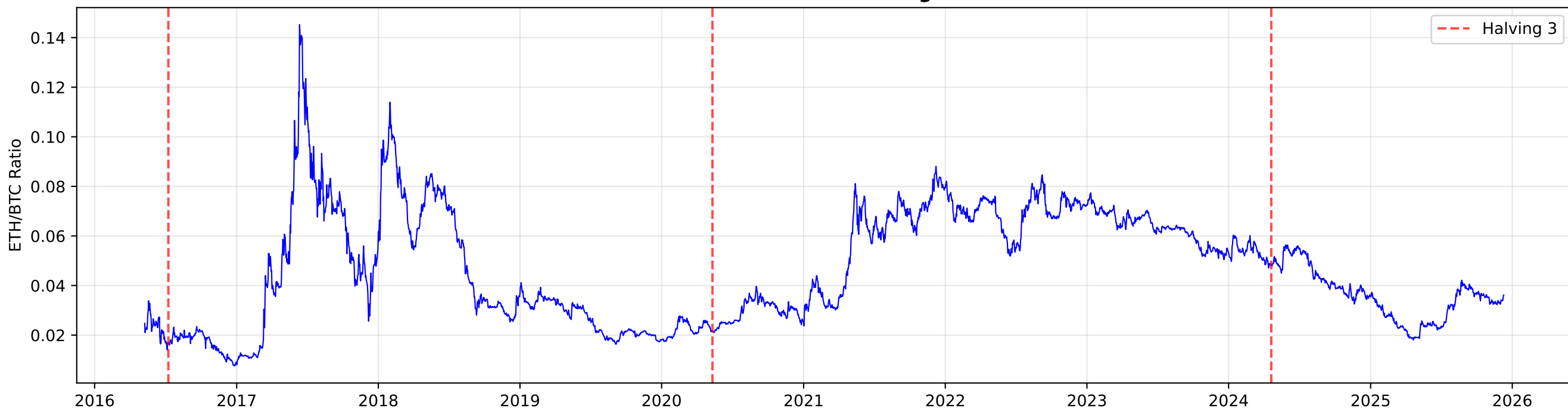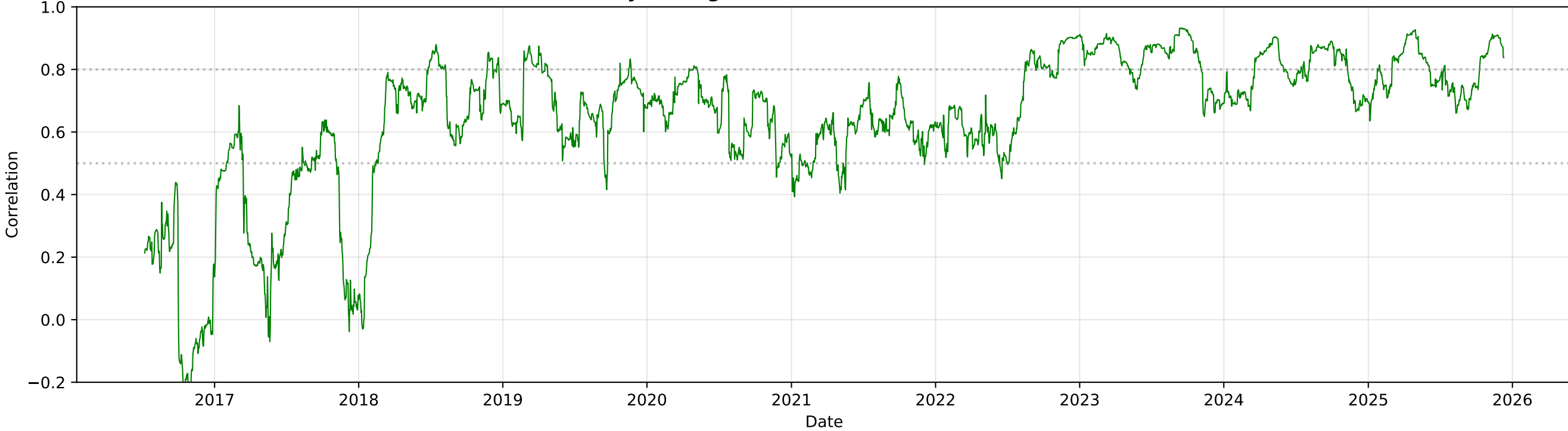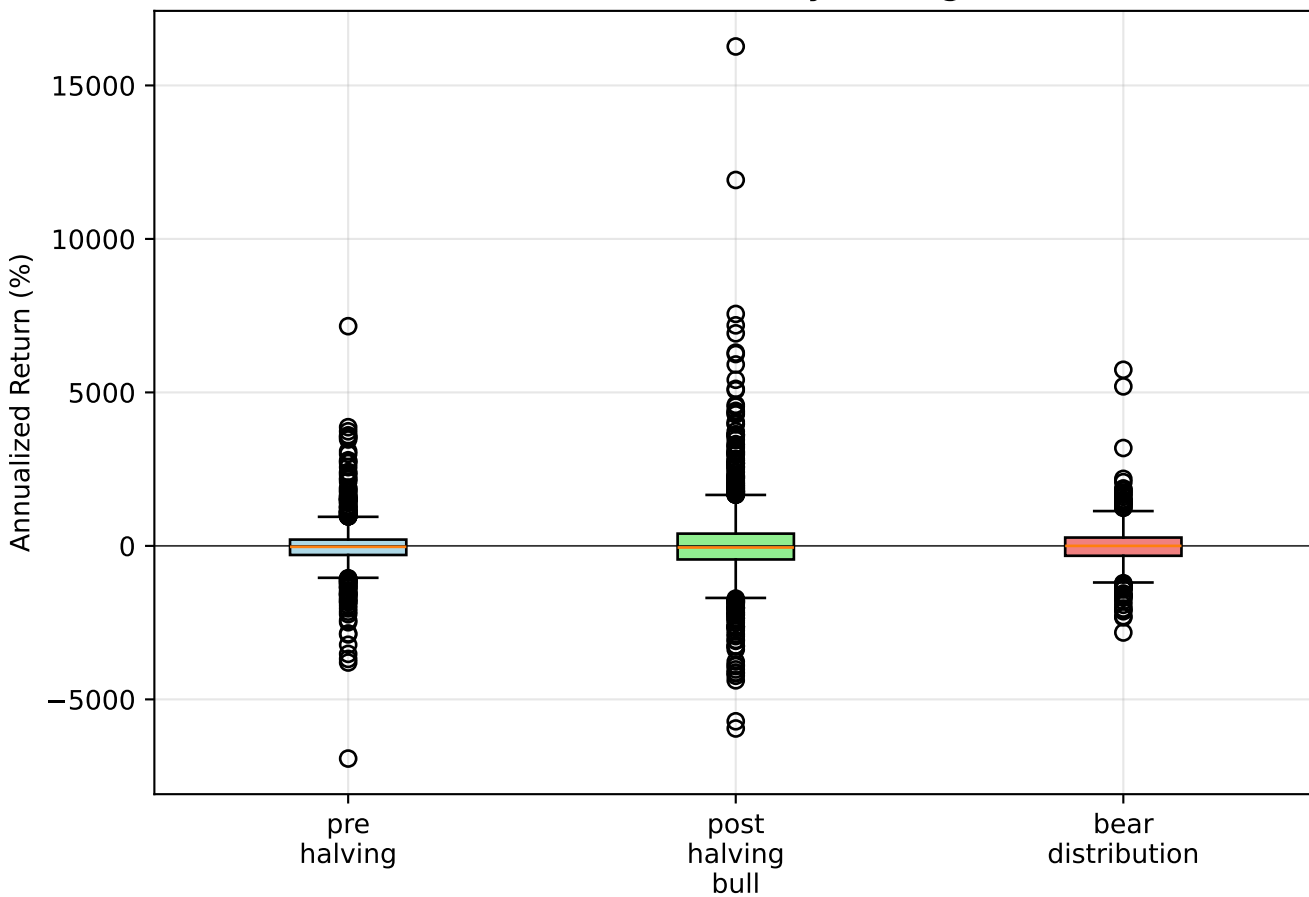**ETH/BTC Ratio with Halving Events**

BTC Dominance
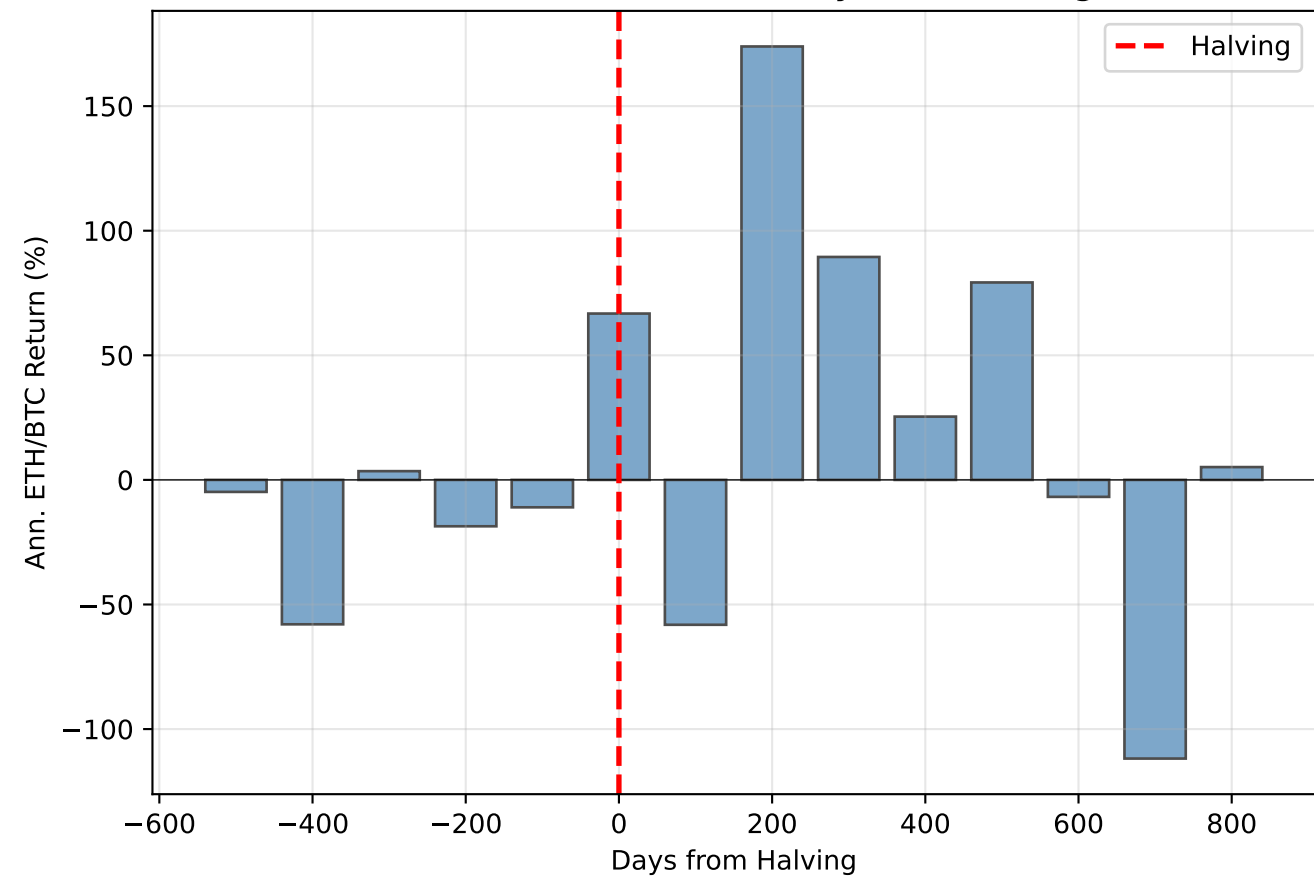
60-Day Rolling Correlation (ETH vs BTC Returns)
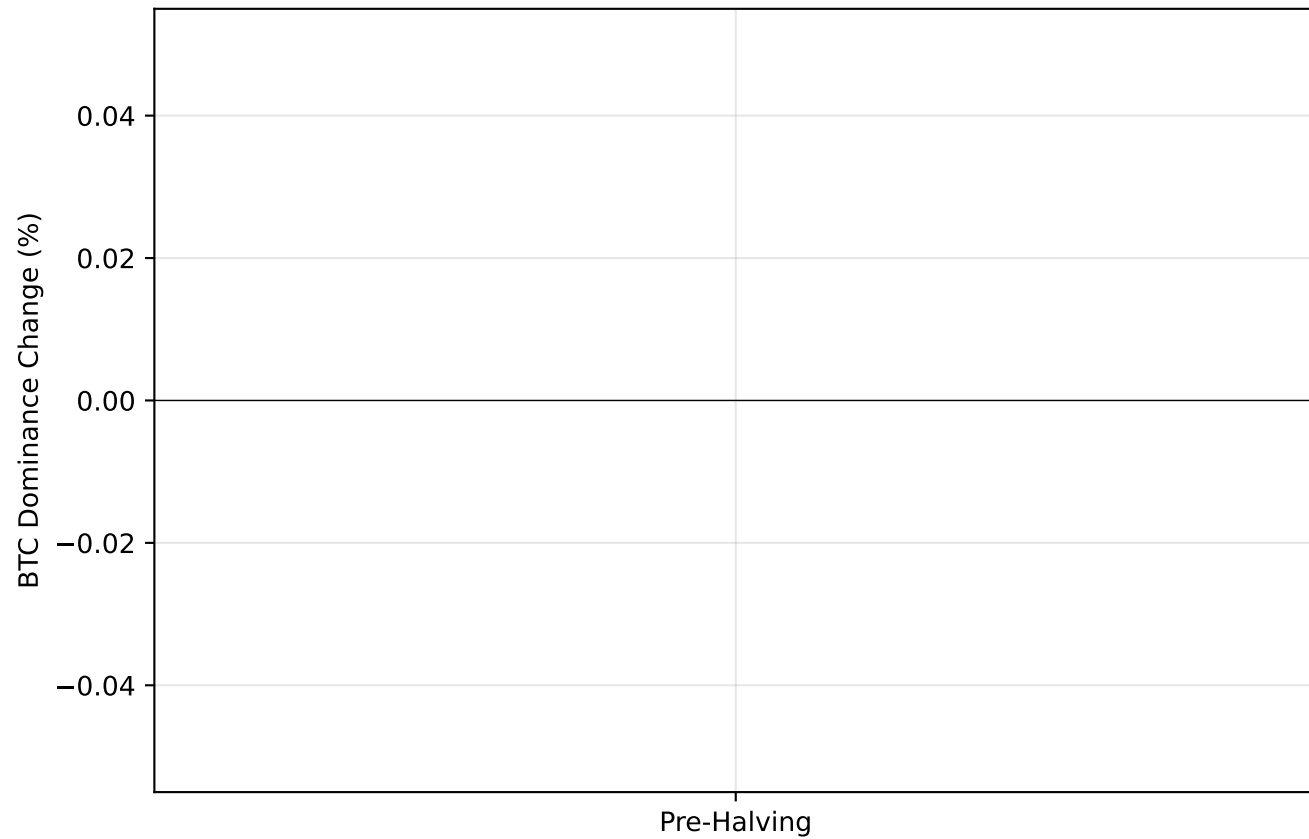
ETH/BTC Ratio Returns by Halving Phase (top-left)

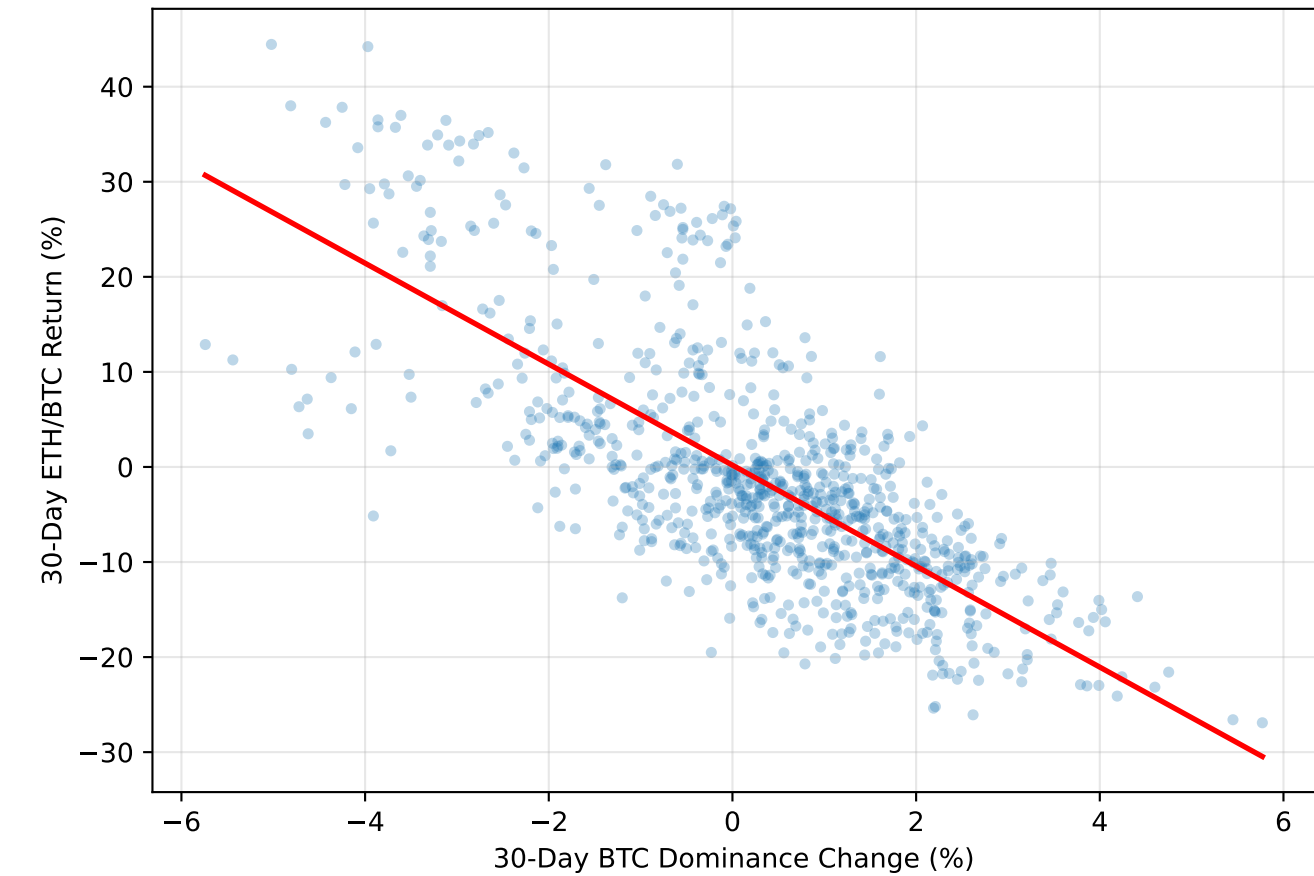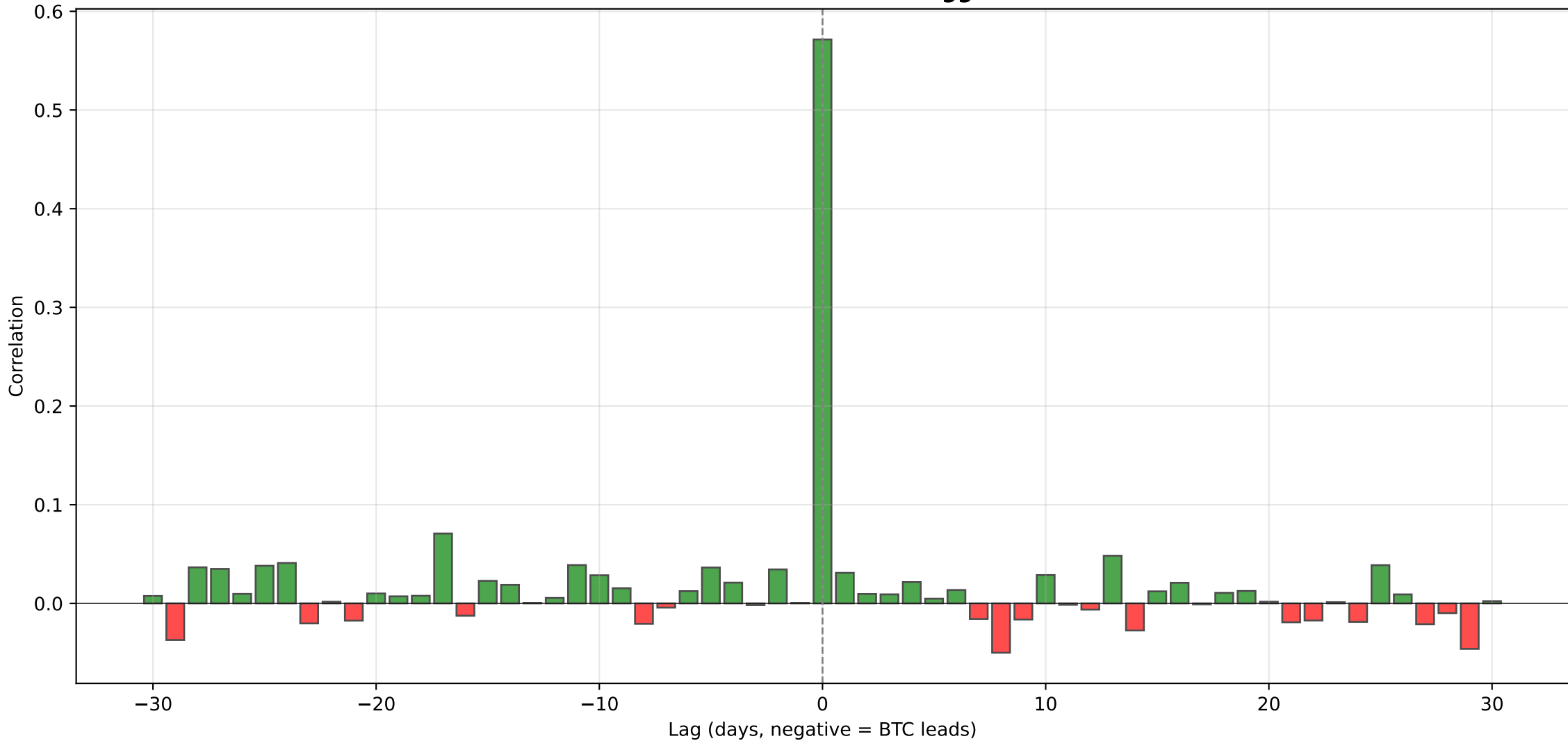**ETH/BTC Performance vs Days from Halving** (top-right)

BTC Dominance Change by Phase (bottom-left)

BTC Dominance vs ETH/BTC (r=-0.73) (bottom-right)

Cross-Correlation: ETH Returns vs Lagged BTC Returns

STUDY 1: ALT SEASON TIMING ANALYSIS - SUMMARY

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EXECUTIVE SUMMARY
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RESEARCH QUESTION: When does 'alt season' occur and what drives ETH?

KEY FINDINGS:

1. ETH-BTC CORRELATION:
   Mean rolling correlation: 0.644
   Range: -0.320 to 0.933
   → ETH is highly correlated with BTC but correlation varies

2. ALT SEASON BY HALVING PHASE:
   Pre Halving:
     Ann. Return: -13.7%
     Sharpe: -0.29
   Post Halving Bull:
     Ann. Return: 61.3%
     Sharpe: 0.80
   Bear Distribution:
     Ann. Return: -15.0%
     Sharpe: -0.35

3. COINTEGRATION:
   coint_log_eth_log_btc: No (p=0.1786)
   coint_log_eth_M2SL: No (p=0.2414)

4. LEAD-LAG RELATIONSHIP:
   Synchronous movement (r=0.571)


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CONCLUSIONS:
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• Alt season (ETH outperformance) most likely in POST-HALVING BULL phase
• BTC dominance drops signal alt season onset
• ETH and BTC are highly correlated but NOT cointegrated
• BTC typically leads ETH by 0-2 days
• Macro factors (M2, liquidity) have secondary influence

TRADING IMPLICATIONS:
• Increase alt exposure 3-6 months after halving
• Watch BTC dominance for rotation signals
• ETH beta to BTC is ~1.0-1.2 historically
```