DELPHI DIGITAL

Bitcoin Holder Analysis Through Cycles

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Introduction

This write-up serves as a supplement to the short term outlook we provided within "The State of Bitcoin". As we mentioned in the report, this concept was previously posited by Unchained Capital in their Hodl Waves Analysis piece. We expand on this analysis to identify when selling pressures will likely wane to forecast the timing of upcoming market cycles. Below, you can find the key takeaways we provide rationale and support for throughout this packet.

Function of UTXOs In Our Analysis

- UTXO stands for the unspent output from bitcoin transactions. Without going into too much detail regarding how Bitcoin's record keeping model functions, every transaction creates a new UTXO and the age of the UTXO indicates the block that it was first included in. In Layman's terms, the UTXO age indicates the last time bitcoin was moved. Analyzing Bitcoin's aggregate UTXO age distribution over time provides insight into buying and selling patterns through previous market cycles, along with where we stand now, and what we can likely expect moving forward.

Key Takeaways

- There have been consistent trends in UTXO age distribution and how that distribution relates to time and price.
- Lost coins likely make up a significant portion of 5 year+ holders, which helps function as a plug when backing into the movement of other UTXO age bands (since it's a zero sum game)
- Selling pressure from long term holders, primarily those holding between 3-5 years, is almost exhausted.
- We're seeing another accumulation process by longer term holders begin, similar to the one at the end of 2014.
- Using the timing of previous price bottoms relative to different bitcoin accumulation points, we are able to use current UTXO dynamics to strengthen our forecast of a rough date for a price bottom (sometime in Q1 2019).

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UTXO Analysis & Market Cycles

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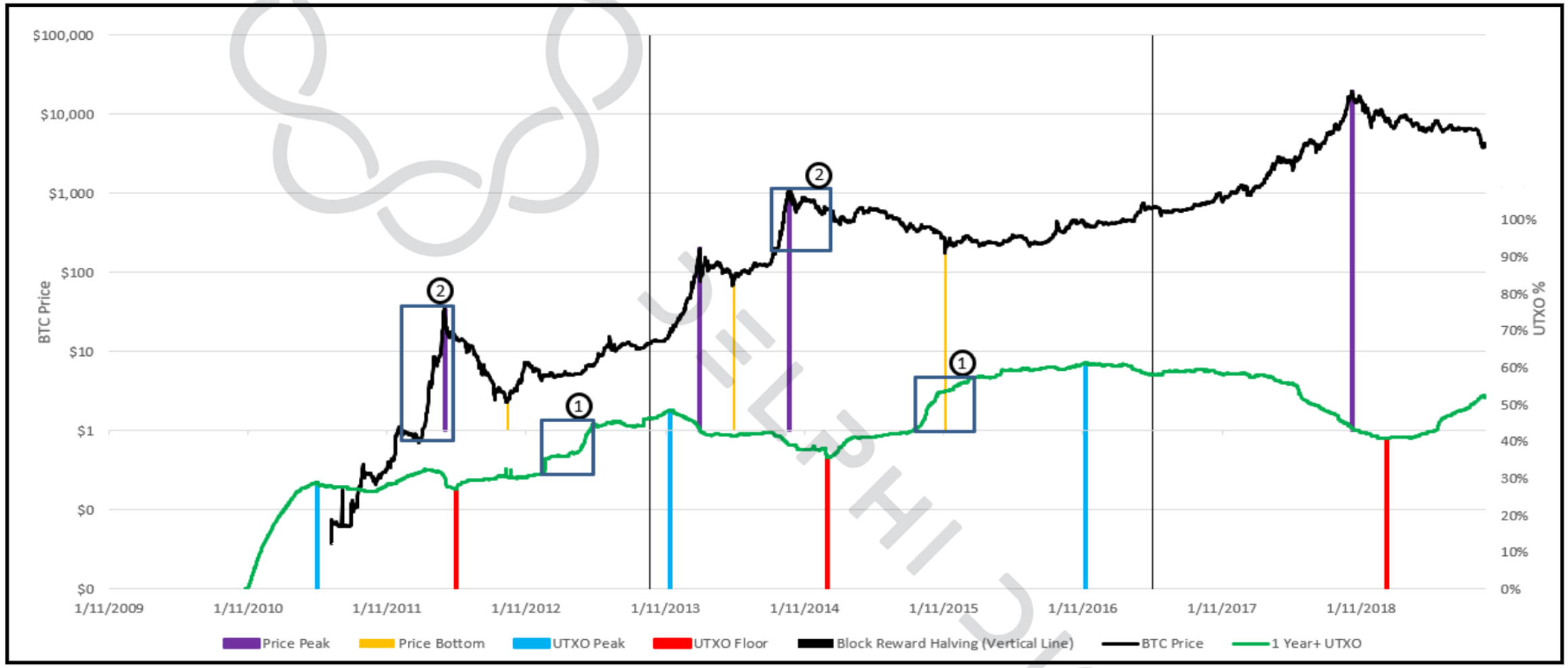
The purpose of this chart is to illustrate the underlying movement of specific bitcoins through previous market cycles using UTXO data.



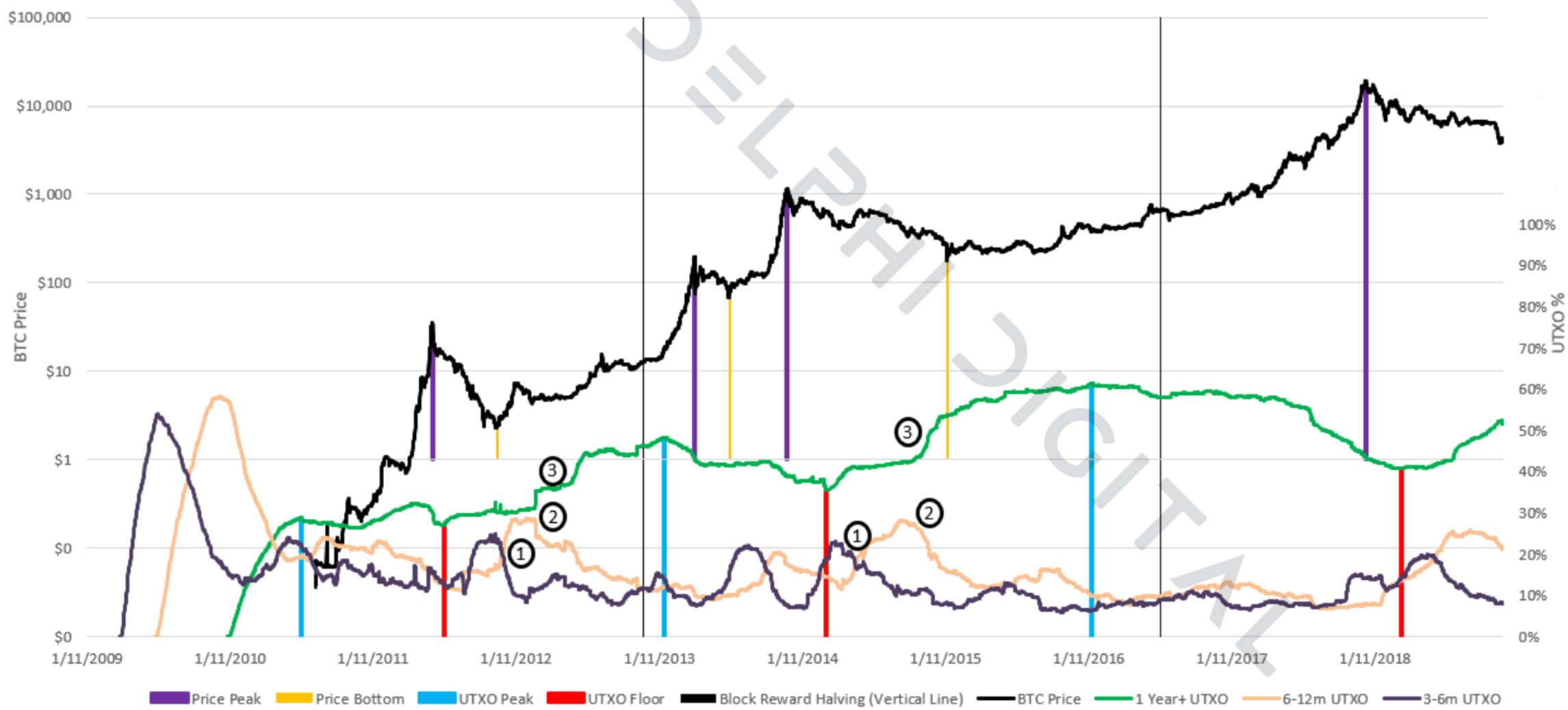
Methodology: The **black line** represents the price of BTC on a logarithmic scale and the **green line** shows the percent of bitcoin UTXO's that have not been used in a transaction in at least a year. We will refer to this line simply as the "**UTXO line**". The boxes[1] sectioning off portions of the UTXO line begin with times where it grows significantly, and end after said rapid growth tapers off in that cycle. In order for a coin to move into the **1 Year+ UTXO band**, it must be untouched for at least one year. We section off the corresponding box[2] on the price chart that indicates the price at which they were last moved to provide timing context. The trend here clearly shows the rapid growth in the UTXO line corresponding with boom and bust cycles. As we saw at the end of 2017, continued price appreciation leads to a rapid influx of new users/additional money into bitcoin, often deep into a rally, subsequently followed by a significant price collapse. In other words, these individuals became the "bag holders" of their time.

Data as of December 3rd, 2018
Sources: Unchained Capital

Movement Across UTXO Bands

Now we introduce lines that represent coins that haven't been moved in **3-6 months** and **6-12 months**. In both instances you can see the untouched coins shift from the **3-6 month line**[1] to the **6-12 month line**[2], and then eventually into the **1 year+ UTXO line**[3]. After these shifts, the **UTXO line** plateaus as we enter a brief "quiet period" where price remains steady. Following this "quiet period", the **UTXO line** slowly begins to climb as we approach the next block reward halving, represented by the thin vertical line. Although there's a clear reduction of natural selling pressure from a block reward halving, it's difficult to isolate its direct impact because market participants likely price it in.

It's important to note that, collectively, these bands represent the total distribution of coins, so they must all sum to 100%*. We can use, both, the timing and wave height of preceding band shifts as indicators for upcoming band shifts. This is because a coin can only shift bands in two ways: either (1) to the adjacently older band as it remains untouched or (2) to the youngest band if it has moved wallets. In other words, declines in any UTXO line can happen immediately while growth is lag dependent on the time frame.



**We don't show the line representing coins that have moved in the within the past 3 months because it creates significant noise in the chart, but it's factored into the analysis. That metric is more relevant further on in the analysis. Please reach out if you'd like to see that chart.*

Who's Selling & Are They Done? (1/3)

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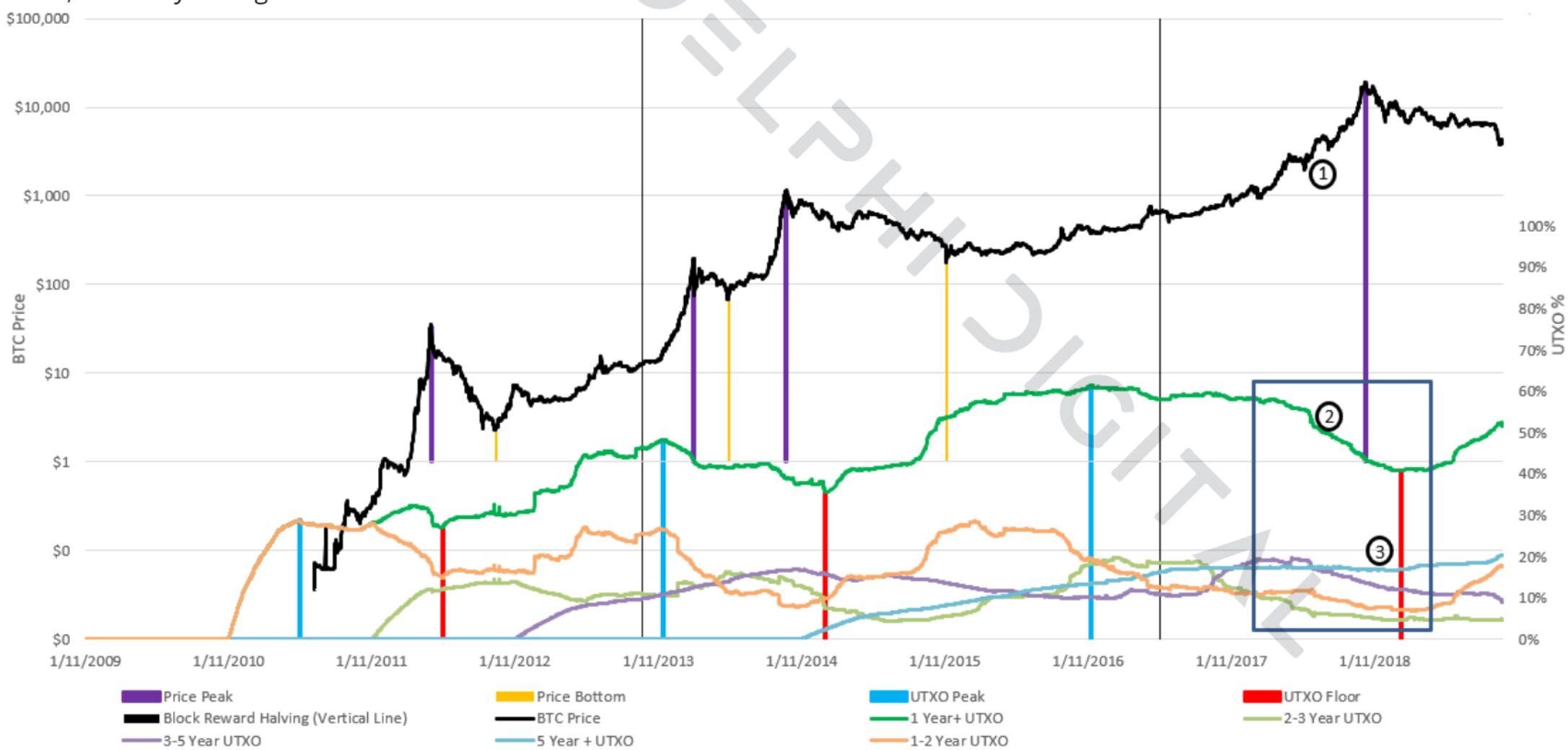
We've established there is a reduction of natural selling pressure from the reward halving, but it's also important to address another major source of selling: long term holders. The **1 Year UTXO line** only changes when coins that haven't been moved for a year are moved (**UTXO line** goes down) or when coins cross the threshold of being untouched for less than a year to over a year (**UTXO line** goes up). Actual movements across these bands can only be analyzed through the individual time bands that make up the **1 Year+ UTXO line**, which we breakout into **1-2 Years**, **2-3 Years**, **3-5 Years**, **5 Years +***.

Applying this analysis to the most recent decline, we can get an idea of where the selling pressure is coming from and approximate how close we are to selling exhaustion. As the price started taking off in early 2017[1], we saw a simultaneous decline in the **1 year UTXO line**[2]. This was indicative of people likely moving their bitcoin to exchanges to sell it. Looking at the same time frame from a UTXO perspective (captured by the **blue box**), we see the **1 Year UTXO line** drop from ~58% to ~41%. During that same time period, the **5 Year+** remains nearly flat[3], going from ~2.8 million coins to ~3 million coins (most of the change is a result of the increased supply). Chainalysis completed a thorough analysis of likely lost bitcoins and came to an estimate ranging from 2.78-3.79M coins. Although these coins were lost throughout bitcoin's history, the majority were lost early on, especially given that the person(s) known as Satoshi Nakamoto accounts for ~1 million of them. This implies that a significant portion of coins in the **5 Year+ band** are lost. The rest of the lost coins will progressively make their way through the bands in a similar fashion, ultimately ending in the **5 Year+ band**.



More granular thresholds were used for the analysis, bands in the chart are used to reduce clutter while still illustrating the same point.

Who's Selling & Are They Done? (2/3)

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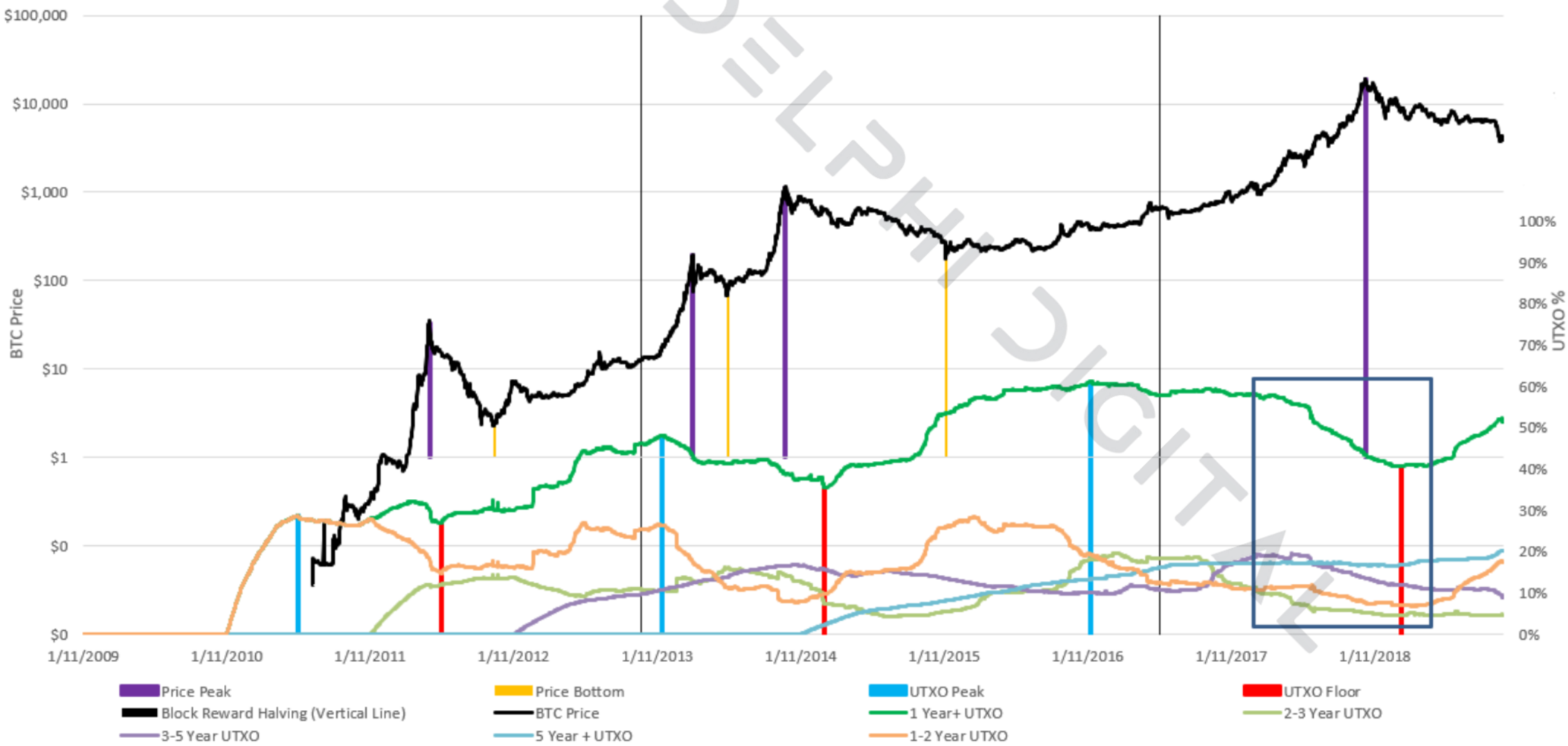
Building off this assumption, the **5 Year+ band** can function as both a plug and an amplifier for our analysis . As previously mentioned, there are two rules that coins must follow when moving through this chart: they either move up to the following chronological band over time or they reset to the beginning if they are moved. With each cycle bitcoin goes through, lost coins will make up a greater percent of the **5 Year+ band** as some long term holders sell at prices they believe are too expensive at any given time.

The **5 Year+ UTXO band** functions as a grounding constant because as it's increasingly made up of lost coins, so it becomes a more suitable variable to be used to back into the movement of previous bands. The amplifier effect is based on the idea that a small decline in the **5 Year+ band** can be attributed to a potentially sizable percent of actual **5 Year+ holders** (those who have control of their coins) selling. It also implies most coins in this long-term band are unlikely to move because they are, indeed, lost.



Who's Selling & Are They Done? (3/3)

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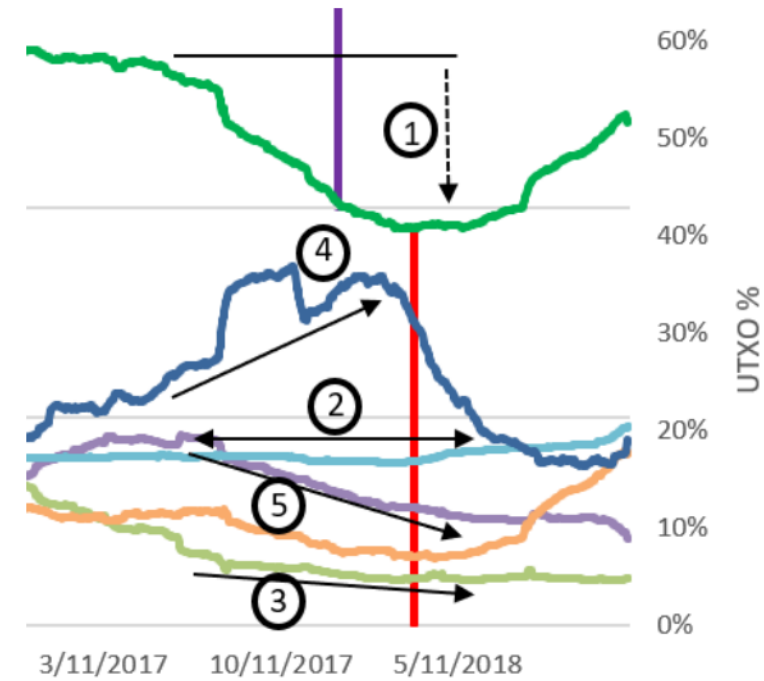
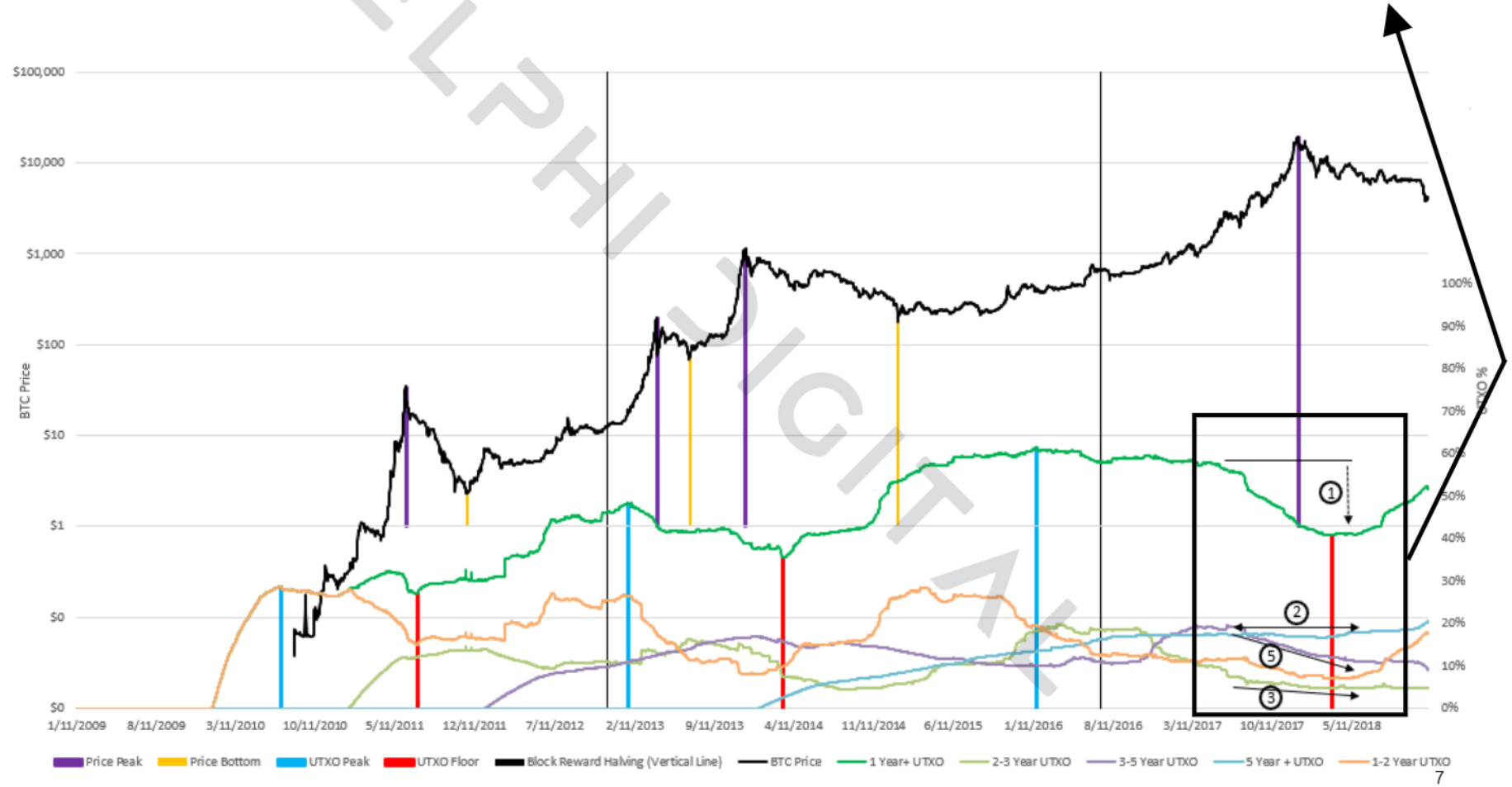
A key takeaway from combining these concepts is it doesn't require much coin movement from the **3Y-5Y band** to the **5 Year+ band** to create an uptick in the latter since a small percent of **5 Year+ UTXO** coins have the ability to move. Logically, declines in the **5 Year+ band** imply very few coins from the **3Y-5Y band** were held and moved into the **5 Year+ band**. We can safely assume the primary source of selling came from coin owners who've been holding for 3-5 years given the combination of a:

- massive reduction in the **1 year+ UTXO**[1]
- flat **5 Year+ UTXO**[2]
- minimal decline in the **2Y-3Y UTXO**[3]
- significant uptick in ≤ **3 month UTXO**[4] (only shown in mini image)
- significant downturn in the **3Y-5Y UTXO**[5] that coincides with **1 Year UTXO**[1]



Another important takeaway is we can assume these older owners have exhausted much of their selling efforts, evident in the flattening of these older UTXO bands, coupled with the **1 Year UTXO band** reaching a floor and staying flat through the first half of 2018. In the second half of 2018, the **1 year UTXO band** began to exhibit a positive growth trajectory directly in tandem with the **1-2 Year band** as older UTXO bands remained flat. We're seeing an accumulation process now similar to the one at the end of 2014. This would imply a bottom is in sight.



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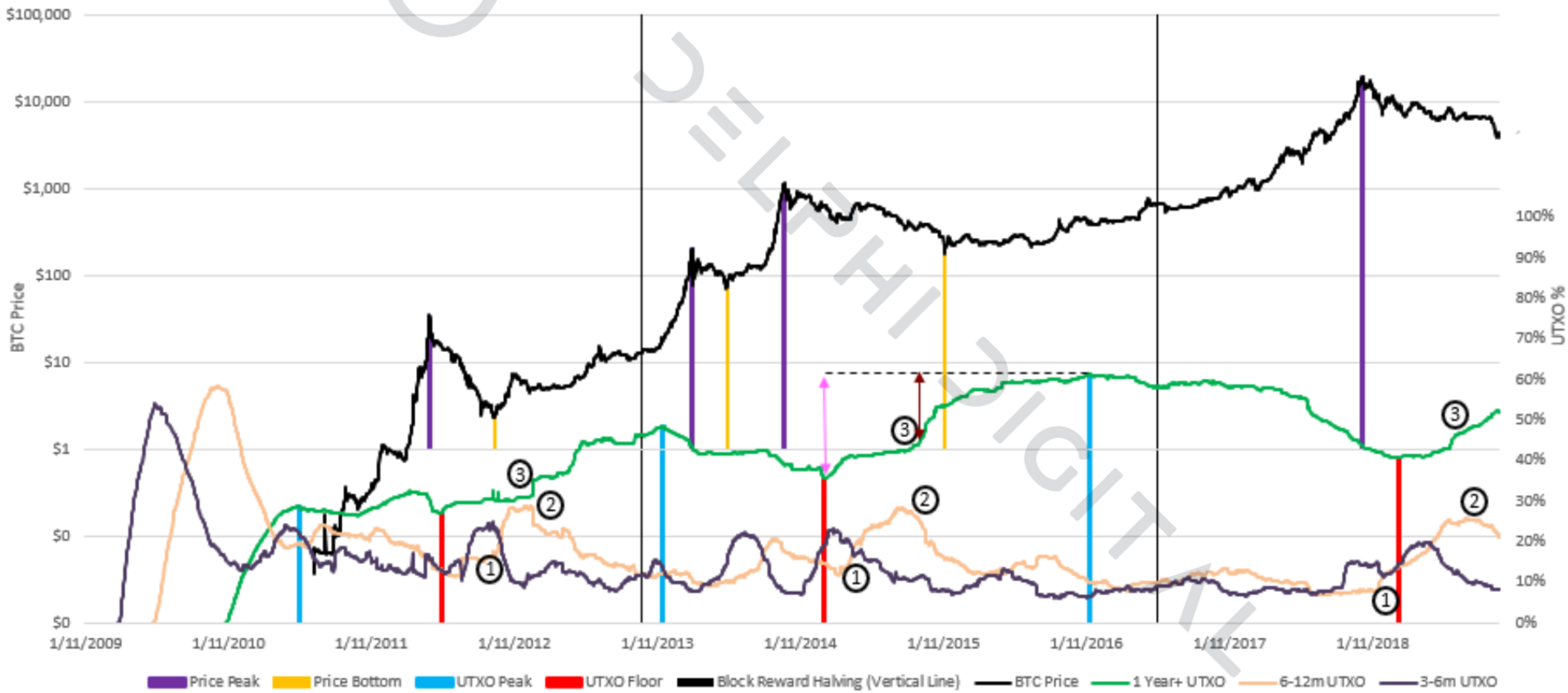
Forecasting Future Cycles

We use historical price cycles for bitcoin to find logical and consistent trends we can extrapolate forward in order to forecast the timing and UTXO composition of the next holding cycle. For example, to forecast the expected 1 year peak holding rate, we looked at how the wave height of the **6-12 month line**[2-1] affected the **1 Year+ line** in the previous two cycles. More specifically, we compared the wave height of the **6-12m line**[2-1] to see what portion it made up of the **1+ Year wave height**[blue-red]. and what portion it made up of the wave height of the **1 year+ line acceleration point to to its peak**[blue-3]. The **1 Year+** acceleration point[3] shows when the 1 Year growth starts to really pick up, which typically coincides with the peak and subsequent downturn of the **6-12M line** as those coins shift into the next band.



Forecasting the Peak Hold of the Next Cycle

The leftmost columns have the dates and values of the bottoms[1] and peaks[2] for the 6-12 month line (the wave height of each cycle can be found at the bottom). The third column shows the same metrics, but for the 1 year **peak**[4] and bottom, while the shaded values are forecasts. The fourth column is calculated in a similar fashion to the third, except it uses the point where growth starts to significantly increase[3] as its starting date, not the **lowest point in the cycle**.

In the bottom section, we show the 6-12 month wave height as a percent of each of the prior 1 year wave heights. There is a strong consistency across both years when comparing these to one another. The 6-12M wave height in 2012, for example, was ~65% of the of the corresponding 1 year wave height that year. The 6-12M wave height in 2014 was also ~65% of the corresponding 1 year wave height that year as well. On top of that, these same 6-12M wave heights both made up ~86% of the "fast growth" 1 Year wave height.

Our sample size is obviously limited, but the consistency gave us a bit of support applying that trend to the 6-12M wave height in 2018 to come up with a rough estimate for potential peak of the next wave. We take the 6-12M wave height, divide it by its average portion of the 1 Year wave height, and use this as a proxy to get our estimate of the 1 year wave height. That value is then added to the base of the wave to get to our estimate for the peak of the next cycle.

From true wave bottom

17.4%/64.75%=26.8%

40.8%+26.8%=67.7%

From start of fast growth

17.4%/86.53%=20.1%

48.2%+20.1%=68.3%

(1)	6-12 Month Bottom	1 Year+ Bottom	1 Year+ Fast Growth (3)
Oct-11	14.8%	27.0%	32.3%
Apr-14	11.6%	35.5%	42.0%
Jan-18	7.9%	40.8%	48.2%

(2)	6-12 Month Peak	1 Year+ Peak	1 Year+ Peak (4)
Feb-12	28.6%	48.3%	48.3%
Sep-14	28.4%	61.4%	61.4%
Sep-18	25.3%	67.7%	68.3%

Cycle	Wave Height	Wave Height	Wave Height
2011/12	13.8%	21.3%	16.0%
2014	16.8%	25.9%	19.4%
2018	17.4%	26.8%	20.1%

Cycle		(6-12M Wave Height) / (1 Year+ Wave Height)	(6-12M Wave Height) / (1 Year+ Wave Height)
2012		64.8%	86.1%
2014		64.7%	86.4%
		Forecast	Forecast

Both methods leave us with a near identical forecast, the peak amount of 1 year holders in the next cycle will be ~68%.

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Forecasting the High Growth Holding Period

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Most of the factors in this table are the same as the previous one, except now we're solving for the high growth slowdown[5]. This is illustrated by the right side of the **dotted box**. The 6-12M wave height in 2012 was 78.87% of the "fast growth" wave height that year while the 6-12M wave height in 2014 was 75.89% of the "fast growth" wave height that year. That same 6-12M wave height made up 112.87% and 107.58% of the size of the changes in the **dotted box** in 2012 and 2014, respectively. These results are, once again, highly consistent, so we used them to forecast the level at which we believe high growth will end.

① 6-12 Month Bottom		1 Year+ Bottom	1 Year+ Fast Growth ③
Oct-11	14.8%	27.0%	32.3%
Apr-14	11.6%	35.5%	42.0%
Jan-18	7.9%	40.8%	48.2%

② 6-12 Month Peak		1 Year+ Growth Slow	1 Year+ Growth Slow ⑤
Feb-12	28.6%	44.5%	44.5%
Sep-14	28.4%	57.6%	57.6%
Sep-18	25.3%	63.3%	63.9%

Cycle	Wave Height	Wave Height	Wave Height
2011/12	13.8%	17.5%	12.2%
2014	16.8%	22.1%	15.6%
2018	17.4%	22.4%	15.8%
		(6-12M Wave Height)	(6-12M Wave Height)
Cycle		(1 Year+ Wave Height)	(1 Year+ Wave Height)
2012		78.9%	112.9%
2014		75.9%	107.6%
		Forecast	Forecast

From true wave bottom

17.4%/77.38%=22.4%

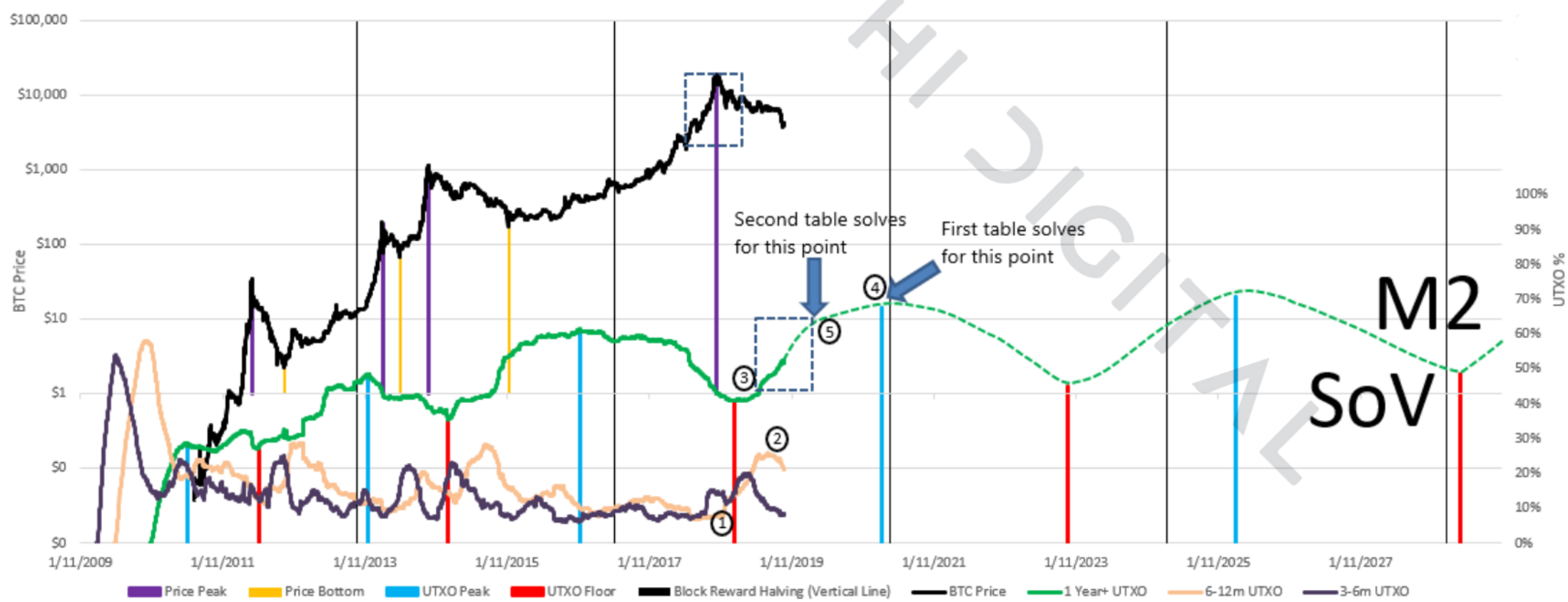
40.8%+22.4%=63.3%

From start of fast growth

17.4%/110.2%=15.8%

48.2%+15.8%=63.9%

Again, both methods leave us with a near identical forecast that the high growth period will end at ~63.5%



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Forecasting Dates Using Slope

Using this data, we can start to formulate a forecast for the dates of these events. One significant uniformity we noticed across both cycles was the slope from the bottom of the **1 Year+ UTXO** line to its peak. Breaking this slope into rise/run, rise is the 1 Year+ UTXO growth and run is the amount of days that pass. The actual trajectory of this UTXO line is certainly not linear, but the low and high UTXO points of each respective cycle can be plotted on a very similar slope. This implies the daily UTXO growth was extremely similar over the course of both cycles. Here are the calculations for the slope of the first and second cycle.

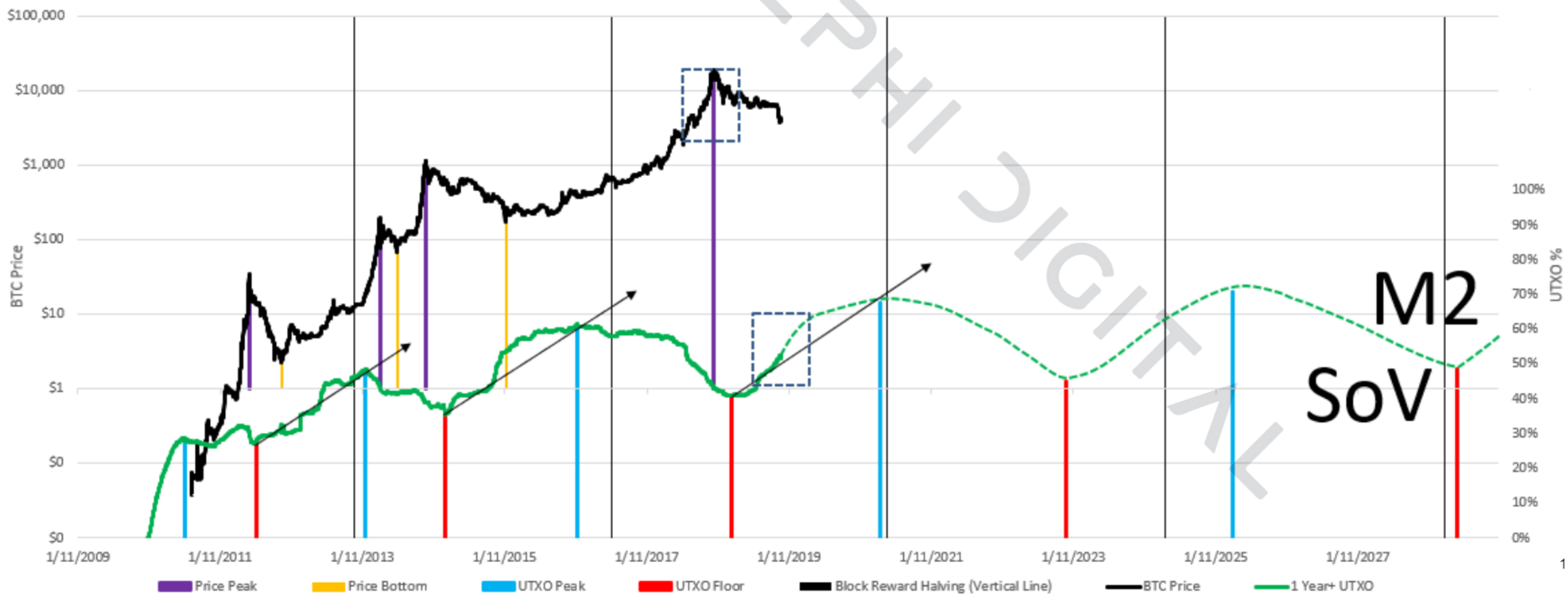
First Cycle: $\frac{(48.29\%-27.04\%)}{(1/22/2013-7/10/2011)} = 0.00037809$

Second Cycle: $\frac{(61.39\%-35.52\%)}{(1/17/2016-3/11/2014)} = 0.00038211$

Using the slope from the most recent cycle (.00038211) and next cycle's UTXO peak holding estimate (67.68%) which we derived in the previous analysis, we can rearrange the slope formula to solve for the expected date.

Forecasted Third Cycle: $\frac{(67.68\%-40.79\%)}{.00038211} + 5/15/2018 = 4/17/2020$

This is how we arrive at April 17, 2020 as the date of the next peak. Visually you would assume the slopes are closer to 1, but it's important to keep in mind that we're using a different unit in each axis. The important aspect is the consistency.



End of the Next Cycle & Beyond

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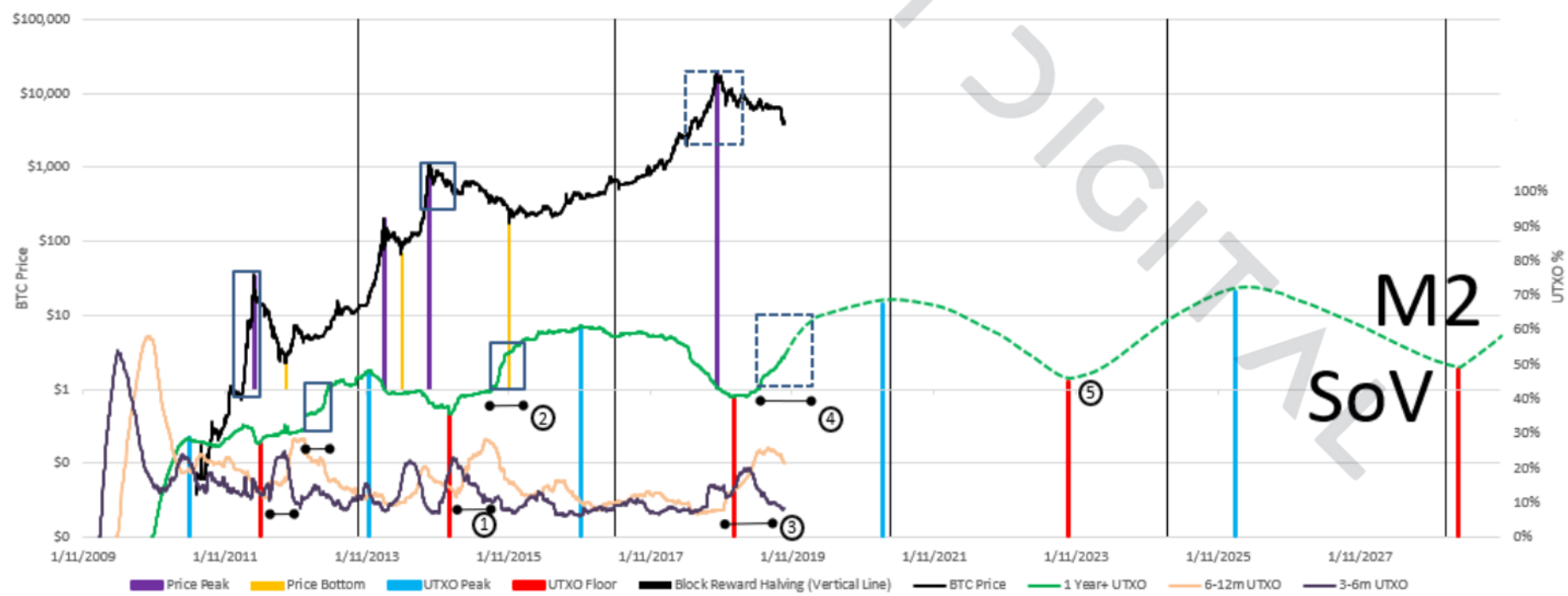
The length of the 1 year+ UTXO rapid growth period is roughly based on the duration of growth in the preceding 6-12M period because it's those same holders that are now transitioning into this longer-term band. Using the previous cycle as an example, we see the 6-12M line rally in 2014 span 152 days[1] from April to September. As that concluded, the 1 Year+ UTXO line rapid growth period spanned 163 days[2] from November 2014 to April 2015. It makes sense for the end 1 Year+ UTXO band to have a slightly longer growth period since it functions as the final destination for these untouched coins, while the 6-12M band is more of an intermediary. The recent 6-12M build up spanned 244 days[3] from January to September 2018. If we assume the current 1 Year UTXO growth follows a similar trajectory as past cycles, it implies the high growth period ends on April 18th, 2019[4].

The date and UTXO floor holding rate are the remaining factors that need to be forecasted to complete the cycle. It's difficult to be confident in a forecast for a date this far out. Assuming the linear change in the 1 year UTXO peak dates is consistent across cycles, we can attempt to extrapolate the remainder of this cycle using the timing of the previous cycle as our base. This would put a rough estimate for the UTXO floor in Q4 of 2022[5]. We believe this will be the last cycle to follow this near linear trajectory as cycles will lengthen at a faster rate than the UTXO peak increases. An obvious reason for this is that the UTXO peak has a fixed ceiling, while the cycle lengths do not. Some factors we believe will contribute to a lengthening cycle are a maturing market and incrementally diminishing effects on natural selling pressure from block reward halvings.

We also believe the level of future 1 year UTXO floors will increase at a decreasing rate. Using historic trends, we can model an approximate level for the 2022 floor of 45%[5]. These values will eventually reach some sort of equilibrium floor, but that's well beyond the scope of our forecasts. Market maturity and increased adoption should dampen both short and long term volatility over time. As long term volatility declines, the size (% change) of price rallies and dips will not be as significant, likely leading to less individuals trying to time the market in hopes of making major gains. We also hold the view that increased adoption of the lightning network will lock up bitcoin in nodes that will most likely not be traded as much through market cycles.



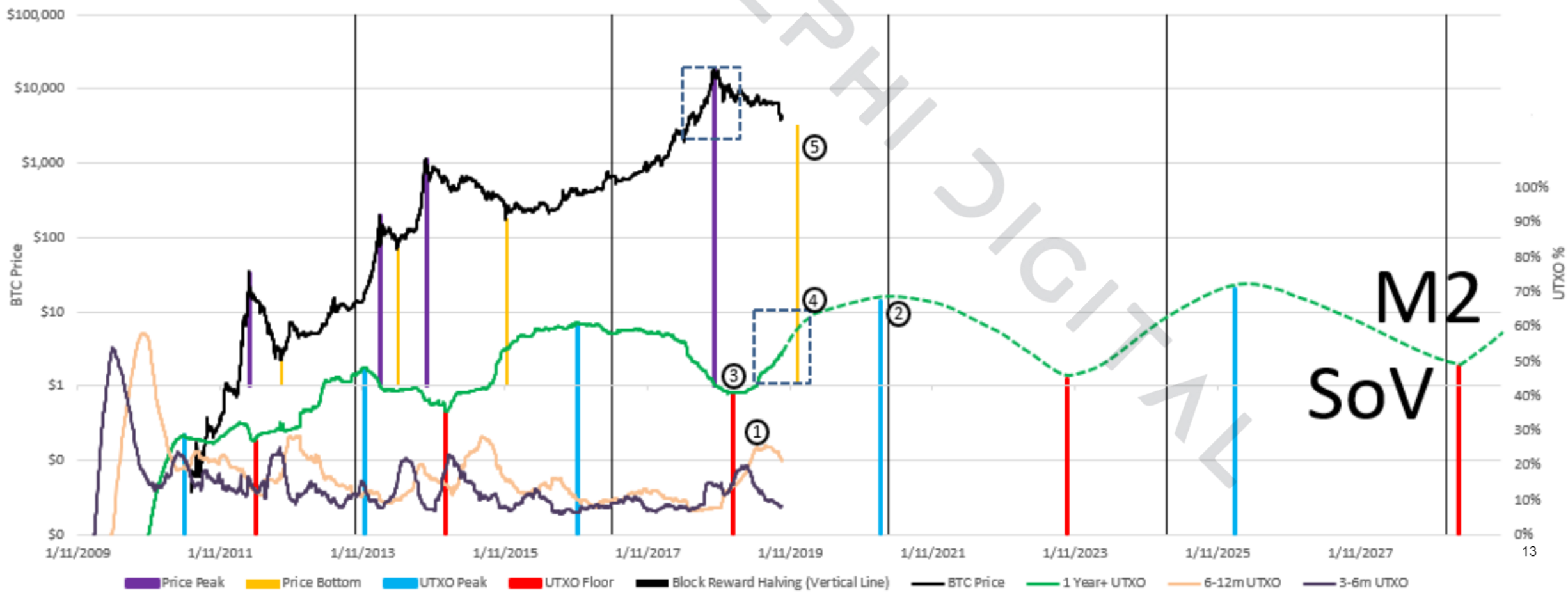
Conclusion

The purpose of this analysis is to provide insight on bitcoin holder patterns to improve our educated guess on the timing of the price bottom. We don't believe this analysis should function as an indicator on its own, but rather that it be used in combination with other relevant data to make the most informed decision possible.

We've established that selling pressure from long term holders is significantly tapped, and accumulation has begun. Using the timing of previous price bottoms relative to different bitcoin accumulation points, we can use current UTXO dynamics to forecast a rough date for a price bottom. We specifically tracked the price bottom relative to the 6-12M holding peak[1], the forecasted UTXO 1 year+ holding peak[2], the existing UTXO 1 year+ holding bottom[3], and the forecasted slowdown point of the 1 Year+ UTXO growth rate[4]. This results in a cluster of dates that indicate a bottom in **Q1 2019**[5].

From a high level, the results of this analysis are also supported by trends in valuation multiples like the rapidly declining NVTS (covered in The State of Bitcoin), and infrastructure tailwinds like the scheduled launch of Bakkt (Early 2019) and Fidelity's custody solution (being made generally available in early 2019).

We'll continue to monitor these trends on our end. Feel free to reach out if you have any questions, and subscribe to our research for updates.



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