The speed

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Abstract

The speed is one of the most important factors in development of any dynamic system.
It is shown that since the end of the 19-th up to the middle of the 20-th centuries the average growth rate of earnings, dividends and S&P 500 index was 1.5% per year. In the second half of the 20-th century the average growth rate of dividend speed up to 5%, earnings up to 5.5% and S&P 500 up to 8% per year. The arisen divergence in the growth rate of earnings and S&P500 led to the essential growth of the earnings multiple P/E. At the same time, from the beginning of 70-th, the 10 year earnings variability has grown, practically, 3 times. Such situation can result in development of long-term stagnate sideways movement.

1. Introduction

The speed is one of the most important factors in development of any dynamic system.

Thus, slowing of exchange processes in a body can result in serious diseases. The death is manifested by stopping of exchange processes.

Do you remember the film of the same name in which terrorist has put a bomb in the bus. He has established the mechanism in such a manner that slowing of speed should blow up the bus. Due to the efforts of the main hero it was possible to avoid the tragedy.

One of the most important factors in development of economy at all and financial market in particular is long-term earnings growth rate. There are a lot of cross-correlated factors connected with the earnings growth rate.

Thus, no long growth on the equity market can occur without the appropriate growth of the companies' earnings. What will occur with the rate of earning growth in the coming decade? How the equity market would reflect it?

There are a lot of questions.

But there is one clear proof namely the market is leveraged mechanism and slowing of long-term earnings growth rate could result in great movements ("blow up") of the equities prices.

2. Discussion

Let's consider historical earnings growth rate of the companies included in S&P 500 index and appropriate growth of an index. As shown in Figures 1-2 the nominal earnings and dividend growth rate since 1871 up to 1948 averaged 1.5% per year. Figure 3 shows that the market has the same growth rate.

In the second half of last century the earnings growth rate was speed up. As shown in Figure 4 it averaged 5.5% per year since 1949 up to 2002. Same meaning was obtained in [1]. At the same time the least earnings growth rate till the beginning of 60-th was limited by 3% and since the beginning of 70-th by 4.7%. Limitation of the upper range was the rate corresponded to 6.2%. Dividend growth rate for the same period was sufficiently stable and averaged 5% per year (Figure 5).

While earnings growth rate was limited by 6.2% curve on the top S&P 500 growth rate was limited by 6.3% curve from the bottom (Figure 6). The average growth rate of S&P 500 since 1949 was approximately 8% per year.

At the end of the 70-th (beginning of the 80-th) both earnings and S&P 500 were on the growth curves corresponded to 6.2-6.3%. However, then the growth of S&P 500 outstrip earnings growth. As a result earnings meaning is close to bottom limit corresponding to 4.7%, while S&P 500 is close to the average rate of growth corresponding to 8%.

As shown in the Figure 7, such divergence has resulted in growth of S&P 500 P/E ratio from 7.3 at the beginning of the 80-th up to 31 at the end of 2002. That is approximately 4 times.

Up to middle of the 90-th the average of P/E ratio for the 25 years period oscillated approximately in the 12-15 range. By the end of 2002 - beginning of 2003 the 25-year average has increased up to 19.

What estimations could be made in relation of dynamics of the earnings and S&P 500 in the future. How much time it could took for the S&P 500 to reach 2000-year peak?

To estimate the above we'll assume that the earnings growth rate will return to the 5.5% average multi year curve and P/E ratio return to average meaning of 15.

Then only by 2020 in accordance with the above estimations S&P 500 could overcome the 1552.87 maximum registered in the beginning of 2000. Really in 2020 meanings of earnings corresponding to 5.5% long-term curve of growth will be equal to $104. Multiplying this value by 15 we'll obtain 1560.

Why earnings multiple P/E should return to the long-term average meaning of 15 instead of 19. First of all, it happens because there is an obvious cyclical behavior in P/E dynamics (see also [2]).

Really from the end of the 19th century till the beginning of the 20th century it is possible to observe 3 descending and 3 ascending trends on the P/E chart.

Down trends		Up trends	
1894-1917	23 year	1917-1938	21 year
1938-1948	10 year	1948-1961	13 year
1961-1979	18 year	1979- 2001	22 year
2001- ?			

Average duration of the downtrend is 17 years, while the up trend is 18.5 years.

In the following table is shown the range of change of P/E ratio in down or up trends.

Down trends		Up trends	
1894-1917	26.9 - 5.31	1917-1938	5.31 - 19.83
1938-1948	19.83 - 6.63	1948-1961	6.63 - 22.50
1961-1979	22.50 - 7.25	1979- 2001	7.25 - 46.2
2001- ?	46.2 - ?		

The value of P/E decreased in 3.7 times in down trend in average.

Now frequently sound statements that in present epoch (or "new era") 12-month forward P/E (were earnings is time-weighted average of current-year and next-year consensus forecasts) appropriate 18-19 practically completely includes existing risks.

However, long-term history obviously indicates existence of cyclic behavior in the earnings multiple P/E. Such cyclic behavior points that market participants estimate market risk differently in different time.

There is one more reason by which premium for risk expressed in value of P/E will be probably reduced [3]. So on the right scale of Figures 7, 8 the 10-year variability for earnings, P/E and CPI are shown. As well as the real earnings variability, which is calculated as the difference between corresponding meanings of earnings and CPI. On the left scale S&P 500 dynamics in a logarithmic scale is shown. For calculation of variability meanings of trailing earnings, P/E and CPI for the given quarter are compared with the appropriate meanings of the same quarter for the previous year. Then values for 40 quarters (or 10 years) are gathered and standard deviation of this set is calculated.

As it is shown, earnings, P/E and CPI variabilities have reached the greatest value in the middle of the 20-th, i.e. on the eve of great depression. In the beginning of the 40-th years bull trend was developed on the market, which was extended up to middle of the 60-th. Earnings and P/E variability in the same time were in steady down trend. CPI variability was stable in the 50-th and was lowered in the 60-th. Thus the growth of the market was accompanied by growing predictability in dynamics of the earnings and inflation.

From the middle of the 60-th prior to the beginning of the 80-th the market was stagnated in sideways movement (certainly for this period several down and up trends in smaller scale were developed). While earnings, P/E and CPI variabilities began to grow. It is interesting to note that new bull market that was started in the beginning of the 80-th years was already accompanied by growing earnings, P/E and CPI variability.

Since the end of the 80-th CPI variability was essentially reduced and has the lowest in history level.

Nevertheless earnings variability continues to grow.

In Figure 10 dynamics of earnings, P/E and CPI variabilities for shorter 3-year period is shown. As it is evident earnings variability have increased up to levels marked last time in the middle of the 40-th years.

So despite of high predictability of inflation dynamics the earnings growth becomes less predictable. As a consequence, the premium for risk expressed in P/E should be reduced in time. As it was already mentioned earlier such process can take some years.

There is popular approximation for measurement of P/E ratio as reciprocal of 10-Year Treasury Yield. But I believe that this approximation has deep limitation. For example, presently yield's current reading 3.3% lead to corresponding P/E meaning of 30, i.e. absurdly high value. Moreover if the yield

will move down further we soon arrive to the stratospheric value of the corresponded P/E ratio.

It is necessary to note that the rate of the market growth should be lowered up to a level of the earnings growth. Otherwise remaining of divergence will result in the further growth of earnings multiple P/E, which is extremely high already now.

But as the history shows, the market does not fall or rise all time. More probably will be realized the scenario of long-term sideways movement. At that case the cyclic downturn will be replaced by cyclic rises.

3. Conclusion

It is shown that the long-term earnings growth was accelerated in the second half of last century. At the same time growth of the S&P 500 essentially passed ahead of earnings growth. It resulted in high level of risk premium expressed in P/E ratio. From the beginning of the 70-th, the 10-year earnings variability has grown practically 3 times. But since the end of the 80-th, the CPI variability was essentially reduced and has the lowest in history level. So despite of high predictability of inflation dynamics the earnings growth becomes less predictable. Long-term history obviously indicates the existence of cyclic behavior in the earnings multiple P/E. Such cyclic behavior points that market participants estimate market risk differently in different times. As a consequence such situation can result in development of long-term stagnate sideways market.

4. Acknowledgment

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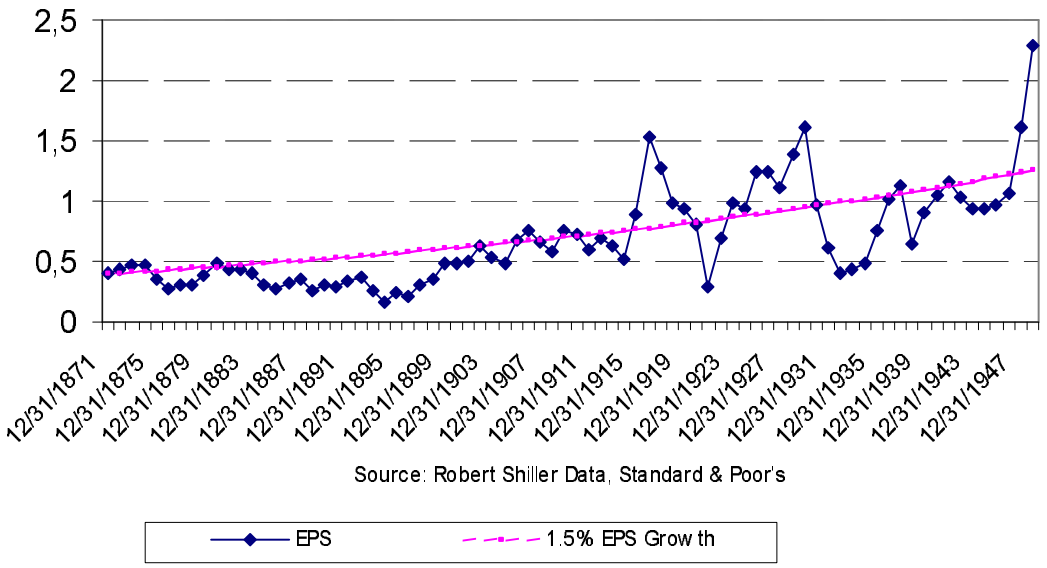
References

[1] " Money And Other Illusions", *Edward Keon and others, Quantitative Equity Strategy, October 14 2002, Prudential Financial*

[2] *"How to work in the uncertain market conditions",* Dmitry Baryshevsky , http://econwpa.wustl.edu/eprints/fin/papers/0211/0211007.abs

[3] *"Global Research Highlights", Richard Bernstein, March 7 2003, Merrill Lynch*

Figure 1



Source: Robert Shiller Data, Standard & Poor's

Figure 2

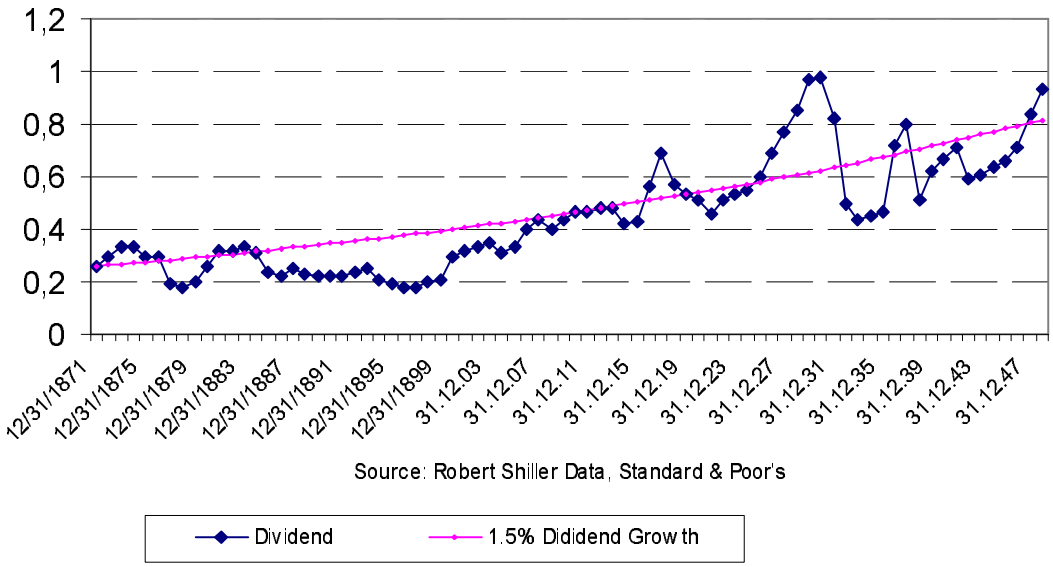


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Figure 3

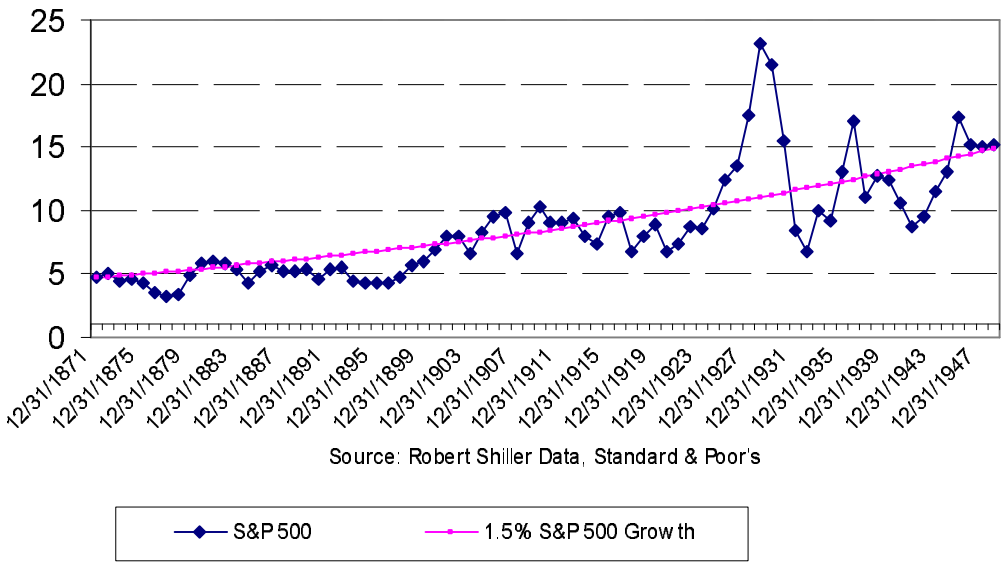

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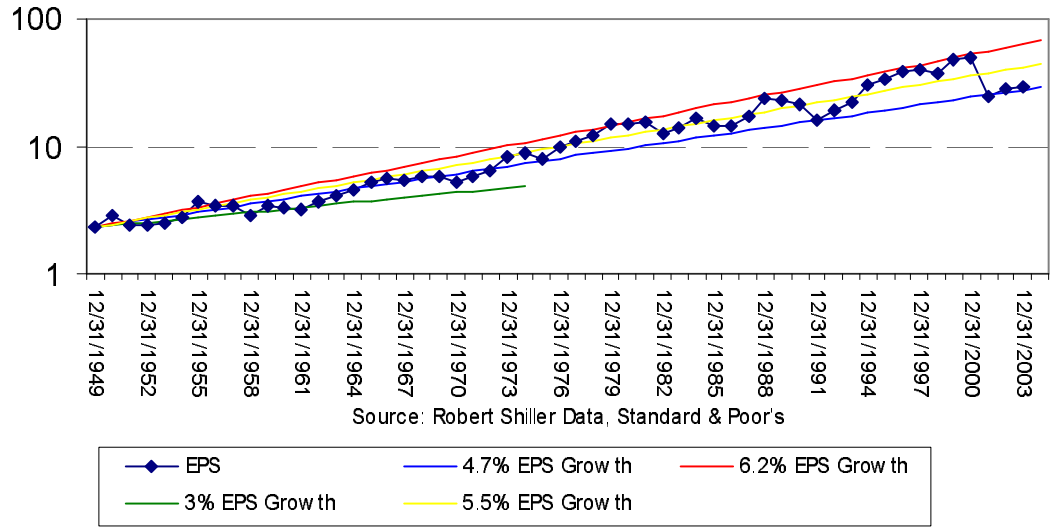
Figure 4



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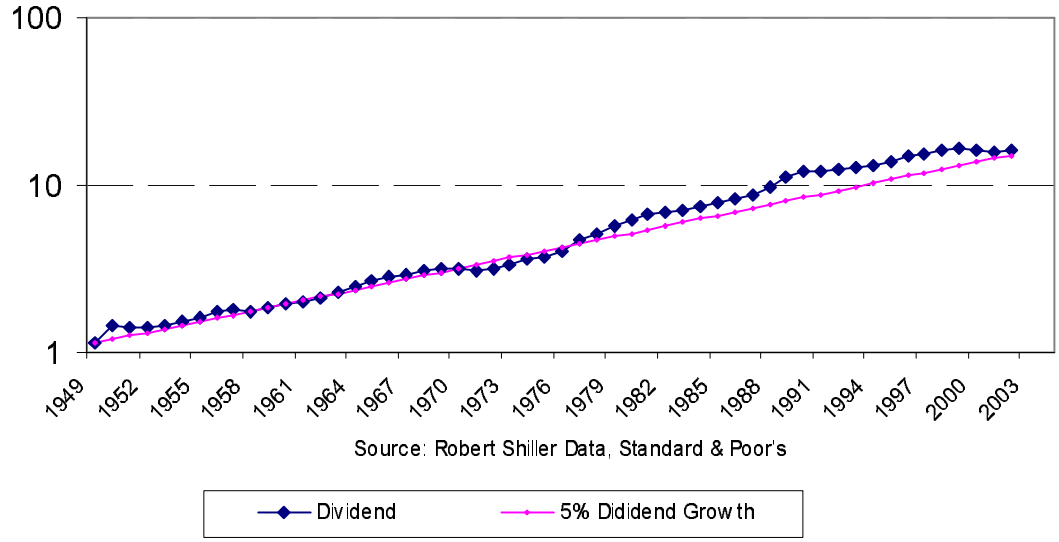
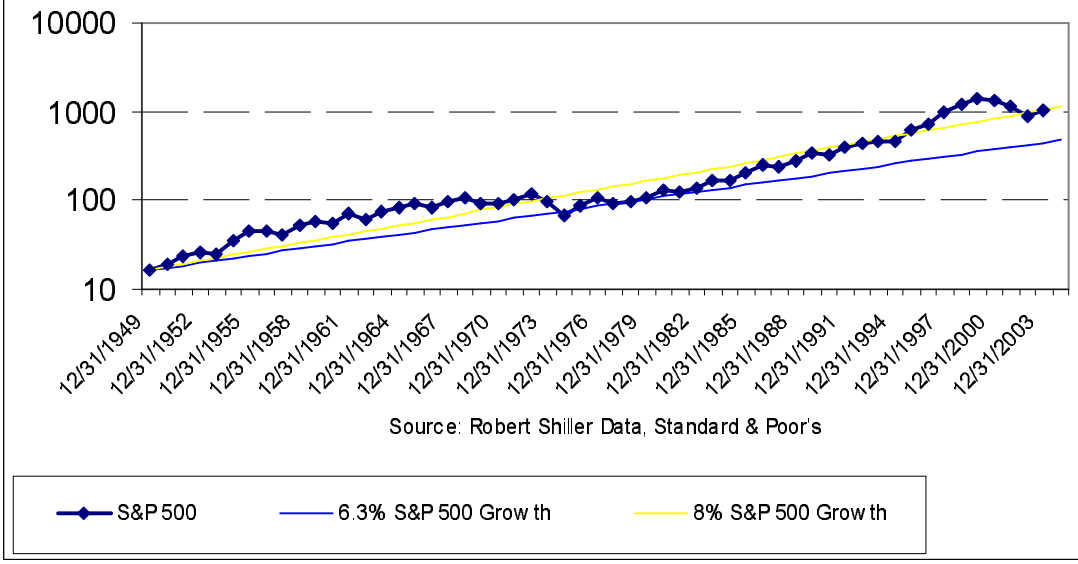
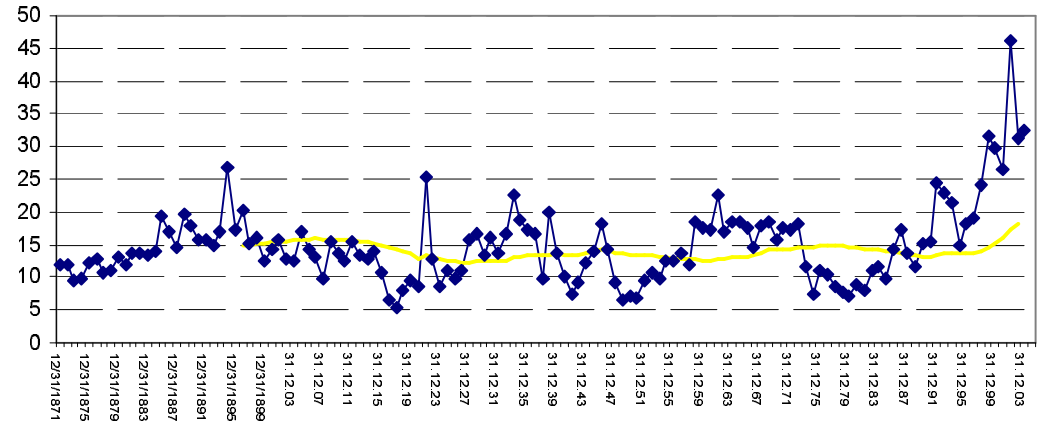


Figure 6



Source: Robert Shiller Data, Standard & Poor's

Figure 7



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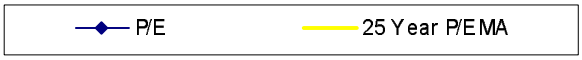
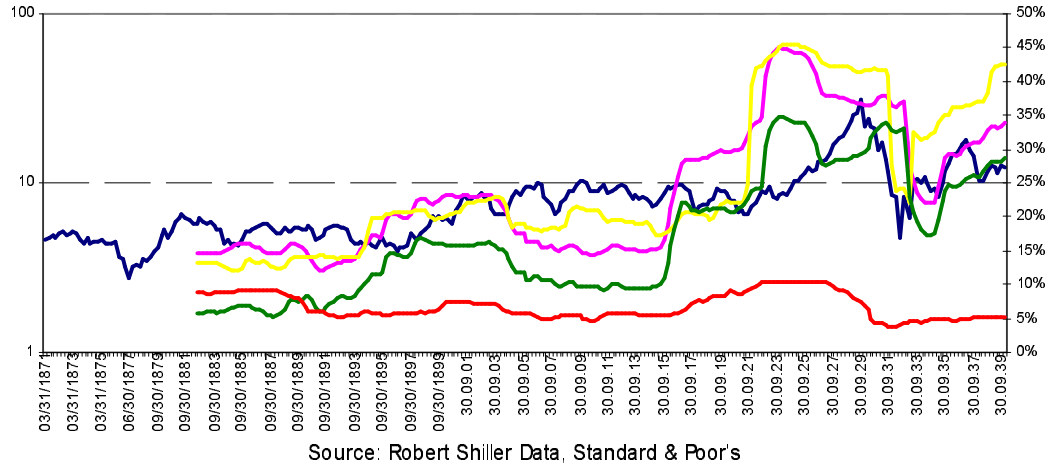


Figure 8



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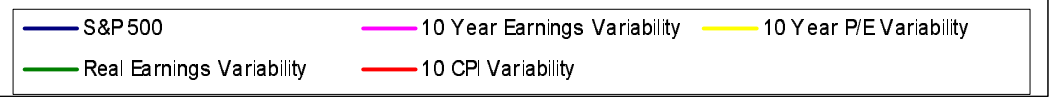

Figure 9

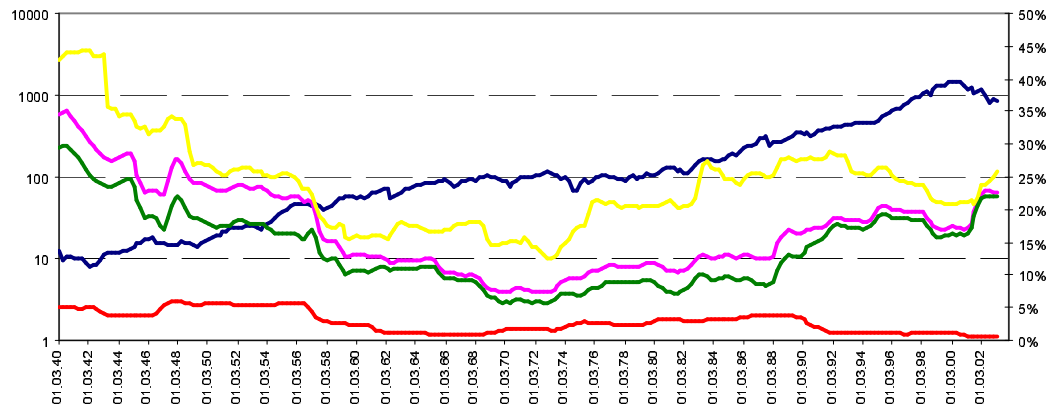

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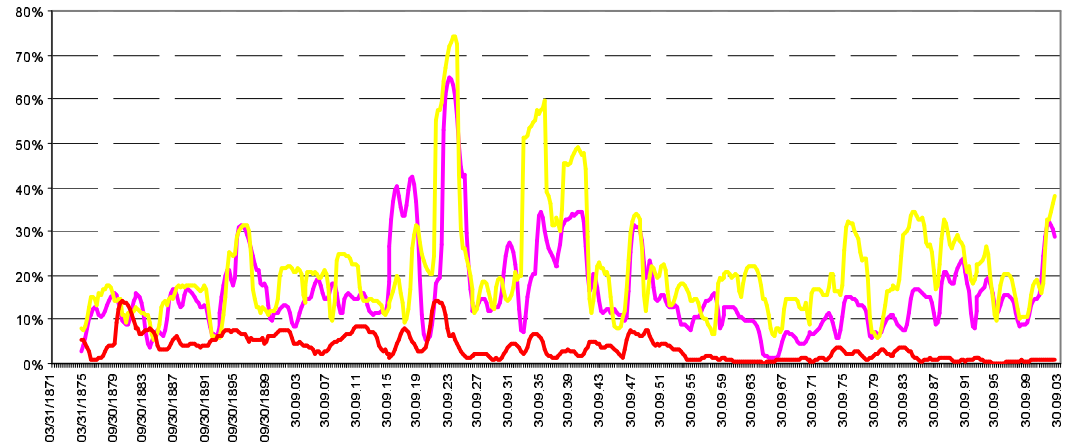
Figure 10



Source: Robert Shiller Data, Standard & Poor's

3 Year Earnings Variability 3 Year P/E Variability 3 Year CPI Variability