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Previous studies of large versus small company performance, though frequent, have not produced a clear answer as to whether large companies outperform small companies or vice versa. This article highlights retentions – the fact that different companies have different dividend policies – as a problem in that retentions obscure accurate measurement of a company's growth. Retentions obscure accurate measurement in that these funds are not costed, hence a high retentions company is getting cost free funds using conventional accounting and security analysis techniques, and, thus other things equal, will outperform a low retentions company. The retentions problem can be overcome by a technique that produces a company statistic called "cash equivalents per share" (CEPS). When CEPS is calculated for 771 companies, arrayed into 13 SIC industrial classifications, each containing a portfolio of large companies (over $1 billion in 1988/1989 sales) and a portfolio of small companies (under $200 million in 1988/1989 sales), then in every industry, the portfolio of large companies outperforms the portfolio of small companies. An additional feature of CEPS covered in the study is that in a competitive economy, the CEPS should show a benchmark growth of zero. The 13 portfolios of large companies all show a CEPS growth rate in excess of zero; only three of the 13 small company portfolios do this. As this is an introductory and relatively small scale study, there are research opportunities to confirm or refute these initial findings.

The debate at the national level on the relative merits of large versus small companies has been long and continuing. Much of the debate stems from pre-existing feelings – for example, feelings that only large companies can ace the rigors of competition imposed by huge overseas companies or, contrariwise, feelings that small companies are the fount of the capitalist economy. At some point, the hard reality has to be faced that this debate, like many others, has to, in the end, focus on the question of limited resources: the dollar budgeted to the S.B.A. is a dollar not available elsewhere in the Federal budget and the loan made by a

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commercial bank to a small company is a loan not available for another prospective borrower. At its simplest, the question is where should the marginal dollar be allocated? Into small companies or into large companies? This question may not have been fully answered because of a problem embedded in corporate data. The purpose of this article is to indicate – fairly quickly – what this problem is and then to show how a new technique – "cash equivalents per share" – represents a significant step forward. The new technique is then used to compare marginal returns in large and small companies in 13 different industries.

PREVIOUS STUDIES

The comparative performance of large versus small companies has been examined in several previous studies. Dwyer and Lynn [1989] concluded that over the period 1965 to 1980, split into three subperiods, "they (the small companies) did better than the large companies." The performance criteria was market value and while much analysis of accounting ratios was done to explain the observed differences in growth of market value, it would appear that changes in price earnings ratios (i.e., the changing fashions of investor preferences for large versus small stocks) was the dominant explanation. Other studies, some of which are very large, such as the Ibbotson-Sinquefield studies [e.g., 1989] – analyzing stock returns from 1926 onwards – and some of which are empirically complex, such as the CAPM type studies investigating differences in excess returns [e.g., Banz 1981, Basu 1977, Dowen and Bauman 1986] – show mixed results. The Ibbotson-Sinquefield studies tend to show that small companies, using stock market returns as the criterion, outperform large companies, though the results are not consistent period to period. Small companies did particularly well 1965 to 1980, the period studied by Dwyer and Lynn [4]. Thus during the Dwyer-Lynn years, the Ibbotson-Sinquefield data shows the small companies outperforming the large companies, 12 out of 15 years. In fact, over the last 20 years, the small companies have outperformed the large companies 12 times, and these 12 years coincide with the years of the Dwyer-Lynn study. In the CAPM area, the results are mixed, but on balance the small companies may have tended to show (positive) excess returns which were not fully explained by their betas.

A BASIC PROBLEM IN CORPORATE DATA

This section demonstrates why inconclusive results are likely to have occurred in many studies of small versus large company performance. To do this, let us examine the growth rate in some easily obtainable number such as earnings per share (EPS). Growth in EPS is chosen because this measure so clearly obscures one very important aspect of company performance – the plowback rate (the proportion of profits that firms retain and reinvest). A company which retains all or most

of its after tax earnings and plows these back into new investments must, other things being equal, show greater EPS growth than the company which distributes most or all of these earnings to its shareholders. To demonstrate how misleading this indicator of company performance can be, assume an investor places $100,000 into a money market fund and the going rate for such funds is 8 percent. The investor will earn $8,000 in the first year, and $8,000 in each future year, assuming the going rate stays at 8 percent. Now assume, for demonstration purposes, that money market fund managers have the option of choosing what proportion of the earnings they pay to their investors. The managers of money market fund A decides to retain 50 percent of the $8,000 and reinvest it. At the going rate of return, the earnings would grow by 4 percent (= .5 X 8%), and the dividends paid to the investor would also grow by 4 percent per year . If the managers of fund B retains 80 percent, the earnings and dividends would grow by 6.4 percent per year. Would an investor believe – because his earnings and dividends were growing faster in fund B – that fund B, which retained 80 percent of his interest, was superior to fund A, which retained 50 percent of his interest? We would hope that a rational investor would not pay a premium for the reinvestment policy of fund B! Yet this is exactly what the use of the growth rate of EPS of a company would have many people conclude; companies that have high growth rates of EPS are superior to more slowly growing

Table 1
Industry Samples

		Number of ←*Companies*→		*Mean Sales* ←*1988/9 $m.*→	
SIC#	*SIC HEADING*	*Large*	*Small*	*Large*	*Small*
2000–2099	Food & Kindred Products	21	17	5477	84
2200–2299	Textile Mill Products	8	29	1565	81
2600–2699	Paper & Allied Products	18	11	3868	67
2700–2799	Printing & Publishing	14	20	2297	57
2800–2899	Chemicals & Allied	32	75	5443	44
3000–3099	Rubber & Misc. Plastic	8	23	3333	56
3300–3399	Primary Metal Industries	15	15	4027	64
3500–3599	Industrial, Commercial, Machinery, Computers	28	136	4173	52
3600–3699	Electrical, Other Electrical Equipment	12	171	2688	42
3700–3799	Transportation Equipment	15	17	5038	90
4800–4899	Communications	9	20	4648	55
5100–5199	Nondurable Goods – Wholesale	15	15	3368	44
5200–5499	Retail	28	9	7724	88
Number of large company portfolios:		13			
Number of small company portfolios:			13		

firms – even though the growth may be merely due to retaining a different proportion of their income and investing it at the going rate of return. Whether from the personal investment viewpoint or that of society, the economy can gain only if funds are reinvested at better than the going rate or return. Thus, if the managers of money market fund A, through superior skill not only retained 50 percent of the earnings but reinvested it at 14 percent, rather than the 8 percent going rate, the resulting 7 percent growth would reflect true growth in the sense that it would increase the investor's wealth by 3 percent. This increase in wealth is due to the manager's ability to invest at above the going rate, not as a result of the plowback (the retention and subsequent reinvestment) at the going rate of return. Therefore, all measure of performance – not just growth in EPS – that reflect this illusionary growth, must be in error and will exhibit asymmetric bias toward overstatement of true performance.

ANALYSIS OF LARGE VERSUS SMALL COMPANY DATA

To test our hypothesis, that EPS growth contains a bias as a performance indicator when comparing large versus small firm performance, data were obtained by searching Compustat in SIC industry headings of 100 (e.g., 1000 to 1099, 1100 to 1199, etc.) to obtain in each industry heading two samples of not less than 8 companies. Thus within each industry, there resulted one sample representing the large companies in that industry and one sample representing the small companies in that industry. Large companies were defined as having 1988/1989 sales in excess of one billion dollars. Small companies were defined as having 1988/1989 sales of less than 200 million dollars. Based on the data available, our sample period is restricted to the period to 1982/1983 through 1988/1989. Each sample was treated as an investment portfolio; thus there were 26 portfolios, 13 each of large and small companies in each industry. These are summarized in Table 1.

The retention problem discussed previously can now be illustrated by reference to Figure 1. The scatter diagram in Figure 1 compares the EPS growth of each of the 13 portfolios of large firms versus the EPS growth of each industry equivalent small firm portfolio. Because each sample is treated as an investment portfolio (in which each company is represented in the portfolio in proportion to its market value), there will be an EPS for each year in each portfolio. The growth rate of the EPS over the life of the portfolio is measured by regression (log of EPS against time) and this growth rate in then plotted in Figure 1. The figure, and the regression line summarized in Table 2 ($R^2 = 6.25\%$), reveal no discernible relationship. This lack of relationship may be due to either (1) there is truly no pattern between the EPS growth rates of large and small companies in each industry and/or, (2) the retention problem may be distorting the relationship.

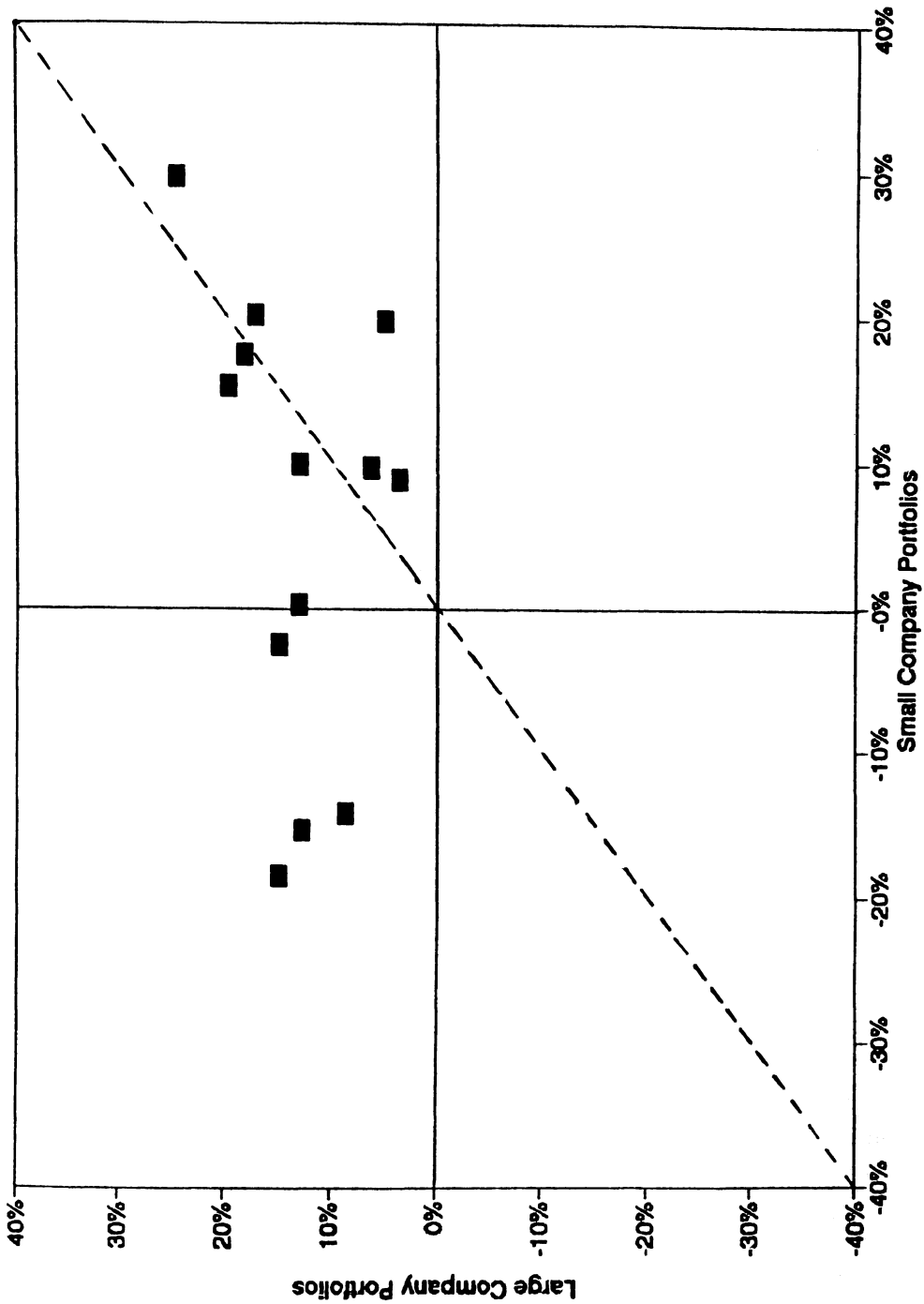

Figure 1. EPS Growth Rates, % pa, 82/3 to 88/9

Table 2
Regression Data

EPS (Figure 1)

$Y = 12.412 + 0.096X \quad R^2 = 6.25\%$
$\quad (5.895) \ (0.112)$

CEPS (Figure 2)

$Y = 15.044 + 0.454X \quad R^2 = 45.40\%$
$\quad (6.372)^*(0.153)^*$

Notes: * = significant at 95%
Y represents large company growth.
X represents small company growth.

CASH EQUIVALENTS PER SHARE

To investigate this lack of relationship, an alternative measure of performance is utilized—Cash Equivalents Per Share. CEPS has been detailed elsewhere in relation to standard financial models and in intuitive terms (Merrett and Newbould [6, 7, 8]). A mathematical statement is given in the Appendix. In intuitive terms, the CEPS concept is simple. Earnings of the company that are not distributed as dividends are treated as compulsory rights issues on the stockholders. The advantage of doing this is that the equity capital gained by the company by not distributing earnings as dividends is costed at the current cost of equity capital—without the CEPS calculation, withheld dividends are free of explicit costs, making that source of capital unique. Treating retentions as a notional rights issue is identical to the procedure used by every security analyst for a standard rights issue—a chain calculation is made to reflect the additional equity capital and, thereby, earnings per share are reduced to reflect the costs of the additional equity capital. The recalculated EPS can be referred to as CEPS. With CEPS, a charge, calculated as per conventional rights issues, has been made for the use of the retentions. Therefore, CEPS show the result of completing the logic of charging for the use of all capital employed by the company.

Applying this procedure to the data for each of the 771 companies in the 26 portfolios yields the CEPS. Figure 1 is now repeated, except an EPS figure for each year is replaced by a CEPS figure for each year. Growth rates of CEPS were then calculated. Thus Figure 2 reveals several things. First, there is a clear relationship to the 45 degree line. In Figure 1 (EPS), observations occurred above and below the 45 degree line (i.e., big company samples did better and worse than small company samples); whereas in Figure 2 (CEPS), ALL observations lie above the 45 degree line (i.e., all large company samples outperformed their industry equivalent small companies). Second, it is clear that there is reduced scatter (the R^2 has increased

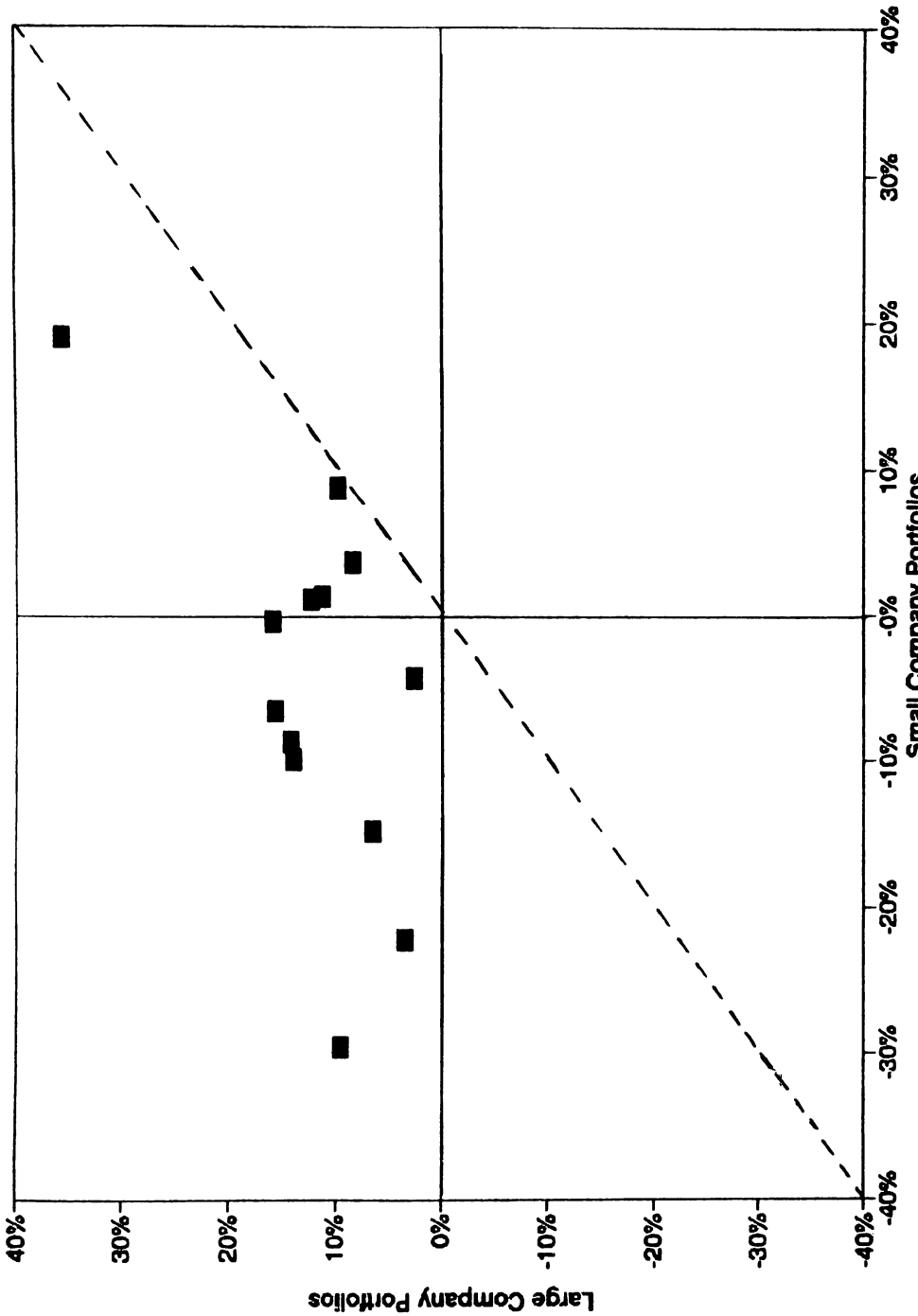

Figure 2. CEPS Growth Rate, % pa, 82/3 to 88/9

from 6.25% to 44.5%)—the result of backing out the effects of the "cost-free" retentions. Thus of the two possibilities that result from EPS analysis in Figure 1 (large company performance to small company performance is unrelated—or their dividend policies differ), there is now an unequivocal picture: the large companies, without exception, outperformed the small companies.

THE MEANING OF CEPS DATA

It is important to realize that the growth pattern of CEPS data carries not only significance for investors but for society as a whole. Because, all sources of capital are now fully and correctly costed in the CEPS procedure, then, with the assumption of a competitive market economy, the benchmark CEPS rate growth is zero. In a competitive economy, a company, or an industry, that is showing positive growth of CEPS is investing at more than the going rate of return. But, over time, as other companies in the U.S. or overseas, see this success, competition, in the form of imitation and additional investment, will erode downward the positive CEPS growth. Likewise a company, or industry, exhibiting a negative growth in CEPS is investing at less than the going rate of return—a situation that cannot continue unless an outside source (that is, an investor or a government, throwing good money after bad) persists in investing in the company. The exceptions to these two powerful economic forces are noted in the next section, but, excepting these, the benchmark for CEPS growth is zero.

OTHER POSSIBILITIES AND FURTHER RESEARCH

Since the picture in Figure 2 is so clear, the possibility of other explanations must be examined. One is that large companies are much more conservative in their accounting practices (e.g., faster depreciation, shadow pension funding, inventory valuation) than are small companies—the large companies are, in effect, concealing retentions in various accounting ways that escape the costing procedures in CEPS, giving an upward bias to their CEPS growth rates. In effect, what may be happening is that the company is creating and hiding cost-free funds and investing them, giving EPS an upward boost. Another possibility is that the large companies are able to engage in monopolistic pricing, whereas small companies—due to lack of market power—have to price at perfectly competitive levels; which again would give an upward thrust to the EPS and CEPS growth of the large companies. With both of these possibilities, there are opportunities for further research. An additional possibility is that there was some biased change in investors perceptions of large versus small companies over the period we analyzed. (The Appendix shows that V_t—the market value of the stock at time t—is in the denominator of the CEPS equation.) Using *P/E* ratios as the test of changing perceptions, the mean *P/E* for

the large companies in our sample fell by 25.8% over the period 1982/1983 to 1988/1989 and the mean *P/E* for the small companies fell by 28.2% over the same time period. These changes are so similar as to preclude a bias from this source.

SUMMARY

Previous studies have produced equivocal results on large versus small company performance. This study—conceding it is small in scope and over a limited time frame—shows a clear performance advantage to large companies; of the 13 industries analyzed, the large company portfolio in every industry outperformed its counterpart small company portfolio. Part of this clear result may be due to the smallness of the study or the limited time frame, but the significant advance is in using a measure of performance that not only unscrambles conventional data, but provides a clear benchmark by which to judge investment and economic performance. Thus, not only did the 13 large company portfolios outperform their industry equivalent small company portfolios, but all 13 of the large company portfolios showed positive CEPS growth—outperforming the benchmark of zero growth—whereas only 3 of the small company portfolios achieved positive growth. If we set aside the uninvestigated possibilities of accounting conservatism and monopolistic pricing, it appears, quite simply, that large companies are making more productive use of society's scarce resources than are small companies.

APPENDIX

Mathematical Statement of CEPS

Take equation (3) in Modigliani and Miller ("Dividend Policy, Growth and Valuation of Shares," *The Journal of Business*, October, 1961), with identical assumptions:

$$V_{(t)} = [D_{(t+1)} - C_{(t+1)} - V_{(t+1)}]\, e^{-r} \tag{1}$$

where $V_{(t)}$ is the ex-dividend value of the firm at the beginning of the period t, $D_{(t+1)}$ are the total dividends paid during period $(t + 1)$, $C_{(t+1)}$ is the total equity raised during the period $(t + 1)$ and r is the continuous rate of discount. Rewrite equation (1) as

$$V_{(t)} = [D_{(t+1)} - K_{(t+1)}V_{(t+1)}]\, e^{-r} \tag{2}$$

where

$$K_{(t+1)} = 1 - [C_{(t+1)}/V_{(t+1)}].$$

By successive substitution into equation (2) and setting $t = 0$:

$$V_{(0)} = \sum_{j=1}^{\infty} K_{(1)}K_{(2)} \cdot \cdot \cdot \cdot \cdot \cdot K_{(j-1)}\, d_{(j)}\, e^{-rj} \tag{3}$$

where $K_{(0)} = 1$.

Equation (3) is the dividend model of valuation (equivalent to MM equation [13]). The factor $K_{(j)}$ represents the dilution to stockholders of record at $t = 0$. The CEPS are derived from equation (1) by rewriting:

$$V_{(t)} = [E_{(t+1)} - S_{(t+1)}V_{(t+1)}]\, e^{-r} \tag{4}$$

where

$$S_{(t+1)} = 1 - [\{R_{(t+1)} + C_{(t+1)}\}/V_{(t+1)}]$$

and $E_{(t+1)}$ are the earnings and $R_{(t+1)}$ are the retentions. By successive substitution and setting $t = 0$:

$$V_{(0)} = \sum_{j=1}^{\infty} S_{(1)}S_{(2)} \cdot \cdot \cdot \cdot \cdot \cdot S_{(j-1)}E_{(j)}\, e^{-rj}$$

where $S_{(0)} = 1$. The CEPS, i.e., $\text{CEPS}_{(j)}$ of period j are defined by the terms $S_{(1)}S_{(2)} \cdot \cdot \cdot \cdot \cdot \cdot S_{(j-1)}E_{(j)}$.

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