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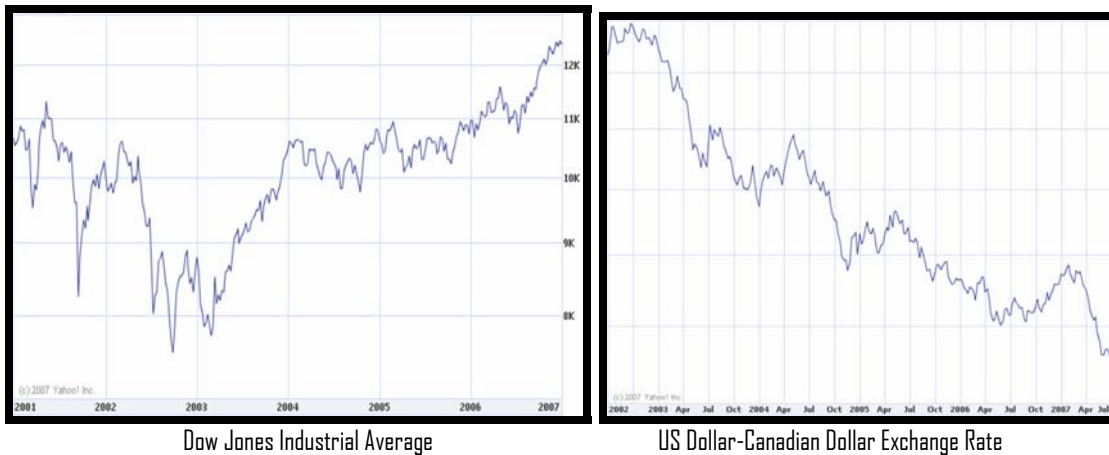
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## How “Point Blindness” Dilutes the Value of Stock Market Reports

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### *Abstract*

The stock index “point” is a focal component of financial news reports. Though many reports draw attention to point changes in major indices, few people realize that the value of a stock index “point” changes frequently. We call this perceptual phenomenon “point blindness.” We examine causes of point blindness and then propose alternate ways of reporting stock market information to counter it. The alternatives are easy to implement and can help citizens draw important inferences about stock values. An experiment shows that alternate modes of presentation have significant effects on public perceptions of the stock market.

Millions of Americans pay attention to US stock market news. They get this news from many sources. Print outlets, 24-hour news networks, and thousands of websites provide scores of financial reports. Many of these reports focus on the rises and falls of major stock indices. As Robert Shiller (2001:60) puts it, “Nothing beats the stock market for sheer frequency of interesting news items.”

One reason for increased attention to the stock market is a dramatic shift in responsibility for the post-work well being of American workers. Part of the shift is from employers to workers. Participation in defined benefit plans (e.g., pensions) has dropped significantly over the past two decades while participation in defined contribution plans (e.g., IRAs, 401(k)s and 403(b)s) has skyrocketed (Poterba et al 2006). A parallel shift from government to workers is also occurring due to growing doubts about the extent to which Americans can count on Social Security for retirement income. As the 2007 Annual Report of the Social Security Administration states:

“The financial condition of the Social Security and Medicare programs remains problematic; we believe their currently projected long run growth rates are not sustainable under current financing arrangements. Social Security's current annual surpluses of tax income over expenditures will soon begin to decline and then turn into rapidly growing deficits as the baby boom generation retires.... The longer we wait to address these challenges, the more limited will be the options available, the greater will be the required adjustments, and the more severe the potential detrimental economic impact on our nation.”<sup>1</sup>

Where recent generations looked to employers or government for post-work guarantees of income, younger and middle-age workers have a different future ahead. Their future financial security is more likely to depend on their own and others’

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<sup>1</sup> Whether the federal government will sustain Social Security at current levels for future generations or cut benefits is an open question. According to the report, “Social Security could be brought into actuarial balance over the next 75 years in various ways, including an immediate increase of 16 percent in payroll tax revenues or an immediate reduction in benefits of 13 percent or some combination of the two. Ensuring that the system is solvent on a sustainable basis beyond the next 75 years would require larger changes. To the extent that changes are delayed or phased in gradually, larger adjustments in scheduled benefits and revenues would be required that would be spread over fewer generations.”

investment decisions. As a result, what Americans believe about the stock market is important – not just to their own financial futures but also to governments and others whose assistance will be sought if scores of people make bad investment choices simultaneously. For these and other reasons, the conclusions Americans draw from stock market news have important implications.

In what follows, we use several analytic methods to examine how a key piece of information about stock market performance is communicated through news reports and understood by citizens. The piece of information is the value of a stock index “point.” Many “business” or “finance” news segments begin with reports about the daily movements of major stock indices. The Dow Jones Industrial Average (DJIA) is usually the index described first. A common highlight of such reports is that a stock index is up or down a certain number of “points” (e.g., “the Dow was up 30 points today and the S&P was up 7”). On days when these point totals rise or fall by large amounts or reach record levels they grab headlines.

Do media reports of this kind fuel a consequential mass blindness? We argue that they do. While many reports focus people’s attention on the changing number of DJIA “points,” few, if any, offer information indicating the frequently changing value of a DJIA “point.” Hence, people regard a DJIA point in the way that they do a “centimeter” or a “day” -- as a metric of constant value. We call this phenomenon *point blindness*. Point blindness will contribute to a reduced quality of life for scores of Americans if the ailment leads them to systematically misestimate stock values relative to other stores of value. It also increases the risk of new demands on government if many people make these errors simultaneously.

In what follows, we explain how the value of a DJIA point has changed in recent years, examine the extent to which this change has been reported, derive a simple palliative to counter point blindness, and evaluate the palliative using an experiment. We do this in four steps.

First, we use a thought experiment entitled “Loonies Under Your Bed” to show how point blindness, in combination with a widely-unappreciated recent drop in the value of “DJIA points,” casts the oft-reported gains of the “extended bull market of 2002-2007” in a sobering light. It also puts a darker spin on subsequent declines in market indices.

Second, we examine how a leading media outlet reports stock market information. Our content analysis of *New York Times* stories during the fall of 2006, when the DJIA was reported as having broken many records, confirms that its reports do not alert readers to changes in the value of index points. The finding implies that potentially important information about the recent dilution in the value of a DJIA point went unreported by leading media outlets. Hence, these outlets have fueled point blindness amongst those persons who rely on them for news about stock values.

Third, we use psychological research on *selective attention* to argue that an alternative means of presenting stock market information can help people adapt to point blindness. The change entails a commitment to presentations that make objectively relevant variations in the value of a DJIA point easier to see. We argue that these alternatives are simple to implement and can be easily understood by a mass audience.

Fourth, we offer the results of an experiment run on a nationally representative sample of over 2000 Americans in 2008. It demonstrates that simple changes in how DJIA point information is conveyed has large effects on how the public perceives the

stock market. These simple changes provide a counter to point blindness for many people.

We conclude by arguing that the shift in retirement income responsibility from employers and government to workers is one of several societal factors that make a recognition of point blindness important. Combating point blindness by paying greater attention to how stock market information is conveyed and understood is a topic in which individuals and governments have a long-term interest.

### ***“Loonies Under Your Bed”***

Here, we describe a thought experiment that highlights the economic significance of point blindness. The experiment can begin on any day in the years 2001 through 2005. For the sake of example, we focus on January 2, 2001, the first day in our database. Later, we will show that what we find to be true about this day is true for many others.

On the start date of the experiment, a subject is given the number of US dollars (USD) that matches the closing point total of the DJIA. On January 2, 2001, this amount is \$10,646.15. With this money, she can do one of two things.

*Option 1.* Use her USD to buy “one share of that day’s DJIA.” On January 2, 2001, such a purchase will result in her owning approximately 6.5 shares of each of the DJIA’s 30 components. The reason that “one share of the January 2, 2001 DJIA” gives her so many shares of stock is that the reported DJIA point total is the sum of the components’ listed closing prices adjusted by a divisor. The DJIA divisor is adjusted after any significant change in a DJIA component or in the index itself. Its purpose is to reduce the impact of such events on daily movements of the DJIA’s point total. On January 2,

2001, the divisor was 0.15369402, which meant that the summed cost of one share of each DJIA component was 1636.25 USD. So for 10646.15 USD, the subject can purchase 6.506432 shares of each component. To simplify the example, we assume that she pays no commissions or other transaction costs when acquiring or selling the stocks, she collects any dividends that accrue to the stocks that she holds, and she benefits from splits or similar passive benefits of stock ownership.

*Option 2.* Go to a bank and exchange 10,646.15 USD for the number of Canadian dollars (CAD) that have the same worth on that day. Again, to keep the example simple, we will assume that she does not pay any fees for the exchange. On January 2, 2001, the CAD-USD exchange rate was 1.4963, so she can obtain 15,929.83 CAD.

There is one additional rule. Whichever option she chooses, she must put the assets under her bed and keep them there until a pre-specified “cash out” date. Until that date, she must be a completely passive investor. For the purpose of the example, we focus on a “cash out” date of December 27, 2006 – the date on which the DJIA achieved its highest point total of any year up to and including 2006. Later, we examine the consequences for all possible “cash out” dates ranging from one year after the start date to December 31, 2006 – the last day in our database.

So, if she buys the stocks, she cannot change her investments if something better comes along and she cannot sell any of her holdings in order to buy a good or service. If a company she owns offers a choice about how to handle a dividend or proceeds from a spin-off, she experiences the consequence that comes from being passive (i.e., not



responding).<sup>2</sup> This implies that dividends can be accumulated but not invested. In short, she must put the stock certificates and any passive gains under her bed where, for the purpose of the example, we will assume they are safe.

If she takes the Canadian dollars, parallel rules apply. She cannot put the money in a bank and collect interest. She cannot reinvest it, spend it, or otherwise exchange it. The currency must go under her bed, where it will be safe.

Before choosing, note that this assumption introduces a bias that favors Option 1. Option 1 allows the subject to own shares of firms that hold assets in interest bearing accounts. Gains from the accounts can raise the firms' share prices or be transferred to investors through dividends. So, choosing Option 1 can provide interest income to the subject in a way that Option 2 cannot. We accept the asymmetry because it follows from our core assumption of investor passivity.

*What should the subject do?* Should she purchase multiple shares of thirty widely-owned icons of American industry during a period that was widely hailed as an "extended bull market" or obtain a currency that is rarely held by Americans or discussed in stock market news?

Before answering this question, we introduce a simplification. Instead of talking about US dollars and Canadian dollars, which can get confusing to people who are accustomed to thinking about "dollars" without respect to nation of origin, we will refer to the Canadian currency by its distinct nickname. In Canada, the dollar is nicknamed "the loonie." This nickname is so given because the dollar coin has loons (geese) engraved on its front.

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<sup>2</sup> For simplicity, and to be consistent with the thought experiment's set-up, we assume that the investor receives the cash value of proceeds from a spinoff rather than shares of the new company. In effect, we treat proceeds from a spinoff in the same way as dividends.

Now, consider the subject's fate if she chooses Option 1. We begin by saying a few words about how to think about the value of a stock index. On any given day, there is a strict linear relationship between USD and DJIA points.<sup>3</sup> When a report says that the DJIA gained 35 points, it means that it costs 35 USD more to buy "one share of that day's DJIA" at the end of the trading day than it did at the beginning.

On December 27, 2006, the DJIA closed at 12510.57 USD, its highest close of the year. This amount is 1864.42 points greater than the January 2, 2001 close. However, if the subject bought "one share of the DJIA" on January 2, 2001, the value of her holdings is different than 12510.57 USD. The reason is that DJIA components do not remain constant over time. Some stocks that were part of the DJIA in 2001 were not part of it in 2006. Decisions about DJIA components are made by the editors of *The Wall Street Journal*, which is owned by Dow Jones and Company. From time to time the editors replace companies that go out of existence or are not performing well with other large firms that have strong growth prospects. In the time period of our study, one set of replacements was made. On April 8, 2004, American International Group, Pfizer, and Verizon replaced the original American Telephone and Telegraph, Eastman Kodak, and International Paper on the DJIA.<sup>4</sup>

So on December 27, 2006, the value of the subject's "share of the DJIA" was 9903.57 USD. But, the subject's investment is worth more than this. When we add

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<sup>3</sup> The exception is at the moments when the divisor is changed. At such moments, which occur several times per year, there is a discrete jump from one linear dollar-points correspondence to another.

<sup>4</sup> At the time, American Telephone and Telegraph was the residual of a once larger entity. It shrank after agreeing to breakup as part of an antitrust settlement with the US Department of Justice. Several splinter companies became known as "baby bells." One "baby bell," SBC Communications, bought the remains of its former parent company in 2005 and renamed the merged entity AT&T. AT&T is now part of the DJIA.

passive gains (dividends received, additional shares gained from splits, and revenues coming from spinoffs), the USD value of her assets is 14023.49.<sup>5</sup>

So if she sells the stocks on December 27, 2006, she realizes a gain of 3377.34 USD. But she has to pay taxes on this gain. Since she held the assets for more than a year, the tax rate on her capital gains and dividends is 15% (assuming that the subject's total income is in the middle to upper ranges). After paying taxes, she has 13516.89 USD – *a gain of 2870.74 USD.*

Now, consider the subject's fate if she chooses Option 2, loonies under the bed. While she may rue the fact that she was not allowed to collect interest on the CAD, *she is better off than if she chose the stocks.* At December 27, 2006's exchange rate of 1.161, she can exchange her 15929.83 CAD for 13720.79 USD – *for a gain of 3074.64 USD.* Since the loonies were simply held under a bed, this gain is not taxable.

Loonies under a bed provided a better return than investing in the most widely-reported stock market index soon after the collapse of the dot-com stock bubble and selling when it achieved its record high point total of 2006. But to generate this example, we chose a specific ending date. Does the same result emerge on other “cash out” dates?

Figure 1 shows how the subject would have fared, using the calculation detailed above, after buying her assets on January 2, 2001 and selling them on any day from January 2, 2002 to December 31, 2006. When the loonie line is above the DJIA line, it

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<sup>5</sup> If on 1/2/01, the subject purchased 6.506432 shares of DJIA stock, the summed listing price of one share of each of the original 30 stocks on 12/27/06 was 1522.12 USD. Adding revenues accruing to shareholders from splits and spinoffs (412.28) and dividends (221.07) and multiplying by 6.506432 yields a cumulative value on 12/27/2006 of 14023.49 USD. To simplify the calculation, we assume that the investor takes the cash value of newly offered shares in the case of spinoffs. Dividend information is from Bloomberg LP as available on its website on July 17, 2007.

means that putting loonies-under-the-bed on the noted “cash out” date provides a greater return than holding a share of the DJIA.

[Figure 1 about here.]

Figure 1 reveals that the loonie line is consistently north of the post-tax DJIA line. That is, **for the subject making a choice on January 2, 2001, loonies under the bed provided a greater return on investment than did “one share of the DJIA” on every possible “cash out” date in 2002 through 2006.** Even without taxes, the same is true for almost every “cash out” date in this range.

Figure 2 extends this analysis further. There are nearly 800,000 pairs of “cash in” and “cash out” dates that occur within the years 2001-2006 and are at least one year apart. The figure depicts results of our thought experiment for every conceivable pair.

Using one year as the shortest holding period simplifies our presentation of post-tax consequences and biases the next result in favor of Option 1 (as returns from assets held for periods of less than a year can be taxed at substantially higher rates). We also assumed that the proceeds from the sale of “one share of the DJIA” would be taxed under the investment-friendly tax code revisions of May 2003 even if the “cash out” date in our analysis occurred before that date. Had we allowed shorter holding periods or calculated returns using the earlier tax rates, the post-tax returns for Option 1 would be no better and, in some cases, substantially worse.

Returning to Figure 2, red pixels depict holding periods in which loonies outperform the DJIA share. Green pixels depict the opposite. **In 97% of all holding periods (756,237/775,929) “loonies under a bed” outperform “one share of the**

**DJIA.”**<sup>6</sup> If, by some means, the subject could avoid the taxman when her “cash out” date arrived, she would be better off with loonies under a bed on 62% (480,423/779,529) of the possible holding periods. In reality, however, she must pay taxes. Hence, measured multiple ways, and making several assumptions that favor Option 1, we find that placing loonies—a currency to which few Americans pay attention—under a bed provided greater investment returns to investors than would buying a share of the nation’s most widely-reported stock index during a period that was widely hailed as an extended bull market of financial significance.

[Figure 2 about here.]

A parallel result holds for the Euro, a currency that receives far more global attention than the loonie. Conducting an analysis that follows the procedures just described above, we find that holding “one share of the DJIA” for one year or greater during a period widely viewed as one of the longest bull markets US history consistently provided inferior returns to the alternative investment. In 86% of all holding periods of one year or greater (667,601/779,529), “Euros under a bed” provided a greater post-tax return than “one share of the DJIA.”

This thought experiment’s outcome was driven by a fall in the value of the USD relative to the Euro and the CAD. But the fall of the USD against these currencies was not an isolated incident. As Figure 3 shows, from the beginning of 2001 to the end of

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<sup>6</sup> The reason that more than 3 percent of the figure appears to be red is that this image is made of far less than 800,000 pixels. All pixel-reducing coloration algorithms that we could have used produce a bias, we chose an algorithm that has a bias towards green pixels.

<sup>8</sup> Consider an alternate interpretation of this result. On January 2, 2001, let the subject purchase “one share of the DJIA” for the USD equivalent of 15,929.83 CAD. Her post-tax revenue from selling these assets on December 27, 2006 would be the USD equivalent of 15,693.11 CAD. *This is 236.72 CAD less than her original investment.* Measured in CAD terms, the DJIA investor *is worse off financially* despite selling on the highest DJIA closing date of 2006. Indeed, on any day that the loonie line is north of the DJIA line in Figure 1, DJIA investors lost value when in CAD terms.

2006, the USD fell against not only the loonie and the Euro, but also against other important benchmarks such as an ounce of gold and a barrel of oil.

[Figure 3 Here]

So, even during the extended bull market of 2002-2007, when the DJIA was reported as hitting a spectacular sequence of record highs, the value of the USD relative to other focal financial metrics declined sharply. Viewed from this perspective, the meaning of DJIA “point” increases and record highs is diluted. The point metric does not provide the same information that it did before the USD’s fall.

What do these results mean to Americans?<sup>8</sup> The answer is that many hold most of their assets in USD-denominated terms. Those assets include stocks. News reports focus attention on changing attributes of the stocks and/or the index’s changing “point” totals. They rarely, if ever, provide any indication that the meaning of these points are changing because of their relation to USD. The reports, therefore, fuel point blindness amongst their readers. To the extent that readers or viewers perceived stocks as valuable because widely-publicized indices were “breaking records,” point blindness likely led them to overvalue stocks relative to other investment vehicles and stores of value. Thus, this thought experiment offers an example where point blindness can skew investors’ perceptions in ways that are economically significant.

### ***How the News Fuels Point Blindness: A Content Analysis***

If many people would benefit from thinking about stock market reports in ways that reflect the changing value of DJIA points, then most news reports are unhelpful. During the extended bull market of 2002-2007, news outlets produced many stories about the rise

of the DJIA. They also offered many stories on the fall of the USD. However, they offered few, if any, stories that related the two topics.

July 12, 2007 was the kind of day on which we would most expect to see such a connection. On this day the USD hit a record low against the Euro and approached a multi-decade low against the loonie. On the same day, the DJIA achieved a record high. On July 14, the *New York Times* published a story that discussed the day's events. It read,

“Wall Street ended a record-setting week yesterday by surging again, sending the Standard & Poor's 500-stock index past a trading high set in March 2000 and thrusting the Dow Jones industrial average past 13,900 for the first time. Both the S.& P. and the Dow logged record closes for the second straight day. The blue-chip index gained 295.57 points for the week...

The dollar was... still trading at a record low versus the euro and 26-year low against the British pound...”<sup>9</sup>

That this article does not link the DJIA's record high to the USD's lows is not an anomaly. As evidence, we report results of a content analysis of *New York Times* articles that appeared in the final quarter of 2006. We selected this time period because the DJIA achieved 21 record-high closes within it.<sup>10</sup> We selected *The New York Times* because of its wide circulation and our belief that its reporting of the stock market is relatively sophisticated.

The sample of articles we analyzed met the following criteria: they were published in the two days following a DJIA high (e.g., for the October 5, 2006 high we

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<sup>9</sup> <http://www.nytimes.com/2007/07/14/business/14markets.html>. On July 13 and 14, 2007, the New York Times published four articles about the DJIA. Of these four articles, only the article cited in the text also mentioned the declining value of the USD.

<sup>10</sup> The search was conducted using Lexis-Nexis. The dates of the DJIA records in the last quarter of 2006: October 3, 2006 (11727.34); October 5, 2006 (11866.69); October 10, 2006 (11867.17); October 12, 2006 (11947.7); October 13, 2006 (11960.51); October 16, 2006 (11980.6); October 18, 2006 (11992.68); October 19, 2006 (12011.73); October 23, 2006 (12116.91); October 24, 2006 (12127.88); October 25, 2006 (12134.68); October 26, 2006 (12163.66); November 8, 2006 (12176.54); November 14, 2006 (12218.01); November 15, 2006 (12251.71); November 16, 2006 (12305.82); November 17, 2006 (12342.56); December 14, 2006 (12416.76); December 15, 2006 (12445.52); December 19, 2006 (12471.32); and December 27, 2006 (12510.57).

included articles that were published on October 6 and October 7) and included the word “Dow” in their headline, lead paragraph or key terms. Fifty articles published over a total of 32 days met these criteria.<sup>11</sup> Table 1 gives an overview of our findings.

[Table 1 about here.]

Our analysis first considered graphics. Since graphics are often more striking than text, we analyzed the content of the graphics in all of the articles. Of the 50 articles that fit our criteria, 46 featured accompanying graphics, of which 28 focused on the changes in the number of DJIA points (the other graphics included different content such as photographs of traders). Of the 28 “point total” graphics, none provided visual stimuli that would induce any manner of thinking about changes in the value of a DJIA point.

We next analyzed text. Ten of the DJIA articles mentioned the value of the USD in the context of exchange rates. Only one article connected stock index increases to the USD’s decline -- an October 7 column by Floyd Norris. The article compares recent returns from many national stock indices. The returns are stated in USD equivalents. Many nations’ main stock indices are shown to outperform the DJIA. Norris (2006) points out that his finding is based, in part, on the USD’s decline.

“Most European markets are shown as being higher than they were in early 2000, but most or all of those increases reflect the fact that the moves are based on dollar performance. The CAC 40 in France, for example, is shown as being up 13 percent, but it is down almost 10 percent in euros. The gain came solely from the dollar’s weakness.”

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<sup>11</sup> We excluded the “Inside” and “Today in Business” features, as they simply tease inside content by providing verbatim quotes from full articles. We coded each article for the following characteristics: (1) Did the article have a graphic? (2) What did this graphic show? (3) Did the article mention the exchange rate? If so, where did this appear? (4) Did the article mention the trade deficit? If so, where in this article did this appear? (5) Did the article explain how changes in the dollar/trade deficit affect the DJIA? (6) Did the article mention the Dow being a “dollar-weighted” index? Three coders (Grafstrom, Krupnikov, and McGovern) performed the analysis. Two coders analyzed each article independently. Overall, the inter-coder reliability was 0.88.



This article, which explains that nominal gains can be deceptive if one does not understand the underlying metric, is the *sole exception* to a rule. In all other cases, *Times* readers are not provided with graphics or text that would cause them to ask whether the USD's fall dilutes the implications of the DJIA record highs.

The *Times*' presentations, and that of other leading media outlets, regularly reinforce a *point blindness* that limits the informative value of these financial reports to their audiences. In making this claim, we follow arguments about the difference between nominal and real asset values that academic economists have made for decades (e.g., Fisher 1928, Shafir et al 1997). Given the length of time for which such real-nominal problems have been known, one could claim this scholarship's implications should be widely understood in the DJIA context. Our content analysis reveals that *they are not*. When reporting on changes in the value of commodities, such as oil and gold, financial news outlets regularly tie price changes to variations in the USD when such ties are appropriate. But when it comes talking about US stock markets, real-nominal lessons have been cast aside. As a result, the lingering problem relating to public understanding of the value of stock market indices is not with the scholarship itself, but in how media outlets forget about it when conveying stock market information to the public.<sup>12</sup>

### ***Countering Point Blindness by Changing the News***

To this point we've shown that point blindness is consequential and is fueled by media coverage of the stock market. Now, we turn to the question of what to do about this. We argue that a simple and easy-to-implement change in media presentations of

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<sup>12</sup> Tyran (2007) offers a brief, but cogent, overview of how related forms of real-nominal confusion have been shown experimentally to affect a wide range of important economic behaviors.

stock market information can increase the informative value of these reports to broad audiences. We begin this phase of our effort by describing a psychological phenomenon that not only explains why so few people have been inquisitive about the changing value of DJIA points, but also how alternate presentations could increase their interest.

The relevant psychological phenomenon is selective attention. In many cases, people direct their attention selectively to only a fraction of the stimuli available to them. Such selective attention often facilitates efficient decision making and eases an individual's cognitive load. Point blindness is a product of selective attention. It results when people selectively pay attention to fluctuations in the total number of points while ignoring the underlying value of the points. In what follows, we use economic and psychological research on selective attention to explain why economic news reports reinforce point blindness. We also use this research as a foundation from which we develop alternative ways of conveying stock market news that can counter point blindness.

Many economists have recognized that selective attention provides an efficient cognitive foundation for decision making. Scholars as far back as Simon (1955), for example, argued that people cannot pay attention to every piece of information available to them. To save cognitive effort, people pay attention to some attributes of incoming information and ignore others. Such selectivity is efficient when limited amounts of information are sufficient for making effective choices (Simon 1955, 106-107). Building from such ideas, other economists have examined how individuals direct their attention. Hirshleifer and Teoh (2003) argue that people pay attention to information that is most salient. Gabaix et al (2006) provide a more conditional argument suggesting that people

pay attention to informational details that are relevant to the decision they are making and that vary across the alternatives from which they can choose.

These economic studies, however, posit relevance and variability as objective characteristics of information. While they explain why people *should* pay attention to objectively salient information, they do not examine why people nevertheless fail to do so. A number of psychologists have examined such questions in greater depth.

Tversky (1977) and Einhorn and Hogarth (1981), among others, use a diagnosticity criterion to explain how people allocate attention. Information is diagnostic when it allows people to distinguish between alternatives (Skov and Sherman 1986). While similar to the notions of “salience” and “relevance” highlighted above, there is an important difference between these concepts and diagnosticity. Where the economists’ work operationalizes salience/relevance with objective determinants, diagnosticity is determined through a more subjective process.

Diagnosticity is the product of a person’s motivation for seeking information, their beliefs about the information’s content, and the context in which the information is presented (Einhorn and Hogarth 1981, Medin, Goldstone and Gentner 1993). ‘Context’ refers to the mode of presentation, the order of presentation, and the other information the individual is receiving at the same time. An important consideration is that changes in context can make certain details appear more or less diagnostic, even though their objective relevance remains constant. So, if people are already attending to a piece of information (e.g., reports about the total number of DJIA points), then changing the informational context can make objectively relevant details (e.g., the value of a DJIA point) more diagnostic.

To this end, Einhorn and Hogarth (1981) argue that diagnosticity is a function of available information. If a person finds a detail diagnostic when it is presented in one manner, he may not find it to be diagnostic when the information is presented in a different manner (e.g., when other available information changes). Skov and Sherman (1986) have shown that details that appear more variable are perceived to be more diagnostic than details that appear constant. So, when interpreting DJIA reports, people are more likely to focus on attributes whose presentation highlights their variability. Hence, it is natural to see why many stock market reports emphasize changes in the number of DJIA points from day to day and why people tune in to learn about these changes.

These studies of diagnosticity provide a basis for thinking that alternate – and easy to implement -- presentations of stock market information can redirect attention and counter point blindness. To this end, experimental research shows that presentational alterations in related domains can redirect attention. Bettman and Kakkar (1977), for example, showed that subjects relied on brand names when available information was categorized by brand, yet relied on objectively relevant product attributes when information was categorized by these attributes. Jarvenpaa (1989), Stone, Yates, and Parker (1997), and Lurie and Mason (2007) describe work that shows similar result with graphic presentations. Jarvenpaa (1989: 299), for example, finds that for many consumer decision contexts, “the graphical format mattered more than the task demands...” Such work suggests that presentation can have substantial effects on what informational details people will perceive as diagnostic.

Our content analysis shows that current news reports present DJIA information in ways that reinforce a particular pattern of selective attention that fuels point blindness. In most reports, changes in the numerical value of the index are highlighted and stand out as a variable factor, thus increasing their diagnosticity. Such presentations direct attention to changes in the number of DJIA points. They direct no attention to objectively relevant changes in the meaning of a DJIA point.

[Figures 4 about here.]

We contend that alternate presentational strategies can make variations in the value of DJIA points diagnostic. Consider Figure 4, which puts the “bull market” of 2002-2007” in a different light. There, the DJIA’s value is shown with respect to more than one currency. In this presentation, the DJIA is no longer the lone source of observable variation. This presentation adds diagnosticity to changes in the value of a DJIA point. Diagnosticity can similarly be added by conveying the ideas textually or verbally. Reporting DJIA closing values against other currencies can lead viewers or readers to draw inferences such as “at time T, the DJIA was up xx% against the dollar but was down yy% when measured in Euros and down zz% in Canadian dollar terms.”

Can such presentations prompt viewers to think about DJIA points as something other than constants of little importance? Our reading of the literature on diagnosticity suggests that they can. We argue that presentations that show the value of the DJIA with respect to other meaningful measures of value can provide people with a basis for questioning whether the value of the oft-presented point metric should be so casually ignored. In particular, we contend that if the subject of our thought experiment had seen

one or more of these alternate presentations, she would be less prone to point blindness.

To evaluate these predictions, we ran an experiment.

### ***An Experiment on the Impact of Our Proposed Alternative***

We conducted an experiment to evaluate whether alternate presentations of stock index information can affect public opinions of the stock market. We embedded the experiment in a survey. The survey was conducted by Knowledge Networks between February 13 and 26, 2008. Knowledge Networks (henceforth, KN) uses random digit dialing techniques, callback strategies, and incentives to initiate and sustain contact with a nationally representative Internet panel of American citizens aged eighteen and above. The subjects in our study constitute a randomly selected subset of the KN panel and approximate a random sample of the U.S. adult population. Our survey was assigned to 3,059 KN panelists. Of those, 2,039 (66.6%) completed the study.<sup>13</sup>

The experiment began with all subjects answering a multiple-choice question. The question was: "What does the Dow Jones Industrial Average measure? The number of people who work for the Dow Jones company, the value of the stocks of major American companies, [or] the height of buildings used in industrial production." Over ninety-eight percent of subjects answered this question correctly. After being asked this question, all subjects were shown the correct answer. The purpose of this question was to document

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<sup>13</sup> The average subject completed the survey in 5.34 minutes. This estimate is the average time taken by the 1989 subjects who took less than one hour to complete the survey. The manner in which the survey was administered allowed subjects to begin the survey, leave to do something else, and return to complete the survey at a later time. We believe that this was the case for our other 50 subjects. Fourteen subjects completed the survey in more than one, but less than twelve hours. Nine subjects completed the survey in more than twelve but less than twenty-four hours. Twenty-seven subjects completed the survey in over twenty four hours. Counting all of these subjects, the average time used to take the survey was 70.39 minutes.

subjects' abilities to understand the content of our experimental stimuli and to provide a needed definition to subjects who did not answer the question correctly.<sup>14</sup>

We then randomly assigned the 2039 subjects into one of eight experimental groups. One group, henceforth known as the control group, received no information about stock indices. All other subjects received information about the performance of the DJIA in the year 2007 (a.k.a., the stimulus). The only factor distinguishing the seven groups was the manner in which we conveyed this information.

One group received this news in a conventional way – the DJIA's performance was simply stated in USD terms. The phrase

**“In the year 2007, the value of the Dow Jones Industrial Average *increased by 6%* when measured in U.S. Dollars.”**

appeared in the center of their screen for five seconds -- at which point the subject was given the option to advance to the next screen.

Three other groups saw one of the following phrases under conditions identical to those just described:

**“In the year 2007, the value of the Dow Jones Industrial Average *decreased by 4%* when measured in Euros.”**

**“In the year 2007, the value of the Dow Jones Industrial Average *decreased by 9%* when measured in Canadian Dollars.”**

**“In the year 2007, the value of the Dow Jones Industrial Average *decreased by 19%* when measured relative to the price of an ounce of Gold.”**

We refer to these three treatment groups collectively as “the single-currency treatments.”

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<sup>14</sup> For subjects who were in one of the two treatment groups that received DJIA information in Euro terms, a second trivia question was asked to serve a parallel purpose. The question was “The Euro is the name of the currency of: “the United Kingdom,” “15 of the 27 member countries of the European Union,” or “Japan?”” 83 percent of subjects who were asked this question answered it correctly. 13 percent responded “the UK” and 4 percent responded “Japan.” After answering the question, all subjects were shown the correct answer.

The three remaining treatment groups received *two* pieces of information in the center of the screen. The first piece of information for all three groups was the USD-denominated DJIA claim described above. The second piece of information was one of the three non-USD denominated DJIA claims (EURO, CAD, or Gold) listed above. We refer to these three treatment groups collectively as “the double-currency treatments.”<sup>15</sup> With this design in mind, it is important to note that no subjects were deceived in this experiment. While we manipulated the presentation of information across treatment groups, every claim about the DJIA is factually accurate (with percentages rounded).

After providing the stimulus, we asked all subjects who were exposed to a stimulus (everyone except control group subjects): “Given what you have just read, would you say that in the year 2007, the stock market performed “much better than you believed prior to starting this survey”, “somewhat better than you believed prior to starting this survey”, “the same as you believed prior to starting this survey”, “somewhat worse than you believed prior to starting this survey”, [or] “much worse than you believed prior to starting this survey.” Figure 5 provides depicts subjects’ responses within the single currency treatments as compared with the US Dollar group.

[Figure 5 about here.]

Figure 5 focuses on the percentage of subjects for whom exposure to the stimulus made them feel “worse” about the DJIA in 2007. Amongst the subjects who received this in the conventional way (in USD terms) twenty percent reported that this report made

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<sup>15</sup> The number of subjects in each group is as follows: control, 266; USD only, 255; Euro only, 263; CAD only, 242; Gold only, 252; USD & Euro, 253; USD & CAD, 253; USD & Gold, 255.



them feel worse about the stock market. By contrast, over twenty eight percent said that this news made them feel better about the stock market.<sup>16</sup>

People who viewed DJIA information in non-USD terms saw matters quite differently. Their judgments about the Dow were harsh. When DJIA information for 2007 was presented in non-USD terms, over 40% of subjects in the single-currency treatments thought worse of the stock market's performance. In other words, a single brief exposure to a non-USD delineated DJIA performance report doubled the percentage of subjects who responded that the stock market performed worse than they thought. For each of the three single-currency treatment groups, the difference between them and the USD group is statistically significant at the .001 level. At the same time, fewer than ten percent of subjects in the single-currency groups responded that the news that we presented to them made them feel better about the DJIA's performance (this compares to nearly 30% for the USD group). So, in a year where the decline in the value of the USD dragged down the value of a DJIA point relative to other value metrics, conveying stock index information in a manner designed to counter point blindness led a substantial number of people to adopt a very sobering view of the US stock market's most famous indicator. In this respect, our result follows that of Sausgruber and Tyran (2005) who use experiments to show that subjects can, given proper feedback, learn to adapt to a real-nominal blindness associated with indirect taxation.

In some cases, it will not be practical for a media outlet to produce a story that frames stock index performance only in a non-USD currency. It remains to determine

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<sup>16</sup> The fact that this USD-based description of the 2007 DJIA makes our subjects feel better on balance suggests that at the time we conducted this survey the average person believed that the DJIA performed worse in 2007 than it actually had when performance is measured in USD terms. For people who are blind to the fact that a DJIA point value declined in 2007, the "news" contained in our stimulus is interpreted as good.

whether reports that contain both a USD-based report of a stock index along with a non-USD based presentation can counter point blindness. To examine this matter, we turn to an evaluation of the double-currency groups. Figure 6 depicts their reactions relative to the US Dollar group.

[Figure 6 about here.]

These results mirror the results from the single currency treatments: people who receive information in other currencies rather than just the US Dollar make different evaluations. In only one case (USD & Ounce of Gold) does the difference reach conventional levels of statistical significance. While the magnitude of double-currency effects is smaller than in the single-currency effects, the general direction of the effects is the same as described above. That said, it is worth remembering these results are the product of *a single exposure* to information that may be as brief as five seconds long. There is no announcer or accompanying text that puts the two sentences into context. As such verbal or textual reinforcements often accompany the presentation of DJIA information, ours is a conservative test of the proposition that alternate presentations of stock index information can counter point blindness.

To further document whether alternate presentation strategies affect public opinion about the stock market, we asked all subjects the following question, “How would you rate the overall condition of the stock market in the year 2007?” Subjects could respond “Very Good”, “Somewhat Good”, “Neither Good nor Bad”, “Somewhat Bad”, [or] “Very Bad.” Figure 7 depicts these results for the single-currency and double-currency treatment groups, respectively. It highlights the percentage of subjects in each group who responded “somewhat bad” or “very bad” to the question.

[Figures 7a and 7b about here.]

The first thing to notice in Figure 7a is the relationship between the USD group and the control group. Roughly 40% of the control group subjects, who received no information about the 2007 stock market, described its condition as bad. Of the subjects who had earlier been reminded that the DJIA actually increased in value, when measured in USD, in 2007, 34% described the stock market's condition as being bad. The difference between this group and the control group suggests that without prompting, citizens in February of 2008 (a bad time for the Dow) remembered the DJIA's 2007 performance as being worse than it actually was.

In Figure 7a, over 50% of treatment group subjects described the stock market's condition as some form of "bad." So subjects in the single-currency treatment groups graded the stock market's health as significantly worse than those who were told about DJIA performance in USD terms. In Figure 7b, the results from the double-currency treatments are in the same direction as the single-currency results, but the magnitudes of the effects are smaller. Considered altogether, the results from Figures 5-7 suggest that even a single brief exposure to DJIA information presented in non-USD terms can change how Americans evaluate the stock market.

In 1979, Modigliani and Cohn argued that investors who fail to adjust long-term expectations about expected growth to variations in inflation would undervalue stocks when inflation is high and undervalue them when inflation is low (also see Cohen, Polk, and Vuolteenaho (2005)). Here, we argue that point blindness, whose causes need not be tied to inflation, can have similar negative consequences for investors. It can cause them to undervalue stocks and stock indices whose values are USD-denominated when the

USD is rising against other plausible stores of value and it can lead investors to overvalue stocks and stock indices when the USD falls. Simple changes in the way that stock information is conveyed can help people adjust their expectations in ways that can protect them from suboptimal investment decisions that may arise as a consequence of unchallenged point blindness.

### ***Conclusion***

During what was reported as an extended bull market from 2002-2007, the DJIA's value, as well as that of the Standard & Poor's 500, soared to new heights -- when measured in "points." At the same time, the USD fell precipitously against many relevant measures, dragging the real economic value of stock index "points" down as well.

We have shown that changes in perspective can come from slight alterations to the traditional presentation of financial news. Altering the presentation of existing reports can make objectively relevant attributes of stock market reports increasingly diagnostic to readers. We recommend that news outlets that offer daily reports about the DJIA and other indices regularly report their value in terms of other focal assets, such as the Euro. Such presentations will offer citizens the ability to draw new inferences from everyday financial news. These inferences, in turn, can lead them to make better choices regarding personal finance and ask better questions about the extent to which their plans are affected by government fiscal and monetary policies. For example, people can hold assets whose value is tied to other currencies, but they require certain kinds of information if they are to consider doing so. One way to help people understand think about such

possibilities is to offer information about common investment vehicles in ways that counter “point blindness.”

People who have such knowledge are less likely to be negatively affected by knowable threats to their financial futures. As an increasing number of Americans now bear greater risks in planning for their financial futures (Hacker 2006), it is important to try to reduce such negative consequences when possible. To that end, we have shown that small changes in the emphasis and content of stock market reports can lead people to pay more attention to the changing meaning of DJIA points which can, in turn, improve their understanding of focal economic phenomena.

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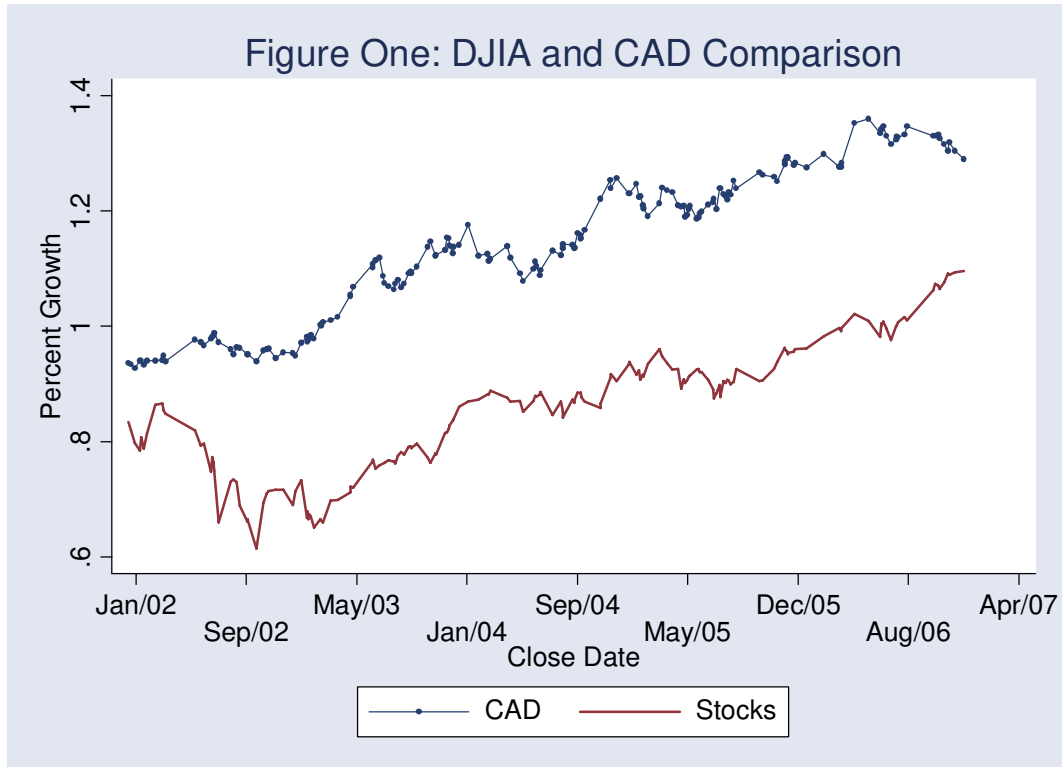
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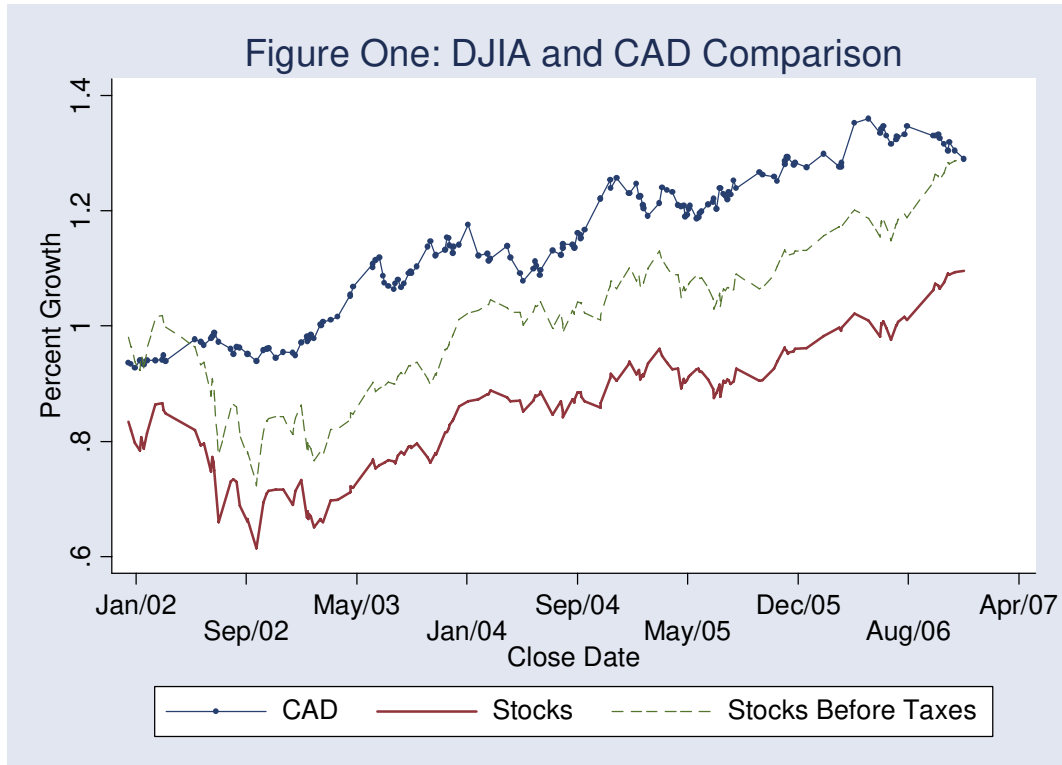
**Table 1. Outcome of Content Analysis**

	Yes	No	Total Number of applicable articles:
<b>GRAPHICS</b>			
Does the article have a graphic?	47	3	50
If so, does the graphic have DJIA content?	28	19	47
<b>If so, does the graphic show fluctuations in the DJIA as a function of exchange rates?</b>	<b>0</b>	<b>28</b>	<b>28</b>
<b>FOCALCONTENT</b>			
Does the article mention the exchange rate?	10	40	50
If so, does it link a USD exchange rate to the DJIA?	1	9	10
<b>Number of all articles linking a USD exchange rate to the DJIA.</b>	<b>1</b>	<b>49</b>	<b>50</b>

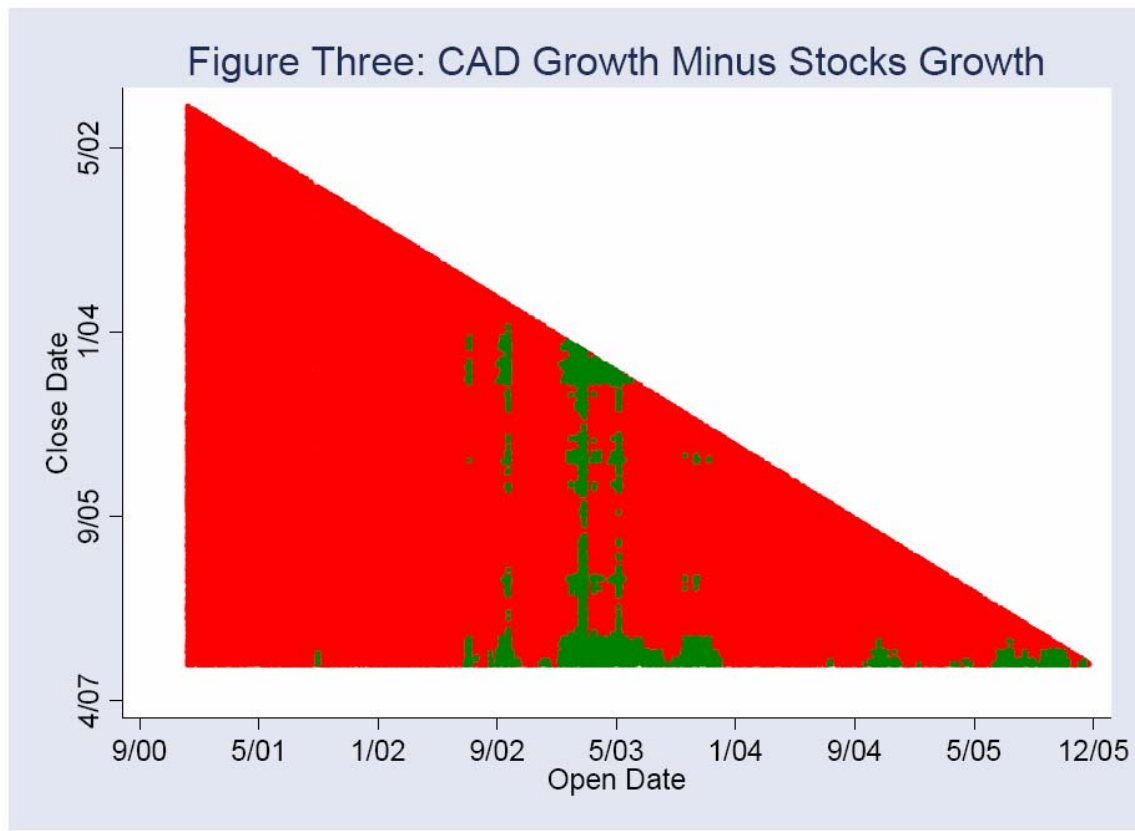




**Figure 1.a. Returns from Loonies Under a Bed and One Share of the DJIA Assuming a Purchase Date of January 2, 2001.**



**Figure 1.b. The Same Figure Also Showing Pre-Tax Returns on Stocks.**

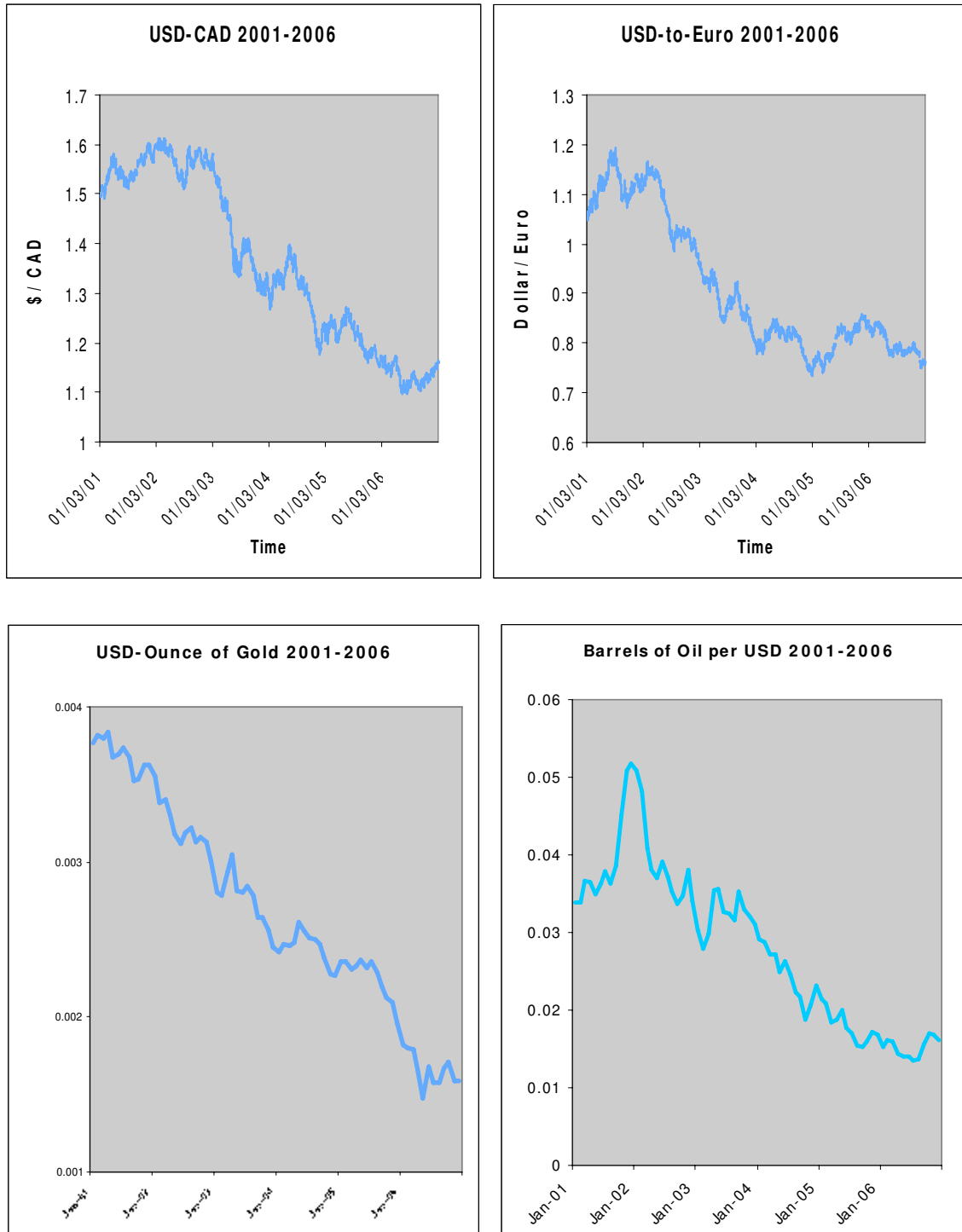


**RED** pixels: CAD return beats “one share of the DJIA” return.

**Green** pixels: “one share of the DJIA” return beats CAD return.

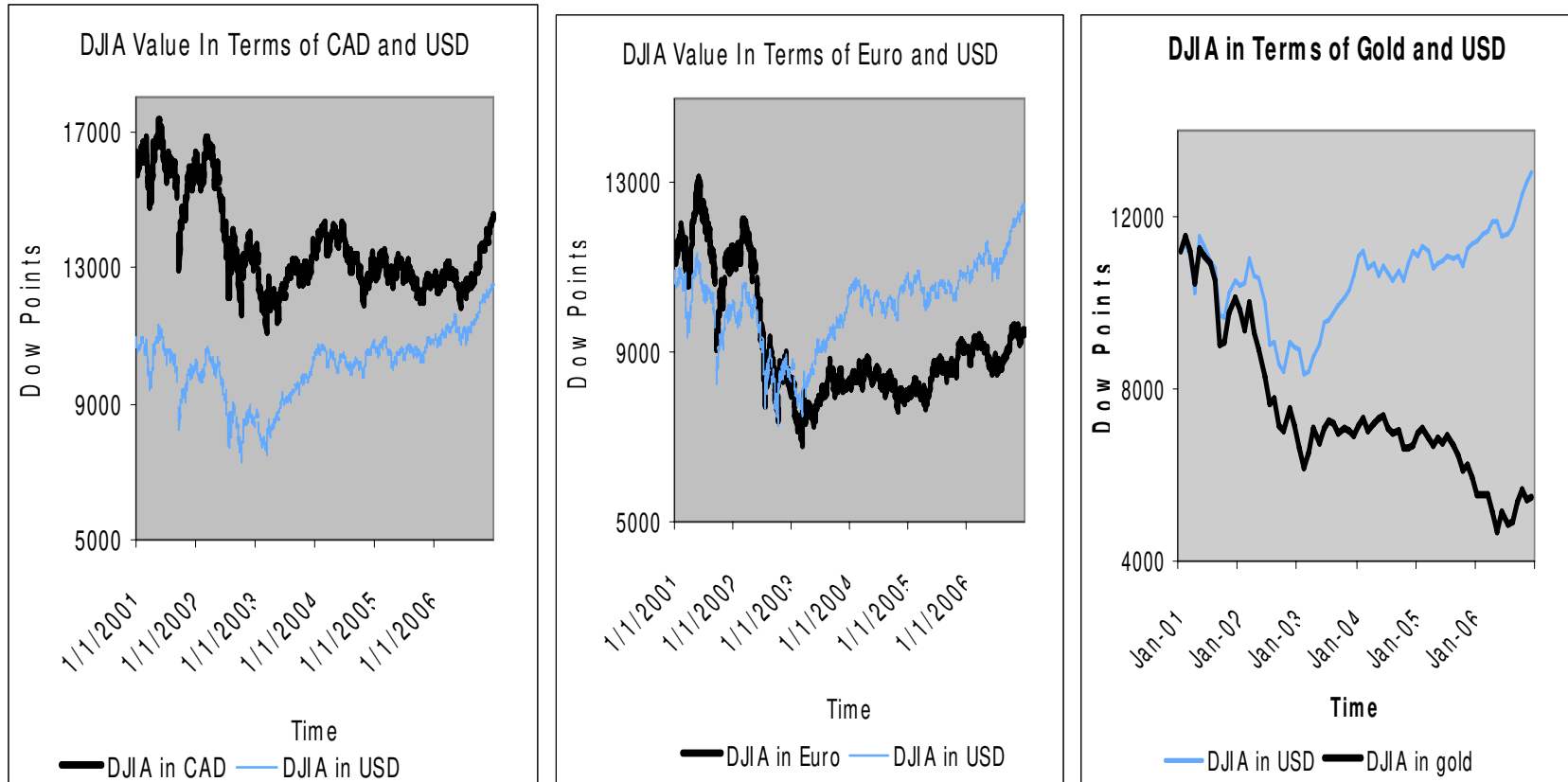
Horizontal axis includes all purchase dates 1/2/01 to 12/31/05 (left-to-right).  
 Vertical axis contains all “cash in” dates 1/1/02 to 12/31/06 (top-to-bottom).  
 Post-tax returns compared.

**Figure 2. Returns from Options 1 and 2 for all possible holding periods of one year or greater, 2001-2006.**



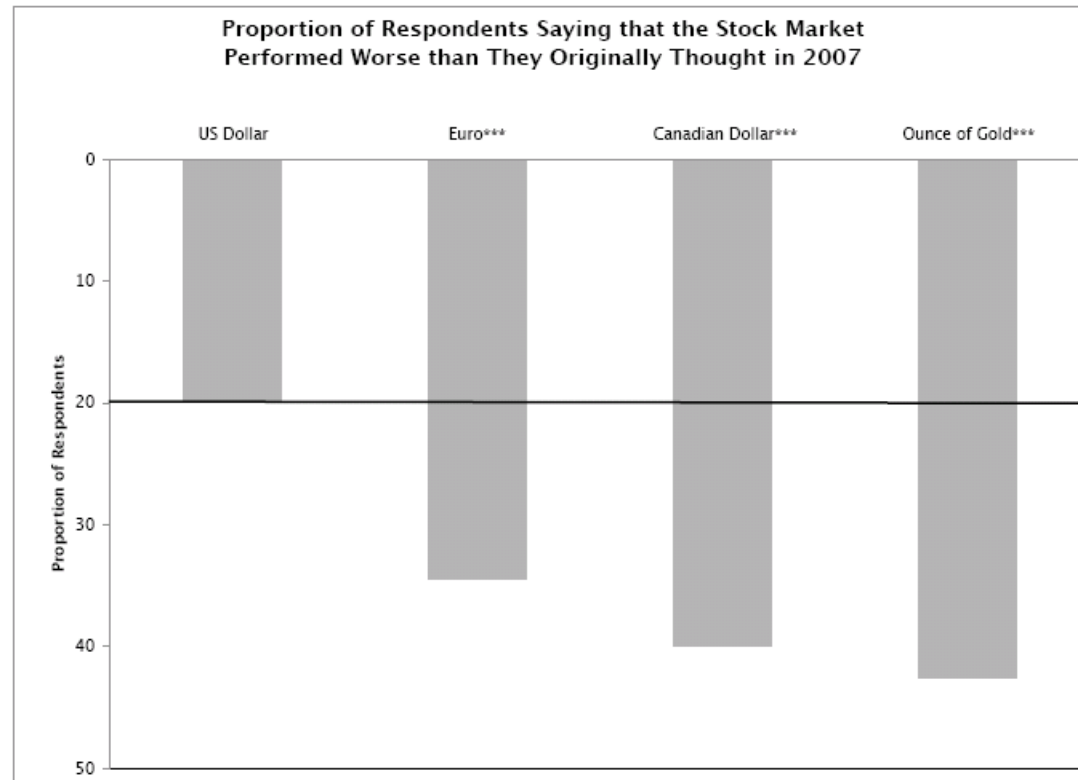
CAD and Euro comparisons use daily closing prices. Oil comparison uses the monthly spot oil price for West Texas intermediate crude and the average monthly closing price for the DJIA. Gold comparison uses the monthly average London Gold Fix the associated DJIA statistic.

**Figure 3. Decline of USD relative to CAD, Euro, Gold and Oil**

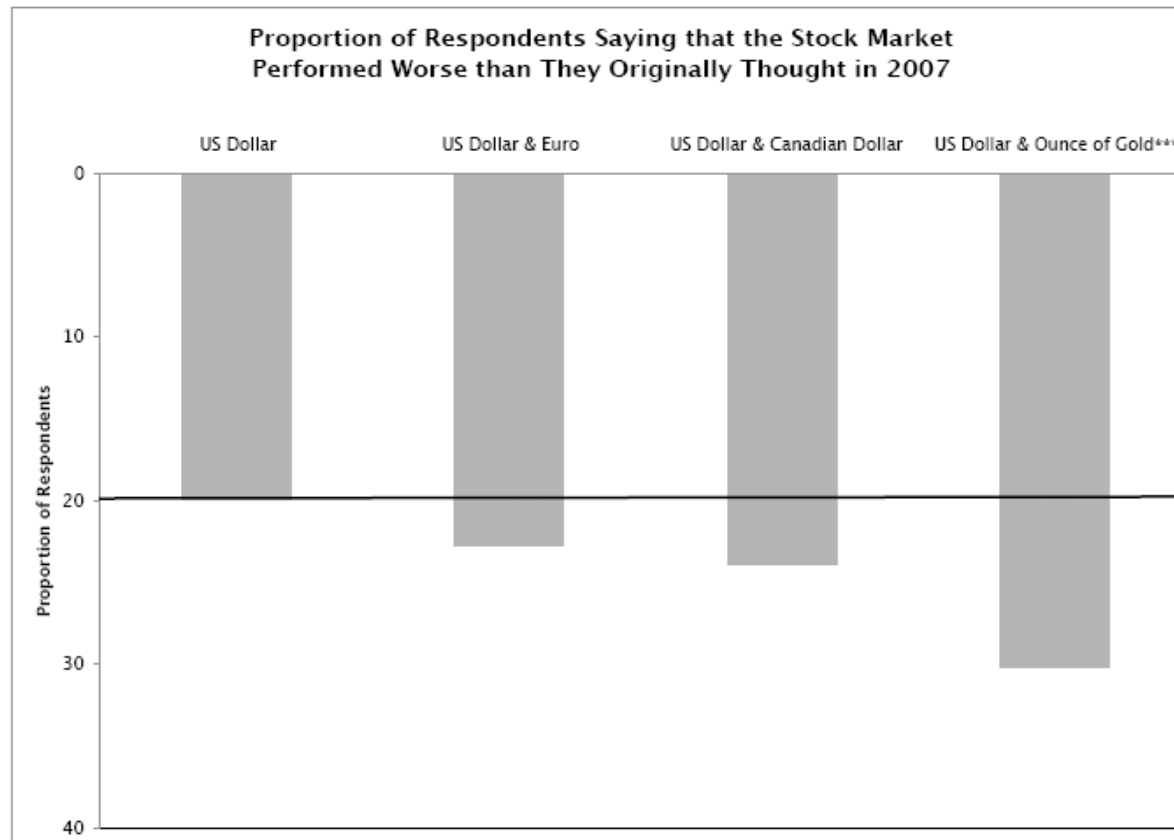


DJIA-Gold values are computed as follows. We begin by taking the number of USD that equals the average DJIA closing point total for January 2001. This is 11216.88 USD. Then, using the monthly average London Gold Fix, we compute the amount of Gold (42.25 Troy ounces) that the same number of USD can buy on that day. These amounts become the bases for the respective panels. The panels then show the amount of gold that a subsequent day's reported DJIA point total can purchase relative to the amount that the DJIA could buy in January of 2001. CAD and Euro comparisons use daily closing prices.

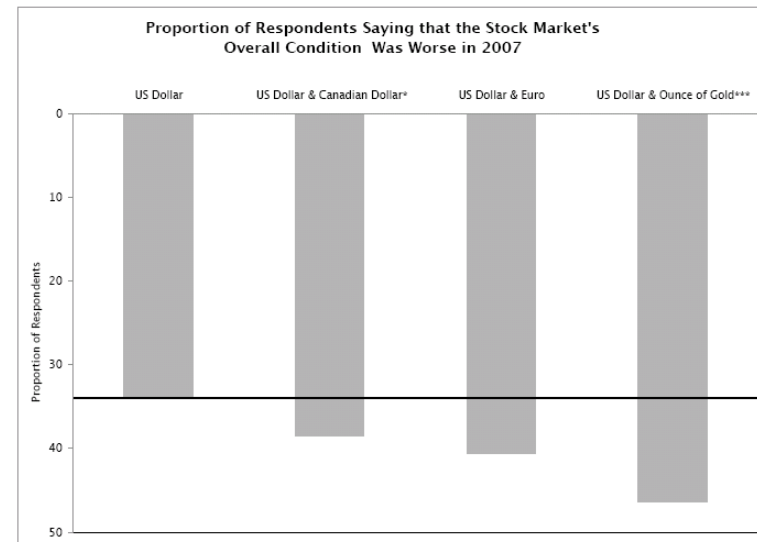
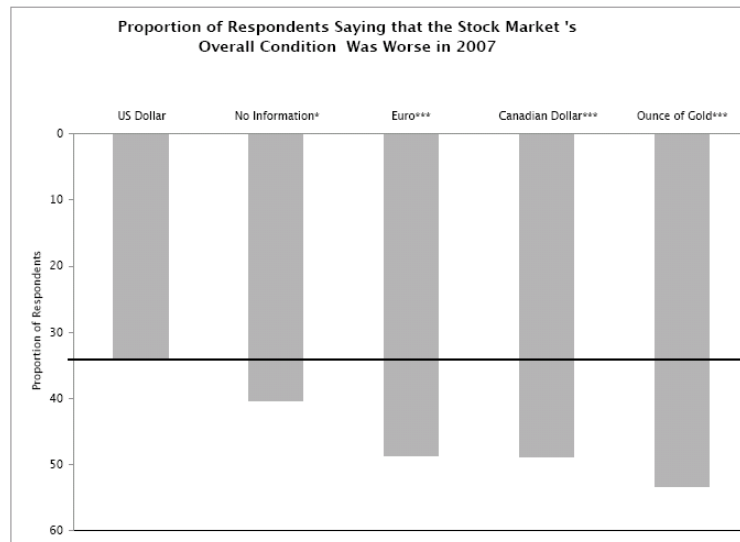
**Figure 4. DJIA value relative to CAD, Euro, and Gold with Emphasis on the Extended Bull Market Era, 2001-2006.**



**Figure 5. Percent of subjects who responded “somewhat worse” or “much worse” to “given what you have just read” question after observing DJIA information USD, CAD, Euros or Gold. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$**



**Figure 6. Percent of subjects who responded “somewhat worse” or “much worse” to “given what you have just read” question after observing DJIA information in double-currency treatment groups. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$**



**Figures 7a and b. Percent of subjects who responded “somewhat bad” or “very bad” to “overall condition” question after observing DJIA information in double-currency treatment groups. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$**