Does multi-block MEV exist?

Insights from 2 years of MEV Boost Data
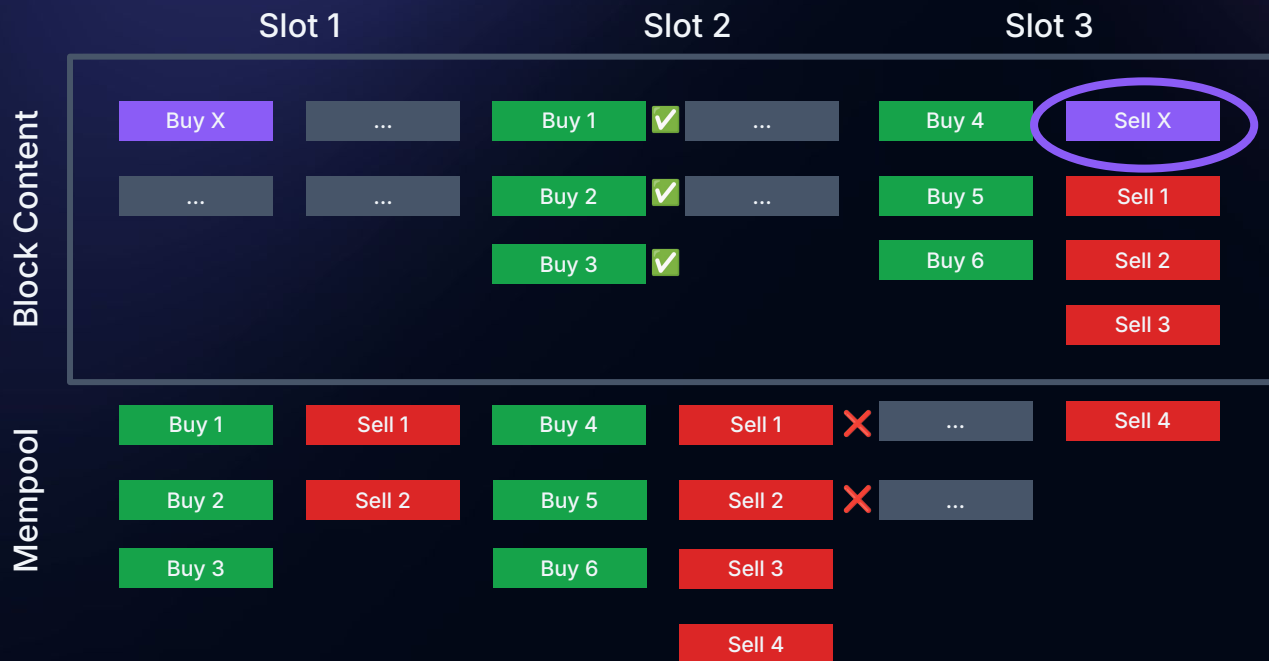
Pascal
@pascalstichler

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What is multi-block MEV?

"Multi-block MEV (MMEV) describes that block builders might extract additional MEV by controlling multiple slots in a row."

	Slot 1		Slot 2		Slot 3	
Block Content	Buy X	...	Buy 1 ✅	...	Buy 4	Sell X
	...	...	Buy 2 ✅	...	Buy 5	Sell 1
			Buy 3 ✅		Buy 6	Sell 2
						Sell 3
Mempool	Buy 1	Sell 1	Buy 4	Sell 1 ❌	...	Sell 4
	Buy 2	Sell 2	Buy 5	Sell 2 ❌	...	
	Buy 3		Buy 6	Sell 3		
				Sell 4		

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Methodology

4.3mn

Slot of MEV-Boost payments
analyzed

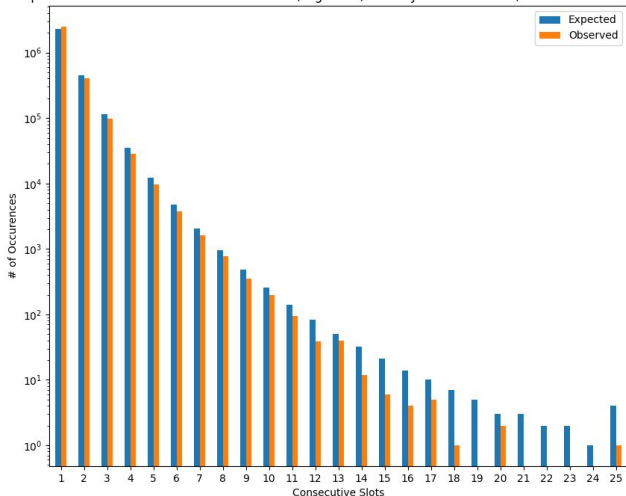**09/22 - 05/24**
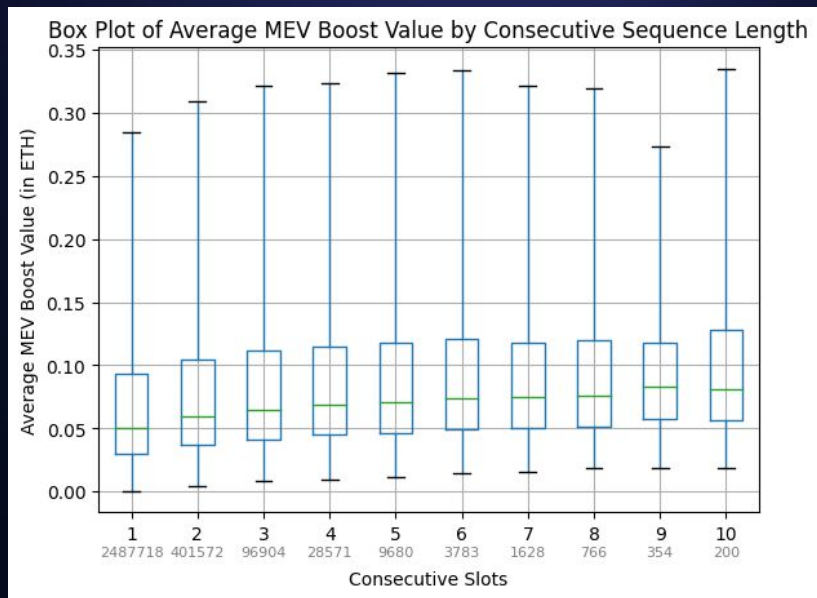
Time frame

Monte Carlo

Baseline

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Finding 1: Fewer multi-slot sequences exist than assumed by random distribution

Expected vs. observed Multi-slot occurences (Log Scale) on daily market shares (Monte Carlo runs: 100)
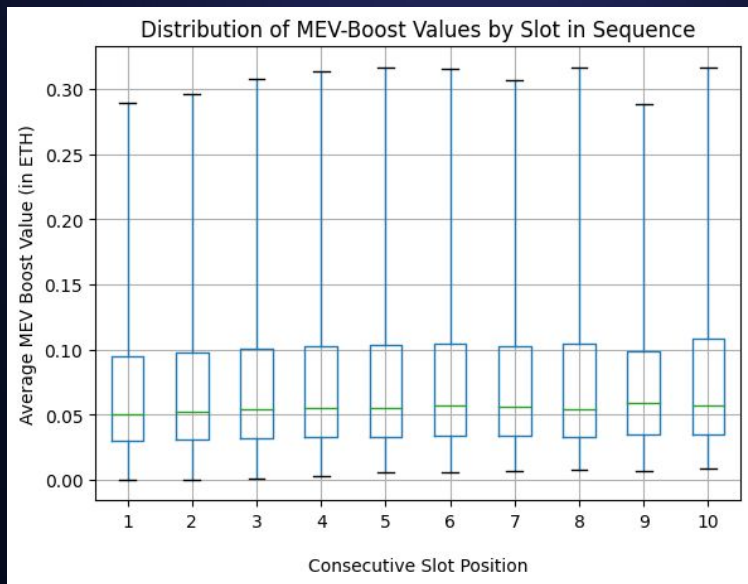
- We compared a Monte-Carlo simulation with the observed number of multi-slots

- **Significantly fewer multi-slot sequences occur than expected** when comparing the MC results (blue) with the observed distribution (orange)

- The longest sequence with the same validator (Lido) and builder (BeaverBuild) was 11 consecutive slots on March 4th, 2024

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Finding 2: Payments for multi-slot sequences are higher on average than for single slots

Box Plot of Average MEV Boost Value by Consecutive Sequence Length

- We observe **higher average MEV payouts for longer consecutive sequences**

- At this stage of the research we can only speculate why this is the case

- One hypothesis: It could be driven by an increasing intrinsic value for the second highest-bidder due to accumulating MEV in private order flow and the intrinsic valuation of the winning bidder remains constant

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Finding 3: Per-Slot-Payments also increase with longer sequences

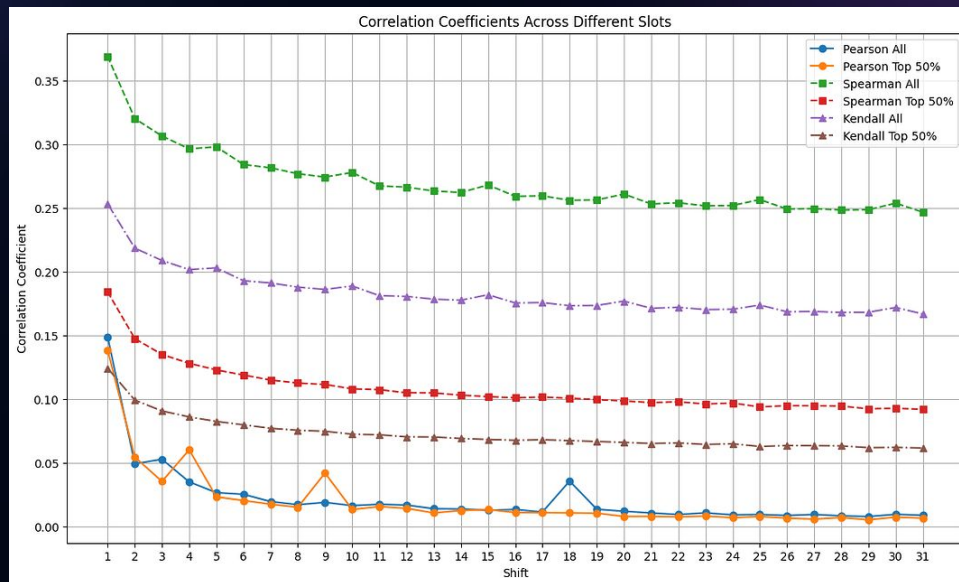Distribution of MEV-Boost Values by Slot in Sequence

- In the payment per slot analysis a **similar trend can be observed, however less prevalent**

- This suggests that there is slight value in longer sequences, but that builders are not willing to bid significantly more for longer consecutive sequences or the first slot after a longer sequence.

→ So far, this indicates that **multi-slot strategies are not applied systematically**

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Finding 4: Low auto-correlation between consecutive MEV-Boost payments

Within the first few slots, the **auto-correlation strongly decreases until an offset of 2 to 3 slots**

→ We can conclude that the MEV value can be moderately predicted no more than 1 to 3 slots in advance based on historical data.
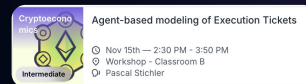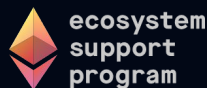

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Q&A

If this was interesting:

ETH Research Post
"Does multi-block MEV exist? Analysis of 2 years of MEV Data"

(bit.ly/mmev-analysis)

Agent-based modeling of Execution Tickets
Nov 15th — 2:30 PM - 3:50 PM
Workshop - Classroom B
Pascal Stichler

Join our **workshop on Execution Tickets at 2:30 pm** in Classroom B

X/Twitter: @ephemalabs

Research project generously supported by
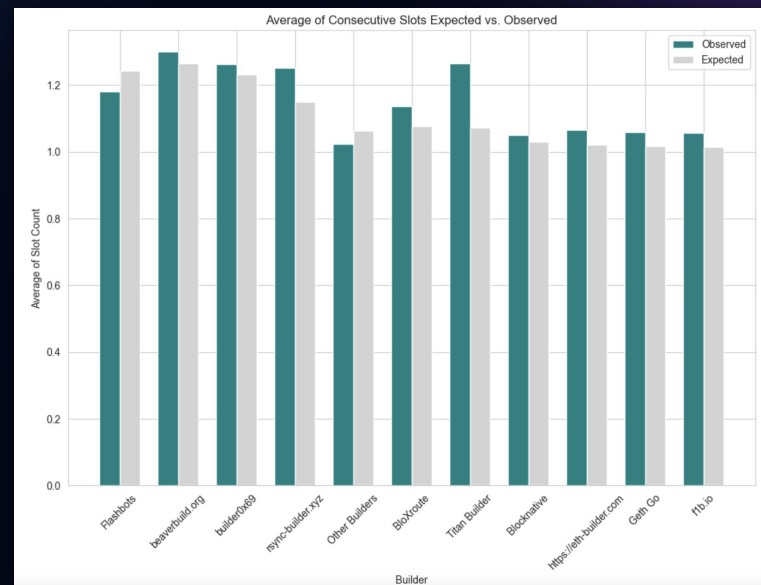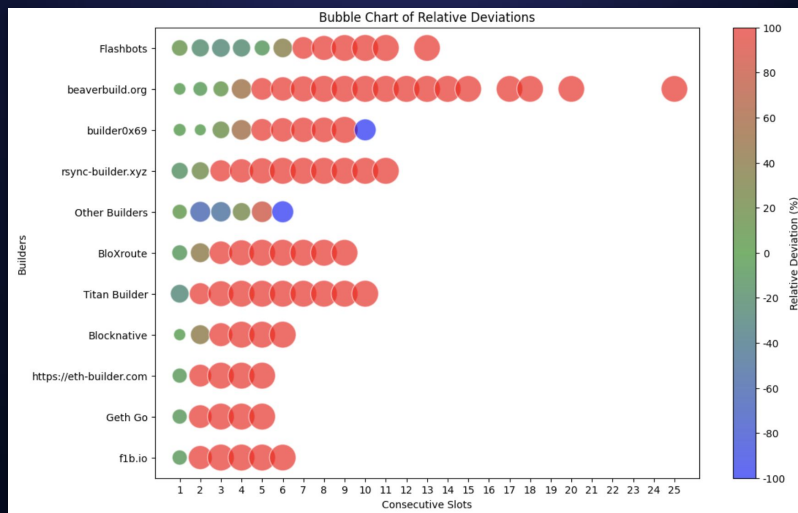
ecosystem support program

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Appendix

Conclusion

- Multi-slot sequences occur **less frequently than statistically** expected

- Average payments for longer multi-slot sequences **increase** with the **sequence length**

- Despite this, there is **no evidence of deliberate multi-slot MEV strategies** being deployed

- Individual builders do not significantly deviate from expected statistical distributions.

→ **No indication of dedicated multi-slot MEV strategies** currently

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Occurrence of multi-slots relative for builders

Multi-block MEV: Historical MEV boost payment distribution