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## Determinants of mergers: a case of specified purpose acquisition companies (SPACs)

### Abstract

This paper establishes major determinants that enable SPACs to successfully execute merger combinations. Using a sample of SPACs, companies that represent a novel invention in capital markets, in the period between August 2003 and January 2010, we test for the most important characteristics of SPACs and their influence on mergers. Obtained results could impact behavior of SPAC investors and SPAC founders. Our major finding is that the size of the SPAC at the Initial Public Offering date has a significant negative effect on the probability of the merger in the future. Additionally, the number of warrants in a unit is a variable negatively related to the probability of a merger. Alternately, if a SPAC is underwritten by the investment bank Early Bird Capital there is an increased probability that a merger will be executed.

**Keywords:** mergers and acquisitions, SPACs, venture capital, merger determinants.

**JEL Classification:** G14, G34.

### Introduction

Specified purpose acquisition companies (SPACs) are recognized as a new asset class (Lawellen, 2010) due to their ability to raise significant amounts of capital in the last decade. According to the data, amongst U.S based capital exchanges 162 SPACs raised approximately \$22 billion between August 2003 and January 2010. In addition to the size, the frequency of SPACs offerings that reached 34% of all Initial Public Offerings in 2008 makes them the subject of intense observation.

According to the definition provided by The Security and Exchange Commission (SEC) SPAC is a clean shell company that acquires public status through the Initial Public Offering process and is specifically formed to purchase one or more operating businesses over a certain amount of time, usually two years. In order to completely protect the interests of investors in SPAC securities SEC requests that SPAC founders and their underwriters deposit all proceeds originated through the Initial Public Offering in escrow accounts held by major commercial banks with excellent credit ratings. The moment funds are deposited proceeds earn a proper T-bill rate. In addition, the SEC requests that deposits are kept in the escrow accounts up to the moment that a newly formed SPAC and its founders are able to completely close the deal either as a merger or a reverse merger with potential targets, usually private. In the case that SPAC founders do not find an appropriate target within the two-year period after the Initial Public Offering, the original SPAC is liquidated and funds from the escrow accounts are returned to investors. Obviously when liquidation is the final outcome a majority of investors realize significant percentage losses. Therefore it is of utmost importance that a merger with the proper target is executed.

To our knowledge no published papers have attempted to answer whether there are determinants that potentially increase the probability of merger or that eventually increase the payoffs to initial investors in SPAC securities. We attempt to fill that gap. In this paper we establish major determinants that enable SPACs to successfully execute merger combinations. Interestingly, the presence of a specialized underwriter has the highest positive impact on a future merger, while the size of a SPAC issuance negatively impacts the possibility of merger.

The paper is organized as follows. Section 1 reviews the relevant literature on merger determinants in and then contributes previous findings from literature on SPACs. Section 2 explains the sample used for empirical study. Section 3 presents tests that establish relationship among defining SPACs variables and the success of the mergers. The final section offers a conclusion.

### 1. Literature review

While mergers and determinants of mergers have been widely written about, literature on SPACs is relatively new and underdeveloped.

The focus of mergers and acquisition research is to properly establish whether mergers and acquisitions are wealth-creating events or wealth-diminishing events for the vested parties. Mandelker (1974) and Dodd and Ruback (1977) wrote the first studies that empirically tested stock price performance of acquiring firms, applying relevant asset pricing methodology. Both of them examined firms listed in the U.S.

In Mandelker's study of 241 companies that executed merger between 1941 and 1962, he used the Fama-MacBeth two factor model to test post-merger performance for a period of 40 months. Mandelker reported negative return of -1.4%. Dodd and Ruback followed after-merger performance of 124 companies that merged between 1958 and 1976 using a

market model; they reported negative 0.059 return sixty months after the merger event. Langetieg (1978) extended the sample to the period between 1929 and 1969, and used all available methods to calculate post-performance. Similar to previous studies, he reported significant negative performance of acquiring companies five years after the merger. The first study to report positive returns to investors was Magenheim and Muller (1988). Although like previous studies, they applied market model as an empirical tool; their sample consisted of 51 companies and covered a five-year period between 1976 and 1981. Franks, Harris and Mayer (1988) was the first important study that, tested the performance of companies operating in both the U.S. and the UK. Interestingly, they reported that acquisitions that were completed as cash deals in the UK two years after the merger exhibited positive performance in the range of 1.75% to 17%. All other mergers, either cash mergers in the U.S. or equity mergers in both countries, exhibited negative performance two years after the merger.

With very few exceptions these early studies reported negative returns to acquiring shareholders and as a response, researchers attempted to either collect better data or to improve asset pricing techniques. An important breakthrough was a study by Franks, Harris and Titman (1991) which established new benchmarks with which to gauge abnormal returns of acquiring shareholders. However, their findings differed very little from previous ones. Rau and Vermaelen (1998) conducted a study with the largest sample, which included 3,169 mergers on all U.S. stock exchanges in the period between 1980 and 1991, and they reported very interesting results: When the returns were calculated using CAR methodology they pointed to negative performance, while BHAR pointed to positive performance<sup>1</sup>. Recently, a behavioral approach into the analysis of a theory of mergers has developed, beginning with Roll (1986). He stated that acquirers may exhibit overconfidence, which leads to a higher valuation of wealth effects of mergers resulting in “winner’s curse”. Along these lines, Shleifer and Vishny (2003) introduced a market-timing model of acquisitions. Their baseline was that acquirers are overvalued, and by conducting a merger, they attempt to preserve some of that value for long-term investors.

Another stream of literature on merger and acquisitions relevant to our study covers predictive models for mergers. The ability to correctly predict which companies might be acquirers or targets can potentially mean significant positive returns to shareholders,

especially in the short time period. Dodd and Ruback (1977) and Asquith (1983), examined characteristics of firms prior to mergers and reported the ability to predict mergers for a high percentage of merging firms. The empirical tools they used were either the logit regression or probit regression procedures, which reported predicting rates higher than 50%. Wansley, Roenfeldt and June (1983) also found that the market has the predictive power to identify firms that would be merger targets in the future some time before the actual merger. Palepu (1986) discounted the predictive power of earlier studies, arguing that methodological issues are unable to capture future targets. Besides prediction of merger targets, important studies have been done on defining characteristics of successful future mergers. Simkowitz and Monroe (1971) and Stevens (1973) isolated firm profitability, leverage and liquidity of targets as important merger determinants. Palepu (1986) found that growth could also be the determining factor. Trahan and Shawky (1992) and Trahan (1994) studied defining characteristics of acquiring companies that impact mergers. Both studies concluded that determinants differ by industry, but can be defined by financial ratios and abnormal returns prior to mergers. Travlos (1987) confirmed that prior abnormal returns are important variable. Newer studies apply different methodology but determinants remain the same.

Literature on SPACs is still underdeveloped and open for plenty of empirical studies in the future. Jog and Sun (2007) produced one of the first studies that examine SPACs. They explain SPACs’ defining characteristics and test the performance of SPACs equity in the long term, as well as the performance of unit securities at the day of issuance. Their sample includes a SPAC population up to 2006, and their main finding shows that entrepreneurs who successfully execute SPAC combinations experience returns of 2000%. Additionally, they document that SPAC units do not exhibit any underpricing on the day of the Initial Public Offering.

Boyer and Baigent (2008) report that SPAC units exhibit significantly lower underpricing than regular Initial Public Offerings at the day of issuance. They also examine characteristics of SPACs and their relationship and report a statistically significant positive relationship between the price of units at the day of the Initial Public Offering and the size of the offering. Flores (2008) classifies SPACs as a subsample of reverse mergers, comparing them to penny stock issuers, and reports some advantages during the Initial Public Offering process.

It is Lawellen (2008) who first made an argument that the new generation of SPAC’s represents an important entity in the capital markets and that they should be considered a separate asset class in further

<sup>1</sup> CAR stands for cumulative abnormal returns. BHAR stands for buy and hold abnormal return.

research. Jenkinson and Sousa (2009) extend the research analyzing properties of SPACs that completed acquisition, and report based on observation of 58 SPACs that only half of the deals were able to create the value for original shareholders, while the rest of them were value-destroying. Reimer (2007) considers SPACs as a beneficial financial innovation, especially due to SPACs' ability to alleviate constraints that the 2002 Sarbanes-Oxley Act imposed on small firms attempting to raise funds in the public markets. In addition, he believes that SPACs are a meritorious entity to substitute the presence of private equity in some segments of the market.

Because of their nearly 100% cash balance sheet and the fact that with that cash SPACs engage in the purchase of some private company, SPACs seem similar to leverage buyouts (LBO). There is no literature on that topic, but several articles in practitioner magazines point out that the increase in SPAC activity leads to a decline in LBO's activity. That was especially significant in 2007 and 2008<sup>1</sup>.

Sjostrom (2008) conducts the comparison of different ways to go public, and finds that SPACs represent a viable alternative to conduct traditional Initial Public Offerings from the perspective of a merger target company because SPACs bring in a significant cash infusion, enable immediate trading with equity on capital markets, and already have vested-in underwriters.

## 2. Sample description and an explanation of the merger process

The data for this study has been collected almost entirely from SEC's Edgar databases. First we collect all available data on relevant characteristics of SPACs such as, the intended number of units issued, the number of warrants in them, pricing at the day of the Initial Public Offering, and all managerial and underwriters' characteristics from the initial filing of the preliminary registration statement forms S-1. The preliminary prospectus is prone to changes due to the dynamics of the process, and we examine the additional 8-K forms for any change. We have updated our collected data with pre-Public Initial Offerings final prospectus 424-B forms where all changes from registration until the offering date have to be recorded. The final piece of data is taken from 10Q statements filed immediately after the Initial Public Offering.

Between August 2003 and December 2009, 269 SPACs registered with SEC and announced their intent to conduct the Initial Public Offerings on one of the U.S. capital exchanges. Exactly 162, or approximately 60%, successfully conducted an Initial Public Offering in that period, selling close to \$23 billion worth of SPAC securities to various classes of investors. SPACs that completed the Initial Public Offering are the subject of our observation. In Table 1 we report summary statistics where SPACs are classified according to their corporate status, concluding with the end of calendar year 2009. In addition to data collected from The Edgar database, we collect pricing information on SPAC warrants and SPAC shares from Bloomberg and Reuter's financial platform. As shown in Table 1, out of 162 SPACs that successfully originated funds through the Initial Public Offerings process, 85 of them were able to consummate successful merger combinations, which represent a 52.4% success rate. The remaining 77 SPACs, or 47.8%, did not consummate merger combinations by January 2010 due to different reasons. The majority of remaining SPACs, 65 of them or 40.2%, already liquidated their shelf company, distributed the funds from the escrow accounts to common shareholders, and ceased the activity as registered corporations. The remaining 11 SPACs were still looking to find a target to close business combinations as of January 2010.

As a recent invention in financial markets, SPACs are formed by their sponsors with the sole purpose to acquire or merge with other companies using the cash previously raised through the Initial Public Offering within a limited period of time. SPACs raise capital in primary markets by selling their securities to interested investors. Their security of choice is a unit and its price is predetermined before the offering. Usually, a unit consists of one common share and one warrant to buy a certain number of shares in the future. On average, around 95% of funds collected in an offering is deposited in the escrow accounts with established commercial banks while the remaining 5% of raised cash issued to pay for underwriters' fees and other business expenses. Immediately after the Initial Public Offering the market makers for SPAC units enable their trading on U.S. capital markets where investors can freely exchange them. Units are on average dissolved 45 days after the Initial Public Offering and that is when separate trading of SPAC shares and SPAC warrants begin. While the trading with SPAC securities is ongoing, managers and underwriters are in search of a target company to acquire. The time frame for that search is limited, and for the majority of SPACs it is defined as two years after the Initial Public Offering. This time limit is either self-imposed or exchange-imposed, and could be extended up to half of a

<sup>1</sup> Thomas Hicks, the leveraged buyout pioneer and owner of the Texas Rangers of Major League Baseball, raised \$552 million for Hicks Acquisition Co. I in September. "I plan to use the vehicle to try to build three or four or five significant companies over the next five to 10 years because it's permanent capital", Hicks, 6 "Once you make an acquisition, that entity has the ability to continue growing both internally and by acquisitions because it will be very lightly leveraged compared to leveraged buyouts."

year in case SPAC managers announce that they intend to conduct a merger but are seeking an additional time to finish all tasks. Usually the SEC grants them the additional time to execute the merger.

The merger process is fairly unique, and the ability of underwriters and entrepreneurs who form SPACs to convince the existing shareholders of the value creation that comes with acquisition is very important. The vote of SPAC investors determines the success of the future business combination. Current owners of common equity could block any merger or acquisition if they vote with, on average, 20% of shares against the deal. Therefore, in order for a merger to take place, it has to be supported by 80% of shareholder votes, which is relatively difficult to achieve unless investors see it as a value-creating operation. In the case that shareholders do not approve of the merger, there are two feasible strategies. First, if there is some unused time of the initial two-year period the underwriters and SPAC executives could use it to conduct a search for another target, and then ask for six months extension once they find it. Second, SPAC executives could be forced to liquidate entity while returning funds from the escrow accounts to the current shareholders at the pro rata basis. The former is in fact relatively rare; exactly 65 companies in our sample, as shown in Table 1, were unable to find proper business combinations to merge with and instead opted to liquidate the SPAC.

### 3. Empirical tests

Although the approval of a merger is almost fully in the hands of a qualifying percentage of investors during the merger voting process and their approval is the most important indicator of perception of the quality of merger. We try to examine the possibility that additional SPAC characteristics could impact the success of the merger. Assuming that investors are rational our hypothesis is that SPAC shareholders approve value-creating business combinations, while rejecting value-destroying business combinations. We test for the possibility that there are merger determinants that potentially increase the probability that a merger outcome will materialize and will eventually increase the payoff to initial investors in SPACs.

By analyzing available data on 162 SPACs that completed the Initial Public Offering in the period between August 2003 and January 2010, we test the likelihood of the merger success on a set of important SPAC characteristics. As done in previous studies on merger determinants, we are applying probit estimation procedures and test for the following:

*Merger success* =  $f(\text{Set of SPACs characteristics})$ ,

where the defining SPAC characteristics are: the gross amount of proceeds originated during the Initial Public Offering process, the number of warrants

in a unit, warrant price, the unit volume at Initial Public Offering date, the percentage of the funds deposited in the escrow accounts, the underwriter's name and the size of the underwriter's syndicate.

The selection of defining SPAC characteristics is similar to variables that were tested in previous studies. Below we statistically describe them, provide the reasoning for their inclusion, and state our hypothesis.

In Table 2 we report that the average SPAC in the sample issues approximately 14.72 units at the Initial Public Offering day, with the number of units ranging between 0.75 million and 90 million units for the largest SPAC conducted by Liberty Acquisition Holdings in 2008. Plenty of studies show that size is a determining variable in various aspects of corporate finance literature, specifically in literature on mergers. We do not have clear expectations about the impact of size on merger success.

As financial instruments, warrants are important tools to help relatively risky companies to access primary capital markets, and they are present in all 162 SPACs that completed the Initial Public Offering during our observation period. Based on their structure they are packaged in units and dissolved for independent trading approximately 45 days after the Initial Public Offering date. Additionally, they can be exercised only after the completion of the merger, otherwise they expire worthless. For these reason the pricing of warrants in financial markets is an important signal to the quality of a SPAC merger proposal, and we vouch for its inclusion as a variable that is considered as a merger determinant. We have clear expectations that the number of warrants in a SPAC will have a negative impact on mergers in the future. The reasoning here is straight forward and supported by two forces. First, the increase of the number of warrants at the IPO serves as "sweetener" for investors and it is higher for more risky prospects. Second, investors such as hedge funds involve in yield game by selling warrants immediately and locking in for profits in the case SPAC is dissolved, which consequently lead to their negative vote on merger and decrease in probability that merger would materialize.

In Table 2, we can see that the average trading price of a warrant is 0.95\$, and the result is obtained by the aggregation of the average trading price for warrants as reported by Bloomberg and Reuters. It is reported that the maximum warrant price obtained in the markets for a particular SPAC is 4.45\$, while the lowest price is approximately zero or as recorded in the Table 2, 0.01\$. Our priors regarding the impact of warrant trading price on merger is that the higher price of warrant on average leads to higher chances of the merger in the future. If markets are rational and efficient the value of option increases when future cash flows are expected to increase.

The gross proceeds indicate the size, but in addition to that they carry information about the potential of the merger and the ability of SPAC managers to convince institutional and retail investor to buy securities at the offering day and increase their value in the future. Before the exercise of the option given to the underwriters to buy over-allotment shares, the largest single SPAC was able to raise 900\$ million. On average though, SPAC managers were able to sell about \$126.15 million, while the smallest amount originated is \$9.05 million. In no reported results do we see that the amount of gross proceeds increased year by year.

Underwriters play an important role in a SPAC's life, from the moment of its registration until the consummation of the merger as a positive outcome or its liquidation as a negative outcome. They help SPAC managers to structure the offering in the most optimal way to potential buyers. Once the offering is successful, they stand up as the market makers in all three SPAC securities, namely warrants, units and common shares. Finally, they provide their expertise to SPAC promoters and help with legal and administrative procedures necessary for the success of merger combinations. Sometimes they also actively seek potential targets for acquisition and become actively involved in negotiations. Aggarval (2000) examines the impact of underwriters on the Initial Public Offering process and its syndication. Compared to the results obtained in Aggarval's study, in our sample of SPACs' underwriting syndicate has around three times fewer underwriters than in the regular Initial Public Offering. In Table 2, we report that on average 3.59 underwriters are involved in an issuance process of a single SPAC. The maximum number of underwriters for a single SPAC is 12. Significant number of SPACs, especially ones that entered capital markets in the latest period of their activity, have only one underwriter behind the whole process.

The underwriting of SPACs was at first the specialization of a few mid-sized investment banks, and the first SPAC that conducted the Initial Public Offering in August 2003 is by many considered the "child" of Early Bird Capital (EBCAP). The fact that bankers of EBCAP were involved in the origination of the first SPAC was not a surprise since many of them were involved in the origination of funds for similar speculative entities in the late 1990s until the moment that the SEC revoked their licenses and pushed them out of the business due to possible fraudulent activities. We include four particular investment banks that served the role of underwriters as a potential merger determinant variable. The EBCAP was the leading underwriter for 31 SPACs, or around 19% of all SPACs, and an additional 11 as the member of a syndicate. Additionally, we include the Maxim group as an indicator because this bank is involved either as the leading un-

derwriter or a member of a syndicate in 45.6% of deals. Citigroup is included as the merger determinant because of its unique approach in being the only leading underwriter in all SPAC deals in which it participated. Finally we include the investment bank Gun Allen, which participated in 19.7% of the deals but was never a leading underwriter.

Reported results obtained applying probit estimation procedures are presented in Table 3<sup>1</sup>. Our findings show that the likelihood of a successful merger for SPACs increases with respect to the unit volume, the price of warrants, and the presence of EarlyBird Capital (EBCAP) and Gun Allen as participating underwriter. The likelihood of a merger decreases with respect to an increase in the size of the offering, the number of underwriters, the number of warrants in unit at the date of issuance, and the presence of Citigroup and Maxim group as participating underwriters.

Although the findings are interesting, they are hardly a surprise. Warrant investors bidding up the price of that security were assigning a higher probability that mergers would materialize. Since warrants are in essence very similar securities as options it seems that investors were rational and were pricing them relatively correctly with respect to the risk of failure of merging business combinations.

Similarly, our finding that the presence of EBCAP as a participating underwriter increases the probability of merger is not unexpected. In fact, it would be surprising if it were otherwise since EBCAP is the investment bank that reinvented the market in SPACs. EBCAP, together with its founders, successfully structured the Initial Public Offering process of Millstream Acquisition Corporation in August 2003, making it the first SPAC of new generation. Consequently, a year later the Millstream Acquisition Company was the first SPAC that successfully executed a merger. In addition to that managers of EBCAP were involved in underwriting of SPAC predecessors in late 90s until their collapse. In a similar way, the presence of the mid-size investment bank Gun Allen increases the probability of a merger event. The most natural explanation is that the expertise of Gun Allen, recognized by nearly 40% of all SPAC issuers, is a kind of guarantee of a successful merger.

More determinants have a negative impact on the probability of merger outcomes than positive. The most significant negative impact is observed with respect to the amount of gross proceeds of SPACs or simply with respect to its size. Therefore, the policy implication from this finding would be that SPAC founders raise larger sums of money have harder

<sup>1</sup>Auerbach and Reishus (1987) and Hannan and Rhoades (1997) apply similar procedure in merger analysis.

time in the current market to find proper business combination. Possible advice for heavy cash SPACs would be than to find a target beforehand.

Our findings also suggest that when they structure a company, founders of SPACs and their underwriters should decrease the number of warrants in a unit in order to increase the probability of a merger in the future. Although there could be a few plausible explanations for the result, the most likely one is that institutional investors in the SPACs, namely hedge funds, very often attempt to block the mergers in capital markets by playing the so-called “yield game” strategy. The idea is relatively simple: Hedge funds and similar institutional investors are investors in SPACs not for the sake of long-term profit but only to profit from a short-term investment around the issuance date. By selling all warrants in their portfolio immediately after the point that trading commences, they focus on short-term positive returns from getting back funds from the trust account once it is dissolved. Therefore, the merger outcome is not the optimal outcome for them.

Interestingly, the increase in the number of underwriters negatively impacts the probability of a SPAC to conduct a merger. The most plausible explanation for this is that the presence of many underwriters dilutes the expertise of significant ones, as shown in the case of EBCAP.

Additionally, the backing of largest financial institutions does not increase SPAC’s chances to merge in the future.

## Conclusion

The probability that the SPAC will successfully find a proper business combination and execute it within the required time frame is influenced by important characteristics that we isolate. Statistically the most significant influence on the probability of a SPAC merger is the amount of gross proceeds raised at the date of the Initial Public Offering. The impact is visibly negative and this finding could serve as a guide to future SPAC founders and investors. The presence of some characteristics increases the probability of potential merger combinations, namely the involvement of two investment banks as the underwriters, EBCAP and Gun Allen.

Table 1. Sample statistics

This table presents summary statistics for the sample period from August 2003 to January 2010. All Specified Purpose Acquisition Companies that conducted the Initial Public Offering in that period are classified into four subgroups depending on their corporate status on January 1, 2010. From the left to the right we report the number of SPACs that completed the Initial Public Offering, the number of companies that completed a merger, the number of companies that were liquidated, and the number of companies that are seeking a merger.

Year	IPO completed	Merger completed	Liquidated	Seeking merger
2003	1	0	0	0
2004	12	1	0	0
2005	27	3	0	0
2006	38	11	4	0
2007	66	42	21	0
2008	17	21	27	9
2009	1	8	13	2
Total	162	86	65	11

Table 2. Values of merger determinants

This table presents values of merger determinants aggregated from available data collected from The Edgar database and Bloomberg and Reuter’s platforms. Values are provided for the following characteristics: unit volume, the average daily warrant price, gross proceeds at the date of the Initial Public Offering, the number of underwriters (UNDN), the number of warrants in unit, EBCAP for Early Bird Capital investment bank, CITI for Citigroup, Maxim for Maxim Group investment bank, and Gun Allen.

SPAC determinants	Mean value	Maximum	Minimum	Deals involved	Lead
Unit volume (mln)	14.72	90.00	0.75		
Warrant price (\$)	0.95	4.45	0.01		
Gross proceeds (\$ millions)	126.15	900.00	9.05		
UNDN	3.59	12	1		
Number of warrants	1.31	2	0.75		
EBCAP				42	31
CITI				18	18
Maxim				4	19
Gun Allen				36	0

Table 3. Merger determinants

Probit estimation results are obtained when the hypothesis that  $Merger = f(\text{set of SPAC characteristics})$  is tested. Here, UNDN = number of underwriters in IPO syndicate. EBCAP = Early-Bird Capital, CITI = Citigroup, Maxim = Maxim group, and Gun Allen = Gun Allen.

Panel A. Merger outcomes: analysis of maximum likelihood estimates					
Parameter	DF	Std. estim	Wald.er	Chi-sq	Pr>Chi-sq
Intercept	1	10.57	3.61	8.48	0.03
Unit volume	1	0.28	0.14	3.55	0.05
Warrant price	1	0.45	0.39	1.31	0.25
Gross proceeds	1	-13.78	3.76	13.40	0.00
UNDN	1	-0.06	0.07	0.81	0.36
Number of warrants	1	-1.51	0.97	3.27	0.02
EBCAP	1	0.10	0.07	2.06	0.15
CITI	1	-0.02	0.02	1.20	0.27
Maxim	1	-0.10	0.08	1.64	0.19
Gun Allen	1	0.13	0.28	0.21	0.64

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