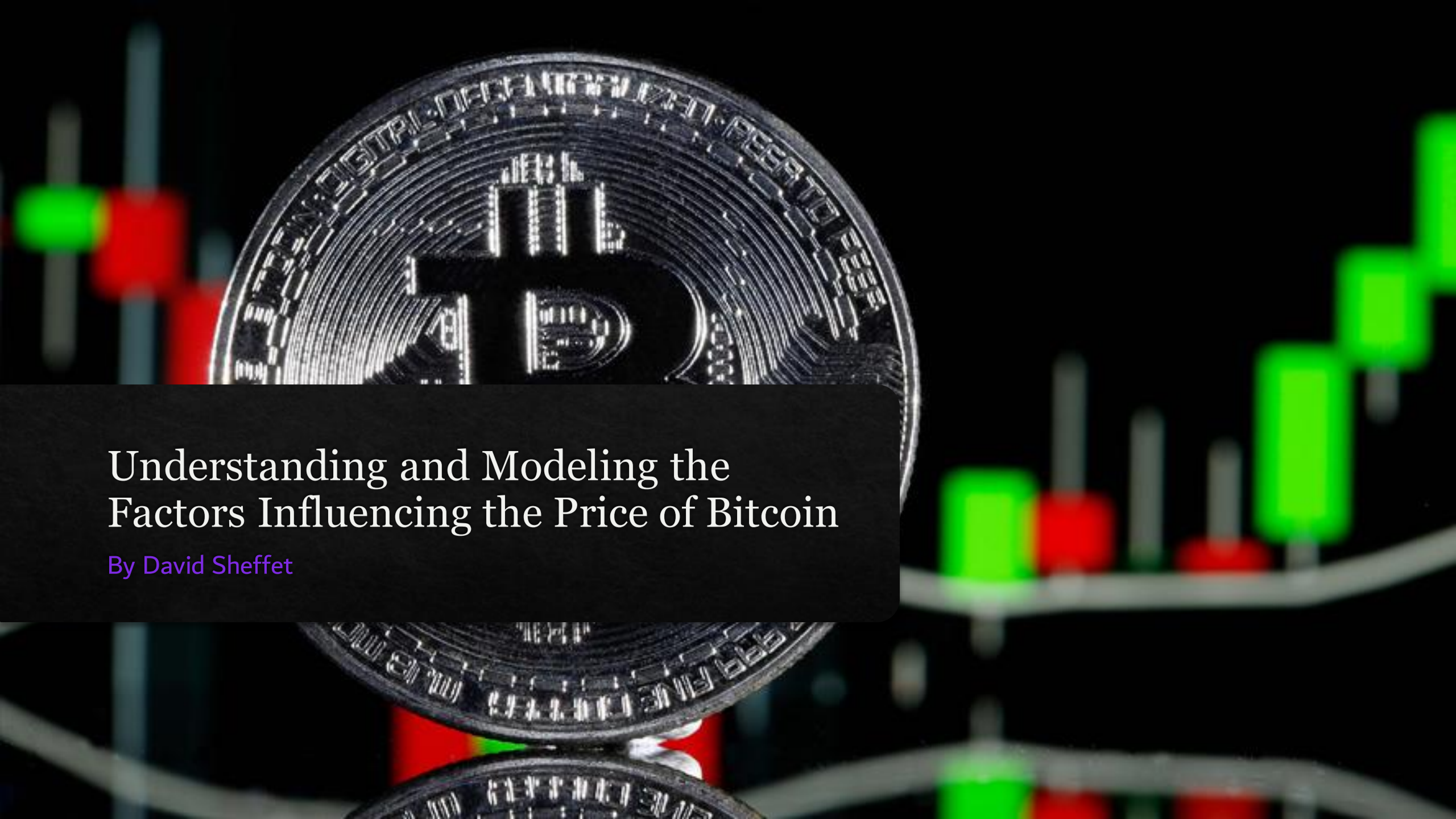


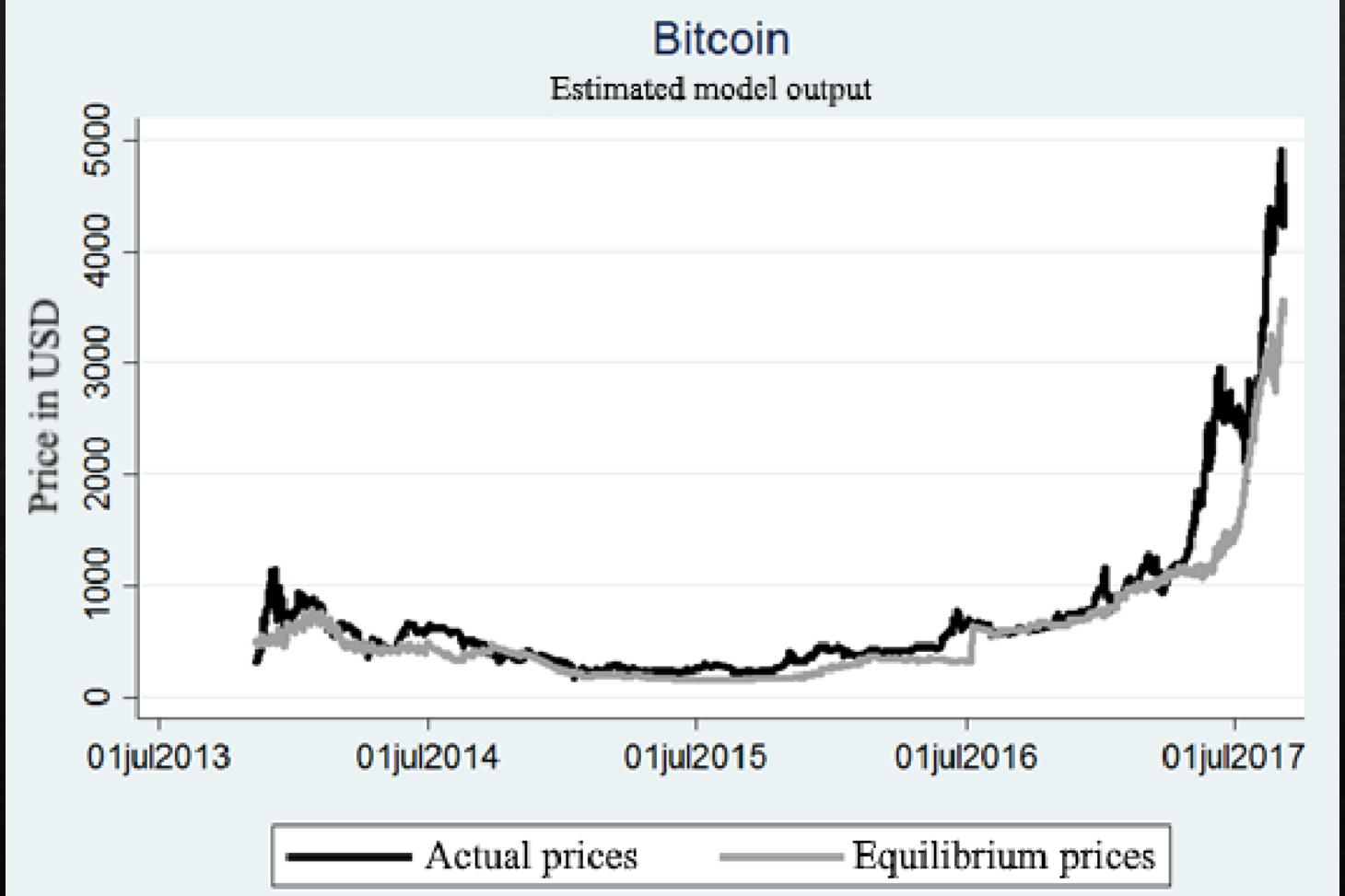
Understanding and Modeling the Factors Influencing the Price of Bitcoin

By David Sheffet

Previous Authors Model

- Used ordinary least-squares model (OLS)
- Key takeaways

5 Results



Other Articles

E*TRADE

The price of cryptocurrencies is impacted by supply and demand. Here are several factors that may affect the price of Bitcoin

Kade Garrett

Addressed some specific issues in other studies

Talked about how institutional money affects bitcoins price

Predicted Equation:

$$Price = \beta 0 + \beta 1 * MarketCap + \beta 2 * Volume + \beta 3 * Blocksize + \beta 4 * MiningDiff + \beta 5 * HashRate + \beta 6 * SocialMedia + \beta 7 * WalletCreation + \varepsilon$$

Variables

AvgBlockSize - The average block size per day in megabytes

Difficulty - A relative measure of how difficult it is to mine a new block for the blockchain per day

FFR - The interest rate at which depository institutions trade federal funds (balances held at Federal Reserve Banks) with each other per day

FeePerTransaction - The daily average transaction fees in USD per transaction

HashRate - The estimated number of terahashes per second the bitcoin network is performing per day

MarketCap - The measure the size and value of a cryptocurrency equal to price times volume

MarketPrice - The average USD market price across major bitcoin exchanges

NTransactionsperblock - The total number of confirmed transactions per day

NVT - Network Value to Transactions. A measure of network activity determined by dividing the Network Value (= Market Value) by the total transactions volume in USD per day

NWalletperd - The total number of unique addresses used on the blockchain

NetworkControlScore - The average percentage of hash power provided to the network by each of the 5 top 5 mining pools

TradeVol - The total number of transactions on the blockchain

VIX - VIX measures market expectation of near-term volatility conveyed by stock index option prices per day

VolumeBTC - The total number of bitcoins on the Gemini Exchange at the end of a day

VolumeUSD - The total dollar amount on the Gemini Exchange at the end of a day

WebSearchesPrecentile - This is an adjusted metric based off of Google trends data regarding bitcoin. The data is adjusted from monthly to be a daily average from that month. It is a percentile.

Close - This is the daily price that bitcoin was at on the Gemini Exchange at 6pm EST

Date - This was the day each piece of data was from. This enables the combination of multiple sources of data.

High - This is the highest price that bitcoin was priced at on the Gemini Exchange during each day

Low - This is the lowest price that bitcoin was priced at on the Gemini Exchange during each day

ntransactionsexcludingpopular - The total number of transactions excluding those involving the network's 100 most popular addresses

Open - This is the daily price that bitcoin was at on the Gemini Exchange at 4am EST

Symbol - This is the link to the data source.

```
. regress MrktPrice HashRate NTransactionsperblock Difficulty NVT NWalletperd NetworkControlScore TradeVol VolumeBTC VolumeUSD WebSear
> chesPrecentile ntransactionsexcludingpopular open
```

Source	SS	df	MS	Number of obs	=	97
				F(12, 84)	=	61599.59
Model	1.2292e+09	12	102435466	Prob > F	=	0.0000
Residual	139685.662	84	1662.92455	R-squared	=	0.9999
				Adj R-squared	=	0.9999
Total	1.2294e+09	96	12805888.4	Root MSE	=	40.779

MrktPrice	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
HashRate	-8.85e-07	1.13e-06	-0.79	0.434	-3.12e-06	1.35e-06
NTransactionsperblock	-.0812223	.1513513	-0.54	0.593	-.382201	.2197564
Difficulty	2.23e-12	8.62e-12	0.26	0.797	-1.49e-11	1.94e-11
NVT	-.3484483	1.097325	-0.32	0.752	-2.5306	1.833703
NWalletperd	.0002416	.0002093	1.15	0.252	-.0001747	.0006579
NetworkControlScore	.800033	1.600642	0.50	0.619	-2.383018	3.983085
TradeVol	-5.29e-08	4.80e-08	-1.10	0.274	-1.48e-07	4.26e-08
VolumeBTC	.1052328	.0357236	2.95	0.004	.0341925	.176273
VolumeUSD	-6.48e-06	2.00e-06	-3.23	0.002	-.0000105	-2.49e-06
WebSearchesPrecentile	.6309367	2.495559	0.25	0.801	-4.331757	5.59363
ntransactionsexcludingpopular	.0006411	.0010252	0.63	0.533	-.0013975	.0026798
open	1.005125	.0022342	449.88	0.000	1.000682	1.009568
_cons	-120.6115	109.9709	-1.10	0.276	-339.3006	98.07773

Equation 1:

MrktPrice = -120.6115 + (-8.85e-07 * HashRate) + (-0.0812223 * NTransactionsperblock) + (2.23e-12 * Difficulty) + (-0.3484483 * NVT) + (0.0002416 * NWalletperd) + (0.800033 * NetworkControlScore) + (-5.29e-08 * TradeVol) + (0.1052328 * VolumeBTC) + (-6.48e-06 * VolumeUSD) + (0.6309367 * WebSearchesPrecentile) + (0.0006411 * ntransactionsexcludingpopular) + (1.005125 * open) + ε

Equation with best R-Squared

MrktPrice = 19742.04 + 0.0004025 * VolumeUSD - 7.531505 * VolumeBTC - 0.0215044 * NWalletperd + 6.86e-06 * TradeVol + 0.000062 * HashRate + 5.865124 * NTransactionsperblock - 271.2442 * VIX - 2014.362 * FFR + ε

```
. regress MrktPrice VolumeUSD VolumeBTC NWalletperd TradeVol HashRate NTransactionsperblock VIX FFR
```

Source	SS	df	MS	Number of obs	=	95
				F(8, 86)	=	36.69
Model	899544713	8	112443089	Prob > F	=	0.0000
Residual	263552254	86	3064561.09	R-squared	=	0.7734
				Adj R-squared	=	0.7523
Total	1.1631e+09	94	12373372	Root MSE	=	1750.6

MrktPrice	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
VolumeUSD	.0004025	.0000745	5.40	0.000	.0002543	.0005507
VolumeBTC	-7.531505	1.276853	-5.90	0.000	-10.0698	-4.993206
NWalletperd	-.0215044	.0054132	-3.97	0.000	-.0322654	-.0107433
TradeVol	6.86e-06	1.87e-06	3.66	0.000	3.13e-06	.0000106
HashRate	.000062	7.53e-06	8.24	0.000	.000047	.000077
NTransactionsperblock	5.865124	1.070299	5.48	0.000	3.737439	7.992808
VIX	-271.2442	61.74447	-4.39	0.000	-393.9882	-148.5003
FFR	-2014.362	471.3613	-4.27	0.000	-2951.397	-1077.327
_cons	19742.04	3108.402	6.35	0.000	13562.74	25921.34

Best Fitting Equation

Weaknesses

Not combining the two data sets, as I need help finding an overlapping variable

Missing Variables

- Market News - plays a significant role in terms of price discovery
  - roughly included in this equation by including Google trend analysis and tracking trading volume, which is highly correlated with market news, it is not directly included
- Regulatory Changes - I did not devise an effective way to measure any regulatory change or announcement
  - Interest-rate tracking included however any governmental change or hostility towards Bitcoin would not be included
    - An example would be the Chinese government attempting to ban all bitcoin inside their country, which caused a significant price decrease
- Could not develop a good descriptor for the estimated time to halving
  - The Bitcoin halving occurs every 210,000 blocks, massively shifting the price as miners' reward decreases by half
  - Due to the unpredictable nature of when that halving occurs, I could not devise an effective means to measure it

Predicted Price of Bitcoin

- Historical Trends
  - Market conditions remain the same
  - Bitcoin may continue to rise gradually over the next year, with significant volatility and corrections
- Increased Market Volatility
  - Market conditions worsen
    - Ie Stagflation ect
  - Bitcoin would experience fluctuations, from changes in demand, supply, and investor behavior
  - Bitcoin price would be negatively effected

Conclusion

- This model should be used to understand further what factors affect the price of Bitcoin
- It has use in terms of investment decisions
- It can also help people better understand the risk of acquiring or holding Bitcoin

this model can aid in further research and development of better models that predict the prices of commodities, specifically Bitcoin

THANK YOU

any questions