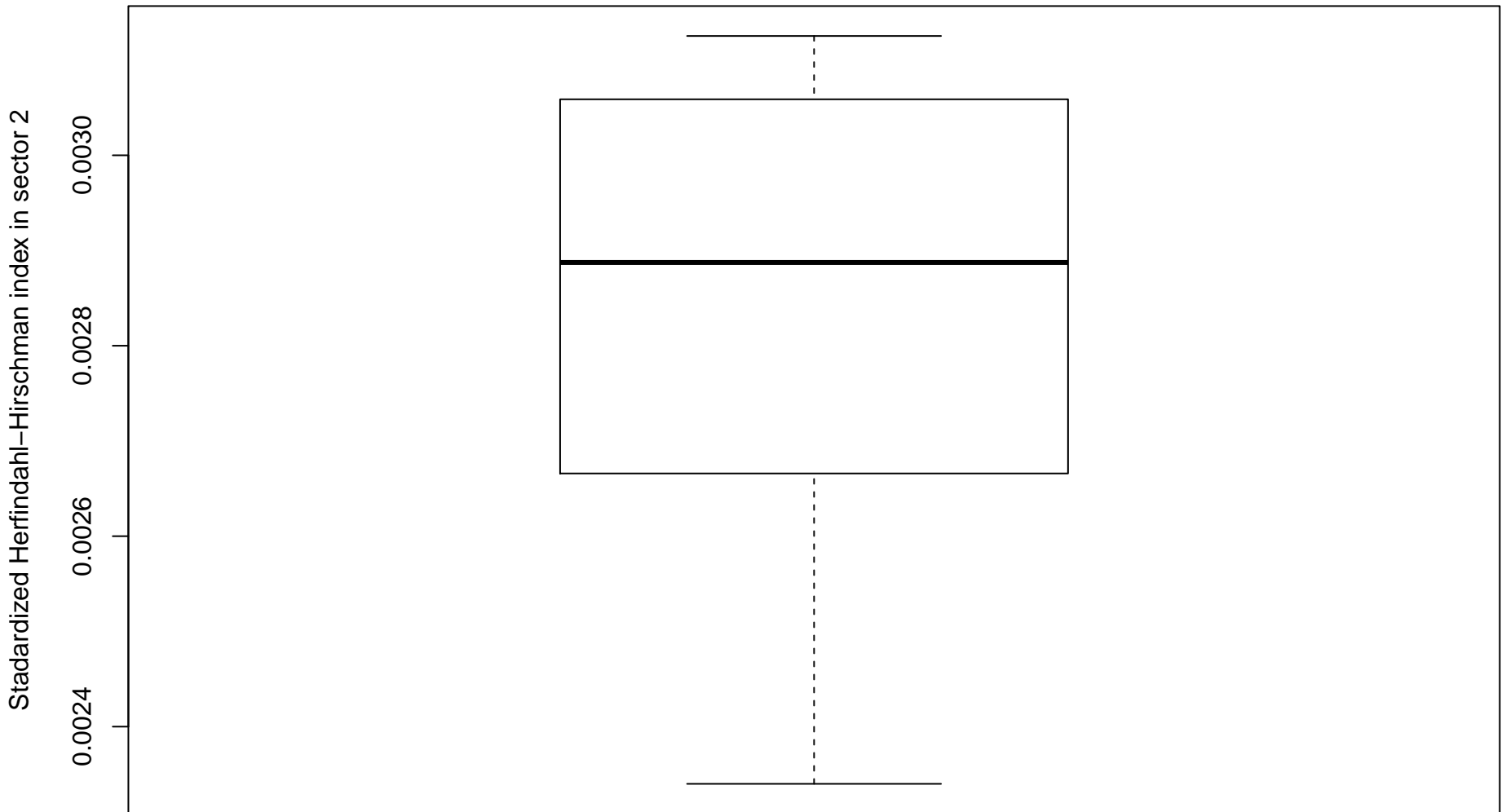
Innovation

Innovating firms share in sector 1

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Imitation

Imitating firms share in sector 1

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Market concentration

Stadardized Herfindahl–Hirschman index in sector 2

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Mark−ups

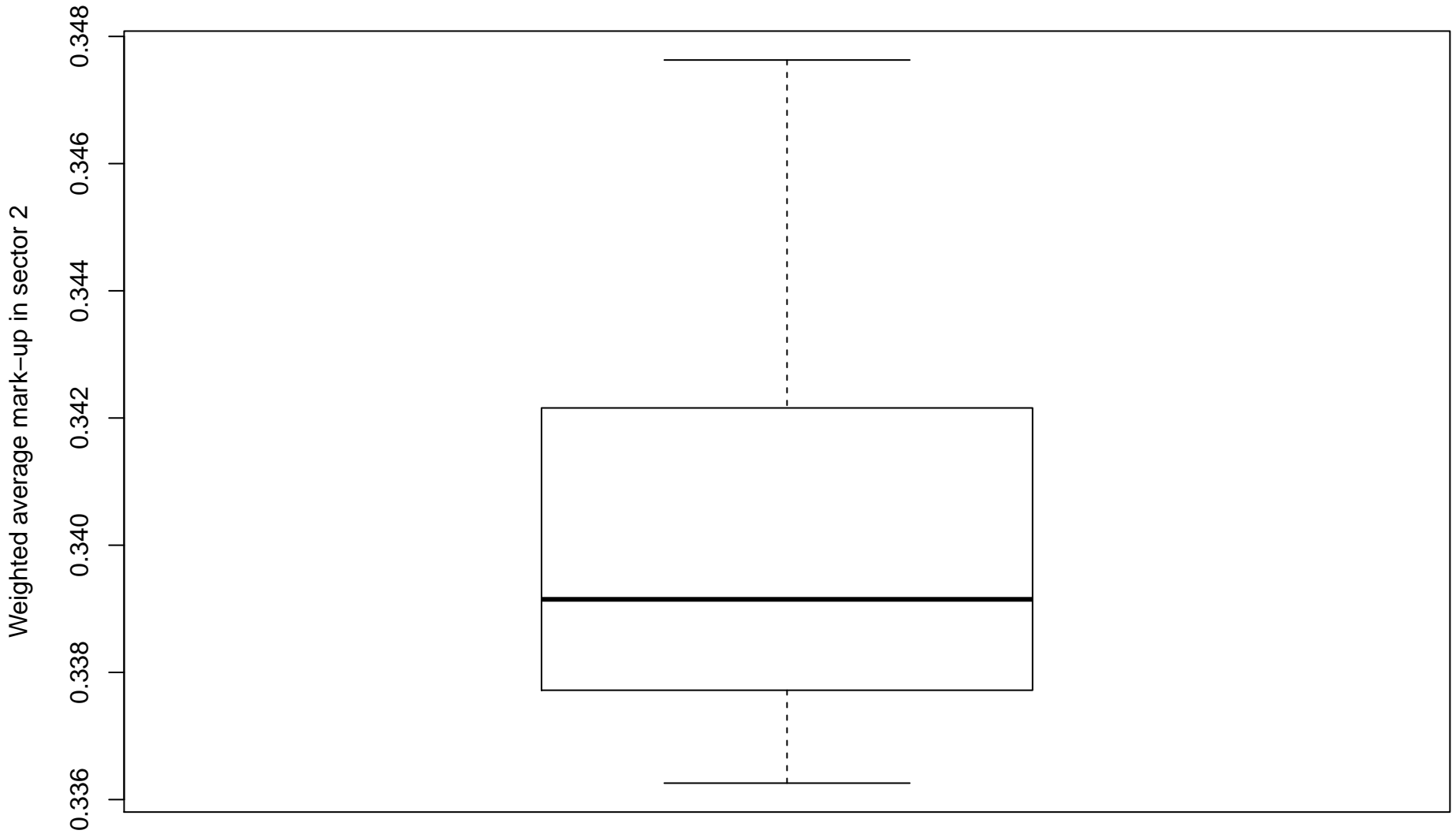Weighted average mark−up in sector 2

(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Net entry of firms

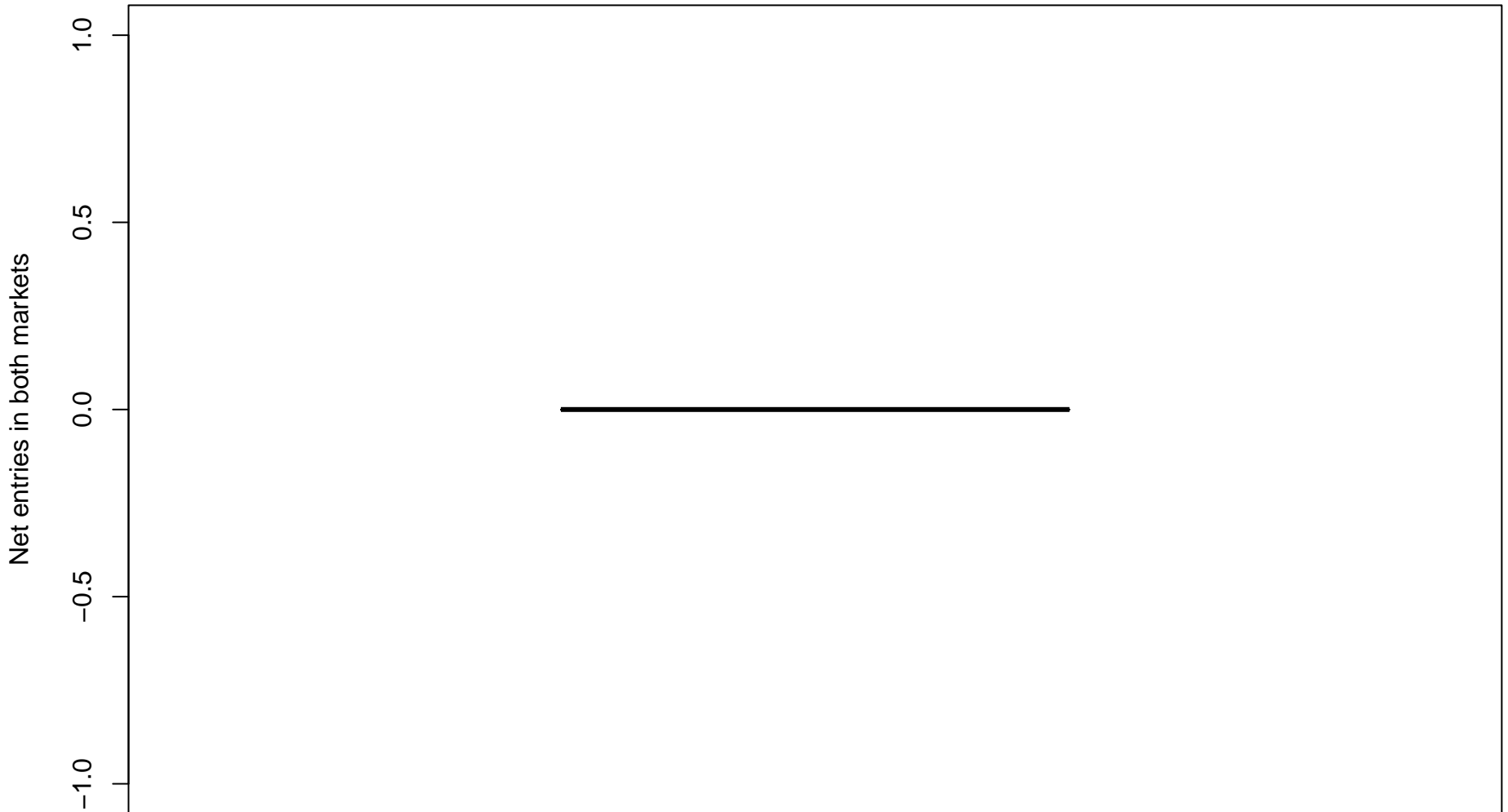(bar: median / box: 2nd−3rd quartile / whiskers: max−min / points: outliers / MC runs = 10 / period = 301 − 600)

Monte Carlo descriptive statistics (all experiments)

	Avg[1]	SD[1]	Min[1]	Max[1]
GDP growth	0.01344	0.001861	0.01025	0.01689
Volatility of GDP growth	0.09427	0.006898	0.08072	0.1035
Likelihood of GDP crises	0.279	0.04116	0.19	0.33
Inflation	0.001737	0.0009128	0.0007227	0.003438
Tax	0.02462	0.00113	0.02268	0.02664
Government total expenditure	0.0466	0.02982	0.002794	0.1014
Government deficit	0.2109	0.091	0.08672	0.3543
Government debt	15.69	7.43	6.603	27.07
Credit supply	−1.157e−08	1.043e−08	−3.152e−08	−2.014e−09
Loans	1.794	0.6884	1.069	3.398
Capacity utilization	0.5252	0.0107	0.5059	0.5453
Full employment frequency	0.314	0.26	0.01333	0.8567
Unemployment	0.1147	0.07007	0.008145	0.2398
Vacancy	0.2466	0.03901	0.2005	0.3313
Productivity growth	0.01336	0.001691	0.01073	0.01637
Innovation	0.06724	0.01082	0.051	0.0786
Imitation	0.05643	0.01144	0.04047	0.06867
Market concentration	0.002843	0.0002422	0.00234	0.003125
Mark−ups	0.3403	0.003336	0.3363	0.3476
Net entry of firms	0	0	0	0

Experiments: [1] Free entry
(numbers in brackets indicate the experiment number / MC runs = 10 / period = 301 – 600)