

# BACKUP SLIDES: COMPLETE TABLES AND RESULTS

Table 1: Descriptive Statistics

Panel A: Full Sample (2019-2025)

Variable	N	Mean	Std Dev	Min	Max
Bitcoin Price (\$)	2,340	31,245	22,847	3,867	106,415
Returns (daily %)	2,340	0.18	3.72	-46.5	23.1
CEIR	2,340	64.7	45.2	8.3	289.4
log(CEIR)	2,340	3.68	0.52	2.12	5.67
Energy (TWh/year)	2,340	112.4	38.9	40.6	175.9
Volatility (30d)	2,340	0.568	0.231	0.187	1.426

Panel B: Pre-China Ban (2019-01-01 to 2021-06-20)

Variable	N	Mean	Std Dev	Min	Max
Bitcoin Price (\$)	902	19,832	16,243	3,867	64,854
CEIR	902	89.2	41.3	28.7	289.4
log(CEIR)	902	4.31	0.458	3.36	5.67
Electricity Price (\$/kWh)	902	0.0542	0.0087	0.040	0.070
Daily Cost (\$ millions)	902	12.3	5.8	4.2	26.1

Panel C: Post-China Ban (2021-06-21 to 2025-04-30)

Variable	N	Mean	Std Dev	Min	Max
Bitcoin Price (\$)	1,408	38,572	23,651	15,788	106,415
CEIR	1,408	47.8	28.6	8.3	142.7
log(CEIR)	1,408	3.52	0.479	2.12	4.96
Electricity Price (\$/kWh)	1,408	0.0783	0.0052	0.060	0.083
Daily Cost (\$ millions)	1,408	28.7	6.2	18.4	41.3

Table 2: Main Regression Results - 30-Day Forward Returns

Original CEIR Specification

$>Returns(t,t+30) = \alpha + \beta_1 \cdot \log(CEIR)_t + \beta_2 \cdot Volatility_t + \beta_3 \cdot FearGreed_t + \varepsilon$

Variable	Pre-Ban	Post-Ban	% Change
log(CEIR)	-0.1312**	-0.0623	-52.5%
	(0.055)	(0.039)	
	[p=0.043]	[p=0.114]	
Volatility	-0.251***	-0.268***	
	(0.043)	(0.028)	
Fear & Greed	0.089**	0.072*	
	(0.038)	(0.041)	
Constant	0.487***	0.412***	
	(0.124)	(0.098)	
N	902	1,408	
R²	0.064	0.039	
Adj. R²	0.061	0.037	

Standard errors in parentheses, p-values in brackets \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

Table 3: Alternative Return Windows

Panel A: Original CEIR

Horizon	Pre-Ban Coef	Pre-Ban p-val	Post-Ban Coef	Post-Ban p-val	% Reduction
30 days	-0.1312	0.043	-0.0623	0.114	52.5%
60 days	-0.2993	0.000	-0.1488	0.000	50.3%
90 days	-0.4397	0.000	-0.2243	0.000	49.0%

Panel B: Economic Significance

Horizon	Pre-Ban: 1 SD ↓ CEIR	Post-Ban: 1 SD ↓ CEIR
30 days	+6.0% return	+3.0% return
60 days	+13.7% return	+7.1% return
90 days	+20.1% return	+10.7% return

Table 4: Structural Break Analysis

Chow Test Results

Test	Statistic	Critical Value (1%)	p-value	Conclusion
Chow F-test	22.954	3.78	<0.0001	Strong break
Break date	2021-06-21	-	-	China ban

Interaction Model (DiD Style)

Returns =  $\alpha$  +  $\beta_1 \cdot \log(\text{CEIR})$  +  $\beta_2 \cdot \text{PostChina}$  +  $\beta_3 \cdot \log(\text{CEIR}) \times \text{PostChina}$  + controls

Variable	Coefficient	Std Error	t-stat	p-value
Intercept	0.5322	0.054	9.914	0.000
log(CEIR)	-0.1244	0.014	-8.632	0.000
post_china	-0.2784	0.063	-4.445	0.000
log(CEIR):post_china	0.0545	0.017	3.206	0.001
volatility_30d	0.0371	0.020	1.822	0.068

Interpretation: Interaction term shows 44% reduction in CEIR effect

Table 5: Robustness Tests

Panel A: Residualized CEIR (Addressing Endogeneity)

	Pre-Ban	Post-Ban
log(CEIR_residual)	-0.1423**	-0.0629
	(0.052)	(0.040)
	[p=0.028]	[p=0.112]
R <sup>2</sup>	0.074	0.040
N	872	1,408

First stage R<sup>2</sup> from purging regression: 0.150

Panel B: Full Controls Specification

	Pre-Ban	Post-Ban
log(CEIR)	-0.2113***	-0.1082**
	(0.079)	(0.055)
	[p=0.008]	[p=0.050]
Controls	Vol, F&G, Google, EPU	Same
R <sup>2</sup>	0.102	0.104

Table 6: Ethereum Merge Analysis

Volatility Comparison (3 months pre/post merge)

Asset	Pre-Merge Vol	Post-Merge Vol	Change
Ethereum	94.4%	65.7%	-28.7pp
Bitcoin	63.1%	50.2%	-12.9pp
Difference	31.3pp	15.5pp	-15.8pp*

Difference-in-Differences Regression

$$\text{Volatility} = \alpha + \beta_1 \cdot \text{ETH} + \beta_2 \cdot \text{PostMerge} + \beta_3 \cdot \text{ETH} \times \text{PostMerge} + \varepsilon$$

Variable	Coefficient	Std Error	t-stat	p-value
Constant	0.6307	0.019	32.624	0.000
ETH dummy	0.1565	0.013	11.655	0.000
Post-merge	-0.1288	0.028	-4.521	0.000
ETH × Post-merge	-0.1583*	0.045	-3.487	0.000

Result: Ethereum became 15.8pp MORE volatile relative to Bitcoin

Table 7: Mechanism Tests - Mining Geography

Hash Rate Distribution

Country	Pre-Ban (%)	Post-Ban (%)	$\Delta$
China	65-75%	0%	-70%
USA	7%	35%	+28%
Kazakhstan	6%	18%	+12%
Russia	7%	11%	+4%
Canada	3%	10%	+7%
Others	12%	26%	+14%

### Electricity Price Dispersion

Period	Mean (\$/kWh)	Std Dev	Range
Pre-Ban	0.054	0.009	0.04-0.07
Post-Ban	0.078	0.021	0.03-0.12

## Table 8: Trading Strategy Performance

### Simple CEIR Trading Rule

**Buy when:** CEIR < 30-day MA - 1.5 $\sigma$

**Sell when:** CEIR > 30-day MA + 1.5 $\sigma$

Period	Annual Return	Sharpe Ratio	Max Drawdown
Pre-Ban (2019-2021)	24.3%	0.87	-18.2%
Post-Ban (2021-2025)	8.1%	0.31	-27.6%
Buy & Hold	42.7%	0.68	-52.3%

## Table 9: Alternative Specifications

### Different CEIR Constructions

Specification	Pre-Ban $\beta$	Post-Ban $\beta$	Difference
Baseline (Market/Cost)	-0.1312**	-0.0623	-52.5%
Cost/Market (inverse)	0.1287**	0.0615	-52.2%
Flow (daily cost only)	-0.0234	-0.0187	-20.1%
Hash rate	-0.0089	-0.0076	-14.6%

**Conclusion:** Cumulative measures dominate flow measures

Table 10: Sample Sensitivity Analysis

Different Sample Periods

Sample	CEIR Coefficient	p-value	R²	N
Full (2019-2025)	-0.0847***	0.003	0.048	2,340
Include 2018	-0.0234	0.412	0.021	2,887
2020-2025 only	-0.0923**	0.021	0.052	1,986
2021 only (pre-ban)	-0.1563**	0.019	0.089	171

Table 11: Comprehensive Summary Statistics

Key Statistics by Period

Metric	Pre-Ban	Post-Ban	Change
CEIR			
Mean	89.2	47.8	-46.4%
Median	78.4	41.2	-47.5%
Std Dev	41.3	28.6	-30.8%
Daily Mining Cost			
Mean (\$M)	12.3	28.7	+133.3%
Total (\$B)	11.1	40.4	+263.9%
Electricity			
Price (\$/kWh)	0.054	0.078	+44.4%
Consumption (TWh/yr)	87.2	134.6	+54.4%
Market Dynamics			
Avg Price (\$)	19,832	38,572	+94.5%
Volatility	61.2%	53.1%	-13.2%
Correlation(CEIR,Ret)	-0.279	-0.142	-49.1%

Figure References (Not Shown Here)

Figure 1: CEIR Evolution Timeline

- Shows log(CEIR) from 2019-2025
- Vertical lines at China ban and ETH merge

- Clear regime change visible

### **Figure 2: Scatter Plot - Structural Break**

- Pre-ban: Clear negative relationship
- Post-ban: Flattened relationship
- Fitted lines show 52% reduction

### **Figure 3: Volatility Regimes**

- Bitcoin and Ethereum volatility
- Annotations show differential changes
- Visual confirmation of DiD results

### **Figure 4: Geographic Dispersion**

- Electricity prices pre/post ban
- Daily network costs evolution
- Explains mechanism visually