QMC RQP Lab - Monte Carlo Review

Generated from the completed result snapshot posted by the QMC frontend. Every plot and table shown in the app is in this document, grouped into numbered sections that follow the reader's questions.

Scenario ID	Scenario	Run mode	Job ID
BASKET_CORR_256	Two-share basket call, correlation 0.5, 256 joint states	run_convergence	qmc_job_20261003-212655_2bb03b09
Status	**Qubits**	**Methods**	**Runtime**
ok	9 (8 for the distribution + 1 objective)	classical_mc, low_depth_ae, objective_shots	8000

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1 The answer

Every method in this report answers the same question: what is the expected discounted payoff E[f(X)] under the scenario's terminal distribution? The engine discretizes the distribution into a probability grid, evaluates the payoff on that grid, and then lets classical and quantum estimators compete on how efficiently they recover the expectation. The exact grid expectation is known in the simulator, so every estimate has a certified error - no method is graded on self-reported accuracy.

VERDICT

METHOD STUDY

The certified grid reference is 16.2244; the closest estimate came from low_depth_ae with an RMSE of 0.0755073 at k=0,1,2,4,8,16, shots/power=512 / cost 34816.

Fitted convergence rates: classical Monte Carlo alpha = 0.43 (reference 0.5); low_depth_ae alpha = 0.87; objective_shots alpha = 0.43. low_depth_ae converges faster than Monte Carlo on this scenario - fewer oracle calls per unit of accuracy - which is the mechanism the Lab exists to show, observed here empirically on a simulator.

Classical baseline: best error 0.194968 at samples=32768 over 4 budget points; every quantum method is read against it on the oracle-call axis.

Resources: up to 9 qubits, circuit depth up to 13056, up to 13056 two-qubit gates per circuit, Grover power up to k = 16; runtime 8000 s.

Vocabulary: this Lab reports a Method study - an empirical convergence comparison on a simulator, not a quantum advantage claim. The fitted alpha is the observed error-versus-budget slope for this finite scenario; the reference expectations are 0.5 for classical Monte Carlo and up to 1 for ideal amplitude estimation.

1.1 Result summary

Metric	Value
Reference value	16.2244
Reference scaled value	0.0446953
Raw expected payoff	16.7185
Continuous-model value	16.272
Grid reference vs continuous model	-0.29%

Metric	Value
Best method	low_depth_ae
Best estimate	16.2467
Best error (RMSE)	0.0755073
Best CI width	0.28325
Runtime	8000

Reading it: The reference value is the exact expectation on the discretized grid - the certified answer every estimator is measured against. "Best" is the single point with the lowest error over all methods and budgets; it says which method got closest, not which one got there cheapest - the convergence rate below answers that. The continuous-model value is what the model is worth without the grid (the same model on a fine grid: 256 points per factor over 6 standard deviations either side). The grid reference differs from it by -0.29% - the price of representing the distribution on this many qubits. That difference is a modelling error: no estimator, classical or quantum, removes it; only a finer grid does.

1.2 Scenario conclusion

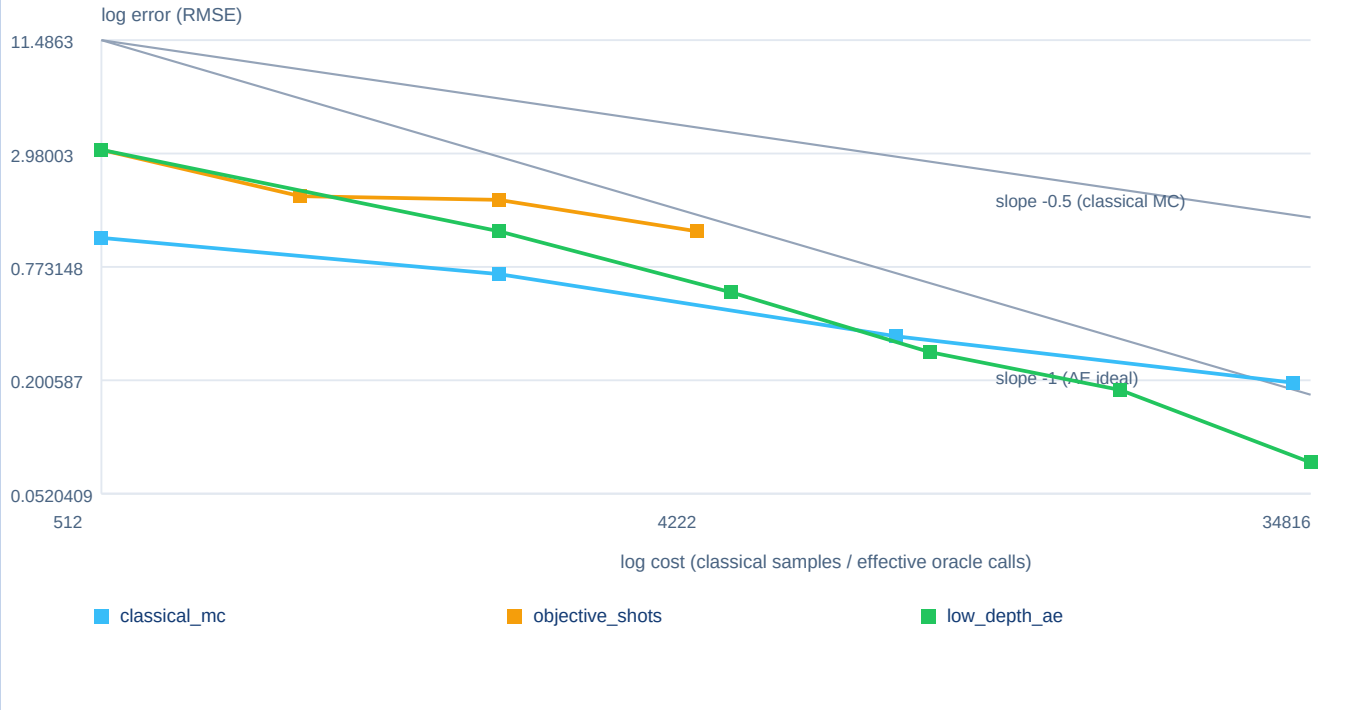
Method	Conclusion
Scaling frame	Classical Monte Carlo error usually decays like 1/sqrt(N). Ideal amplitude estimation targets 1/N query scaling; the fitted alpha below is empirical for this finite scenario and is not a quantum advantage claim.
classical_mc	Best baseline error 0.194968 at samples=32768. Empirical alpha 0.43; the MC reference expectation is about 0.5 for 1/sqrt(N) convergence.
low_depth_ae	Best error 0.0755073 at k=0,1,2,4,8,16, shots/power=512 / cost 34816. That is 2.58x lower error than the best classical_mc point. A 1/sqrt(N) MC extrapolation from the latest classical point would need about 218473 samples to reach this error, about 6.28x of this method's reported budget. Empirical alpha 0.87, faster than classical_mc's fitted 0.43 in this run. For AE-style methods the ideal query-scaling target is alpha around 1, i.e. roughly sqrt(N) fewer queries than MC for the same error in the asymptotic model.
objective_shots	Best error 1.17993 at shots=4096 / cost 4096. That is 6.05x higher error than the best classical_mc point. Empirical alpha 0.43, similar to classical_mc's fitted 0.43 in this run. Objective shots are direct sampling, so no AE-style quadratic query scaling is expected.

1.3 Empirical convergence rate

Method	Positive points	Fitted alpha	Reference expectation	Latest error
classical_mc	4	0.43	~0.5 MC reference	0.194968
objective_shots	4	0.43	empirical	1.17993
low_depth_ae	6	0.87	AE ideal often ~1; empirical here	0.0755073

Reading it: The fitted alpha is the least-squares slope of log(error) against log(budget) - the empirical convergence rate of each method in this run. About 0.5 is Monte Carlo behaviour; values approaching 1 indicate the amplitude-estimation speedup is materializing. The steepest slope here is low_depth_ae at 0.87. Fits over few points or few repetitions are noisy; treat alpha as a trend indicator, not a measured constant.

1.4 Log error vs cost



Reading it: The one chart to judge the methods on: error against cost - simulated samples for classical Monte Carlo, effective oracle calls for the quantum methods, one evaluation of the model each - on log-log axes where a power law is a straight line. A method's slope matters more than its position - the dashed guides mark the classical Monte Carlo slope of -0.5 and the ideal amplitude-estimation slope of -1. In this run low_depth_ae overtakes classical Monte Carlo at a cost of about 7200 (interpolated); below that classical Monte Carlo has the lower error, because a classical sample returns the payoff itself while a quantum shot returns one bit.

2 The inputs: distribution and payoff

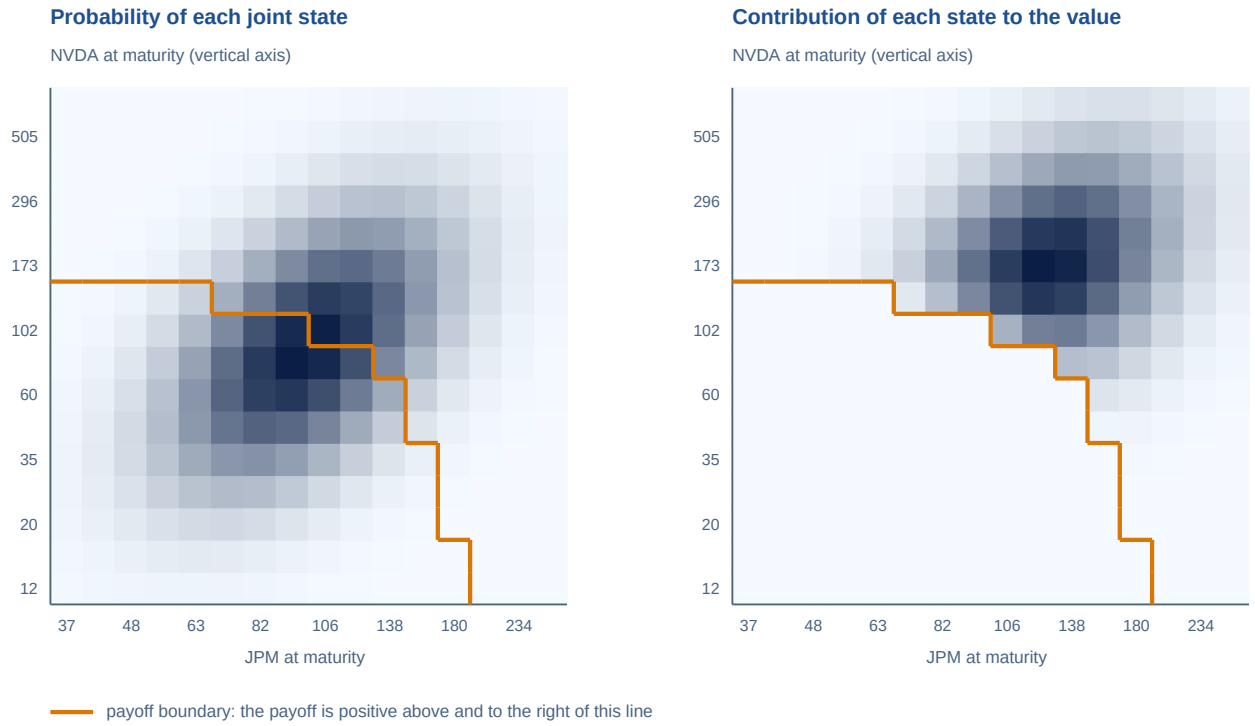
The model inputs before any estimation happens: the discretized terminal distribution (each cell is one basis state of the quantum register), the payoff evaluated on the same grid, and their product - the contribution of each state to the price. Where the contribution concentrates tells you which part of the distribution the estimators must resolve; deep out-of-the-money or rare-event payoffs concentrate mass in a thin tail, which is exactly the regime where amplitude estimation is most interesting.

2.1 Model and grid

Metric	Value
Payoff	basket_call, strike 100
Maturity	1 years
Factor JPM (JPMorgan Chase)	weight 50%, spot 100, volatility 28.3%, drift 3.0%, lognormal, grid from 37 to 267
Factor NVDA (NVIDIA)	weight 50%, spot 100, volatility 57.8%, drift 3.0%, lognormal, grid from 12 to 659
Correlation	0.5 between the two factors, applied to the joint grid
Grid	16 x 16 = 256 states, spaced evenly in the logarithm of the value (equal relative steps) (bounded_log_grid)
Qubits	8 for the distribution + 1 objective qubit = 9

Reading it: The model exactly as the grid applies it. The two factors share one joint grid; the correlation of 0.5 makes the joint probabilities differ from the product of the two marginals, so the two quantum registers are entangled by the state preparation. A grid in equal relative steps follows a lognormal factor closely: in log-value the distribution is a symmetric bell.

2.2 Joint distribution and payoff contribution



Reading it: Each cell is one joint state of JPM (horizontal) and NVDA (vertical) - one basis state of the quantum register; the darker the cell, the larger the value. Left: where the probability sits. Right: probability times discounted payoff, i.e. where the value comes from. The orange line is the payoff boundary. With a correlation of 0.5 the probability lies along the diagonal: the factors tend to move together, which puts more weight on the corner where both are high.

2.3 Largest contributions

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 154: JPM=121.112, NVDA=173.374	147.243	0.0193209	47.243	0.885801	0.814604	6.0663
state 170: JPM=138.168, NVDA=173.374	155.771	0.0155426	55.7711	0.841207	0.907467	9.40295
state 171: JPM=138.168, NVDA=226.446	182.307	0.00931405	82.307	0.743955	0.916781	10.1469
state 153: JPM=121.112, NVDA=132.741	126.926	0.0279948	26.9263	0.731518	0.795283	5.1805
state 155: JPM=121.112, NVDA=226.446	173.779	0.0100314	73.7789	0.718235	0.824635	6.78453
state 138: JPM=106.161, NVDA=173.374	139.768	0.0179895	39.7677	0.694258	0.67416	3.19241
state 169: JPM=138.168, NVDA=132.741	135.454	0.0195116	35.4544	0.671327	0.891924	8.56174
state 186: JPM=157.626, NVDA=173.374	165.5	0.00936495	65.5002	0.595277	0.959322	12.3369
state 187: JPM=157.626, NVDA=226.446	192.036	0.00647741	92.0361	0.578536	0.9658	12.9154
state 137: JPM=106.161, NVDA=132.741	119.451	0.0300849	19.451	0.567887	0.656171	2.49815
state 139: JPM=106.161, NVDA=226.446	166.304	0.00809236	66.3036	0.520696	0.682253	3.7131
state 172: JPM=138.168, NVDA=295.764	216.966	0.00419895	116.966	0.476619	0.92098	10.6235
state 185: JPM=157.626, NVDA=132.741	145.183	0.0101858	45.1835	0.446629	0.949958	11.7416
state 188: JPM=157.626, NVDA=295.764	226.695	0.00337041	126.695	0.414394	0.96917	13.3298
state 156: JPM=121.112, NVDA=295.764	208.438	0.00391819	108.438	0.412323	0.828553	7.19686

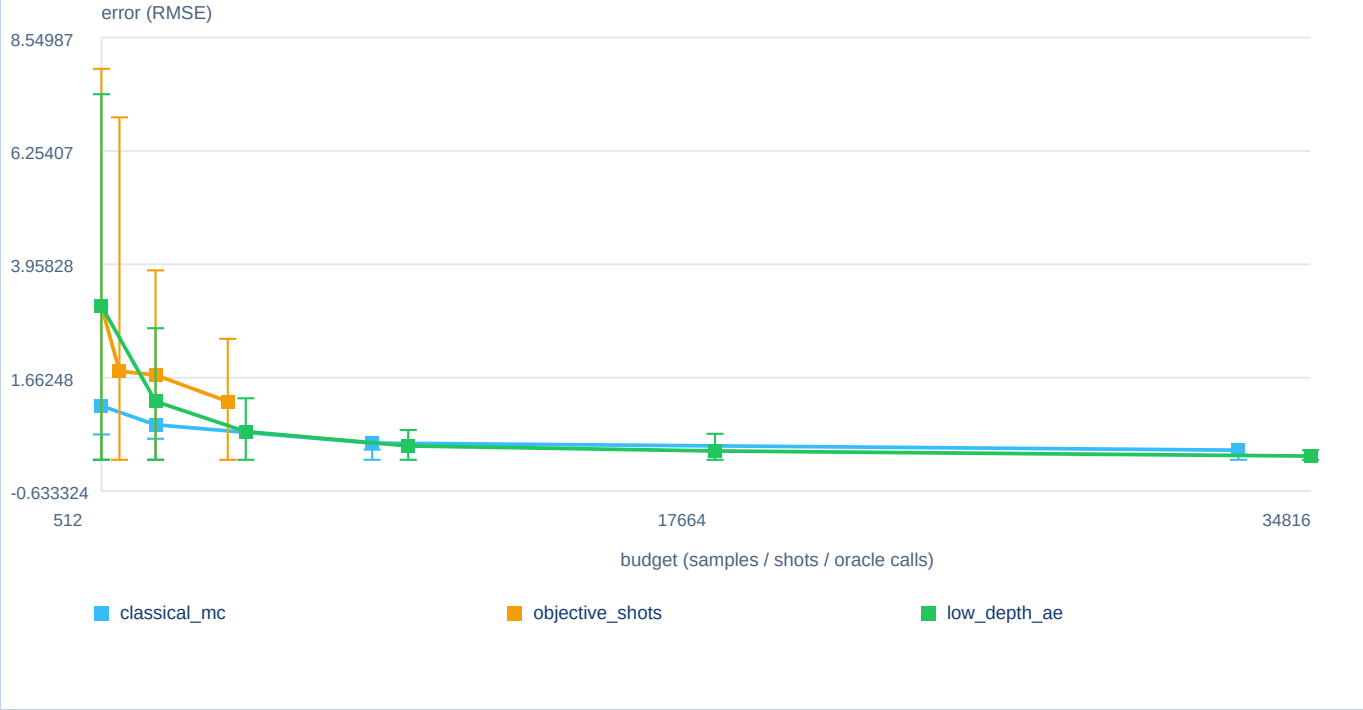
State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 122: JPM=93.0564, NVDA=173.374	133.215	0.0125458	33.2152	0.404396	0.498916	1.31754
state 168: JPM=138.168, NVDA=101.63	119.899	0.0184268	19.8993	0.355842	0.872413	7.89042
state 203: JPM=179.825, NVDA=226.446	203.135	0.00337405	103.135	0.337699	0.987713	14.7001
state 152: JPM=121.112, NVDA=101.63	111.371	0.030515	11.3712	0.336737	0.767288	4.44898
state 202: JPM=179.825, NVDA=173.374	176.599	0.00422645	76.5994	0.314176	0.984339	14.3624
state 121: JPM=93.0564, NVDA=132.741	112.898	0.0242163	12.8985	0.303122	0.486371	0.913148
state 123: JPM=93.0564, NVDA=226.446	159.751	0.00488962	59.7511	0.283526	0.503806	1.60107
state 204: JPM=179.825, NVDA=295.764	237.794	0.00202635	137.794	0.270966	0.989739	14.9711
state 140: JPM=106.161, NVDA=295.764	200.962	0.00273853	100.962	0.268318	0.684991	3.98142

Reading it: The 24 states with the largest contribution, of 256; the full table is in the appendix. 256 grid states; the 51 states with the largest contribution (20% of the grid) carry 95% of the price, and 149 states contribute at all. The more concentrated the contribution, the thinner the tail the estimators must resolve - the regime where amplitude estimation earns its keep.

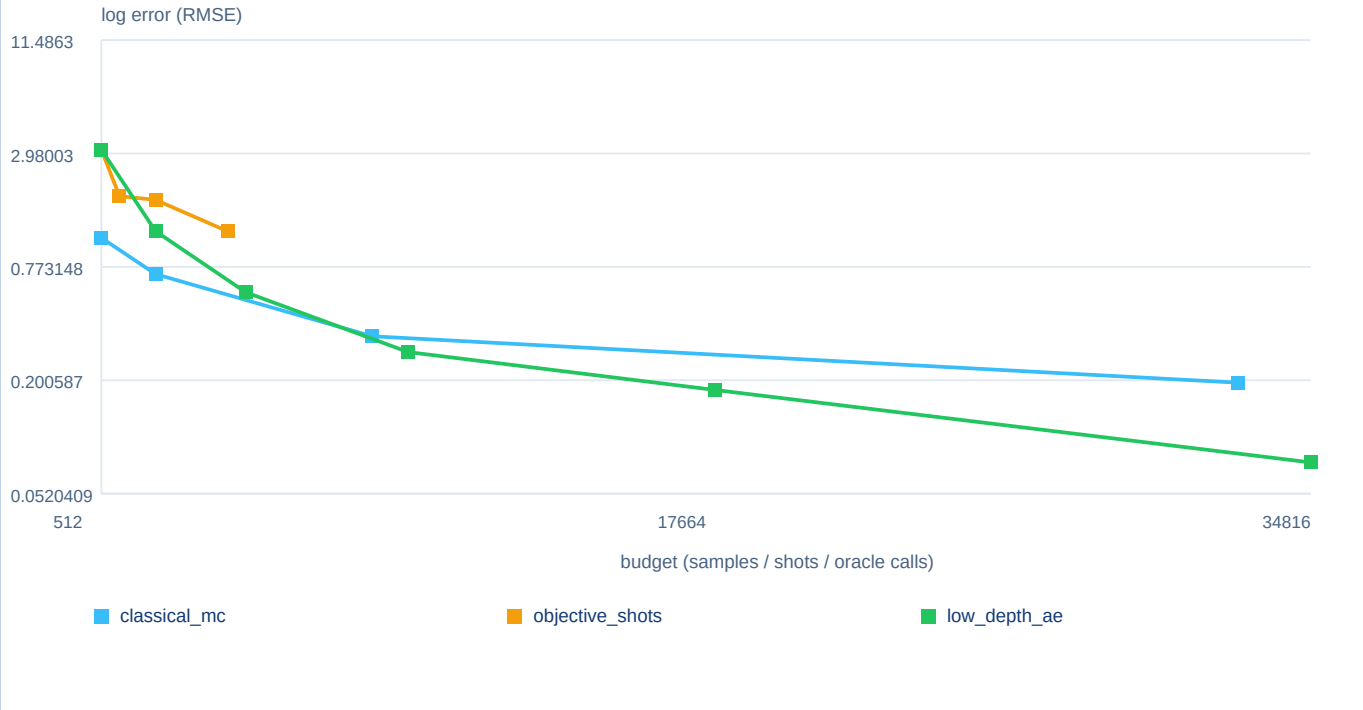
3 How the estimators converged

Each point is one budget level for one method: how far the estimate sits from the certified grid reference (RMSE over repetitions where the run was repeated across seeds). The first two charts show raw and log error; the log-log chart is the one to judge scaling on. For amplitude-estimation methods the budget grows by adding deeper Grover powers at fixed shots per power - depth, not shot count, is what buys the steeper slope. Budgets are expressed in samples for classical Monte Carlo, shots for direct quantum sampling, and effective oracle calls (shots x sum(2k+1)) for amplitude estimation.

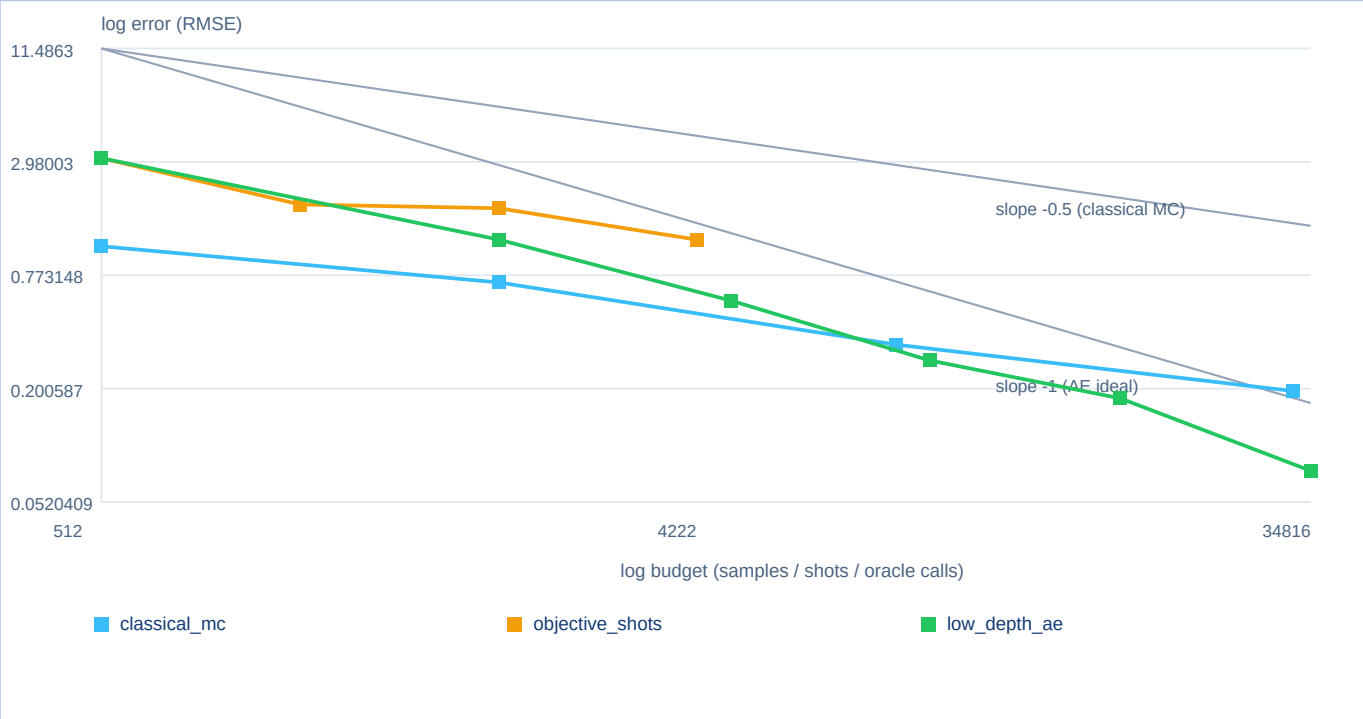
3.1 Error vs budget



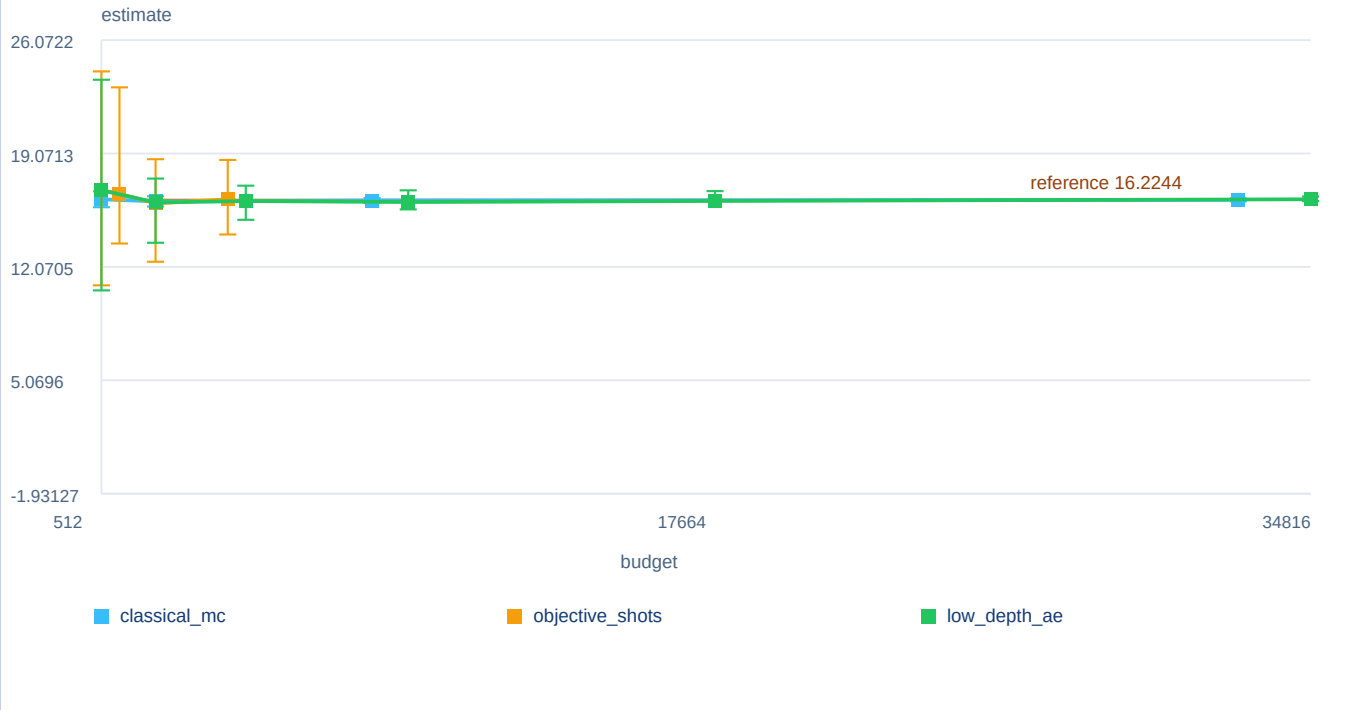
3.2 Log error vs budget



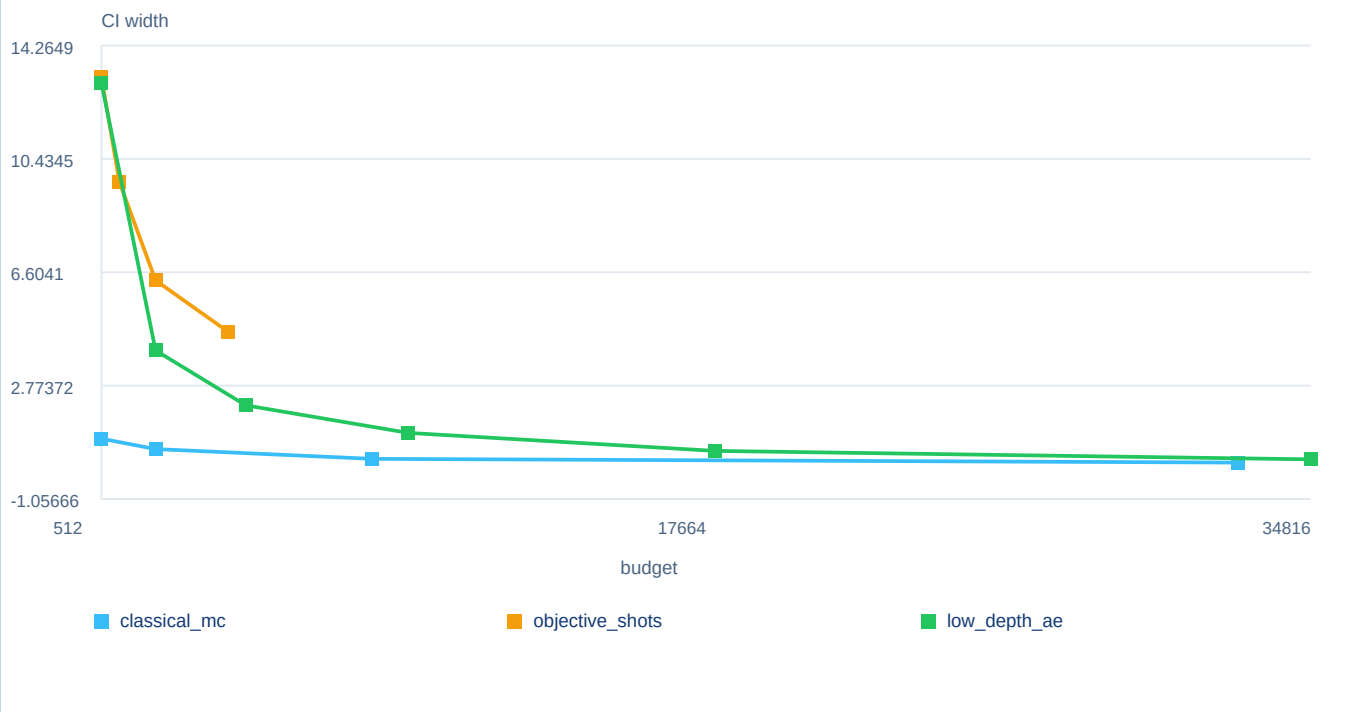
3.3 Log error vs log budget



3.4 Estimate vs reference



3.5 Confidence interval width vs budget



3.6 Convergence comparison

Method	Budget	Cost	Reps	Estimate	Error (RMSE)	CI Width	Oracle Calls	Max Grover
classical_mc	samples=512	512 samples	20	16.2465	1.09219	0.981995	n/a	n/a

Method	Budget	Cost	Reps	Estimate	Error (RMSE)	CI Width	Oracle Calls	Max Grover
classical_mc	samples=2048	2048 samples	20	16.1136	0.709815	0.630508	n/a	n/a
classical_mc	samples=8192	8192 samples	20	16.1692	0.338695	0.300512	n/a	n/a
classical_mc	samples=32768	32768 samples	20	16.2099	0.194968	0.174852	n/a	n/a
objective_shots	shots=512	512 shots	20	16.8029	3.11275	13.2082	512	n/a
objective_shots	shots=1024	1024 shots	20	16.5902	1.79448	9.64305	1024	n/a
objective_shots	shots=2048	2048 shots	20	15.9876	1.71704	6.33128	2048	n/a
objective_shots	shots=4096	4096 shots	20	16.2446	1.17993	4.60159	4096	n/a
low_depth_ae	k=0, shots/power=512	512 oracle calls	20	16.8043	3.11545	13.0083	512	n/a
low_depth_ae	k=0,1, shots/power=512	2048 oracle calls	20	16.0505	1.18233	3.96381	2048	1
low_depth_ae	k=0,1,2, shots/power=512	4608 oracle calls	20	16.136	0.571436	2.10814	4608	2
low_depth_ae	k=0,1,2,4, shots/power=512	9216 oracle calls	20	16.0757	0.28057	1.17775	9216	4
low_depth_ae	k=0,1,2,4,8, shots/power=512	17920 oracle calls	20	16.141	0.178741	0.56963	17920	8
low_depth_ae	k=0,1,2,4,8,16, shots/power=512	34816 oracle calls	20	16.2467	0.0755073	0.28325	34816	16

Reading it: Budget is the human-readable schedule label; Cost is the same budget expressed in its comparable unit (samples, shots, or effective oracle calls). Reps is the number of independent seeded repetitions behind the RMSE; confidence intervals for repeated points come from the first repetition. 14 budget points across 3 methods. Points were repeated 20 to 20 times across seeds.

4 Circuit and resources

On the quantum side, loading the distribution and adding the payoff become a circuit: state preparation loads the amplitudes sqrt(p_x), and one controlled rotation per grid state writes the scaled payoff onto an extra objective qubit, so that P(objective = 1) equals the scaled expectation exactly. The resource table translates the run into hardware-relevant quantities. Depth per circuit grows linearly with the Grover power k (each amplification repeats the state preparation and payoff oracle), which is the practical constraint on near-term devices: the statistical efficiency of amplitude estimation is bought with longer coherent circuits, not more of them.

distribution_loading (correlated_lognormal_placeholder): 8 qubits, depth 256, 255 two-qubit gates per circuit; payoff_objective_loading (bounded_log_grid): 9 qubits, depth 256, 256 two-qubit gates per circuit; objective_shot_readout (objective_shots): 9 qubits, depth 512, 512 two-qubit gates per circuit; grover_iterate (objective_reflection_and_diffusion): 9 qubits, depth 784, 784 two-qubit gates per circuit. 1 further components are listed in the table.

4.1 Circuit resource estimate

Component	Method	Qubits	Gates/Circuit	Depth/Circuit	2Q/Circuit	Ctrl Rot./Circuit	Circuit Calls	Oracle Calls	Max k	Suitability
distribution_loading	correlated_lognormal_placeholder	8	510	256	255	0	1	n/a	n/a	simulator_or_stateprep_research
payoff_objective_loading	bounded_log_grid	9	512	256	256	256	1	n/a	n/a	controlled_rotation_bottleneck
objective_shot_readout	objective_shots	9	1024	512	512	256	n/a	n/a	n/a	small_simulator_or_toy_hardware_candidate
grover_iterate	objective_reflection_and_diffusion	9	1568	784	784	256	n/a	n/a	16	reflection_size_bottleneck
ae_schedule	low_depth_ae	9	26112	13056	13056	4352	n/a	n/a	16	simulator_benchmark_first

Reading it: One row per estimator component. Depth per circuit and two-qubit gates per circuit are the hardware-relevant numbers; circuit calls times depth is the coherent work a device would have to sustain. The suitability column is a coarse placement of each component on

today's simulator-vs-hardware spectrum.

4.2 Statevector memory estimate

4.3 Statevector memory table

Component	Method	Qubits	Raw statevector	Planning estimate	Worker hint
distribution_loading	correlated_lognormal_placeholder	8	4 KiB	0.25 GiB	small candidate
payoff_objective_loading	bounded_log_grid	9	8 KiB	0.25 GiB	small candidate
objective_shot_readout	objective_shots	9	8 KiB	0.25 GiB	small candidate
grover_iterate	objective_reflection_and_diffusion	9	8 KiB	0.25 GiB	small candidate
ae_schedule	low_depth_ae	9	8 KiB	0.25 GiB	small candidate

Reading it: These runs execute on a statevector simulator, which stores all 2^n complex amplitudes explicitly - memory doubles with every added qubit. This is a simulator constraint, not a property of the algorithm: on hardware the same circuit needs n physical qubits, not 2^n memory. The planning estimate adds the working-set overhead the worker actually needs on top of the raw statevector.

5 Run record and method

What was run and how the problem was set up - the facts needed to reproduce the result - followed by the three-step estimation pipeline and a glossary of the methods that took part. Worker telemetry, the per-point resource metrics, warnings and the backend log are in the appendices.

5.1 Run metadata

Metric	Value
Original workbook	n/a
Selected scenario	n/a
Run mode	n/a
Job ID	qmc_job_20261003-212655_2bb03b09
Job status	ok
Downloaded at	2026-10-04T05:53:25.385544+00:00
API URL	n/a

5.2 Selected scenario

Metric	Value
Scenario name	Two-share basket call, correlation 0.5, 256 joint states
Problem type	basket_call
Payoff type	basket_call
Distribution model	correlated_lognormal_terminal
Underlyings	JPM, NVDA
Qubits	9 (8 for the distribution + 1 objective)
Max total qubits	16
Notes	The same basket on a log-spaced 16 x 16 grid (9 qubits). A long run: about two hours on the standard worker.

5.3 QMC estimation pipeline

Step	Name	What is reported
1	Load distribution	Terminal-state probability mass over the discretized grid.
2	Add payoff	Payoff or event indicator evaluated for each grid state.
3	Derive expectation value	Classical MC, objective shots, and AE-style methods estimate the expected value.

State preparation loads the amplitudes sqrt(p_x) so that measuring the register samples the distribution, and one controlled rotation per grid state writes the scaled payoff g(x) onto an extra objective qubit, with rotation angle theta_x = 2 arcsin(sqrt(g(x))). After that, P(objective = 1) equals the scaled expectation E[g(X)] exactly. Step 3 is where the methods differ: they are simply different read-out strategies for that one probability, from naive repeated measurement to Grover-amplified interval estimation.

5.4 Methods in this run

Method	What it does	Cost unit / expected scaling
classical_mc	Crude Monte Carlo: draw terminal states from the same discrete grid, average the discounted payoff.	samples; error ~ 1/sqrt(N)
objective_shots	Prepare the payoff circuit once per shot and measure the objective qubit. Quantum hardware, but statistically identical to Monte Carlo; the baseline any AE method must beat.	shots; error ~ 1/sqrt(N)
low_depth_ae	Maximum-likelihood amplitude estimation over a bounded Grover-power schedule (NISQ-style depth budget). Combines counts from all powers into one likelihood fit for theta.	oracle calls; error up to ~ 1/N as depth grows

Why report it this way: on a log-log plot a power law error ~ budget^-alpha is a straight line with slope -alpha. Classical Monte Carlo is pinned at alpha = 0.5; amplitude estimation can approach alpha = 1, i.e. quadratically fewer oracle calls for the same accuracy. The fitted alpha table quantifies where this finite-size run actually lands, which is an empirical observation about this scenario on a simulator, not a quantum advantage claim.

Appendix A Memory diagnostics

The telemetry below documents what the worker actually used while executing the run.

A.1 Worker memory telemetry

No plottable points available for this chart.

Appendix B Resource metrics per budget point

Every convergence point with its shots, samples, oracle calls, Grover power, runtime and confidence-interval width.

Resource metrics

Method	Budget	Cost	Shots	Samples	Oracle Calls	Max Grover	Runtime	CI Width
classical_mc	samples=512	512 samples	n/a	512	n/a	n/a	0.0410699	0.981995
classical_mc	samples=2048	2048 samples	n/a	2048	n/a	n/a	0.00429015	0.630508
classical_mc	samples=8192	8192 samples	n/a	8192	n/a	n/a	0.0131178	0.300512
classical_mc	samples=32768	32768 samples	n/a	32768	n/a	n/a	0.0446083	0.174852
objective_shots	shots=512	512 shots	512	n/a	512	n/a	60.6002	13.2082
objective_shots	shots=1024	1024 shots	1024	n/a	1024	n/a	54.9048	9.64305
objective_shots	shots=2048	2048 shots	2048	n/a	2048	n/a	55.983	6.33128
objective_shots	shots=4096	4096 shots	4096	n/a	4096	n/a	59.2261	4.60159
low_depth_ae	k=0, shots/power=512	512 oracle calls	512	n/a	512	n/a	56.2939	13.0083
low_depth_ae	k=0,1, shots/power=512	2048 oracle calls	512	n/a	2048	1	223.728	3.96381
low_depth_ae	k=0,1,2, shots/power=512	4608 oracle calls	512	n/a	4608	2	505.821	2.10814
low_depth_ae	k=0,1,2,4, shots/power=512	9216 oracle calls	512	n/a	9216	4	1029	1.17775
low_depth_ae	k=0,1,2,4,8, shots/power=512	17920 oracle calls	512	n/a	17920	8	2057	0.56963
low_depth_ae	k=0,1,2,4,8,16, shots/power=512	34816 oracle calls	512	n/a	34816	16	3898	0.28325

Appendix C Full distribution and payoff data

Every grid state in register order, with its probability, payoff and contribution to the value.

Distribution and payoff data

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 0: JPM=37, NVDA=12	24.5	1.38536e-05	0	n/a	1.38536e-05	0
state 1: JPM=37, NVDA=15.6733	26.3367	3.40814e-05	0	n/a	4.7935e-05	0
state 2: JPM=37, NVDA=20.4711	28.7356	6.30755e-05	0	n/a	0.000111011	0
state 3: JPM=37, NVDA=26.7376	31.8688	8.78193e-05	0	n/a	0.00019883	0
state 4: JPM=37, NVDA=34.9223	35.9611	9.19824e-05	0	n/a	0.000290812	0
state 5: JPM=37, NVDA=45.6124	41.3062	7.2478e-05	0	n/a	0.00036329	0
state 6: JPM=37, NVDA=59.5748	48.2874	4.29629e-05	0	n/a	0.000406253	0
state 7: JPM=37, NVDA=77.8114	57.4057	1.91588e-05	0	n/a	0.000425412	0

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 8: JPM=37, NVDA=101.63	69.3152	6.42728e-06	0	n/a	0.000431839	0
state 9: JPM=37, NVDA=132.741	84.8703	1.62208e-06	0	n/a	0.000433461	0
state 10: JPM=37, NVDA=173.374	105.187	3.07968e-07	5.18701	1.55022e-06	0.000433769	1.55022e-06
state 11: JPM=37, NVDA=226.446	131.723	4.39869e-08	31.7229	1.35415e-06	0.000433813	2.90437e-06
state 12: JPM=37, NVDA=295.764	166.382	4.72637e-09	66.3818	3.04472e-07	0.000433818	3.20885e-06
state 13: JPM=37, NVDA=386.3	211.65	3.82049e-10	111.65	4.13951e-08	0.000433818	3.25024e-06
state 14: JPM=37, NVDA=504.551	270.776	2.32325e-11	170.776	3.85028e-09	0.000433818	3.25409e-06
state 15: JPM=37, NVDA=659	348	1.06282e-12	248	2.55789e-10	0.000433818	3.25435e-06
state 16: JPM=42.2107, NVDA=12	27.1053	3.57991e-05	0	n/a	0.000469617	3.25435e-06
state 17: JPM=42.2107, NVDA=15.6733	28.942	0.00010165	0	n/a	0.000571267	3.25435e-06
state 18: JPM=42.2107, NVDA=20.4711	31.3409	0.000217135	0	n/a	0.000788403	3.25435e-06
state 19: JPM=42.2107, NVDA=26.7376	34.4741	0.000348931	0	n/a	0.00113733	3.25435e-06
state 20: JPM=42.2107, NVDA=34.9223	38.5665	0.000421827	0	n/a	0.00155916	3.25435e-06
state 21: JPM=42.2107, NVDA=45.6124	43.9115	0.000383632	0	n/a	0.00194279	3.25435e-06
state 22: JPM=42.2107, NVDA=59.5748	50.8928	0.000262472	0	n/a	0.00220526	3.25435e-06
state 23: JPM=42.2107, NVDA=77.8114	60.011	0.000135094	0	n/a	0.00234036	3.25435e-06
state 24: JPM=42.2107, NVDA=101.63	71.9205	5.23089e-05	0	n/a	0.00239267	3.25435e-06
state 25: JPM=42.2107, NVDA=132.741	87.4756	1.52371e-05	0	n/a	0.0024079	3.25435e-06
state 26: JPM=42.2107, NVDA=173.374	107.792	3.33897e-06	7.79235	2.52495e-05	0.00241124	2.85039e-05
state 27: JPM=42.2107, NVDA=226.446	134.328	5.50442e-07	34.3282	1.83372e-05	0.00241179	4.68411e-05
state 28: JPM=42.2107, NVDA=295.764	168.987	6.82646e-08	68.9871	4.57019e-06	0.00241186	5.14113e-05
state 29: JPM=42.2107, NVDA=386.3	214.255	6.36892e-09	114.255	7.06178e-07	0.00241187	5.21175e-05
state 30: JPM=42.2107, NVDA=504.551	273.381	4.47016e-10	173.381	7.52134e-08	0.00241187	5.21927e-05
state 31: JPM=42.2107, NVDA=659	350.605	2.36029e-11	250.605	5.7402e-09	0.00241187	5.21984e-05
state 32: JPM=48.1552, NVDA=12	30.0776	6.92898e-05	0	n/a	0.00248116	5.21984e-05
state 33: JPM=48.1552, NVDA=15.6733	31.9143	0.000227083	0	n/a	0.00270824	5.21984e-05
state 34: JPM=48.1552, NVDA=20.4711	34.3132	0.000559871	0	n/a	0.00326811	5.21984e-05
state 35: JPM=48.1552, NVDA=26.7376	37.4464	0.00103843	0	n/a	0.00430654	5.21984e-05
state 36: JPM=48.1552, NVDA=34.9223	41.5387	0.00144894	0	n/a	0.00575548	5.21984e-05
state 37: JPM=48.1552, NVDA=45.6124	46.8838	0.00152094	0	n/a	0.00727642	5.21984e-05
state 38: JPM=48.1552, NVDA=59.5748	53.865	0.00120104	0	n/a	0.00847746	5.21984e-05
state 39: JPM=48.1552, NVDA=77.8114	62.9833	0.000713497	0	n/a	0.00919096	5.21984e-05
state 40: JPM=48.1552, NVDA=101.63	74.8928	0.000318868	0	n/a	0.00950983	5.21984e-05
state 41: JPM=48.1552, NVDA=132.741	90.4479	0.000107205	0	n/a	0.00961704	5.21984e-05
state 42: JPM=48.1552, NVDA=173.374	110.765	2.71149e-05	10.7646	0.000283255	0.00964415	0.000335453
state 43: JPM=48.1552, NVDA=226.446	137.3	5.15925e-06	37.3005	0.000186755	0.00964931	0.000522208
state 44: JPM=48.1552, NVDA=295.764	171.959	7.385e-07	71.9593	5.15714e-05	0.00965005	0.00057378

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 45: JPM=48.1552, NVDA=386.3	217.228	7.95245e-08	117.228	9.04695e-06	0.00965013	0.000582827
state 46: JPM=48.1552, NVDA=504.551	276.353	6.44224e-09	176.353	1.10253e-06	0.00965013	0.000583929
state 47: JPM=48.1552, NVDA=659	353.578	3.92609e-10	253.578	9.66144e-08	0.00965013	0.000584026
state 48: JPM=54.9368, NVDA=12	33.4684	0.000100451	0	n/a	0.00975059	0.000584026
state 49: JPM=54.9368, NVDA=15.6733	35.3051	0.000379971	0	n/a	0.0101306	0.000584026
state 50: JPM=54.9368, NVDA=20.4711	37.704	0.00108127	0	n/a	0.0112118	0.000584026
state 51: JPM=54.9368, NVDA=26.7376	40.8372	0.00231473	0	n/a	0.0135266	0.000584026
state 52: JPM=54.9368, NVDA=34.9223	44.9295	0.00372782	0	n/a	0.0172544	0.000584026
state 53: JPM=54.9368, NVDA=45.6124	50.2746	0.00451644	0	n/a	0.0217708	0.000584026
state 54: JPM=54.9368, NVDA=59.5748	57.2558	0.00411645	0	n/a	0.0258873	0.000584026
state 55: JPM=54.9368, NVDA=77.8114	66.3741	0.00282251	0	n/a	0.0287098	0.000584026
state 56: JPM=54.9368, NVDA=101.63	78.2836	0.00145591	0	n/a	0.0301657	0.000584026
state 57: JPM=54.9368, NVDA=132.741	93.8387	0.000564963	0	n/a	0.0307306	0.000584026
state 58: JPM=54.9368, NVDA=173.374	114.155	0.000164927	14.1554	0.00226561	0.0308956	0.00284964
state 59: JPM=54.9368, NVDA=226.446	140.691	3.62201e-05	40.6913	0.00143028	0.0309318	0.00427992
state 60: JPM=54.9368, NVDA=295.764	175.35	5.98402e-06	75.3502	0.000437571	0.0309378	0.00471749
state 61: JPM=54.9368, NVDA=386.3	220.618	7.43743e-07	120.618	8.70579e-05	0.0309385	0.00480455
state 62: JPM=54.9368, NVDA=504.551	279.744	6.95407e-08	179.744	1.21301e-05	0.0309386	0.00481668
state 63: JPM=54.9368, NVDA=659	356.968	4.89149e-09	256.968	1.21981e-06	0.0309386	0.0048179
state 64: JPM=62.6735, NVDA=12	37.3368	0.000109076	0	n/a	0.0310477	0.0048179
state 65: JPM=62.6735, NVDA=15.6733	39.1734	0.000476215	0	n/a	0.0315239	0.0048179
state 66: JPM=62.6735, NVDA=20.4711	41.5723	0.0015641	0	n/a	0.033088	0.0048179
state 67: JPM=62.6735, NVDA=26.7376	44.7056	0.00386467	0	n/a	0.0369527	0.0048179
state 68: JPM=62.6735, NVDA=34.9223	48.7979	0.00718368	0	n/a	0.0441363	0.0048179
state 69: JPM=62.6735, NVDA=45.6124	54.143	0.0100454	0	n/a	0.0541817	0.0048179
state 70: JPM=62.6735, NVDA=59.5748	61.1242	0.0105675	0	n/a	0.0647493	0.0048179
state 71: JPM=62.6735, NVDA=77.8114	70.2425	0.00836309	0	n/a	0.0731124	0.0048179
state 72: JPM=62.6735, NVDA=101.63	82.152	0.00497904	0	n/a	0.0780914	0.0048179
state 73: JPM=62.6735, NVDA=132.741	97.7071	0.00223003	0	n/a	0.0803214	0.0048179
state 74: JPM=62.6735, NVDA=173.374	118.024	0.000751384	18.0238	0.0131425	0.0810728	0.0179604
state 75: JPM=62.6735, NVDA=226.446	144.56	0.000190458	44.5597	0.00823593	0.0812633	0.0261964
state 76: JPM=62.6735, NVDA=295.764	179.219	3.63181e-05	79.2185	0.00279204	0.0812996	0.0289884
state 77: JPM=62.6735, NVDA=386.3	224.487	5.20994e-06	124.487	0.000629401	0.0813048	0.0296178
state 78: JPM=62.6735, NVDA=504.551	283.612	5.62249e-07	183.612	0.000100185	0.0813054	0.029718
state 79: JPM=62.6735, NVDA=659	360.837	4.56468e-08	260.837	1.15545e-05	0.0813054	0.0297295
state 80: JPM=71.4998, NVDA=12	41.7499	8.87131e-05	0	n/a	0.0813941	0.0297295
state 81: JPM=71.4998, NVDA=15.6733	43.5866	0.000447037	0	n/a	0.0818412	0.0297295

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 82: JPM=71.4998, NVDA=20.4711	45.9855	0.00169467	0	n/a	0.0835358	0.0297295
state 83: JPM=71.4998, NVDA=26.7376	49.1187	0.00483295	0	n/a	0.0883688	0.0297295
state 84: JPM=71.4998, NVDA=34.9223	53.211	0.0103688	0	n/a	0.0987375	0.0297295
state 85: JPM=71.4998, NVDA=45.6124	58.5561	0.016735	0	n/a	0.115473	0.0297295
state 86: JPM=71.4998, NVDA=59.5748	65.5373	0.0203195	0	n/a	0.135792	0.0297295
state 87: JPM=71.4998, NVDA=77.8114	74.6556	0.0185603	0	n/a	0.154352	0.0297295
state 88: JPM=71.4998, NVDA=101.63	86.5651	0.0127539	0	n/a	0.167106	0.0297295
state 89: JPM=71.4998, NVDA=132.741	102.12	0.00659309	2.1202	0.0135655	0.173699	0.0432951
state 90: JPM=71.4998, NVDA=173.374	122.437	0.00256401	22.4369	0.0558283	0.176263	0.0991234
state 91: JPM=71.4998, NVDA=226.446	148.973	0.000750131	48.9728	0.0356503	0.177014	0.134774
state 92: JPM=71.4998, NVDA=295.764	183.632	0.000165097	83.6317	0.0133993	0.177179	0.148173
state 93: JPM=71.4998, NVDA=386.3	228.9	2.73357e-05	128.9	0.00341943	0.177206	0.151592
state 94: JPM=71.4998, NVDA=504.551	288.025	3.40491e-06	188.025	0.000621289	0.177209	0.152214
state 95: JPM=71.4998, NVDA=659	365.25	3.19057e-07	265.25	8.21285e-05	0.17721	0.152296
state 96: JPM=81.5691, NVDA=12	46.7845	5.40425e-05	0	n/a	0.177264	0.152296
state 97: JPM=81.5691, NVDA=15.6733	48.6212	0.000314319	0	n/a	0.177578	0.152296
state 98: JPM=81.5691, NVDA=20.4711	51.0201	0.00137528	0	n/a	0.178953	0.152296
state 99: JPM=81.5691, NVDA=26.7376	54.1533	0.00452689	0	n/a	0.18348	0.152296
state 100: JPM=81.5691, NVDA=34.9223	58.2457	0.0112097	0	n/a	0.19469	0.152296
state 101: JPM=81.5691, NVDA=45.6124	63.5907	0.0208821	0	n/a	0.215572	0.152296
state 102: JPM=81.5691, NVDA=59.5748	70.572	0.0292644	0	n/a	0.244836	0.152296
state 103: JPM=81.5691, NVDA=77.8114	79.6902	0.0308526	0	n/a	0.275689	0.152296
state 104: JPM=81.5691, NVDA=101.63	91.5997	0.0244698	0	n/a	0.300159	0.152296
state 105: JPM=81.5691, NVDA=132.741	107.155	0.0146001	7.15483	0.101374	0.314759	0.25367
state 106: JPM=81.5691, NVDA=173.374	127.472	0.00655338	27.4715	0.174711	0.321312	0.42838
state 107: JPM=81.5691, NVDA=226.446	154.007	0.0022129	54.0074	0.115981	0.323525	0.544361
state 108: JPM=81.5691, NVDA=295.764	188.666	0.000562141	88.6663	0.0483699	0.324087	0.592731
state 109: JPM=81.5691, NVDA=386.3	233.935	0.000107427	133.935	0.013963	0.324195	0.606694
state 110: JPM=81.5691, NVDA=504.551	293.06	1.54444e-05	193.06	0.00289357	0.32421	0.609588
state 111: JPM=81.5691, NVDA=659	370.285	1.67037e-06	270.285	0.000438131	0.324212	0.610026
state 112: JPM=93.0564, NVDA=12	52.5282	2.46587e-05	0	n/a	0.324236	0.610026
state 113: JPM=93.0564, NVDA=15.6733	54.3649	0.000165533	0	n/a	0.324402	0.610026
state 114: JPM=93.0564, NVDA=20.4711	56.7638	0.000835963	0	n/a	0.325238	0.610026
state 115: JPM=93.0564, NVDA=26.7376	59.897	0.00317595	0	n/a	0.328414	0.610026
state 116: JPM=93.0564, NVDA=34.9223	63.9893	0.00907711	0	n/a	0.337491	0.610026
state 117: JPM=93.0564, NVDA=45.6124	69.3344	0.0195167	0	n/a	0.357008	0.610026
state 118: JPM=93.0564, NVDA=59.5748	76.3156	0.0315684	0	n/a	0.388576	0.610026

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 119: JPM=93.0564, NVDA=77.8114	85.4339	0.0384136	0	n/a	0.42699	0.610026
state 120: JPM=93.0564, NVDA=101.63	97.3434	0.0351644	0	n/a	0.462154	0.610026
state 121: JPM=93.0564, NVDA=132.741	112.898	0.0242163	12.8985	0.303122	0.486371	0.913148
state 122: JPM=93.0564, NVDA=173.374	133.215	0.0125458	33.2152	0.404396	0.498916	1.31754
state 123: JPM=93.0564, NVDA=226.446	159.751	0.00488962	59.7511	0.283526	0.503806	1.60107
state 124: JPM=93.0564, NVDA=295.764	194.41	0.00143363	94.4099	0.131349	0.50524	1.73242
state 125: JPM=93.0564, NVDA=386.3	239.678	0.000316218	139.678	0.0428634	0.505556	1.77528
state 126: JPM=93.0564, NVDA=504.551	298.804	5.24714e-05	198.804	0.0101232	0.505608	1.78541
state 127: JPM=93.0564, NVDA=659	376.028	6.55004e-06	276.028	0.00175456	0.505615	1.78716
state 128: JPM=106.161, NVDA=12	59.0807	8.4274e-06	0	n/a	0.505623	1.78716
state 129: JPM=106.161, NVDA=15.6733	60.9174	6.52963e-05	0	n/a	0.505689	1.78716
state 130: JPM=106.161, NVDA=20.4711	63.3163	0.0003806	0	n/a	0.506069	1.78716
state 131: JPM=106.161, NVDA=26.7376	66.4495	0.00166892	0	n/a	0.507738	1.78716
state 132: JPM=106.161, NVDA=34.9223	70.5419	0.00550541	0	n/a	0.513243	1.78716
state 133: JPM=106.161, NVDA=45.6124	75.8869	0.0136625	0	n/a	0.526906	1.78716
state 134: JPM=106.161, NVDA=59.5748	82.8681	0.0255067	0	n/a	0.552413	1.78716
state 135: JPM=106.161, NVDA=77.8114	91.9864	0.0358234	0	n/a	0.588236	1.78716
state 136: JPM=106.161, NVDA=101.63	103.896	0.0378499	3.8959	0.143101	0.626086	1.93026
state 137: JPM=106.161, NVDA=132.741	119.451	0.0300849	19.451	0.567887	0.656171	2.49815
state 138: JPM=106.161, NVDA=173.374	139.768	0.0179895	39.7677	0.694258	0.67416	3.19241
state 139: JPM=106.161, NVDA=226.446	166.304	0.00809236	66.3036	0.520696	0.682253	3.7131
state 140: JPM=106.161, NVDA=295.764	200.962	0.00273853	100.962	0.268318	0.684991	3.98142
state 141: JPM=106.161, NVDA=386.3	246.231	0.000697183	146.231	0.0989366	0.685688	4.08036
state 142: JPM=106.161, NVDA=504.551	305.356	0.000133525	205.356	0.0266098	0.685822	4.10697
state 143: JPM=106.161, NVDA=659	382.581	1.92381e-05	282.581	0.00527566	0.685841	4.11224
state 144: JPM=121.112, NVDA=12	66.556	2.15727e-06	0	n/a	0.685843	4.11224
state 145: JPM=121.112, NVDA=15.6733	68.3927	1.92921e-05	0	n/a	0.685863	4.11224
state 146: JPM=121.112, NVDA=20.4711	70.7916	0.000129789	0	n/a	0.685992	4.11224
state 147: JPM=121.112, NVDA=26.7376	73.9248	0.00065688	0	n/a	0.686649	4.11224
state 148: JPM=121.112, NVDA=34.9223	78.0172	0.00250103	0	n/a	0.68915	4.11224
state 149: JPM=121.112, NVDA=45.6124	83.3622	0.00716371	0	n/a	0.696314	4.11224
state 150: JPM=121.112, NVDA=59.5748	90.3435	0.0154363	0	n/a	0.71175	4.11224
state 151: JPM=121.112, NVDA=77.8114	99.4617	0.0250228	0	n/a	0.736773	4.11224
state 152: JPM=121.112, NVDA=101.63	111.371	0.030515	11.3712	0.336737	0.767288	4.44898
state 153: JPM=121.112, NVDA=132.741	126.926	0.0279948	26.9263	0.731518	0.795283	5.1805
state 154: JPM=121.112, NVDA=173.374	147.243	0.0193209	47.243	0.885801	0.814604	6.0663
state 155: JPM=121.112, NVDA=226.446	173.779	0.0100314	73.7789	0.718235	0.824635	6.78453

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 156: JPM=121.112, NVDA=295.764	208.438	0.00391819	108.438	0.412323	0.828553	7.19686
state 157: JPM=121.112, NVDA=386.3	253.706	0.00115132	153.706	0.171734	0.829705	7.36859
state 158: JPM=121.112, NVDA=504.551	312.832	0.000254501	212.832	0.052565	0.829959	7.42115
state 159: JPM=121.112, NVDA=659	390.056	4.23224e-05	290.056	0.0119131	0.830001	7.43307
state 160: JPM=138.168, NVDA=12	75.0841	4.1362e-07	0	n/a	0.830002	7.43307
state 161: JPM=138.168, NVDA=15.6733	76.9208	4.2693e-06	0	n/a	0.830006	7.43307
state 162: JPM=138.168, NVDA=20.4711	79.3197	3.3151e-05	0	n/a	0.830039	7.43307
state 163: JPM=138.168, NVDA=26.7376	82.4529	0.000193653	0	n/a	0.830233	7.43307
state 164: JPM=138.168, NVDA=34.9223	86.5452	0.000851013	0	n/a	0.831084	7.43307
state 165: JPM=138.168, NVDA=45.6124	91.8903	0.00281342	0	n/a	0.833897	7.43307
state 166: JPM=138.168, NVDA=59.5748	98.8715	0.00699713	0	n/a	0.840895	7.43307
state 167: JPM=138.168, NVDA=77.8114	107.99	0.0130916	7.98979	0.101508	0.853986	7.53458
state 168: JPM=138.168, NVDA=101.63	119.899	0.0184268	19.8993	0.355842	0.872413	7.89042
state 169: JPM=138.168, NVDA=132.741	135.454	0.0195116	35.4544	0.671327	0.891924	8.56174
state 170: JPM=138.168, NVDA=173.374	155.771	0.0155426	55.7711	0.841207	0.907467	9.40295
state 171: JPM=138.168, NVDA=226.446	182.307	0.00931405	82.307	0.743955	0.916781	10.1469
state 172: JPM=138.168, NVDA=295.764	216.966	0.00419895	116.966	0.476619	0.92098	10.6235
state 173: JPM=138.168, NVDA=386.3	262.234	0.00142406	162.234	0.224204	0.922404	10.8477
state 174: JPM=138.168, NVDA=504.551	321.36	0.000363332	221.36	0.0780501	0.922767	10.9258
state 175: JPM=138.168, NVDA=659	398.584	6.97372e-05	298.584	0.020207	0.922837	10.946
state 176: JPM=157.626, NVDA=12	84.8132	5.94001e-08	0	n/a	0.922837	10.946
state 177: JPM=157.626, NVDA=15.6733	86.6498	7.07655e-07	0	n/a	0.922838	10.946
state 178: JPM=157.626, NVDA=20.4711	89.0487	6.34222e-06	0	n/a	0.922844	10.946
state 179: JPM=157.626, NVDA=26.7376	92.1819	4.2761e-05	0	n/a	0.922887	10.946
state 180: JPM=157.626, NVDA=34.9223	96.2743	0.000216891	0	n/a	0.923104	10.946
state 181: JPM=157.626, NVDA=45.6124	101.619	0.000827598	1.61934	0.00130056	0.923931	10.9473
state 182: JPM=157.626, NVDA=59.5748	108.601	0.00237566	8.60058	0.0198282	0.926307	10.9671
state 183: JPM=157.626, NVDA=77.8114	117.719	0.00513021	17.7189	0.0882149	0.931437	11.0553
state 184: JPM=157.626, NVDA=101.63	129.628	0.00833437	29.6283	0.239635	0.939772	11.295
state 185: JPM=157.626, NVDA=132.741	145.183	0.0101858	45.1835	0.446629	0.949958	11.7416
state 186: JPM=157.626, NVDA=173.374	165.5	0.00936495	65.5002	0.595277	0.959322	12.3369
state 187: JPM=157.626, NVDA=226.446	192.036	0.00647741	92.0361	0.578536	0.9658	12.9154
state 188: JPM=157.626, NVDA=295.764	226.695	0.00337041	126.695	0.414394	0.96917	13.3298
state 189: JPM=157.626, NVDA=386.3	271.963	0.00131932	171.963	0.22017	0.97049	13.55
state 190: JPM=157.626, NVDA=504.551	331.089	0.000388513	231.089	0.0871276	0.970878	13.6371
state 191: JPM=157.626, NVDA=659	408.313	8.60689e-05	308.313	0.0257519	0.970964	13.6629
state 192: JPM=179.825, NVDA=12	95.9124	6.3894e-09	0	n/a	0.970964	13.6629

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 193: JPM=179.825, NVDA=15.6733	97.749	8.78565e-08	0	n/a	0.970964	13.6629
state 194: JPM=179.825, NVDA=20.4711	100.148	9.08812e-07	0.147917	1.30455e-07	0.970965	13.6629
state 195: JPM=179.825, NVDA=26.7376	103.281	7.07229e-06	3.28114	2.25194e-05	0.970972	13.6629
state 196: JPM=179.825, NVDA=34.9223	107.373	4.14031e-05	7.37348	0.000296262	0.971014	13.6632
state 197: JPM=179.825, NVDA=45.6124	112.719	0.000182344	12.7185	0.00225061	0.971196	13.6654
state 198: JPM=179.825, NVDA=59.5748	119.7	0.000604137	19.6998	0.0115496	0.9718	13.677
state 199: JPM=179.825, NVDA=77.8114	128.818	0.0015058	28.818	0.0421117	0.973306	13.7191
state 200: JPM=179.825, NVDA=101.63	140.728	0.00282347	40.7275	0.111595	0.976129	13.8307
state 201: JPM=179.825, NVDA=132.741	156.283	0.00398278	56.2826	0.217537	0.980112	14.0482
state 202: JPM=179.825, NVDA=173.374	176.599	0.00422645	76.5994	0.314176	0.984339	14.3624
state 203: JPM=179.825, NVDA=226.446	203.135	0.00337405	103.135	0.337699	0.987713	14.7001
state 204: JPM=179.825, NVDA=295.764	237.794	0.00202635	137.794	0.270966	0.989739	14.9711
state 205: JPM=179.825, NVDA=386.3	283.062	0.000915506	183.062	0.162642	0.990655	15.1337
state 206: JPM=179.825, NVDA=504.551	342.188	0.000311168	242.188	0.073134	0.990966	15.2068
state 207: JPM=179.825, NVDA=659	419.412	7.95638e-05	319.412	0.0246626	0.991045	15.2315
state 208: JPM=205.149, NVDA=12	108.575	5.14779e-10	8.57464	4.28359e-09	0.991045	15.2315
state 209: JPM=205.149, NVDA=15.6733	110.411	8.16985e-09	10.4113	8.2545e-08	0.991045	15.2315
state 210: JPM=205.149, NVDA=20.4711	112.81	9.75425e-08	12.8102	1.21261e-06	0.991045	15.2315
state 211: JPM=205.149, NVDA=26.7376	115.943	8.76113e-07	15.9434	1.35554e-05	0.991046	15.2315
state 212: JPM=205.149, NVDA=34.9223	120.036	5.91987e-06	20.0358	0.000115104	0.991052	15.2316
state 213: JPM=205.149, NVDA=45.6124	125.381	3.00919e-05	25.3808	0.000741186	0.991082	15.2324
state 214: JPM=205.149, NVDA=59.5748	132.362	0.000115073	32.3621	0.00361395	0.991197	15.236
state 215: JPM=205.149, NVDA=77.8114	141.48	0.000331044	41.4803	0.013326	0.991528	15.2493
state 216: JPM=205.149, NVDA=101.63	153.39	0.000716444	53.3898	0.0371203	0.992245	15.2864
state 217: JPM=205.149, NVDA=132.741	168.945	0.00116645	68.9449	0.0780438	0.993411	15.3645
state 218: JPM=205.149, NVDA=173.374	189.262	0.00142868	89.2616	0.123757	0.99484	15.4882
state 219: JPM=205.149, NVDA=226.446	215.798	0.00131641	115.798	0.147931	0.996156	15.6362
state 220: JPM=205.149, NVDA=295.764	250.456	0.000912496	150.456	0.133233	0.997069	15.7694
state 221: JPM=205.149, NVDA=386.3	295.725	0.000475838	195.725	0.0903807	0.997545	15.8598
state 222: JPM=205.149, NVDA=504.551	354.85	0.000186669	254.85	0.0461667	0.997731	15.9059
state 223: JPM=205.149, NVDA=659	432.075	5.509e-05	332.075	0.0177533	0.997786	15.9237
state 224: JPM=234.04, NVDA=12	123.02	3.10648e-11	23.0201	6.93982e-10	0.997786	15.9237
state 225: JPM=234.04, NVDA=15.6733	124.857	5.69039e-10	24.8568	1.37265e-08	0.997786	15.9237
state 226: JPM=234.04, NVDA=20.4711	127.256	7.84154e-09	27.2557	2.0741e-07	0.997787	15.9237
state 227: JPM=234.04, NVDA=26.7376	130.389	8.12919e-08	30.3889	2.39736e-06	0.997787	15.9237
state 228: JPM=234.04, NVDA=34.9223	134.481	6.33985e-07	34.4813	2.12145e-05	0.997787	15.9237
state 229: JPM=234.04, NVDA=45.6124	139.826	3.71961e-06	39.8263	0.00014376	0.997791	15.9239

State	x	Probability	Payoff	Contribution	Cum. probability	Cum. contribution
state 230: JPM=234.04, NVDA=59.5748	146.808	1.64173e-05	46.8076	0.000745742	0.997807	15.9246
state 231: JPM=234.04, NVDA=77.8114	155.926	5.45119e-05	55.9258	0.00295853	0.997862	15.9276
state 232: JPM=234.04, NVDA=101.63	167.835	0.000136166	67.8353	0.00896387	0.997998	15.9365
state 233: JPM=234.04, NVDA=132.741	183.39	0.000255877	83.3904	0.0207071	0.998254	15.9572
state 234: JPM=234.04, NVDA=173.374	203.707	0.000361726	103.707	0.0364049	0.998616	15.9936
state 235: JPM=234.04, NVDA=226.446	230.243	0.000384694	130.243	0.0486229	0.999	16.0423
state 236: JPM=234.04, NVDA=295.764	264.902	0.000307777	164.902	0.049253	0.999308	16.0915
state 237: JPM=234.04, NVDA=386.3	310.17	0.000185244	210.17	0.0377821	0.999493	16.1293
state 238: JPM=234.04, NVDA=504.551	369.296	8.38759e-05	269.296	0.0219199	0.999577	16.1512
state 239: JPM=234.04, NVDA=659	446.52	2.85705e-05	346.52	0.00960764	0.999606	16.1608
state 240: JPM=267, NVDA=12	139.5	1.40412e-12	39.5	5.38236e-11	0.999606	16.1608
state 241: JPM=267, NVDA=15.6733	141.337	2.96864e-11	41.3367	1.19087e-09	0.999606	16.1608
state 242: JPM=267, NVDA=20.4711	143.736	4.72168e-10	43.7356	2.00402e-08	0.999606	16.1608
state 243: JPM=267, NVDA=26.7376	146.869	5.64966e-09	46.8688	2.56967e-07	0.999606	16.1608
state 244: JPM=267, NVDA=34.9223	150.961	5.0855e-08	50.9611	2.51503e-06	0.999606	16.1608
state 245: JPM=267, NVDA=45.6124	156.306	3.44375e-07	56.3062	1.88174e-05	0.999606	16.1608
state 246: JPM=267, NVDA=59.5748	163.287	1.75435e-06	63.2874	0.000107747	0.999608	16.161
state 247: JPM=267, NVDA=77.8114	172.406	6.72335e-06	72.4057	0.000472421	0.999615	16.1614
state 248: JPM=267, NVDA=101.63	184.315	1.93839e-05	84.3152	0.00158606	0.999634	16.163
state 249: JPM=267, NVDA=132.741	199.87	4.20421e-05	99.8703	0.00407467	0.999676	16.1671
state 250: JPM=267, NVDA=173.374	220.187	6.85983e-05	120.187	0.00800095	0.999745	16.1751
state 251: JPM=267, NVDA=226.446	246.723	8.42031e-05	146.723	0.0119894	0.999829	16.1871
state 252: JPM=267, NVDA=295.764	281.382	7.77551e-05	181.382	0.0136865	0.999907	16.2008
state 253: JPM=267, NVDA=386.3	326.65	5.40152e-05	226.65	0.0118807	0.999961	16.2126
state 254: JPM=267, NVDA=504.551	385.776	2.82286e-05	285.776	0.00782863	0.999989	16.2205
state 255: JPM=267, NVDA=659	463	1.10981e-05	363	0.00390955	1	16.2244

Appendix D Diagnostics, warnings and artifacts

Diagnostics and warnings

Type	Message
Info	No warnings or errors were included in the result payload.

Artifacts

Artifact	Status
JSON result	ready
CSV convergence export	ready

Artifact	Status
PDF report	ready
Qiskit notebook	ready
PennyLane notebook	ready
Workbook/result bundle	future