





# University of Melbourne Collaboration

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## **University of Melbourne Collaboration**

JANA commenced a research collaboration with the University of Melbourne in 2019.

A select number of Honours in Finance students undertake research on topics that are developed in conjunction with their supervisor and JANA. JANA provides an industry lens, proposing questions that are relevant to our industry/clients and acting as a sounding board as the students develop their research questions and methodology. In 2019, the first two students completed their Honours in Finance as part of this collaboration:

Angela Pan: Do commodities enhance portfolio performance? An Australian perspective Kelvin Sun: A study of actively managed fund performance in differing volatility states

The students were supervised by Professor Federico Nardari, Dr Jonathan Dark and Dr Thijs van der Heijden.

Three new students have commenced work on their Honours in Finance under the collaboration with JANA in 2020.

# Do commodities enhance portfolio performance? An Australian perspective

### Angela Pan

#### **Research Questions**

Angela Pan's Honours in Finance project sought to answer the following questions:

- What is the role for "hard" commodities in institutional multi-asset portfolios for Australian investors?
- Does holding listed mining stocks provide the desired characteristics, or are direct holdings of commodities required?
- Are there particular commodities that offer superior returns or risk reduction benefits?

#### **Key Insights & Learnings**

- Pan's research concluded that there was no tangible benefit of including diversified direct commodities exposure in diversified Australian institutional portfolios. This was the case across a broad range of portfolio construction approaches and under varying underlying assumptions.
- This was also the case for specific exposure to the Energy, Industrial and Agriculture commodity subsectors.
- There was more of a case for Gold and Precious Metals commodity subsectors under some portfolio construction approaches, and in particular for investors that are focused on volatility and performance in higher volatility market conditions.
- Prior empirical research has generally found benefits from the inclusion of commodities. Pan's research had some key differences from prior research that may explain these differences:
  - Most prior research has been done from a non-Australian investor perspective. A starting
    thesis was that Australian investors already have indirect exposure to commodities
    through equities and other domestic assets in the portfolio. Pan's research included an
    analysis of the impact of substituting direct commodity exposure for Australian Equities.
    She found that they were not perfect substitutes, but that Australian Equities sufficiently
    encompasses the risk/return profile offered by direct commodity series.
  - Most research has considered diversification benefits relative to equities only or to a bond/equity balanced portfolio. Pan considered a more diversified balanced portfolio that is more reflective of Australian institutional investor portfolios. This would naturally reduce the potential for diversification benefits of an incremental asset class.
  - While not the direct subject of the research undertaken by Pan, she noted broader research that has been undertaken on the financialisation of global commodity markets, with growth in non-traditional investors resulting in structural changes and rising correlations between commodity futures and equities over the past 15years. The period of analysis for this paper was 1989-2019 and should reasonably be expected to generate different results to research conducted on data pre-2000.
  - The majority of research undertaken has been "in sample" analysis. "Out of sample" analysis, which is generally considered more robust, has been less common and has had mixed outcomes with respect to the diversification benefits of commodities. Pan conducted both in sample and out of sample results, with consistent results across both.

#### What are the potential implications for JANA client portfolios?

#### • Direct Exposure to Commodities

Pan's research provides further data points that confirm some of JANA's beliefs regarding direct commodity exposure, and the limited benefit for Australian investment portfolios.

- **Existing Indirect Exposure.** JANA's view has been that Australian investors have significant indirect exposure to commodities through Australian listed companies and other Australian assets (including the Australian dollar). Pan's research confirmed the former of these points, demonstrating that substitution of direct commodity exposure for Australian Equities exposure had a negligible impact on outcomes for a diversified portfolio.
- Diversification Benefits. JANA has held the view that the empirical research that shows commodity benefits to a stock/bond portfolio would be less significant when added to a typical Australian balanced portfolio, where real assets and other diversifying investments feature prominently. Pan's research suggests that this may be one of the reasons (along with higher indirect exposure to commodities through Australian listed companies) that the diversification benefits are lower in her findings than for others.
- **Financialisation of Commodity Markets.** JANA's view has been that the increased level of investment in commodity markets over the past 20 years has resulted in structural changes that challenge the applicability of earlier research regarding the diversification benefit of direct commodity exposure. JANA's view has been informed both by empirical research undertaken by the academic community and by our own observations in the market. While Pan did not tackle this issue directly, her research corroborated the view, noting that this is one of the potential reasons for the outcomes of her analysis differing from prior analysis.

#### • Gold and Precious Metals

 Gold and, to a lesser extent, other precious metals are once again gaining popularity as a defensive component of investor portfolios globally. Pan's research was inconclusive but suggests that there may be some benefit to holding direct gold and precious metal exposure from an Australian investor's perspective, depending on the portfolio construction methodology and the investor's own measure of success. This warrants further exploration by JANA, especially in the context of the diminished defensiveness of bond investments (with the caveat that Gold and Precious Metals are of course not immune from the financialisation of commodity markets issue outlined above and witnessed in markets over March 2020).

#### What are the potential limitations and next steps for this research?

Pan's research was very comprehensive and didn't suffer any significant, unexpected data limitations. However, we should acknowledge that although the benchmark portfolio used in the analysis was far more diversified than that used in prior research on the topic, it remained skewed toward listed markets, using listed infrastructure and property data. This is an accepted limitation of any analysis of this nature. If anything, the inclusion of unlisted assets may be expected to result in a further reduction of any potential diversification benefits from including commodities in the portfolio. In addition, the proposed performance metrics assume that investor's risk preferences are adequately characterized by the volatility of portfolio returns, hence excluding the potential impact of tail events and downside risk.

#### Further work:

• Consider the substitution question of commodities for Australian equities in a more specific manner (such as targeting the Resources component of the Australian equity market)

- Investigate the effects of tail events and downside risk on portfolio outcomes and, hence, on investors' preferences and utility.
- Deeper work on the impact of financialisation of commodities on portfolio outcomes.
- Further work on role of gold/precious metals, considering alternative components of the portfolio as substitutes.

JANA is currently working with the University of Melbourne 2020 Honours in Finance students to develop follow on research topics.

#### **Summary of Research Conducted**

Pan's research used the passive index data for construction of the benchmark portfolio and direct commodities. These are provided in the Appendix.

Pan undertook very comprehensive analysis, with the following techniques:

- In sample efficient frontier plots and mean variance spanning tests
   Findings: that the intercept estimates were insignificant suggests that existing assets in the benchmark portfolio already span the additional commodity exposures, such that a direct investment in commodities would not provide any tangible benefit to the portfolio.
- Out of sample analysis "naïve" portfolio allocation approaches:
   Equal weighted portfolio

*Findings:* **No tangible benefit for inclusion of commodities**. There was a <u>non-statistically</u> <u>significant</u> improvement of the Sharpe Ratio for inclusion of GSCI Gold and GSCI Precious Metals.

• Strategically weighted portfolio (based on average institutional portfolio weights estimated by JANA)

Findings: Consistent with other findings for diversified commodities and all subsectors with the exception of GSCI Gold and GSCI Precious Metals, which provided an improvement of the Sharpe Ratio (1.67 to 1.75, at 10% confidence level). This was driven by decrease in portfolio volatility rather than an improvement in return. Pan concludes that, while statistically significant, the increase is less than 5% and therefore not economically significant for the investor.

 Substitution of Commodities for Australian Equities in equal weight and strategically weighted portfolios

Findings: Generally speaking, substitution resulted in insignificant or negative changes in the Sharpe Ratios (the latter in the case of Agriculture). Pan concluded that Australian equities exposure already sufficiently encompasses the risk/return profile offered by direct commodities exposure and that substitution for commodities would take the investor further away from the optimal portfolio.

The exception to this was for GSCI Gold and GSCI Precious Metals for the strategically weighted portfolio approach where the Omega Ratio was used as a measure of performance. This improved around 15% at a significant (5%) level. The Omega Ratio is a risk/return measure that seeks to consider the full range of the distribution (and therefore considers skewness and kurtosis, which the Sharpe Ratio does not). Pan noted that this may be because of lower levels of gold and precious metals exposure in the Australian listed market or driven by the strong performance of these commodity sectors, and that more work needs to be completed to come to firmer findings.

• Out of sample optimisation portfolio allocation approaches:

Note that Pan simplified the benchmark portfolio to five asset classes (Australian Equities, International Equities, Global Property, International Government Bonds and Cash) for the optimisation analysis. The analysis was conducted across a range of portfolio optimisation approaches:

- Risk parity
- Global minimum variance
- Mean variance

Backward-Looking optimisation (using only past return and risk realizations as inputs):

Findings: Generally speaking, inclusion of commodities did not improve portfolio outcomes (either reduced the Sharpe ratio or displayed improvement that failed to be significant and/or was marginal in magnitude). The exception to this was Gold and Precious Metals in the strategically weighted portfolio. Certainty equivalent return metrics also supported this.

Forward looking (forecasting future volatility and correlations):

Findings: Pan's forward-looking analysis had similar findings to the backward-looking analysis, with **the** *inclusion of commodities failing to improve measures of portfolio performance* across the full range of portfolio construction approaches. This finding was not consistent with the literature. Pan notes that this may be driven by the financialisation of commodity markets over recent years or the high representation of commodities in the Australian equity market. Or, by not including tail risk in the assessment of portfolio performance.

Robustness Tests

Pan undertook a number of robustness tests, varying assumptions and limitations and considering differing time periods. This also included considering high and low volatility market conditions.

Findings: **Results were consistent under the robustness tests**. Pan noted that benefits of inclusion of Gold and Precious Metals became more pronounced in volatile market conditions but were still largely not statistically significant (the exception being the Omega Ratio for the naïve equal weight portfolio).

# A study of actively managed fund performance in differing volatility states

#### Kelvin Sun

#### **Research Questions**

Kelvin Sun's Honours in Finance project sought to answer the following questions:

- Whether managers have the skills to extract rent from the market
- Whether managers' performance vary in different volatility states
- Whether investors extract value by investing with fund managers

#### **Key Insights & Learnings**

- Sun's research concluded that some Australian equity managers demonstrated an ability to outperform over time.
- Managers performed significantly better than the market in high volatility environments (although we note that the GFC was the only high volatility period in the study).
- When the market is in a mid-level volatility state, funds with lower funds under management performed better than larger funds.
- The use of three measures of outperformance highlighted that the proportion of outperformance that accrued to managers was very high. The results led Sun to conclude that investors do not benefit from investment in managed funds.
- Notwithstanding that institutional investors typically pay far lower fees than is captured in the Morningstar expense ratio figures that were used to determine manager net alpha, the findings are interesting.
  - While there were managers that were able to generate outperformance over the full period, the research indicated that the top performing managers accrued c. 75% of these gains in fees.
  - A higher expense ratio predicted better performance for funds using the gross alpha (1.1%) and value-added methods. This was not the case for net alpha, where there was a non-statistically significant negative association with the expense ratio. This would indicate that managers that perform well charge higher fees that result in (at best) neutral outcomes for their clients.
  - The disproportionate share of returns accruing to investment managers was amplified during periods of high volatility. During the GFC, gross alpha was positive (+1.6%), but net alpha was significantly negative (-3.3%), suggesting that managers that outperformed during the GFC extracted more in fees and expenses than they added in gross outperformance.

#### What are the potential implications for JANA client portfolios?

#### • Evidence of Manager skill

Sun's research validated JANA's belief that <u>some</u> managers have an ability to outperform over the long term.

#### Fee Quantum

Skilled investment managers should be appropriately compensated for their work, but it is the investor who takes on capital risk and who should therefore accrue most of the gains of outperformance. In 2010, JANA collaborated with Frontier to establish joint fee principles to apply to setting investment management fee structures. Principle 1 from that list addressed

the quantum of fees, suggesting that investment management fees should be limited to 1/3 of expected active returns (after expenses). While there are many other considerations for structuring appropriate fees, JANA continues to consider this rule of thumb appropriate. By this measure, the aggregate manager universe captured by the Morningstar database would not warrant being held in the portfolio at the expense ratios recorded.

While institutional investors typically pay significantly lower fees than retail investors, this research highlights the importance of setting fees that result in a reasonable division of the gains from active management between investment managers and investors. Fees are certain; outperformance is not. Active managers should only be appointed where there is conviction in their ability to outperform after their fees, or where they provide exposure that cannot be readily gained without such expense.

#### • Defensiveness – the Pattern of Manager Alpha

Sun's research verified JANA's understanding of the historical pattern of manager alpha in the Australian equity market, with greater (gross) performance during the high volatility period of the GFC. The degree of difference between the gross and net performance during this period warrants further investigation. It also indicates the importance of considering the impact of the fee structure when appointing managers that are intended to provide defensiveness (i.e. the use of a performance fee structure may significantly reduce the impact of a defensive equity manager in a downturn)

#### What are the potential limitations and next steps for this research?

We should acknowledge that there are data related limitations that should be considered before drawing any strong conclusions from the research undertaken:

- As noted, the expense ratios used to calculate net alpha are typically higher than the institutional investor experience
- The duration of the analysis has been limited by data availability, and results in only one high volatility period that could be assessed.
- Data cleaning resulted in funds that did not have complete data being excluded from the analysis. As such, there is a survivorship bias in the data used.

JANA is currently working with the University of Melbourne 2020 Honours students to develop follow on research topics.

#### **Summary of Research Conducted**

Sun's research used the Morningstar database, including 195 managed equity funds over the period July 2005-June 2019. This represented 65% of the Australian equity manager universe.

Sun considered three measures of manager skill:

- Gross alpha
- Net alpha
- Value added measure, which seeks to adjust for scale by measuring the amount of value added in dollar terms rather than percentages.

Sun performed a cross-sectional regression considering the following attributes against the three measures of skill:

- Total net assets
- Duration of fund (inception)
- Expense ratio
- Asset inflow (i.e. new assets being invested in the fund)
- Asset outflow (i.e. assets being redeemed from the fund)

Of these measures, a higher expense ratio was associated with higher gross alpha and value add measures of skill but had no impact on net alpha. Unsurprisingly, the value add measure of skill was also positively associated with higher total net assets, implying that managers that have higher asset levels are able to generate a higher level of outperformance when measured in dollars rather than percentages (i.e. they may not be the top performer for the investor, but they add the most capital relative to the market).

## **Appendix – Data Sources for Angela Pan's Research**

Asset Class <sup>1</sup>	Ргоху	Time Period	Length (years)
Australian Equities	S&P ASX 200 TR AUD	14 Oct 1989 – 14 Sep 2019	30
International Equities	MSCI World Ex Australia NR USD	14 Oct 1989 – 14 Sep 2019	30
Emerging Markets	MSCI EM PR USD	14 Oct 1989 – 14 Sep 2019	30
Global Property	S&P Global Property TR USD	14 Oct 1989 – 14 Sep 2019	30
Australian Property	S&PASX 200 A-REIT TR	14 Oct 1989 – 14 Sep 2019	30
Global Infrastructure	S&P Global Infrastructure TR Hdg AUD	01 Jan 2001 – 14 Sep 2019	18
Australian Government Bonds	Bloomberg AusBond Govt 0+Y TR Bloomberg AusBond Treasury 0+Y TR	14 Oct 1989 – 04 July 1998 11 July 1998 – 14 Sep 2019	30
Australian Corporate Bonds	Bloomberg AusBond Credit 0+Y TR AUD	14 Oct 1989 – 14 Sep 2019	30
International Government Bonds	Bloomberg Barclay Global Treasury TR USD Bloomberg Barclay Global Aggregate Government TR USD	14 Oct 1989 – 30 Sep 2000 7 Oct 2000 – 14 Sep 2019	30
International Corporate Bonds	Bloomberg Barclay US Corporate Bond TR USD Bloomberg Barclay Global Aggregate Corporate TR USD	14 Oct 1989 – 27 Jan 2001 03 Feb 2001 – 14 Sep 2019	30

Asset Class <sup>1</sup>	Proxy	Time Period	Length (years)
GSCI	S&P GSCI TR USD	14 Oct 1989 – 14 Sep 2019	30
DIU	DJUBS TR USD	29 Dec 1990 – 14 Sep 2019	29
Bloomberg	Bloomberg Commodity TR USD	12 Jan 1991 – 14 Sep 2019	28
GSCI Agriculture	S&P GSCI Agricultural TR	14 Oct 1989 – 14 Sep 2019	30
GSCI Energy	S&P GSCI Energy TR	14 Oct 1989 – 14 Sep 2019	30
GSCI Gold	S&P GSCI Gold TR	14 Oct 1989 – 14 Sep 2019	30
GSCI Industrial	S&P GSCI Industrial Metal TR	14 Oct 1989 – 14 Sep 2019	30
GSCI Precious	S&P GSCI Precious Metal TR	14 Oct 1989 – 14 Sep 2019	30

Source: Morningstar, Datastream

1. Hedged according to Real-World Hedging when applicable to remove currency risk, where  $1 + R_{A,AUD} = (1 + r_{AUD})/(1 + r_{USD}) + (1 + r_S) r_{A,USD}$  where R\_A, AUD is the asset return hedged in AUD, r\_A,USD is the asset return in USD, r\_aud r\_US are the risk-free rates in the respective currency, and r\_S is the spot currency return

