

# **ANALYSTS: ORACLES?**

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December 2005

## **Abstract**

Investors often make investment decisions based on analyst ratings without studying the full analyst reports that explain the ratings. This paper examines whether such investing is sound by studying the relationship between lagged (from one to 250 trading days) excess returns and average analyst ratings for six stocks that command considerable analyst interest. This study has found that these six stocks reveal no clear trend for the accuracy of analysts' predictions, that analysts are unable to forecast stock performance in the near term (~2 weeks), and that the optimum investment period for such an investment is more than 7 months.

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I would like to thank Professor Til Schuermann and my colleagues for their kind input. All errors are my own.

## Analysts: Oracles?

### **Introduction**

Equity analysts are an important medium for bringing corporate information to the market.

However, private investors often neglect the content of analyst reports, and make investment decisions based only on “analyst rating” – a summary of an analyst’s opinion of the firm’s future performance.

Is investing based on analyst recommendations a sound investment decision? This study attempts to answer the question by examining the relationship between *excess returns* on a firm’s stock and *average (normalized) analyst ratings*. If analysts are truly oracles, then one would expect returns and ratings to be positively related.

### **Background**

From time to time, analysts release *Analyst Reports* in which they provide:

- A description of the firm they are reporting on
- Justification for their opinion on the firm’s future performance outlook
- A “*rating*” or “recommendation” that summarizes their opinion of the firm’s future
- (Often) A target price for the firm 1 – 2 years from the date of the report

However, full reports are not easily accessible, and financial websites and other publications typically report only the *ratings*, leaving plenty of room for misinterpretation. An investor who sees only a rating will not know why firm received that rating, and may be misled into making the investment decision that is not in his best interests (e.g. investing for the near-term when the analyst projects only long-term gains).

Following the implementation of NASD Rule 2711 in 2002 requiring broker’s ratings distributions to be made public, financial websites now report both the average analyst ratings and the distribution of ratings (number of analysts rating the firm “Buy”, “Hold”, “Sell”, etc). However, specific ratings for each analyst are not reported. By aggregating analyst ratings, each analyst is regarded as having equal authority. Thus, the fact that certain analysts may have better information regarding the firm is ignored.

### Analyst Opinion

RECOMMENDATION SUMMARY*	
Mean Recommendation (this week):	3.6
Mean Recommendation (last week):	3.4

\* (Strong Buy) 1.0 - 5.0 (Strong Sell)

RECOMMENDATION TRENDS				
	Current Month	Last Month	Two Months Ago	Three Months Ago
Strong Buy	2	2	2	2
Buy	0	0	0	0
Hold	9	9	12	12
Sell	3	3	1	1
Strong Sell	4	4	2	2

Fig 1: Analyst rating information available on Yahoo! Finance.

Financial articles, however, do the opposite. Financial publications often ignore the opinions of smaller, less-established analysts, and only quote the ratings of inveterate analysts such as Goldman Sachs or Merrill Lynch. The danger is clear – many educated opinions are neglected.

It has surprised this author to note that the academic community has largely ignored this glaring information imperfection. This issue is typically only commented on in articles such as *“Analyst Recommendations: Do Sell Ratings Exist?”* (Investopedia.com, 2001). The US Securities and Exchange Commission (SEC) provides suggestions on how investors should analyze analyst recommendations, such as understanding possible conflicts of interests between analysts and investors. However, these articles and the tips from SEC are only qualitative in nature, and mostly concerned with the over-abundance of “buy” ratings.

There are surprisingly few quantitative studies concerning analyst ratings. One of these is a study by Barber, LeHavy, McNichols and Trueman in 2005 that analyzes the distribution of analyst ratings and their relation to the profitability of analysts' recommendations. The study has verified that the percentage of buy ratings increased substantially between 1996 and 2000, but decreased from mid-2000 onwards (likely due to NASD Rule 2711). The study also found that brokers' ratings distributions could generally predict the profitability of its recommendations.

Another related study by Chakrabarti in 2004 examined the predictive power and market impact of over 2000 analyst recommendations in India. The study found that recommendations have some predictive power in the near term, and that recommendations seem to have some impact on stock price.

This study examines the risk of investing based on average analyst ratings by exploring the relationship between the excess returns of six stocks and their corresponding average ratings.

### **Data & Process**

This study has arbitrarily chosen to limit itself to two industries – Automobile Manufacturers and Appliances – within the broad “Consumer Goods” sector. The choice of the six firms was driven by their positions as industry leaders, consequently commanding considerable analyst attention.

The following six firms were chosen:

- Automobile Manufacturers: Ford (F), General Motors (GM), Daimler-Chrysler (DCX)
- Appliances: Maytag (MYG), Whirlpool (WHR), Helen of Troy (HELE)

Historical stock and S&P 500 price data were obtained from Yahoo! Finance. The sample period was 3 years (11/1/02 – 11/1/05). Log-returns in excess of S&P 500 log-returns – lagged by  $k = 1 - 250$  days – were then calculated for each firm according to the following formula:

$$r_{t,k}^x = \ln\left(\frac{P_{t+k}}{P_t}\right)$$

The use of  $P_{t+k}$  in the numerator instead of  $P_{t-k}$  in the denominator was because this study is concerned with projecting future returns instead of computing historical returns.

Analyst ratings were also obtained from Yahoo! Finance. However, there were two problems:

1. Analysts have different rating scales: Most analysts use a 3-rating scale (Goldman Sachs, Merrill Lynch), but others may rate stocks on 4- (Raymond James), 5- (HSBC, KeyBanc Capital Mkts) or even 6-rating scales (Credit Lyonnais Sec). In order to standardize ratings, all the analysts' ratings were normalized to a scale from  $-1$  (Strong Sell) to  $+1$  (Strong Buy).
2. Only *changes* in analyst ratings are reported:

UPGRADES & DOWNGRADES HISTORY				
Date	Research Firm	Action	From	To
21-Oct-05	Goldman Sachs	Downgrade	In-Line	<b>Underperform</b>
14-Oct-05	Citigroup	Downgrade	Hold	<b>Sell</b>
6-Oct-05	Bear Stearns	Initiated		<b>Underperform</b>
20-Jul-05	KeyBanc Capital Mkts / McDonald	Downgrade	Underweight	<b>Sell</b>
20-Jun-05	Banc of America Sec	Upgrade	Sell	<b>Neutral</b>

Fig 2: Selected changes in analyst ratings for Ford (F). Source: Yahoo! Finance

Fortunately, analysts maintain their ratings in between changes. Since every *change* in analyst rating is known, any analyst's rating on any given date can be inferred by simply examining that analyst's changes before and after that date.

Applying the above two methods to the analyst rating data, the average analyst ratings were found for each day within the sample period for every stock.

Excess returns were then regressed (Ordinary Least-Squares) against the average analyst rating for  $k = 1, \dots, 250$  for each of the six stocks ( $A_t =$  Average analyst rating at time  $t$ ):

$$r_{t,k}^x = \alpha_k + \beta_k A_t$$

The  $\beta_k$ 's reflect whether there exists a positive relationship between excess returns and average analyst rating. The sign of  $\beta_k$  indicates the direction of analysts' forecasts (positive/negative  $\beta_k$  indicates analysts accurately/wrongly predict the direction of excess returns). The magnitude of  $\beta_k$  indicates the strength of the analysts' accuracy (stronger/weaker positive indicates analysts are more/less accurate).

### Findings

A plot of lag-1 (daily) excess returns and average analyst ratings for Ford (F) (Fig 3) reveals no visual correlation between the two. After running the regression of daily excess returns on average analyst for Ford (F), it is impossible to reject  $\beta_k = 0$  at the 99% significance level (Fig 4).

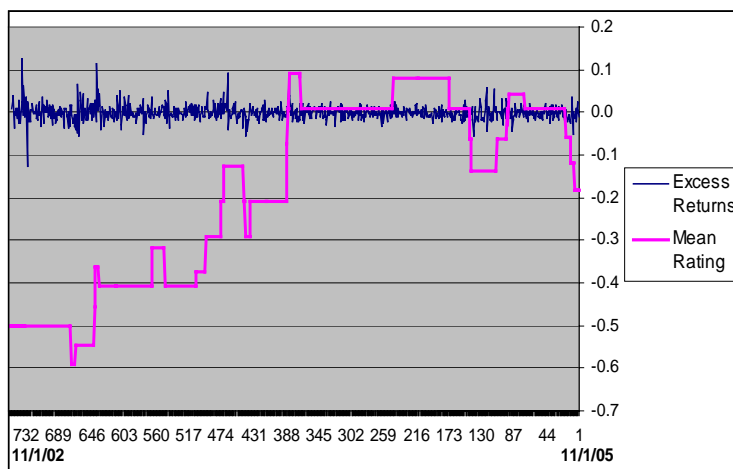


Fig 3: Lag-1 Excess Returns and Average Analyst Rating plotted against time for Ford (F)

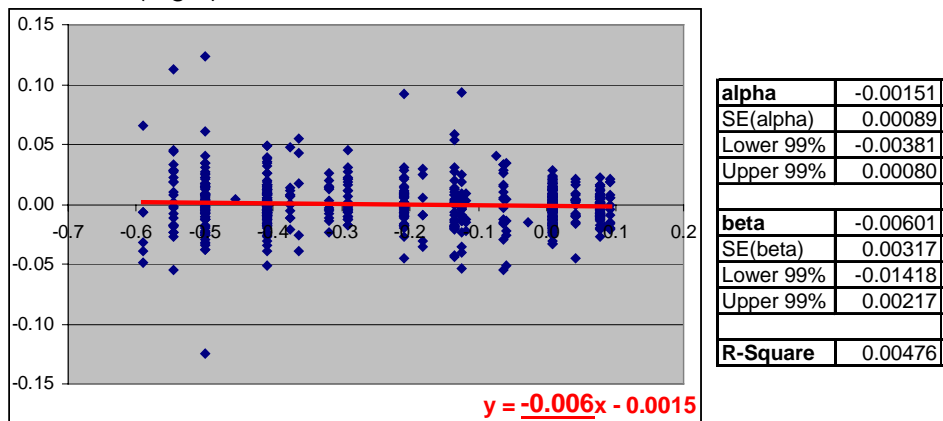


Fig 4: Regression results – Lag-1 Excess Returns against Average Analyst Rating for Ford (F)

The following summary of the  $\beta_k$ 's for lag-1 excess returns regressed against average analyst rating reveals that the findings for Ford are representative of all six stocks – in all six cases, it is impossible to reject  $\beta_k = 0$  at 99% significance. Moreover, five out of the six  $\beta_k$ 's are negative (albeit very weakly negative), indicating that analysts forecasts are generally inaccurate on the daily time scale. This is important for day-traders.

	$\beta_{k=1}$	$SE_{\beta}$	Lower 99%	Upper 99%
<b>F</b>	-0.0060	0.003	-0.014	0.002
<b>GM</b>	-0.0011	0.003	-0.009	0.007
<b>DCX</b>	-0.0018	0.002	-0.008	0.004
<b>MYG</b>	-0.0005	0.002	-0.005	0.004
<b>WHR</b>	-0.0040	0.005	-0.017	0.009
<b>HELE</b>	0.0036	0.002	-0.003	0.010

Fig 5:  $\beta_k$ 's for lag-1 (daily) excess returns regressed against average analyst rating

While regression results for the six stocks were similar for lag-1 analysis, examination of the of  $\beta_k$ 's for lag  $k = 1, \dots, 250$  (see Appendix) reveals both similarities and differences in trends for the six stocks.

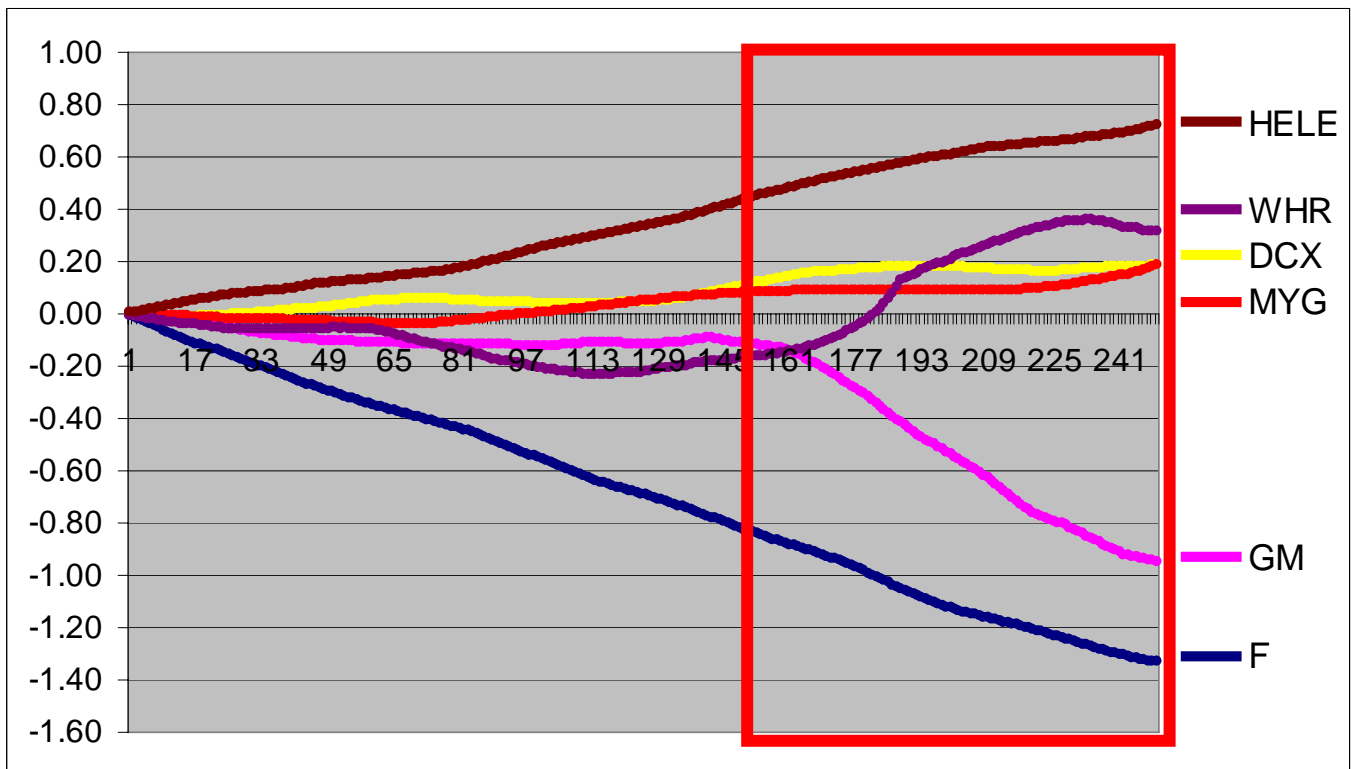


Fig 6: Plot of  $\beta_k$ 's (vertical axis) against lag  $k$  (horizontal axis); red box highlighting  $k > 150$

There is clearly no consensus as to the accuracy of analysts' forecasts.  $\beta_k$ 's for DCX, MYG, WHR and HELE are predominantly positive. This shows that analysts are generally accurate in their projections for the performance of these stocks. However,  $\beta_k$ 's of F and GM are instead completely negative indicating that analysts of F and GM are completely inaccurate in their performance forecasts for F and GM.

One clear universal trend, however, is that the magnitude of the  $\beta_k$ 's for all six stocks become larger as lag  $k$  increases, indicating that the relationship (positive/negative) between analyst ratings and excess returns strengthens over time. In particular, analysts were not able to completely describe excess returns (4 out of 6  $\beta_k$ 's indistinguishable from zero) within the time scale of 2 weeks (lag-10). But by  $k = 250$  (~1 year), not only were all six  $\beta_k$ 's significantly non-zero, but the  $\beta_k$ 's were more than 10 times as large in magnitude.

	$\beta_{k=10}$	$SE_{\beta}$	Lower 99%	Upper 99%
<b>F</b>	-0.068	0.010	-0.094	-0.043
<b>GM</b>	-0.017	0.009	-0.041	0.007
<b>DCX</b>	-0.011	0.008	-0.031	0.009
<b>MYG</b>	0.002	0.002	-0.003	0.007
<b>WHR</b>	-0.030	0.014	-0.067	0.006
<b>HELE</b>	0.031	0.008	0.011	0.051

Fig 7:  $\beta_k$ 's for **lag-10 (2 weeks)** excess returns regressed against average analyst rating

	$\beta_{k=250}$	$SE_{\beta}$	Lower 99%	Upper 99%
<b>F</b>	-1.332	0.016	-1.373	-1.292
<b>GM</b>	-0.946	0.075	-1.139	-0.753
<b>DCX</b>	0.186	0.021	0.133	0.239
<b>MYG</b>	0.184	0.030	0.107	0.261
<b>WHR</b>	0.315	0.097	0.064	0.567
<b>HELE</b>	0.721	0.024	0.660	0.783

Fig 8:  $\beta_k$ 's for **lag-250 (~1 year)** excess returns regressed against average analyst rating

Observing Fig 6, it appears that lag  $k \sim 150$  (~7 months) is a distinct turning point at which noticeable strengthening in the magnitude of  $\beta_k$  occur (GM turns sharply negative; DCX, WHR rise sharply; MYG plateaus before rising at  $k \sim 210$ ).

## Conclusion

This study is somewhat limited in its selection of stocks and sample period. Studying just six stocks within only two industries may not reveal the entire market situation. Similarly, studying these stocks over only three years may not be sufficient, although the choice is logical given the implementation of NASD Rule 2711 just three years ago.

However, if these six stocks are indeed representative of the entire market, then there is no guarantee that analysts are at all able to predict stock performance (measured by excess returns), since analysts were “accurate” ( $\beta_k$ 's generally positive) only 4 out of the 6 stocks.

Moreover, analysts are generally unable to forecast stock performance in the short term (1 – 2 weeks). This is evidenced by the fact that 4 out of the 6  $\beta_k$ 's were still indistinguishable from zero at lag  $k = 10$  (2 weeks).

Lag  $k > 150$  (~7 months) is where the magnitude of  $\beta_k$ 's for all six stocks begin to strengthen (positively in the case of DCX, MYG, WHR, HELE; negatively for F, GM). This indicates that investors should expect analyst ratings to best (or worst in F and GM's case) reflect excess returns about 7 months later. This suggests the optimum investment period for an investment decision based on analyst rating is at least 7 months.

## References

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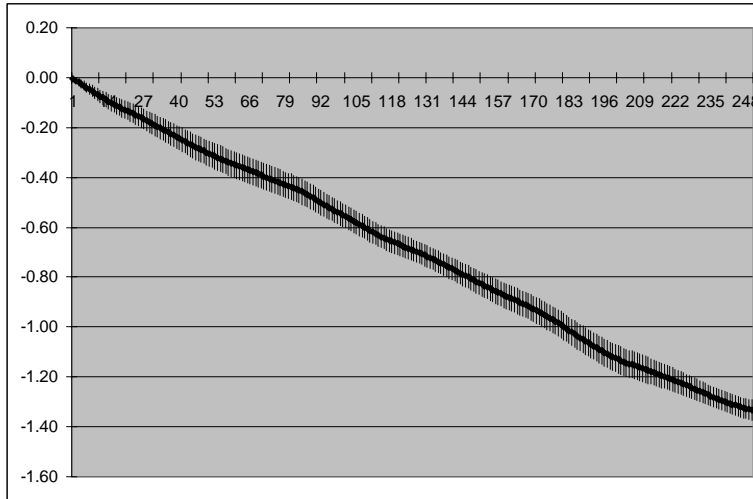
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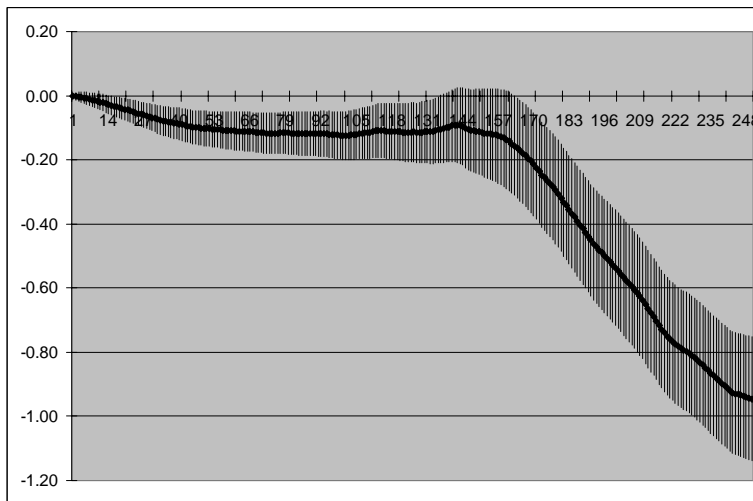
Yahoo! Finance. <<http://finance.yahoo.com>>

**Appendix: Individual Plots of  $\beta_k$ 's against Lag  $k$  (bars indicate 99% confidence interval)**

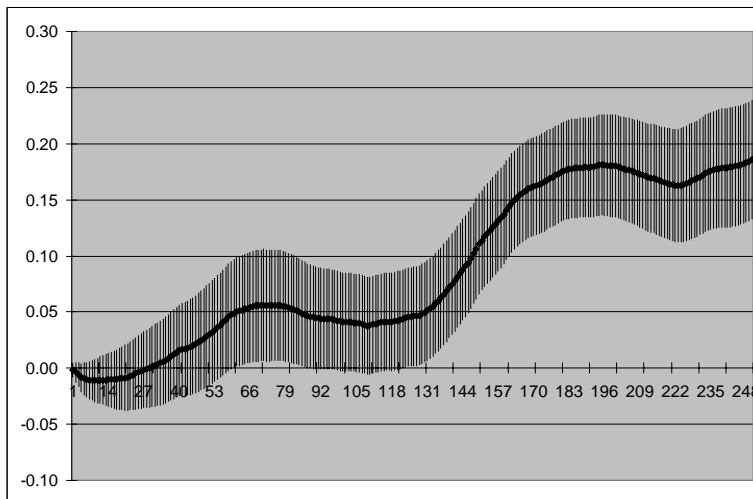
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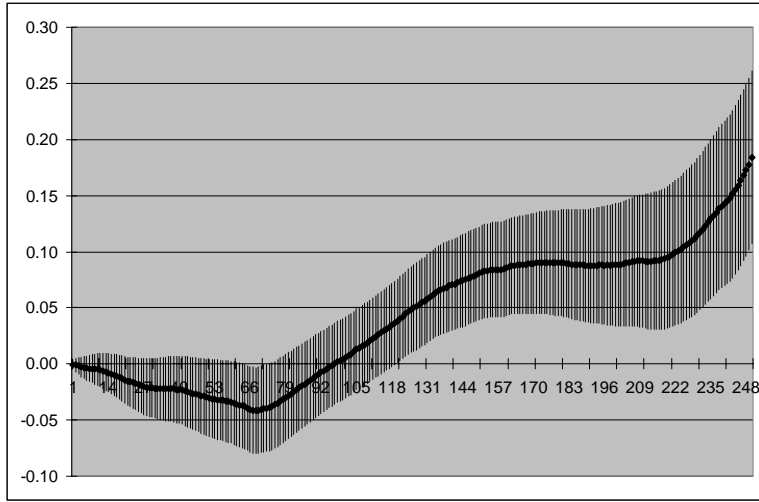
**General Motors, GM:**



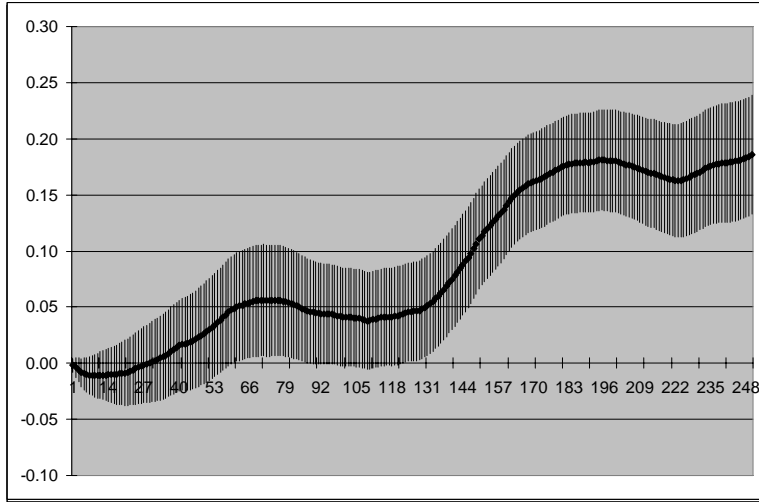
**Daimler-Chrysler, DCX:**



**Maytag, MYG:**



**Whirlpool, WHR:**



**Helen of Troy, HELE:**

