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Can Joe Granville time the market?

Yes.

Jerome Baesel, George Shows, and Edward Thorp

Joseph E. Granville may have the most spectacular stock market forecasting record in the world today. In a weekly market newsletter he predicts when the Dow Jones Industrial Average (DJIA) is going to go up and when it is going to go down. He does not issue forecasts for very short-term moves but rather for moves that have a duration of a month or more and are likely to be changes of 10% or so.

For the last three years, Granville has been forecasting the direction of the DJIA without the usual double talk in market newsletters. He tells the investor to be 100% long, or 100% short, or, in the case of one 2-week period, “hold.” Granville’s view is that the market is a tide and the stocks are boats carried by that tide. When the market is moving up, nearly all stocks are carried up with it. When the market is moving down, nearly all stocks are carried down with it.

Granville is willing to forecast the movement of individual stocks that he thinks will move against the market, but, since these are relatively few in number, he omits this from his advice to subscribers. He also may recommend certain stocks that he thinks will move very strongly in the same direction as his market forecast.

Thanks to Granville’s unusual record (only for forecasting the direction of the DJIA) and his extensive worldwide series of speaking engagements, he has developed an enormous following. His $250 a year newsletter has more than 20,000 subscribers; his telegraphic early warning system has more than 1,000 subscribers at $500 a year. Add to this his tape cassette learning system and other revenues, and he now grosses more than $6 million a year.

To avoid a conflict of interest between his own investments and his recommendations to subscribers, Granville states emphatically that he does not invest his money in the stock market. To do so would generate a potential conflict of interest and could reduce his objectivity in analyzing the market.

An indication of Granville’s enormous following occurred on Monday, April 21, 1980. Over the preceding weekend, he sent a telegraphic early warning to subscribers to tell them that he was changing his recommendation to 100% long. He also suggested several specific stocks that he thought would be good buys at this point. When the market opened, it gapped up on heavy volume. The influx of buy orders for the specific stocks that Granville recommended was so large that trading in them was suspended. The market closed up approximately 30 points on the day. Afterwards, Granville was asked how much his recommendation had to do with the 30-point move. He said that perhaps 5 or 6 points of it were due to his recommendations, but that the rest was because the market was ready to turn anyhow.

Another example occurred on January 6, 1981, when Granville recommended selling all stocks. The market opened on a downward gap. This call received considerable comment in such places as the Wall Street Journal. Granville commented that he has read a list of the twelve most powerful men in the world and that not one of them had the power to move the Dow Jones Averages one point, let alone 5, 6 or 30.

THE METHOD

Granville became well known as a market forecaster with the appearance of his book in 1960 (3). Over the years, he has improved and updated his system; the latest version appeared in 1976 (4). He missed some major market moves in 1974, but since then he seems to have become increasingly accurate. His method is to follow a horde of technical indicators of which a dozen or so are the principal ones.

Among Granville’s indicators are the advance-decline line, the number of daily highs and lows, the 200-day moving average of the DJIA, the price movements of General Motors, and the short interest ratio. Also important are volume-based indica-
tors that Granville has developed: the climax indicator, the net field trend indicator, and the on-balance volume behavior for individual Dow Jones stocks. These and many others are discussed in detail in his book.

The basic idea is that he wants almost all of his indicators to agree that a market turn is at hand before he finally makes the call. He likes to talk about a tree of indicators with many branches and says he looks at all the branches. In contrast, he says, many analysts follow just one or a few indicators and that small numbers of indicators are frequently unreliable. He refers to an analyst who follows a single indicator as someone who swings from a single branch of the tree and when the branch breaks . . .

His many indicators are not generally unanimous on market turns. He refers to an indicator that is out of line with others as a "hook." He also likes to have news stories breaking at the time of the market turn, which suggest to the public that the market is not going to turn. He also calls these news stories "hooks." For example, suppose all the indicators forecast a market downturn. Then news stories such as "Federal Government to Bail Out Chrysler" or "New Hope for Release of Hostages" or "Federal Reserve Cuts Discount Rate" will serve to draw the last buyers into the ending bull market.

Such news "hooks" to discharge the last buying seem to be important in bringing a bull market move to an end, paving the way for a downturn that the indicators say is imminent. When the market has been falling and the indicators say it is about to turn, similar "hooks"—only this time bad news stories—are important in discharging final selling activity to clear the way for a market rebound.

A mutual friend, Wayne Shapiro, head of the options department at First of Michigan, arranged for one of us to meet with Granville. Granville was interested in an academic and statistical validation of techniques that he felt sure were working. We were fascinated by the possibility that somebody really could use technical methods to beat the market. The academic world has tested many such claims in the past on an informal basis and all reports have been negative; no one seems to have produced a technical system to beat the market that continued to work into the future after the claim was made for it.

We have had Granville's full cooperation in this project. He has sent us his newsletters, telegrams, and learning material; he has also discussed his ideas at length with us.

THE DATA

We want to test whether Granville's forecasts of market direction were better than chance by a statistically significant margin. To do this, we compare the results from his "buy" and "sell" recommendations with actual market performance from December 4, 1978 through October 15, 1981 (the latest feasible date prior to the publication of this Journal), and also over the subperiod from November 8, 1979 through October 15, 1981. Following Granville, we shall use the Dow Jones Average of 30 Industrials (DJI) as a proxy for the market.

Granville has had a biweekly and then a weekly market letter for many years. He says that since 1975 his market calls have been accurate. For this study, he has kindly supplied us with copies of these letters from October 1974 through November 1981. We chose to start the study period at December 4, 1978, because Granville's recommendations from this date forward are unequivocal that an investor be 100% long, 100% short, or, in the case of one 2-week period, "hold." Thus, we had a "mechanical" strategy that lent itself readily to statistical tests.

We chose the subperiod from November 8, 1979 through October 15, 1981 for separate analysis, because November 8, 1979 was the date that we began to monitor Granville's forecasts before the fact with the intention of statistically testing them. This eliminates some of the "data mining" problem (see Appendix A).

THE RECORD

On December 1, 1978, Granville said "buy" after the market had closed for the day. This was a Friday, and one could not act on his suggestion until the following Monday, December 4, 1978. For this reason, we start this "buy" period with the Dow closing price on December 4, 1978. This is typical of the timing of his calls, since many of his indicators depend on closing market statistics. The buy and sell short recommendations along with their corresponding time periods are presented in the following table. (Investors who cannot sell short should sell and put their funds in an alternate investment.)

<table>
<thead>
<tr>
<th>Close After Which Call Was Made</th>
<th>Call</th>
<th>Data Examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/01/78</td>
<td>buy</td>
<td>12/04/78 to 09/24/78</td>
</tr>
<tr>
<td>09/21/79</td>
<td>sell short</td>
<td>09/24/79 to 11/08/79</td>
</tr>
<tr>
<td>11/07/79</td>
<td>buy</td>
<td>11/08/79 to 02/15/80</td>
</tr>
<tr>
<td>02/14/80</td>
<td>sell short</td>
<td>02/15/80 to 04/22/80</td>
</tr>
<tr>
<td>04/21/80</td>
<td>buy</td>
<td>04/22/80 to 01/07/80</td>
</tr>
<tr>
<td>01/06/81</td>
<td>sell short</td>
<td>01/07/81 to 10/15/80</td>
</tr>
</tbody>
</table>

After the close of January 24, 1980, Granville recommended no new buying. We do not treat this separately, because we would already have bought on November 8, 1979 and would not have sold until February 15, 1980.
PREDICTIVE ABILITY — THE FIRST TEST

For both the entire period and the subperiod, we use two different statistical tests to test the null hypothesis that the results from Granville's calls are not significantly better than chance.

All our trades are assumed to be at DJIA closing prices. Although in fact such trades cannot be made, actual trades of component DJIA stocks, made in suitable proportions during the day, should have an expected value near the closing price. We expect a small adverse bias due to liquidity costs of the market makers. This point is discussed in our working paper on this subject (1).

Let $t_1, t_2, \ldots, t_n$ be successive market days during the test period and let $d_{t_1}, d_{t_2}, \ldots, d_{t_n}$ be the corresponding DJIA closing prices. Define $\Delta d_i = d_i - d_{i-1}$ as the change in successive closing prices of the DJIA.

If $\Delta d_i > 0$, think of it as a "head;" if $\Delta d_i < 0$, think of it as a "tail." A "no change" day is counted neither as a head nor a tail and is dropped. Think of these heads and tails as labeling balls in an urn. If Granville is not able to select "up" periods better than chance, then the number of heads found in his set of "buy" days can be expected to be no greater than we might find if we sampled randomly from the urn. The data are as follows:

<table>
<thead>
<tr>
<th>Period A: 12/04/78 through 10/15/81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Market Days</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>DJIA</td>
</tr>
<tr>
<td>Granville's &quot;up&quot; days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Period B: 11/08/79 through 10/15/81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Market Days</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>DJIA</td>
</tr>
<tr>
<td>Granville's &quot;up&quot; days</td>
</tr>
</tbody>
</table>

Let $b(p, q)$ represent the binomial coefficient, then

$$\frac{1}{b(719,446)} \sum_{q=0}^{347} [b(372, q) b(347,446 - q)] = .000231$$

$$\frac{1}{b(487,253)} \sum_{q=0}^{192} [b(253, q) b(234,257 - q)] = .000477$$

So, given the numbers of up and down days in the periods as a whole, it seems very unlikely that Granville's "buy" periods would have contained so many up days by chance. For period A, the chance is about $1/4329$ and for the period B it is about $1/2096$.

THE SECOND TEST

If $d_i$ and $d_{i-1}$ are the DJIA close for two consecutive days, we examine the numbers $\log (d_i/d_{i-1})$ for the periods under study. We also assume that Granville's recommendations have no causative effect on the DJIA. To the extent that they do, the significance of our tests is less than reported. If Granville's calls do change the DJIA, market efficiency would appear to be violated. We assume that such numbers are normally distributed and independent.

If we further assume that Granville cannot call the market, then the "log ratios" from this "buy" periods and his "sell" periods are really just two samples drawn from the same population and there is no reason to believe that $\mu_u > \mu_s$. That is, we assume $\mu_u - \mu_s < 0$ where $\mu_u$ is the mean log ratio from his buy periods and $\mu_s$ is the same from his sell periods. For the following t-tests, we assume the variances $\sigma_u^2$ and $\sigma_s^2$ are equal. Then the t-statistic is

$$t_{n_u+n_s-2} = \frac{\bar{x}_u - \bar{x}_s}{\sqrt{\frac{\sigma_u^2}{n_u} + \frac{\sigma_s^2}{n_s}}}$$

For the times under study,

<table>
<thead>
<tr>
<th>Period A: 12/04/78 through 10/15/81</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{x}$</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>buy periods</td>
</tr>
<tr>
<td>sell periods</td>
</tr>
</tbody>
</table>

and $t_{251} = 3.31$ and the one-tail significance level is $P(t_{251} > 3.31) = .000490$ or about $1/2041$.

<table>
<thead>
<tr>
<th>Period B: 11/08/79 through 10/15/81</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{x}$</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>buy periods</td>
</tr>
<tr>
<td>sell periods</td>
</tr>
</tbody>
</table>

and $t_{268} = 2.79$. The one-tail significance level is $P(t_{268} > 2.79) = .0027$ or about $1/370$. Notice that the second test slightly exceeds that used in the first, because on six occasions the DJIA had identical closing values two days in a row and these were excluded as neither a
"head" or a "tail" in the first test but included as a valid observation of 0 in the second.

Thus, both statistical tests, over the subperiod as well as the full period, show that Granville's predictions were better than chance, with significance better than the 0.01 level.

THE RESULTS OF AN INVESTMENT STRATEGY

The table below will help us estimate the economic consequences of following Granville’s advice in the test period.

<table>
<thead>
<tr>
<th>i</th>
<th>t_i</th>
<th>d_i = t_i - t_1</th>
<th>DJIA_i</th>
<th>VR_i</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12/4/78</td>
<td>304</td>
<td>806.83</td>
<td>Buy</td>
</tr>
<tr>
<td>2</td>
<td>9/24/79</td>
<td>294</td>
<td>885.84</td>
<td>1.07976</td>
</tr>
<tr>
<td>3</td>
<td>11/8/79</td>
<td>45</td>
<td>797.61</td>
<td>1.09960</td>
</tr>
<tr>
<td>4</td>
<td>2/15/80</td>
<td>99</td>
<td>884.98</td>
<td>1.10950</td>
</tr>
<tr>
<td>5</td>
<td>4/22/80</td>
<td>67</td>
<td>789.85</td>
<td>1.10749</td>
</tr>
<tr>
<td>6</td>
<td>10/7/81</td>
<td>260</td>
<td>880.89</td>
<td>1.24186</td>
</tr>
<tr>
<td>7</td>
<td>11/15/81</td>
<td>312</td>
<td>856.25</td>
<td>1.12706</td>
</tr>
</tbody>
</table>

Total calendar days = 1077, product = 2.0764

* The holding period value relatives VR_i, i = 2, ... , 7, are computed as follows: If we buy at t_1, then VR_i = [DJIA_i - DJIA_i-1] / DJIA_i-1.

If we sell short at t_1, then VR_i = [DJIA_i - DJIA_i-1] / [DJIA_i-1 - DJIA_i]. With this scheme, $1 grows to $2.0764 in 1077 days. This is a compound annual growth rate of 28.10% (2.0764^{360/1077} = 1.2810).

In addition, since we were net long 229 days out of 1077 (653 days long minus 424 days short), we would have gained about 4.5% of 229/1077 or .96% annually in dividends.

This corresponds to having 100% margin on the long side, and having 100% initial margin on the short side. We could have posted this assumed 100% short side margin in Treasury bills. The yield from these bills would add to the return. This yield plus the net dividend yield ought to more than cover commission costs and the implicit costs of the specialist or market maker. It is also possible to receive interest on some of the short sale proceeds, by negotiating with a suitable broker.

The actual initial margin for both long and short positions was 50% during the test period. Thus a position twice as large could have been taken. It also could have been maintained, since there were no price fluctuations adverse enough to trigger a maintenance margin call. On the long side, the debit balance would have led to interest charges. When all these factors are considered, a fully margined position would have led to a compound annual rate of return of about twice the 28.10% rate quoted above, less perhaps 8.5% for interest on the long side debit, or about 48% per year. (The 8.5% comes from the average broker call during the period under study, which was just over 14% and we were long 653 out of 1077 days.)

As Sharpe (6) points out, instead of buying and selling short the DJIA, we could have used a diversified portfolio of high beta stocks. If the portfolio beta were, say, 1.5 times the beta of the DJIA (approximately 1.0), then we would expect to multiply the previous excess return (return minus risk-free rate) by about 1.5.

Still another strategy when the DJIA is expected to rise is to buy a diversified portfolio of call options, especially ones at or somewhat out of the money, preferably not overpriced according to the Black-Scholes model, and preferably on high beta stocks. When the DJIA is expected to fall, adopt a similar strategy with puts, although that would have been harder during the test period, because for most of it there were only 25 put stocks. Wayne Shapiro, head of the options department at First of Michigan, reports that this approach has been very profitable.

The investment results from Granville’s forecasts are dramatically better than what Sharpe indicates in (4) as likely from market timing. There are several reasons for this.

First, Sharpe assumes that the market timer is either long or is out of the market, whereas we have assumed that the Granville trader is short in markets expected to fall. With the accurate market timing of the test period this accounts for about one half of the annual compound growth rate.

Second, Sharpe limits his market timer to making annual forecasts of the market, whereas Granville may call a market turn at any time during the year. If Granville had been so limited during the test period, and had accurately forecast market direction each year, or fraction thereof, the calls would have been "up" for each of the periods (1) December 4, 1978 through December 31, 1978, (2) January 1, 1979 through December 31, 1979, (3) January 1, 1980 through December 31, 1980, and (4) January 1, 1981 through October 15, 1981. Market timing would have coincided with buy and hold. The wealth relative would have been 856.25/806.83 = 1.0613 and the compound annual growth rate would have been only 2.04%.

A third difference is that our test was over a very short period (under three years). Sharpe’s test covers the 44-year period from 1929 through 1972.

Note that Sharpe refers to the correct yearly choice of whether to be long the market, or long cash equivalents instead, as "perfect timing." He concludes that the gain from "perfect timing" over buy and hold would have been a modest 5.5%. Then he considers "virtually clairvoyant market timing" in which the timer buys at the low for the year, sells at the next annual high and goes into cash equivalents, buys at the
In isolated incidences, some of his indicators have undergone rigorous testing. For example, one Granville indicator is the mutual fund cash fund to asset ratio. This is analyzed in (5), which concludes this indicator has no predictive power. Another example where Granville made a testable assertion was when he said the market falls more rapidly than it rises. We found this to be true and that the market tended to fall about 1.15 times as fast as it rose.

In the minds of many, Granville has discredited himself by rash and inconsistent predictions. Yet this is definitely not true for the DJIA in the last three years. If he has any predictive power, this is the place he is most likely to have it; hence, we cannot dismiss the possibility that he has market timing ability.

APPENDIX A
The “Data Mining” Problem
Suppose many analysts are randomly calling the market (up or down) at times $t_1, t_2, \ldots, t_n$. By chance a few of them may have perfect or near perfect records. Anyone receiving the first $n-1$ communications from the luckiest few might see a highly statistically significant prediction record and invest heavily on prediction number $n$, even though these analysts have no predictive power. To guard against the possibility that Granville might have been such a lucky survivor at time $t_{n-1}$ (when we first began to follow his record on November 10, 1979), we gave special attention to his record after that date, hence the special attention paid to the November 8, 1979 to October 15, 1981 period.

REFERENCES