

Volatility Matters: The Case for Investment in Resource Stocks

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Introduction

Investment by the public in resource stocks tends not to be fashionable, thereby impacting adversely on resources job security. Yet resources are one of the most significant contributors to Australia's GDP. In fact, the resource sector per employed person easily contributes the highest proportion of GDP of all industries in Australia.

Over the last 20 years, stock-market return from the investment in resource stocks has been about a third that of other heavyweight industries (eg banking and industrials). Therefore a *fait accompli* might be that public investors would ignore resource stocks.

This article shows that ignoring resources is shortsighted, because sophisticated investors look at more than the industry returns. They consider the efficiency of the investment, quantifying the returns and the variability in those returns.

The efficiency of an investment portfolio depends critically on how returns correlate between different stocks. Resources have the desired low correlation with other prominent industries, therefore adding resource stocks to a portfolio will increase its efficiency.

Mining contribution to GDP

Two measures of an industry's importance are its contributions to GDP at basic prices and to employment. A 1998-99 ABS surveyⁱ showed that manufacturing is the most significant industry (12.5% contribution to GDP) and is the second largest employing industry behind retail trade.

Where does Mining fit in? Mining contributed 3.9% to GDP and 0.9% to employment. Another way to look at these statistics is to compute the ratio of percent GDP to percent industry employment. Mining is by far the highest contributing industry. It has a ratio of 4.3, compared with 1.2 average of all industries.

Resources Industry - Stock-market returns

Resources, Banks and Industrials are three main industries for which stock-market dataⁱⁱ are available from the Reserve Bank. Figure 1 shows their cumulative stockmarket returns, assuming an index of 500 at December 1979. For reference, the ASX/S&P 200 is shown.

During the 1980s, we see that industrials were the best performer while resources had the lowest growth. During the 1990s, it was the turn of banks to shine. Resources growth was strong in the early part of the decade, but poorer in the later half.

Annual returns of these industries, on a financial year basis, are shown in Figure 2 and Tables 1 and 2. We see that over the last 20 years, banks were the standout performer (average return 14.2%), while resources had a 4% average

return. Over the last 10 years banks still dominated, however resource performance was a little better, being closer to industrials.

	Averages for 1980 - 2001			
	Banks	Indust.	Res.	ASX/200
Return	14.2%	11.5%	4.0%	8.2%
St. Dev.	17.0%	17.0%	25.5%	18.0%

Table 1.

	Averages for 1990 - 2001			
	Banks	Indust.	Res.	ASX/200
Return	16.3%	9.7%	6.5%	8.8%
St. Dev.	15.2%	8.8%	13.8%	7.7%

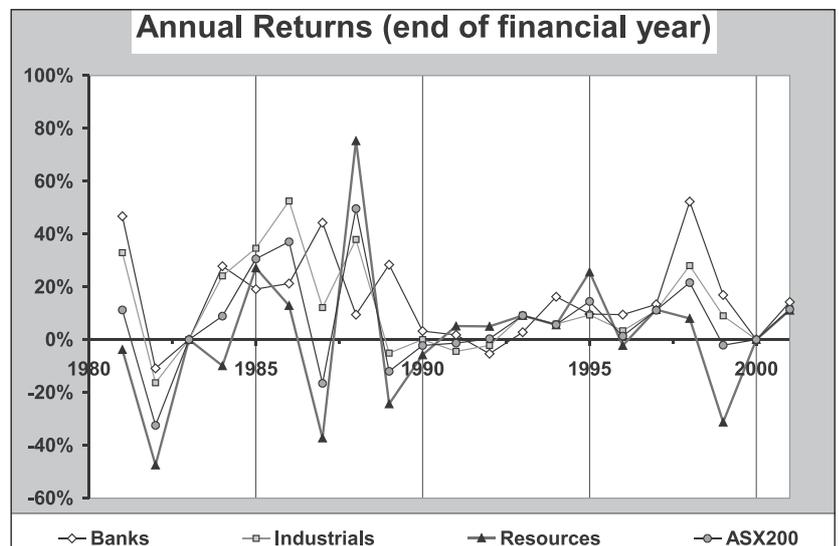
Table 2.

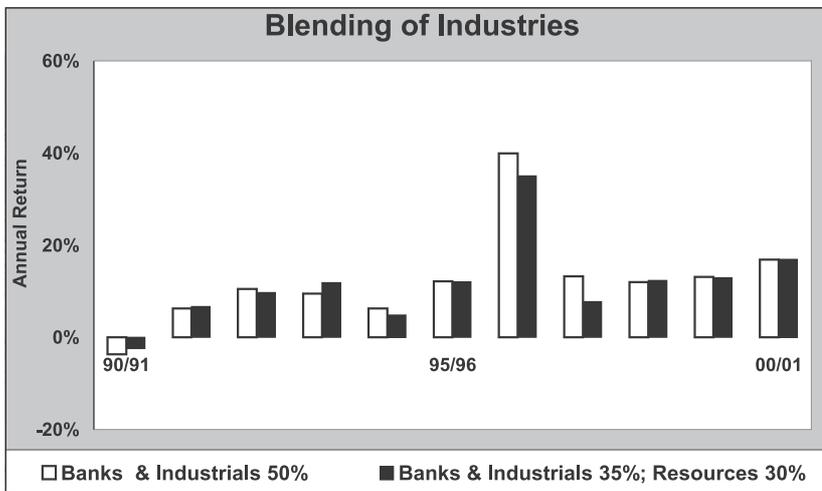
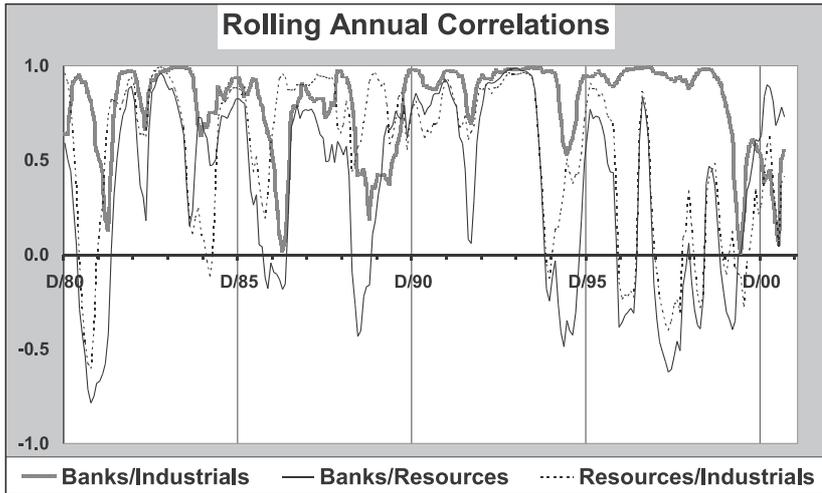
Given this information, where should investors put their money to maximise returns? All in banks, or diversify in some proportion among these sectors?

ⁱ "Industry Overview - Output and employment by industry" ABS, <http://www.abs.gov.au/ssstats/abs@.nsf/0/B62C6D55E5E1C19ACA2569DE00263EE8?Open>

ⁱⁱ Reserve Bank Statistical Table F6, accessed 2 Nov 2001 http://www.rba.gov.au/Statistics/Bulletin/index.html#table_f

Fig. 1. (Below) and Fig. 2. (Bottom)





Correlation - Financial Concept

Financial analysts compute another measure of stock performance - the correlation of its returns with other stocks and industries. The correlation is required to calculate the volatility of a portfolio.

A portfolio's *expected return* is easily found from the weighted average of returns of the individual projects.

A portfolio's *volatility* is not the weighted average of volatilities, but is related to the covariance between stocks' return (see Moriarty (2001) for more discussion of this concept).

The outcome is that in a portfolio, individual stock volatilities cannot be added. As an example, it is possible to have two industries with high volatilities. Yet when combined, the portfolio volatility may be considerably lower than either of the individual volatilities. This happens if the correlation between these industries is low.

Financial diversification ("not putting all your eggs in one basket") is mathematically a consequence of selecting investments that have the lowest correlation. This reduces the volatility of a portfolio, thereby increasing its efficiency.

Rolling annual correlations for banks/industrials, resources/banks and resources/industrials are shown in Figure 3 and Table 3. Note that banks/industrials had the highest correlation (average 0.8), while resources/banks had the lowest (average 0.5).

Therefore a portfolio of only banks and industrials (which both have higher returns than resources) is less diversified than a portfolio of say only banks and resources. The case is proposed that diversification in a portfolio should include exposure to resources.

	Average Correlation 1980 - 2001			
	Banks	Indust.	Res.	ASX/200
Banks	1.0	0.8	0.5	0.7
Indust.	0.8	1.0	0.7	0.9
Res.	0.5	0.7	1.0	0.9
ASX/200	0.7	0.9	0.9	1.0

Table 3.

As an example, consider the performance of two portfolios over the last 10 years. One portfolio had 50% banks and 50% industrials, the other had 35% of both banks and industrials and 30% resources. The financial year average returns are shown in Figure 4. The average returns for the two portfolios were 12.4% and 11.6% respectively.

Many investors would prefer the non-resource portfolio, yet its volatility was 10.6%, higher than the resource portfolio 9.3%. To be relatively efficient, the non-resource portfolio having being exposed to higher volatility, is expected to achieve higher returns. (Note that higher volatility does not guarantee higher returns, just that it provides *potential* to achieve better returns).

Over the last financial year, these portfolios would have had the same 17% return (Figure 5). The volatilities,

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Fig. 3. (Top) and Fig. 4. (Above)

Before we answer this question, we need to introduce two concepts used by sophisticated investors - financial volatility and correlation.

Financial Volatility Concept

Financial analysts consider not only the expected return of an investment, but also quantify the volatility (uncertainty, or the range of possible returns). The standard deviation of the returns is taken as the measure of the volatility. Usually, investments with a higher return for a given volatility are favoured [Markowitz (1952, 1957) introduced this concept of "Efficiency" to the financial world, and was later awarded the Nobel Prize for Economics].

Tables 1 and 2 show the standard deviation (volatility) for each of the industries. We see that since 1980, resources have been the most volatile (25.5%), however in the last 10 years resources were less volatile than banks.

A portfolio of only resource stocks is clearly inefficient. To be efficient, highest volatility should provide highest returns.

Therefore, pundits might say that it is a waste of money to invest in resources... but they would be wrong. There is another factor to consider - *correlation*.



Minotaur Resources Announces Copper Find in South Australia

This month's good news story must surely go to Minotaur Resources Ltd, which is the operator of the Mt Woods Joint Venture. On 14 November it announced a significant copper discovery at the Prominent Hill Prospect (see Fig. right).

The results of the first hole drilled to test a discrete gravity anomaly measuring about 1500 x 500 m are shown in Table 1.

From (m)	To (m)	Interval (m)	Copper (%)	Gold (g/t)
107.8	128.0	20.2	0.03	2.3
200.0	307.0	107.0	1.94	0.66
including: 272.0	307.0	35.0	3.86	0.63
429.0	450.0	21.0	0.90	0.46

According to the announcement, "the vertical hole passed through 108 m of younger sediments before intersecting a massive haematite-supported breccia. Haematite dominates both the matrix and breccia clasts. The hole reached 450 m in mineralised haematite breccia at which

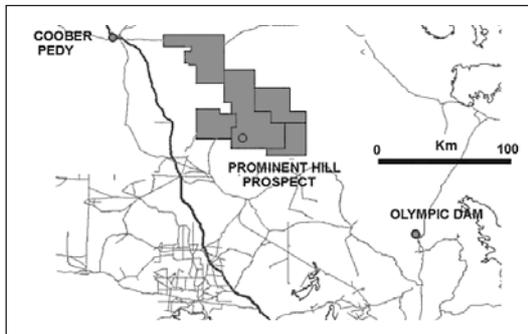


Fig. 1. Location of the Mt Woods Joint Venture Tenements and the Prominent Hill Prospect.

point drilling was terminated pending mineralogical assessment and analytical data."

"Copper mineralisation (chalcocite) occurs as disseminations and thin veins within the haematite matrix. The chalcocite is concentrated at about the -300 m level,

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though, were different. The non-resource portfolio had 10.6% volatility, compared with 9.3% for the resource component portfolio. The latter portfolio is more efficient, because it achieved the same return with a lower volatility.

The case is made that efficient investment portfolios should contain some provision for resource stocks, despite their lower average return. Typically, resource stocks form about 5 to 20% of sophisticated investor's portfolios.

Determining the relative exposure of a stock in a portfolio is a factor of each its expected returns, the volatility and correlation of returns with other stocks. The optimal exposure of a stock depends on how much volatility an investor wishes to accept. Given this constraint of desired volatility, Monte-Carlo modelling is usually employed to determine the relative exposures that maximise the return.

Summary

Resources are a significant and valuable contributor to Australia's GDP. cursory inspection of past returns would suggest their performance is unattractive compared with glamour stocks such as banking.

During certain periods, resource stocks are good performers. However, the case is made that even during times when resource stocks are not the best performers, they should be included in a personal investment portfolio.

The returns from resource stocks have a lower correlation with other major industries. Including resources therefore decreases the volatility of a portfolio, thereby improving the efficiency (stability) of its returns.

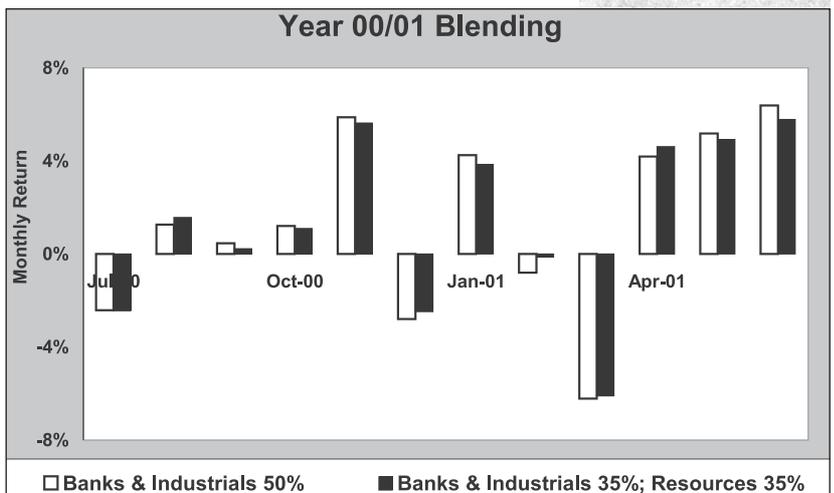


Fig. 5.

Investment in resource stocks should be actively promoted. If the general public is made aware of concepts such as portfolio efficiency, it will be to the benefit of all those work in the resource industry.

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