Arbitrage in the Ancient World

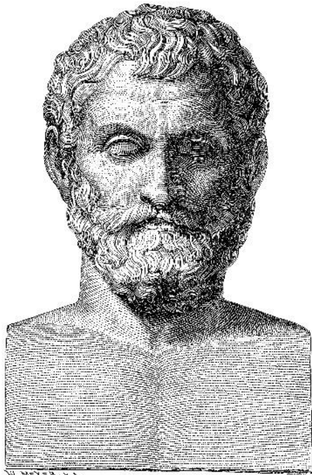

Figure 1. Thales of Miletus

Nearly every option book ever published invariably includes a reference to Thales of Miletus, who is credited for being the first person ever to use an option contract. We know from our last lesson that this is not strictly true.

Babylonian merchants paid an extra premium above their loan costs when they borrowed money to outfit trading ships. This historical attestation of an insurance contract is, as we know now, an example of a put option.

From an account by Aristotle, people believe that Thales was the first person to use call options, sometime around 600 BCE.

The article linked in the Supplemental Resources section was posted in 2012 on a site for people interested in investing and the markets called Minyanville. It takes a detailed look at the account of Thales provided by Aristotle – who does not seem very interested in the economic details of the situation – and makes an economic analysis of what may have happened in actuality.

Here is the account provided by Aristotle:

> There is the anecdote of Thales the Milesian and his financial device, which involves a principle of universal application, but is attributed to him on account of his reputation for wisdom. He was reproached for his poverty, which was supposed to show that philosophy was of no use. According to the story, he knew by his skill in the stars while it was yet winter that there would be a great harvest of olives in the coming year; so, having a little money, he gave deposits for the use of all the olive-presses in Chios and Miletus, which he hired at a low price because no one bid against him. When the harvest-time came, and many were wanted all at once and of a sudden, he let them out at any rate which he pleased, and made a quantity of money. Thus he showed the world that philosophers can easily be rich if they like, but that their ambition is of another sort. He is supposed to have given a striking proof of his wisdom, but, as I was saying, his device for getting wealth is of universal application, and is nothing but the creation of a monopoly. It is an art often practiced by cities when they are want of money; they make a monopoly of provisions.

Before we look at the Minyanville author's economic analysis of this account, let us check it against our definition of an option so that we can prove to ourselves that Thales really was engaging in an option trade.

Thales' Call Option

Remembering back to the four characteristics shared by all options, we recall that an option...

> Is a contractual obligation, limited by time, that allows investors to profit from a change in value of some other asset, and which has value over its economic life.

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In Aristotle's account, while he does not make explicit mention of a contract, he does say that "…[Thales] gave deposits for the use of all the olive-presses…which he hired for a low price because no one bid against him." This suggests that the hiring of olive presses was a common occurrence and interestingly implies there existed an established auction market to offer olive press owners the opportunity to rent presses out to the highest bidder. We'll count this practice as a "common law" contractual obligation.

As for being limited by time, it is clear from Aristotle's account that the rental agreement was to exist only through the next harvest and pressing season; the second of our option characteristics is met.

Our condition that an option allow investors to receive the economic benefit of an underlying asset is clearly met with the details provided by Aristotle. Note the word "deposit", which we take to associate with call options in particular; the deposit allowed Thales economic control of the underlying press, which is clearly an asset.

Finally, we can see that the contract had value for its entire life – Thales had to pay a small amount as a deposit, so the agreement was worth a small amount when it was entered into. Because he had control of the presses at harvest time, Aristotle says that Thales "…let them out at any rate which he pleased, and made a quantity of money."

Because the agreement as described matches all the characteristics of an option, we can be sure that Thales did indeed invest in call option contracts. In the present day, an option on a real asset such as real estate or manufacturing capacity – which is distinguished from an option on a financial asset like a stock or futures contract – is known as a "real option." As such, we could further describe Thales economic coup as stemming from the ownership of a real call option.

The Muddled Economics of Aristotle's Account

Aristotle is famous for being the student of Plato and the teacher of Alexander, but the Minyanville author points out that Aristotle must not have thought very carefully about economics.

The article author makes the point that Aristotle claims Thales creates a monopoly, then rightly observes that the power of a monopolist comes from restricting supply. However, Aristotle's account suggests that Thales did not restrict supply.

The author points out several scenarios that would be more plausible from an economic perspective.

One possibility is that Thales knew that the harvest would be strong, so placed deposits not on "all the presses in Miletus and Chios" but on the worst presses in the outlying areas. Presumably, the deposit on these presses would be very inexpensive because they were not usually used, and if they were, could usually generate only slight revenues. If Thales knew that the harvest would be strong, so that even the normally underused presses would be operating at full capacity, he would be able to make a fat profit on his call options.

The other possibility is that Thales had no special understanding of future crop yields, but that everyone in the community understood that the olive harvest had been bad. In this case, the deposit required on any single press was likely to be low, since the chances that that press would need to be used was also low. If Thales understood that he could monopolize all the presses,

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then charge what he liked on the only presses that he put into service, he would have been able to make a killing. Again, a monopolist generates profits by restricting supply, not by providing limitless supply.

Long story short, Thales was either a temporary monopolist that restricted access to all but a few presses, or he was not a monopolist at all, but bought the rights to the least productive assets in a boom year.

An Option-Based Explanation

While the explanations above are based upon pure economics, the article author brings up the possibility of an option-based explanation. On the bottom of page three of the linked article, we find:

> The third explanation in Aristotle's confused account is that Thales was able to reserve the presses by giving a small "deposit." This suggests that Thales recognized the value of the real option in an olive price deposit. If this were unappreciated at the time, and therefore underpriced, Thales could have profited without any predictions of the olive market. This is the explanation favored by Nassim Taleb in his account of the story in his forthcoming book.

The author offers a scenario by which Thales might have approached the owners of presses that had been unused in the most recent season and offered them a small deposit that we know to represent call option premium.

The premium would represent a deposit on renting the presses for the standard price, and especially if Thales was talking to owners whose presses had been unused in the season, he may have been able to offer such a small amount of premium that as long as some of the presses he had reserved ended up being used, he would recoup the premium he had spent and earn a nice profit.

Another way of saying this is that Thales understood the value of the optionality of the presses better than other investors or press owners, so was able to buy real call options on the cheap.

Thales is known for his mathematical observations, so this scenario is attractive from the "man ahead of his time" perspective. It's not impossible, but it would mean that Thales was truly a prodigious mathematical thinker.

The author titles his article "Arbitrage in the Ancient World", but if this scenario is the correct one, it strikes me that using the term "arbitrage" is a stretch. Arbitrage means the riskless profit earned by buying an asset on one market and immediately selling it for a higher price on another market.

Thales might have been an insightful speculator, but communications technology would have to progress quite a bit before he or anyone else would have the capacity to become an arbitrageur.

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Vocabulary

Arbitrage: The practice of taking advantage of a price difference between two or more markets: striking a combination of matching deals that capitalize upon the imbalance, the profit being the difference between the market prices.

Real Option: .

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