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Payden & Rygel  
**POINT** *of* **VIEW**

SPRING 2015

*Our Perspective on Issues Affecting Global Financial Markets*

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# The **Original** *Flash Boys*

Think high speed, techy traders seeking out information and trading faster than the average Joe are new to the financial markets? Think again. The quest for speed and near riskless profit has been with us for centuries.

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It isn't every day that arcane economics and finance topics make the nightly news. But with the release of Michael Lewis' *Flash Boys* book last fall, the finer points of capital markets transactions appeared in the mainstream press. Discussions centered on the ethics and propriety of certain high-speed traders and market-makers who compete with the use of extremely fast computers to detect (and trade on) price discrepancies in global financial markets.

We write neither to condemn nor condone today's high-frequency traders. We only hope to show that the creative, if questionably legal, spirit behind such tactics are not unique in the history of finance. Since Hammurabi, traders of all ages worked on the cutting edge of communication inefficiencies in search of monetary gain.

By surveying select instances of arbitrage—the technical term for exploiting price differences in the same good across different markets—we hope to provide a deeper appreciation for the ways financial market participants over the years have used the best technology of their era to skim profit off the top of normal trades and/or make pricing more efficient.

## DID YOU KNOW?

### What is Arbitrage Anyway?

Before we get too specific, a bit of history is in order. Historically, we find the first published usage of the term "arbitrage" in the 1704 French accounting textbook *La Science des Negocians et Teneurs de Livres* (The Science of Merchants and Accountants). Clever research shows that the term appeared in a discussion of "the relationship between exchange rates and the most profitable locations for issuing and settling a bill of exchange."<sup>1</sup>

For our purposes here, arbitrage will take the broader meaning of "buying and selling of the same product in different markets – at the same [or nearly the same] time and with little risk of loss."<sup>2</sup>

## THE USES AND MISUSES OF ARBITRAGE

Ok, you might be saying, if this were so easy and so riskless, and so widespread, how does it continue? The truth is, arbitrage opportunities are rare precisely for this reason. The bottom-up discovery process wrought by myriad market participants hunting around for ways to make money leaves few, if any, of these "free-lunch" opportunities unexploited for long.

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The social uproar generated by *Flash Boys* and the controversy surrounding high-frequency trading share important similarities with their predecessors. In what follows, we catalogue historical instances of financial market arbitrage. In the majority of cases, advances in communication technology aid and abet the work of traders as they scour the earth for profit.

## HISTORICAL ADVENTURES IN ARBITRAGE: A SERIES OF CASE STUDIES

### Case Study One: Mediterranean Mischief in Precious Metals

Date: ca. 480-404 BCE

*The trade:* Even in ancient Persia and Athens, currency took the form of gold and silver coins. Despite being relatively easy to transport and modestly difficult to counterfeit, coins were nevertheless traded actively, as merchants sought to exploit valuation discrepancies across regions.

At the time, Persia depended on a coinage system which used both gold and silver. The Persian emperor was the only one legally allowed to coin gold, while he "granted [the authority] of striking silver coins to his regional delegates."<sup>3</sup> Silver would trade at a fixed ratio to gold (at 13 1/3 to 1). So how did the arbitrage work?

In the Persian system, silver was undervalued relative to gold. To make a profit, traders would export silver from Persia and trade it for gold elsewhere in the Mediterranean - especially in Greece. Such arbitrage was highly profitable and practiced for centuries, in part because of the time it took information to travel.<sup>4</sup>

### Case Study Two: French Government Bonds in Amsterdam and Frankfurt

Date: ~1760 to 1780

*The trade:* Despite the political turmoil in France in the late eighteenth century, financial markets were as active as ever. As relayed in the colorful journals of Giacomo Casanova, opportunities abounded in

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early modern Europe for financial market arbitrage. (As an aside, Sr. Casanova was a trader, secretary, Venetian soldier, escaped prisoner, preacher, alchemist, gambler, violinist, lottery director, and a spy.)

In one particular case, Casanova offered up the cunning strategy of “sell[ing] French government bonds ‘to an association of brokers at Amsterdam, and tak[ing] in exchange the securities of any other country whose credit was higher than that of France.’”<sup>5</sup> Such a transaction gave the trader (Casanova) receiving the higher credit securities a safer and more valuable stream of cash flows (the other government bond) at a lower price.

Casanova also described a simple gold price arbitrage. This strategy, admittedly more involved than the aforementioned government bond swap, involved a complex array of news sources positioned around Europe reporting gold prices from various markets (e.g., Venice, Antwerp, London, etc.). When markets fell gravely out of alignment, Casanova would simply charter the speediest stagecoach he could find and hightail it to the exchange with the higher price to sell gold.

### Case Study Three: The Blanc Brothers and the Chappe telegraph between Paris and Bordeaux

Date: ~1834

*The trade:* Brothers always find a way to cause trouble. No less was true for the twins Francois and Louis Blanc. Known in their day as

“brilliant financiers” and bankers, they were also preeminent arbitrageurs who used the latest in communication technology to arbitrage security prices.

In 1834, the fastest way to communicate over long distances was a Chappe telegraph. A precursor to the electrical telegraph, Chappé’s semaphore telegraphs transmitted messages using telescopes to observe the positions of various panel and arm configurations (see Figure 1 on next page). Specific panel configurations were associated with specific meanings, and thus messages could be shared.<sup>6</sup>

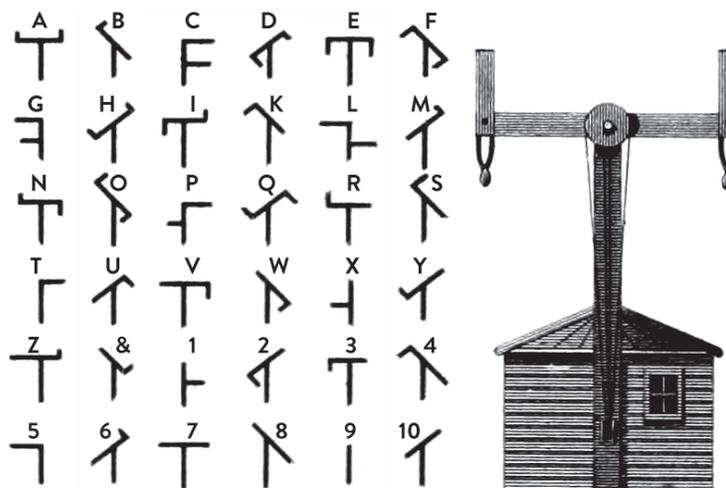
While far from speedy, these novelties allowed for information to travel much faster than possible with post horseback riders. For the Blanc brothers, sending and receiving news from Paris to Bordeaux by mail stagecoach took five days. With a Chappe telegraph, they could move information in a matter of hours.

But there were three problems. First, only the French government possessed a Chappe telegraph machine. Second, the government did not allow private use of its technology. Third, non-government messages would quickly be detected as suspicious.

Undeterred in their relentless pursuit of trading riches, the Blanc brothers devised a scheme to solve all three problems and transmit security price information from Paris to Bordeaux clandestinely through the Chappe system. Working covertly, the brothers embedded errors in the legitimate messages sent by the government. These messages were illegally intercepted by an agent working for the brothers and the pattern of errors (ignored by the officials) was decoded for the security price information it contained. With advance knowledge of prices in hand, the brothers would trade profitably in Bordeaux.

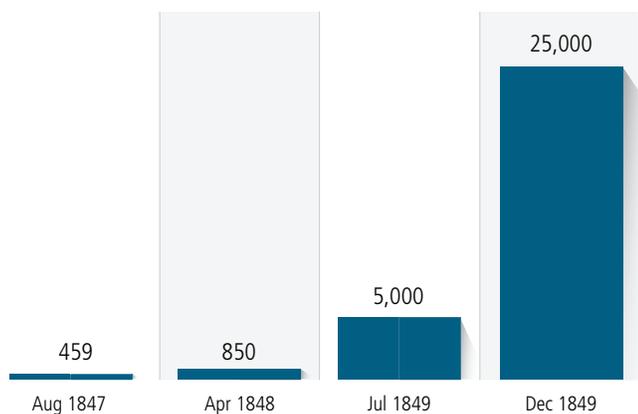
The method worked for a few years until the French government discovered the practice and banned the Blanc brothers.<sup>7</sup>

fig. 1 19<sup>TH</sup> CENTURY TEXT MESSAGE? THE CHAPPE SEMAPHORE ALLOWED COMMUNICATION OVER GREAT DISTANCES



Source: Wikipedia

fig.2 49ERS FLOCK TO PROMISE OF GOLDEN PROFITS:  
THE POPULATION OF SAN FRANCISCO



Source: San Francisco Genealogy

**Case Study Four: Gold Dust in San Francisco and Philadelphia**

Date: ~1849

The trade: In 1849, thousands flocked west to California in the hopes of striking it rich in a massive gold rush (see Figure 2). And riches indeed were to be had, not least for the arbitrageurs.

According to periodicals at the time, in San Francisco abundant supply (and the prospect of more) sunk the gold dust price per ounce to \$16.00. However, the going price per ounce of gold dust at the Philadelphia mint was \$18.05. Brokers and traders communicated across

the United States using telegraphs, working the price difference by buying as much gold as possible in San Francisco and selling as much as possible in Philadelphia.

To make good on the trades, the arbitrageurs had to factor in some costs. Indeed freight, insurance and other sundry charges totaled \$0.92 per ounce. After deducting these charges, the mid-19th century US gold trader could have made “\$1.13 [per ounce], or 7 percent, not a bad return for a relatively effortless transaction.”<sup>8</sup>

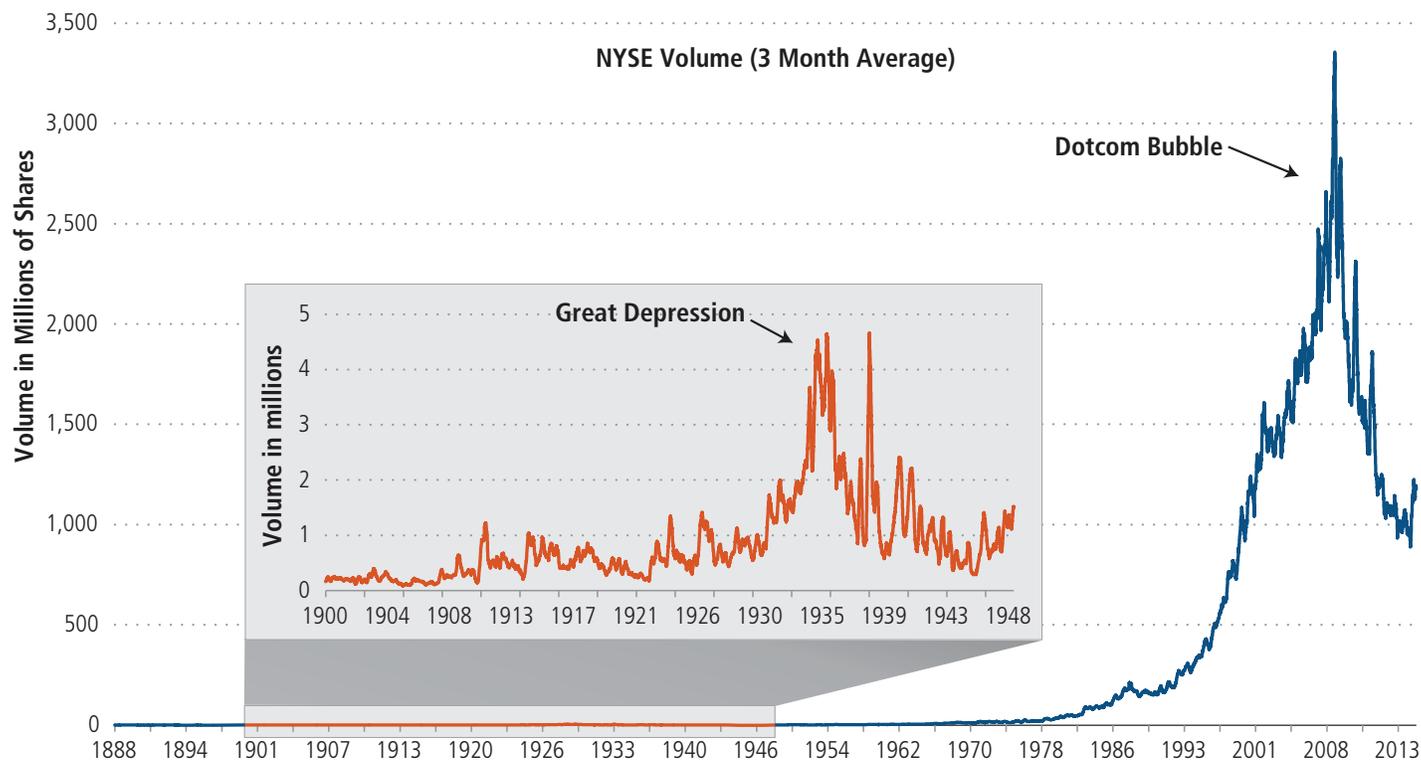
**Case Study Five: Datek and NASDAQ**

Date: ~1990

The trade: Long before Flash Boys and the investigation of 21st century computerized trading led by US television news magazine 60 Minutes, high-frequency traders of earlier generations were already keeping busy. This was especially the case for Datek Securities, a small trading firm based in New Jersey, which worked through the NASDAQ stock exchange system to find different quotes on different markets at the same time.

Here is how it worked: unlike a traditional stock exchange, the early digital incarnations of NASDAQ allowed “market makers [to] be physically located anywhere: the ‘floor’ is implemented in a fault-tolerant computer system [sic] collocated in Trumbull (Connecticut) and Rockville (Maryland).”

fig.3 INCREASED VOLUME: THE SOUND OF MARKET EFFICIENCY?



Source: New York Stock Exchange

In the NASDAQ system, various market makers post their prices in the form of bid/ask spreads for different securities. “The idea is that market makers compete with each other to offer the best price to customers: the actual buyers and sellers of stocks.”<sup>9</sup>

Datek, though, developed software called “the Watcher” which allowed them to profit from the discrepancies in price for the same security offered by different market makers using the NASDAQ system. In the SEC’s words: “The Watcher system gave Datek Securities traders a significant time advantage because they received last sale and quotation update information before other market participants... [and] enabled Datek Securities traders to react more quickly to market activity.”<sup>10</sup>

Why quote the SEC? Well, some years later the regulatory agency found Datek guilty of violating anti-fraud and reporting statutes. As has been the case across history, the line between legal arbitrage and illegal arbitrage is very blurry, and often defined only after the fact.

### **SOME THINGS CHANGE, SOME STAY THE SAME**

As financial and communication technologies progress, opportunities and frustrations with arbitrage are inevitable. Just recently, the SEC reviewed its own process for posting public information to the internet because some market participants gained faster access (an average timing advantage of about 10 seconds, an eternity for the fast traders).<sup>11</sup>

Our historical review shows that people in any era look for ways to make a quick profit. These characters will always exist. Investors today should count themselves lucky, though. As global trading volume has exploded, market pricing has become vastly more efficient (see Figure 3).

All of the characters on display in the case studies detailed above depended on cunning, faster information access, and the pursuit of profit. Any arbitrageur, past, present or future, who plies her trade shares a long lineage. 

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### US FIXED INCOME

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Cash Reserves Money Market Fund

Core Bond Fund

Corporate Bond Fund

Floating Rate Fund

GNMA Fund

High Income Fund

Limited Maturity Fund

Low Duration Fund

Strategic Income Fund

US Government Fund

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