



Strategy Research

Catching Up to the Market

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Dot-Com Bubble and Crash

The dot-com bubble, also known as the Internet bubble, was a speculative rally in the stock market that began in 1997 and ultimately burst in 2000. At its peak, the NASDAQ, a technology-heavy stock exchange, reached a high of 5132.5. There were many factors that formed the bubble. First and foremost, investors ignored conventional valuation metrics such as P/E ratio and EBITDA in favor of anticipated future profits. Coupled with easily accessible venture capital and low interest rates, stock prices of Internet companies that made little or no profit rocketed.

Concept of a Boom/Bust Cycle

In *The Alchemy of Finance*, George Soros, one of the world's greatest hedge fund managers, gave an insightful and succinct description of a boom & bust cycle. It will be constructive to understand the general framework of a bubble to help explain how the Internet bubble formed and progressed. According to Soros, at any given time in the stock market, there is always an *underlying trend* and a *prevailing bias*. The prevailing bias reflects the overall biases, misconceptions, and expectations of market participants (for example investors, speculators, etc.). The underlying trend on the other hand represents forces in the market that are independent of participants and may be unrealized. Stock prices reflect the combination of the underlying trend and prevailing bias.

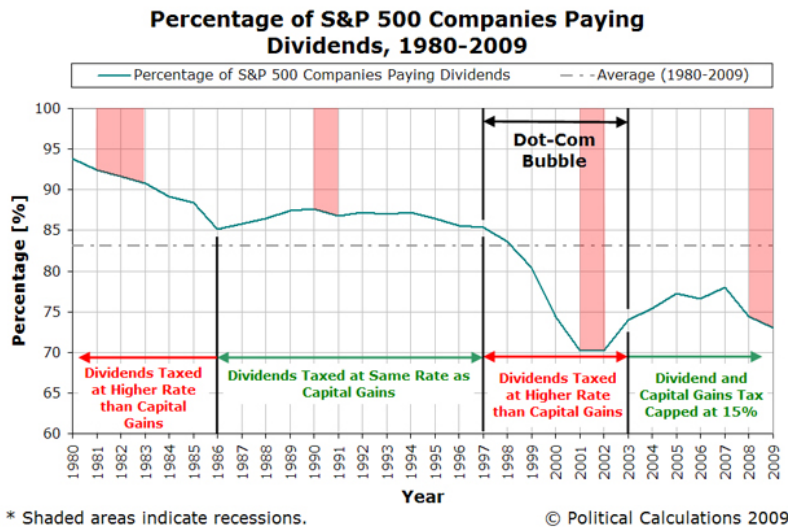
A bubble begins to form when investors recognize a previously undiscovered underlying trend. The prevailing bias then becomes positive due to this change in perception and puts upward pressure on stock prices. If the change in stock prices then affects the underlying trend, the bubble becomes self-reinforcing since participants will have higher and higher expectations of the underlying trend. This of course inflates the prevailing bias even further, causing prices to rise and the bubble to grow. There may be periods when investors expect a correction, causing prices to momentarily dip, but if the market overcomes this correctional period, the bubble will continue to be in full swing. When the self-reinforcing process between the underlying trend and prevailing bias progresses to a certain point, increases in stock price become purely dependent on investors' expectations that it will keep going up. When the trend in prices finally fails to meet exorbitant expectations, participants are disappointed and the prevailing bias reverses, forcing prices down. Decreasing stock prices will also negatively impact the underlying trend, reversing that as well. The self-reinforcing process described earlier continues, except at a faster pace and in the opposite direction. The bust period eventually ends and the market returns to normal conditions.

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It is crucial to note that a bubble only occurs when the change in stock prices affects the underlying trend and the stock's fundamentals; otherwise the self-reinforcing process will not happen and a bubble cannot form. With this framework in mind, we shall discuss the biases that caused the dot-com bubble.

Forming the Bubble

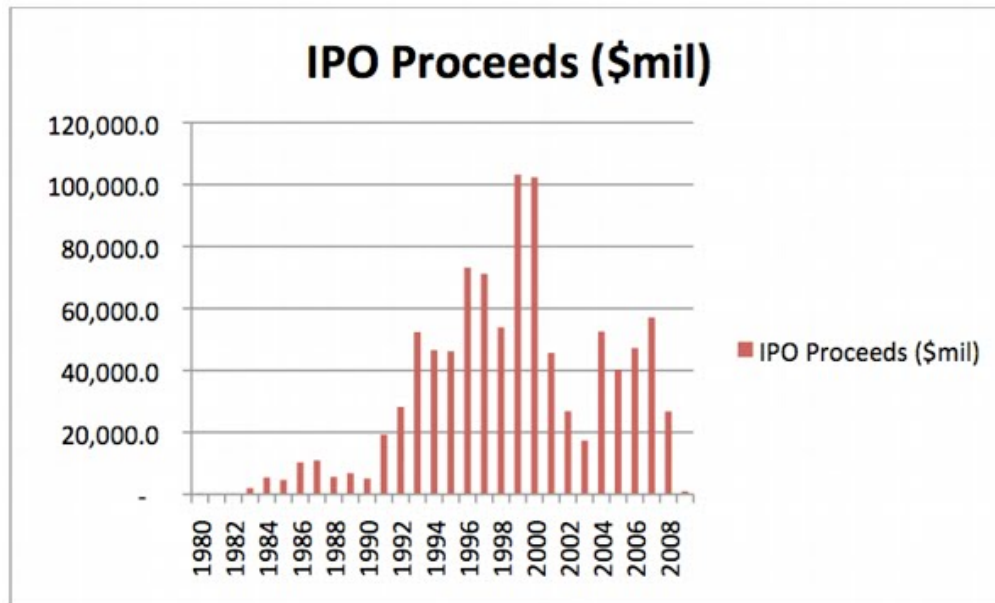
According to a landmark study by Zhonglan Dai, Douglas A. Shackelford and Harold H. Zhang, the major catalyst for the bubble was a piece of legislation called the Taxpayer Relief Act of 1997 (TRA97). It lowered the maximum capital gains tax on long-term assets (i.e., financial assets held for more than 18 months) from 28% to 20%. The tax relief was large and relatively unexpected, having been prompted by a surprising announcement in April about a \$45 billion reduction in the national deficit. To compound the effects of the tax cut, TRA97 left capital gains tax on dividends unchanged. Naturally, investors began favoring high-growth companies that paid little to no dividends, and moved away from blue-chip companies with steady dividend streams. As such, venture capitalists and other investors were drawn to more risky tech startups. TRA97 caused volatility in non-dividend paying firms to spike relative to the rest of the market. The legislation led to fewer S&P 500 companies paying dividends.



To summarize, the catalyst was a combination of lower capital gains taxes and a discrepancy between dividend and capital gains taxes. However, that raises the question: why didn't a bubble form before 1986, when dividends were taxed at a different rate? The simple answer lies with the foundation of new computer and Internet companies in the early 1990's. They quickly grew into

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large companies that still did not pay dividends. These companies became the standard that investors were attracted to due to TRA97, and fledgling companies tried to imitate this prototype. The effects are reflected in the expanding total size of annual IPO's from 1997-2000 as shown below.



Source: Thomson Reuters

The participant bias toward these types of companies pushed up the prices of tech stocks in the beginning. However, recall that for a bubble to form, the underlying trend (and the stock's fundamentals) must be impacted by the stock prices so that a self-reinforcing process can happen. In the Internet bubble, this manifested due to the way investors evaluated dot-com companies. Investors valued stocks at a multiple of anticipated revenues and ignored price-to-earnings. This put pressure on companies, especially new ones, to focus on expanding and gaining users, even if the practice resulted in losses. Companies also found that they could grow by issuing more shares and taking advantage of their inflated stocks. Doing so boosted their revenues and increased their price to revenue, which also demonstrated "growth" to investors. This impacted the companies' fundamentals and other valuation metrics, which pushed up the underlying trend, confirming Soros's bubble framework. Stock prices of dot-com companies accelerated the underlying trend, which increased expectations, leading to higher prices. At the height of the bubble in 1999-2000,

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prices went up only because speculators expected them to rally higher in the future, while in reality many companies had no sound business plans. Inflated stock prices became a cash cow for dot-com companies and backed many businesses' debts.

The Bubble Bursts

On March 10, 2000 the NASDAQ reached a high of 5046.86. The following day, the market began to fall as the bias saw a reversal. Part of the reason for this deflation could be attributed to the anti-trust lawsuit against Microsoft, which was announced April 4, 2000. However, the market had already anticipated the outcome against Microsoft in the middle of March, which prompted an initial dip in the markets. Following the public announcement of the findings against Microsoft on April 4, the market saw a large intraday dip. In the months following, investors finally sobered up and realized that most of the new loss-making tech firms never had profit-potential in the first place, no matter how fast their user base grew. Eventually start-ups burned through all their venture capital funding, failed to raise new rounds, and went bankrupt.

As the prevailing bias changed directions, stock prices started falling. But that caused the underlying trend to reverse as well because most businesses depended on inflated stock prices for growth and to pay their debt. Since stock prices could no longer generate earnings, companies that were desperate to match market expectations turned to unscrupulous methods such as massaging numbers and hiding debt. In good times, investors had overlooked these unethical tactics, but when the market crashed, all of it came to light. Companies used special purpose entities (SPE) to hide debt, inflate profits, and hide relationships between entities that were in fact connected to each other. The most notable case was Enron, which revealed its use of SPEs at the end of 2001 and ended in bankruptcy. These scandals fuelled the downward trend and on October 9, 2002 the NASDAQ closed at 1114.11, 78% lower than what it was two and a half years ago.

How It Relates to Now

Some argue that we are in a similar situation now in the sense that many technology companies are similarly overvalued. Tech company IPO's and acquisitions are constantly making news headlines as they continue to break records. When Facebook held its IPO in May 2012, it was valued at \$104 billion and the company made headlines again when it acquired WhatsApp for \$16 billion this year. It is also not surprising that most of those companies are social networking sites, where investors mainly value companies based on user base and global reach, giving companies an

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incentive to expand at all costs, rather than focus on earnings. Again, with Facebook, we see that companies are taking advantage of their inflated stock prices to fund their acquisitions (which one could argue are also inflated). All of this sounds very similar to the mechanisms that contributed to the Internet bubble a decade ago.

On the other hand, there are key factors that differentiate the current situation from that of the 1990's. First, technological infrastructure is much better now, especially with the growth of mobile technology. Smartphones are still at 30% of the 5.2 billion mobile phone user base and continues to grow at a fast pace. Tablet sales are growing faster than PC's ever did; global sales grew by 52% last year. All of this growth in new mobile tech infrastructure means more monetization opportunities than ever before. Internet advertising continues to grow at 16% every year, with mobile growing 105% in 2013. Whereas the "hottest" Internet companies in 2000 failed to generate revenue from their user base, companies nowadays are beginning to capture this gigantic ad market. Facebook claims 22% of all mobile ad bookings, which generated \$6.82 billion for them in 2013 and Google still dominates overall Internet advertising. The well-established social networks and Internet companies have clear business plans for growth and are indeed generating revenue. It is the smaller social networks, which have no solid plans to monetize, that should have investors concerned about the possibility of a bubble. However, they are not going public at the rate that the economy saw in 2000. Global tech IPO volume is down 87% compared to 1999 and 2000, and total IPO valuation is down 73%. We aren't seeing the underlying trend of companies going public with the expectation of increasing their valuations. Investors are also not buying stocks simply because they expect prices to rise. Therefore, there is no reflexive relationship now like there was in 1998-2000.

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Housing Bubble and Subsequent Crash

Forming the Housing Bubble

Despite the economic instability that came with the dot-com bubble and its subsequent burst, another bubble began to develop in the mid-2000s. Housing prices grew rapidly, reaching historically high prices. The Federal Funds Rate (the interest rate the Federal Reserve sets on banks) reached historically low levels at about 1%. Because of the recently burst Internet bubble, the Federal Reserve wanted to incentivize growth and economic activity. By lowering its interest rates, it made borrowing easier and by extension, allowed for more growth in the economy. This affected the housing market in two ways. First, low interest rates allowed banks to borrow vast amounts of money from the Federal Reserve, which they then loaned to even more homebuyers. Second, because mortgage rates are derived in part from Treasury bond yields (which decrease with a lower FFR) homebuyers saw lower mortgage rates. This lower borrowing rate allowed more buyers to enter the market, which naturally drove up prices. Many people who already owned homes refinanced with these lower interest rates and took multiple mortgages to invest back in a booming market. Buyers saw the housing market as an investment that could only keep going up, causing many of them to invest in multiple homes that they hoped to resell for a profit later.

The degradation of lending standards, coupled with questionable lending structures helped to compound this increase in credit. The expansion of subprime mortgages played a critical role in creating the housing bubble. Essentially, because of these lax standards, under- or unqualified candidates were given mortgages that they could not afford. Further, some “qualified” borrowers were actually under-qualified. When evaluating the financial reliability of a potential borrower, many lenders turned to credit scores. The problem with this, however, is that credit scores are incredibly difficult to standardize. Lenders did not acknowledge that two clients with credit scores of 675 could be two very different borrowers: one could have an extensive history, while the other could be a brand new credit card owner with little financial history. The likelihood that these two people would be able to eventually pay back their home loans would have been very different.

Additionally, the structure of these mortgages was flawed. Many of these subprime loans had a floating interest rate. During the first few years of the contract, consumers would have to pay a low, enticing rate; after this period, however, they were overwhelmed by rates almost double what they were seeing before. Since they were unable to pay these rates, they defaulted.

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Exploiting Mortgage Backed Securities

Banks began using several tools to capitalize on these opportunities, the first being the mortgage-backed security (MBS), specifically the collateralized debt obligation (CDO). They are referred to as “mortgage-backed” because they were secured by a mortgage or a group of mortgages. This means that as mortgage owners paid back their loans, the owner of a CDO would receive their payments. These CDOs were usually divided into three sections (often called tranches) depending on the risk and returns. Naturally, riskier tranches promised higher returns. They were structured so that those in the least risky tranche received their payment first, followed by the second riskiest, and finally closed out by those in the most profitable but also riskiest tranches. Rating agencies then assigned appropriate grades to each tranche, ranging from AAA to BBB to even lower. In theory, if the mortgages that composed the CDO were sound, those in the riskiest tranche stood to make large amounts on their initial investment. During the financial crisis, however, entire MBSs were backed with subprime mortgages, meaning that the entire CDO was at a large risk of not paying anything out at all. The housing bubble created such positive sentiments about the housing markets that CDO failure was seen as very unlikely; the prevailing sentiment was that if they did fail, only the riskiest investments would, and would not be nearly bad to wipe out the potential for profits. As a result, everyone ranging from small investors to institutional banks around the world poured their money into these MBSs, creating a precarious situation in which a slipping housing market could rattle the financial world. Banks were unconcerned because the process of packaging these MBSs was incredibly lucrative; by pumping money into the financial markets, banks were increasing the amount of capital available.

CDOs were particularly toxic when packaged inappropriately. Banks often synthesized the bottom tranches and repackaged them as brand new CDOs, claiming that they were “diversified” (despite still being based on the riskiest type of mortgages). With this diversification came higher ratings from rating agencies: somehow, pools of BBB bonds could be repackaged into an instrument that was rated AAA. This made it easier to sell to consumers, as some funds such as pension funds had minimum rating requirements for their investments, but vastly skewed the amount of risk that these consumers believed they were taking on. This repackaging, naturally, came with greater fees paid to the banks.

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Though these CDOs played a large role in creating the financial crisis, credit default swaps later exacerbated the fall. A credit default swap (CDS) works essentially like insurance: for a small fee paid over the time of the contract, the seller of a CDS guarantees the buyer of a CDS the full value of some underlying asset in the case of a default. The intended purpose of these contracts was to serve as insurance: if firms had CDO positions that they wanted to ensure, they would create a CDS and pay a regular premium in order to prevent a total loss on the position. If the underlying assets never failed, the seller of the CDS would profit from the “insurance” fee (since the market was so bullish about the housing market, investors thought that there was no way that the mortgage bundles these CDSs were insuring could all collapse).

There are two large differences between a CDS and owning conventional (such as house) insurance. The first is that the person buying the insurance does not need to own the asset. Unlike a homeowner buying home insurance, the person buying the insurance on these mortgage-backed securities did not need to own any. As long as they were willing to pay the insurance fee, anybody could buy the “protection” on these MBSs: if the security defaulted, they would earn a huge amount on their investments. The second difference is that multiple CDSs could be created on the same security. A homeowner cannot take out multiple contracts on the home, but as long as there is a market, theoretically an infinite number of swaps could be created on a single security. The problem with this is that if there are a larger number of swaps held by a single company on an asset that defaults, they were required to pay out all of these contracts. Because of laws at the time, companies were not required to have this amount of cash on hand, meaning that when these securities failed they simply did not have the resources to pay these contracts. Without the ability to pay out these contracts, the companies insuring billions of dollars of CDSs went bankrupt.

Crash of the Housing Market and Financial Sector

When banks began to realize that the billions of dollars of CDOs they had on their balance sheets would default, they tried to purchase as many CDSs as they could to weather the massive losses they were about to incur. However, a couple investors were a few steps ahead of them. One of these investors was Michael Burry. By researching and studying how the housing market was booming, he realized that it would crash when floating interest rates came into effect. As a result, he began searching for ways to short the housing market. Some of this came through shorting the stocks of large financial institutions, but much of it came from CDSs. Prior to the crash, banks did

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not distinguish between CDOs: it was just as easy to buy a CDS on CDOs of mortgages from a historically poor area as it was to buy one from a middle class area. This allowed Burry to carefully comb through the composition of CDOs and pick the ones that were most likely to fail in order to create a swap on them, allowing him to pick what essentially were guaranteed investments that would return huge multiples on his investment. Banks wanted to sell these swaps to collect the fees on them, so he was able to buy vast amounts at incredibly low rates. When banks started to buy CDSs, he was able to sell them back to the banks at vast multiples of what he paid.

As the market and demand for homes began to explode, so did the effort to build homes to sell. This happened so extensively that the supply of housing outstripped the demand, leaving empty homes that needed to be sold. Prices began to decline nationwide, and suddenly, homes were worth less than the mortgages used to buy them. People with multiple mortgages were no longer able to pay them, causing extensive defaults. Floating interest rates began to shift to higher levels, preventing ill-informed consumers from being able to pay them. This economic disaster turned into a catastrophe as it hit the financial institutions that had made billions in mortgage-backed securities. Companies such as AIG had billions of dollars in CDS on their balance sheets, and now that these mortgages had failed, they owed the buyers of these swaps trillions. Banks and other financial institutions collapsed, requiring government intervention to prevent even more from failing. This caused the markets to go into panic, plummeting from the highs seen during the bubble.

Road to Recovery

In the aftermath of the housing crisis and subsequent descent into recession, the United States Federal Government (primarily through the Federal Reserve) saw it necessary to enact numerous policies to assist failing institutions and kick-start the economy.

Troubled Asset Relief Program

The TARP program, signed by President George W. Bush in October of 2008 approved the government's purchase of assets and equity to bailout the financial system of the United States. The program was originally authorized for \$700 billion, but the Dodd-Frank Act reduced that amount to \$475 billion. These funds were used on anything deemed to be a trouble asset, including mortgages and the CDOs built on them. To qualify for this program, companies were required to enact certain policies, including limiting executive pay and removal of some tax benefits.

Quantitative Easing (QE)

Quantitative Easing describes the Fed's purchase of US Treasury Notes and MBSs as well as issuing credit to bank reserves to allow them to buy bonds. This policy was designed to lower interest rates, allowing for borrowing in the hopes of driving economic growth. As QE progressed forward, the amounts of notes that the Fed held had quadrupled to around \$4 trillion, making it the largest stimulus program in history.

QE 1 (December 2008-June 2010)

On November 25th, 2008, the Federal Reserve announced it would buy \$800 billion in bank debt, MBSs, and Treasury notes from member banks. The Fed ended up actually buying \$175 million in MBSs from Fannie Mae, Freddie Mac, and Federal Home Loan Banks as well as \$1.25 trillion in MBSs that were guaranteed by top mortgage companies. This balance peaked in June 2010 when Fed balance sheets reached \$2.1 trillion. With signs of improvement, the Fed began to halt purchases in June 2010 but quickly resumed them in August when growth was not robust enough.

QEm2 (November 2010-June 2011)

Shortly after this resumption of purchases in August, the Fed announced an increase of QE, dubbed QE 2. It would buy another \$600 billion of Treasury securities by the end of the second quarter of 2011 in the hopes of stimulating growth through inflation once again.

Operation Twist (September 2011-December 2012)

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In another attempt to stimulate growth without printing or expanding its balance sheets, the Fed enacted Operation Twist. In order to do so, the Fed sold short-term Treasuries while buying long-term ones, pushing long term-bond yields down. Lower long-term yields stimulate short-term growth because they incentivize more short-term spending by lowering the long-term returns of saving. A second round of Operation Twist was implemented in mid-2012, totaling the size of the program to over \$500 billion.

QE 3 (September 2012-Present)

QE3 was announced in September of 2010 as an open-ended purchasing program of \$40 billion per month. Coupled with this purchasing was an announcement that the Federal Funds rate would be kept near zero, another attempt to spur lending and spending. Near the end of 2012, the Fed announced that it would more than double the amount it was buying to \$85 billion a month (sometimes referred to as QE4).

QE Tapering

As economic conditions began to recover, the Fed announced in 2013 that it would begin tapering its purchases of bonds because macroeconomic indicators had not yet hit the Fed's target numbers: the unemployment rate was under 7%, GDP growth was at least 2-3%, and core inflation had not exceeded 2%. After rocking the markets with announced of considering the end of tapering, the Fed has finally reduced the \$85 billion a month purchasing of bonds monthly by \$10 billion to \$15 billion, and it is predicted to end after a final purchase this October, 2014.

Impact of QE

Quantitative easing was able to achieve some of its objectives but failed to complete others. The program helped reduce the inventory of subprime mortgages held by financial institutions, allowing them to rebuild and push forward with operations while beginning to rebuild trust. Deflated interest rates helped consumption (especially in the housing market) and generated economic growth. Though this growth may not have been as robust as the Fed had hoped, it provided a catalyst for the economy and provided the funds to stabilize the U.S. economy and to begin lifting it out of recession. What it did not do, however, was achieve the goal of making more credit available. Banks did not use the funds distributed; rather, they used them to triple stock prices with dividends and stock buy backs. Banks consolidated holdings: according to the Wall Street Journal, 0.2% of banks control over 70% of bank assets. In addition, because this credit was not

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being lent out, there was not as large of an effect on the consumer price index (CPI, a measure of inflation) and allowed it to stay within Fed limits. Lastly (and probably the most debated), some argue that QE created an asset bubble. Commodities (especially gold) saw their prices skyrocket as they were seen as safe investments. A similar phenomena happened with stocks: as corporations looked to banks, they sat on assets and used them to increase stock prices through buybacks and dividends.

Dodd-Frank Wall Street Reform and Consumer Protection Act

In 2010, President Obama signed into law the Dodd-Frank Act in an attempt to bolster financial regulatory capabilities. As a whole, the legislation is designed to improve transparency and accountability while protecting consumers and taxpayers from many of the problems that led to the financial crisis. First, it established the Financial Stability Oversight Council to oversee financial institutions by collecting information to accurately gauge risk and identify threats in the U.S. financial system while overhauling and consolidating existing oversight agencies. Dodd-Frank extends supervision for some non-bank institutions to the Fed as well as eliminates exemptions for low client investment advisers. Securitization rules were altered to shift credit risk onto financial institutions when creating securities. Federal assistance was prohibited from being given to swap entities, such as major non-bank swap participants. Credit rating agencies are required to now disclose more information to the Securities and Exchange Commission in an attempt to prevent the subprime lending that helped fuel the housing bubble. One of the most important provisions of the Dodd-Frank Act was the implementation of the Volcker Rule. The Volcker Rule restricts most banks from making speculative investments that do not benefit customers and that incur high risk for the bank. This law was targeted mostly at proprietary trading (using the firm's own assets to trade rather than depositors' to increase profits), preventing them from taking the huge risks that resulted in the 2008 financial crisis.