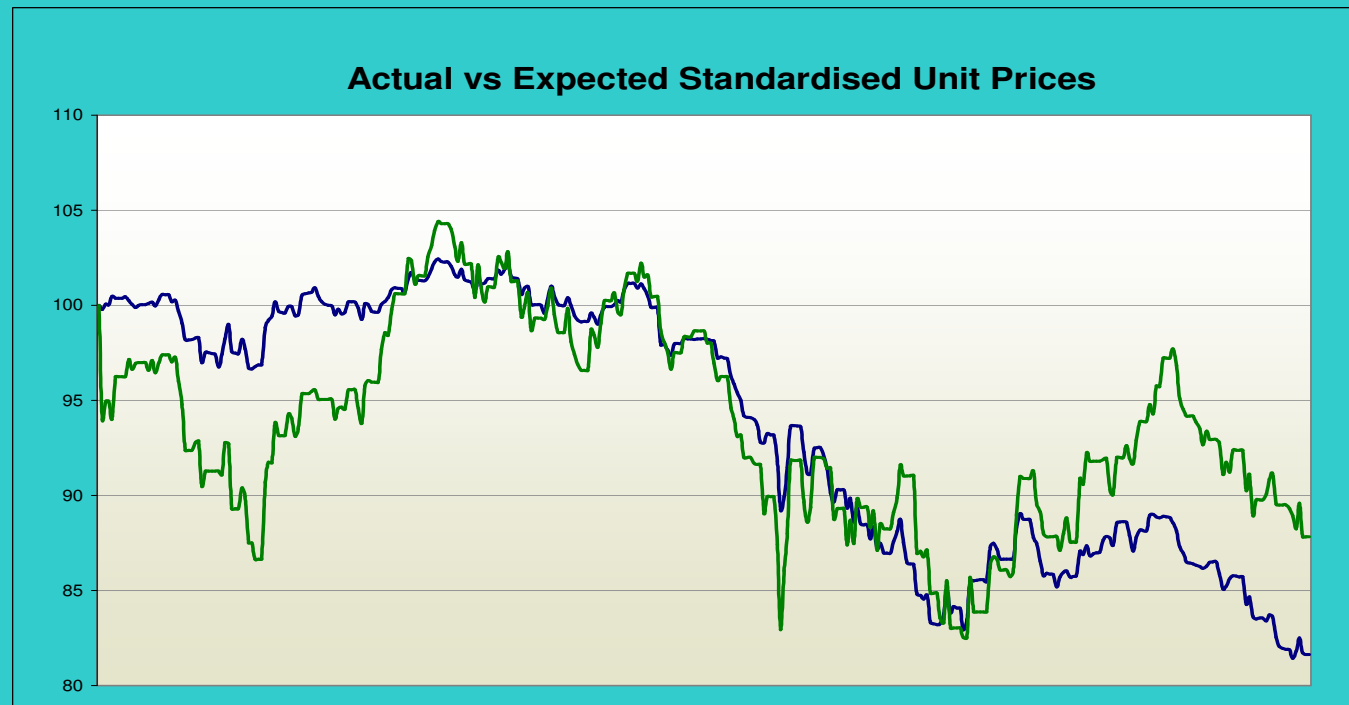


# ADUP: Analysing Daily Unit Prices.



# ADUP: Compliance and unit prices

- Unit pricing incorporates a range of functions

PROCESS	AUDIT
Asset valuation	✓ Year end
Charges	✓ Year end
Unit registry	? Implicitly
Unit Prices	? No direct checks

- Fiduciary responsibility
  - If prices too high, contributors lose
  - If prices too low beneficiaries lose
  - Errors mean unravelling previous allocations
- Best practice is daily checking of unit prices
  - Is a BaU process
  - Itself requires independent checks

# ADUP: Providing Compliance

- ADUP helps compliance and senior management to know the business better:
  - It gives the big investment picture
  - The dashboard immediately highlights anomalies in **daily pricing** and **annual performance**
- ADUP identifies:
  - Asset and style allocation, and degree of index hugging
  - Significant long term deviations from investment indices
  - Significant price changes not explained by investment indices
  - Frequency of stale prices, historic pricing and unit pricing errors
- ADUP is a completely independent review of every unit price
  - Uses published prices – from Bloomberg or website
  - Initially requires no input from administrators or investment managers
- ADUP provides a second line of defence:
  - Supplements best practice daily reviews
  - Supplements internal and external audit and other reviews of process
  - Is cost effective with limited intrusion into the daily process

# ADUP dashboard

Prices provided every day

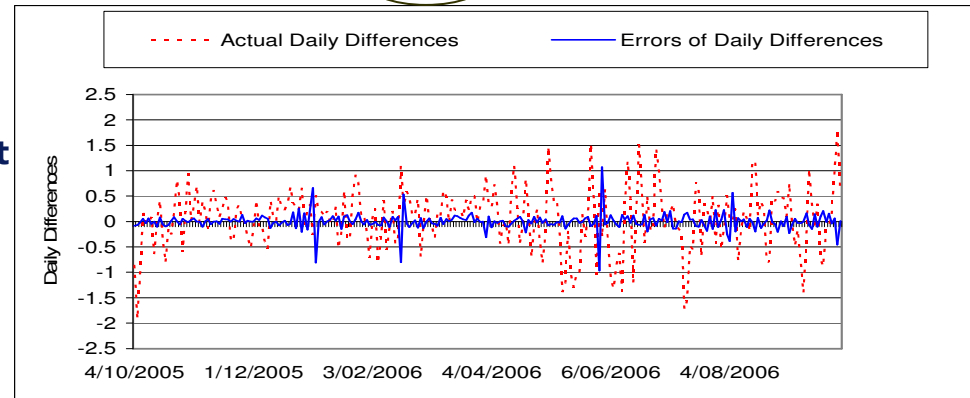
92% of price movements explained

FUND	NAME
Benchmark	Growth
Type	Growth
<b>Estimated Asset Allocation</b>	
3%	UNALLOCATED
50%	ASX 500 LAG 1
5%	Aus Small Cap
4%	ASX 200 Resources
28%	ASX 300
2%	ASX 200 Fins
2%	ASX 300 indust.
0%	Aus Growth
0%	Aus Value
0%	Europe
0%	Japan
2%	North America
0%	Asia x Japan
0%	Emerging Markets
4%	World x Aus LAG 1
0%	World x Aus LAG 2
0%	World Growth
0%	World IT x Aus
0%	World Small Cap x Aus (Pindex)
0%	Aus Bonds
0%	Aus Bills
0%	World Bonds
0%	Aus Dollar
0%	Aus Property

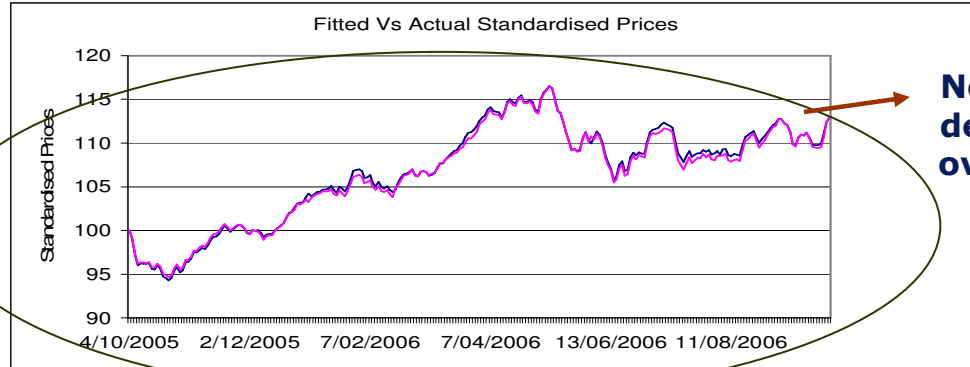
Number of Zero Changes  
Reduction of SS

0  
92%

Historical pricing of part of portfolio



Asset allocation estimated from actual prices



No major deviation over year

0.08% Annual Gross Overperformance  
(Unadjusted for fees or tax)

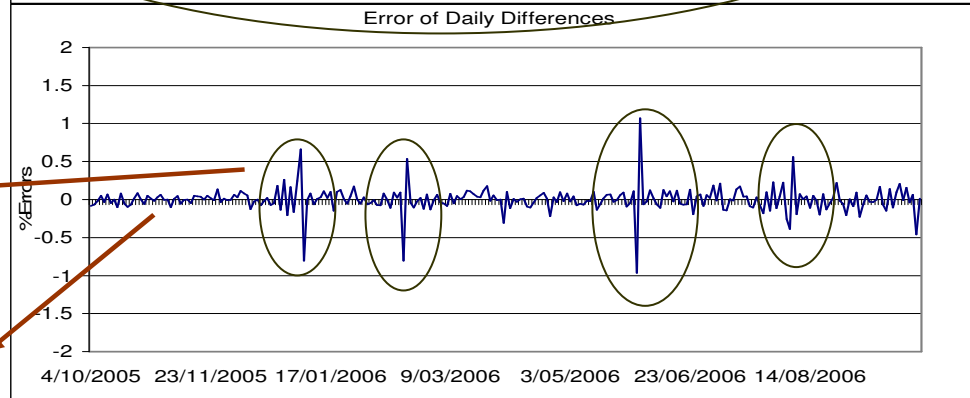
Spikes occur on:

Performs better than index after franking credits and fees

- 4/01/2006
- 20/02/2006
- 1/06/2006
- 7/08/2006

Anomalies occur

Normally fits index very closely



## Extract from ADUP report

The report summarises each of the anomalies by day, possibly identifying problems that affect more than one fund

Date	Funds affected	Size of Anomaly		Explanation
		Std dev	b points	
02/07/2007	FUND 1	15.2	396	
	FUND 2	16.2	673	
17/07/2007	FUND 3	10.7	90	
21/08/2007	FUND 3	6.4	54	
13/09/2007	FUND 4	-5.8	-160	
13/12/2007	FUND 3	9.1	883	
17/12/2007	FUND 4	9.2	255	
18/12/2007	FUND 5	10.3	423	
	FUND 6	9.4	218	
02/01/2008	FUND 1	7.7	201	
	FUND 2	4.2	174	
23/01/2008	FUND 7	8.2	595	
25/01/2008	FUND 5	-8.1	-332	
	FUND 6	-8.0	-186	
29/01/2008	FUND 8	-7.6	-550	
01/04/2008 C	FUND 5	+/-8.9	84/-98	
01/05/2008	FUND 9	10.2	269	
08/05/2008	FUND 9	-10.6	-280	

# ADUP: Outline

- Uses daily unit prices, preferably those that are publicly available on Bloomberg or Morningstar
  - Many prices are already available
  - Tests the actual prices that unitholders have available to them
- Mathematically compares the unit prices with a variety of share and bond price indices
  - Technically a constrained statistical regression
- Estimates the asset allocation for each series of unit prices
  - Can identify style and other biases
- Calculates expected prices, and graphs both actual and expected prices
  - Shows daily movements over the past year
  - Can identify anomalies of as little as 15 basis points (with some funds)
- ADUP was developed by Anthony Asher while at APRA
  - Is still being used by APRA to identify pricing anomalies and errors
  - Copyright belongs to APRA and is used under licence
  - Requires maintenance and interpretation
  - Technical paper at [http://www.acst.mq.edu.au/research/research\\_papers](http://www.acst.mq.edu.au/research/research_papers) (paper 2006/01)

# ADUP: Limitations

- ADUP cannot identify all errors:
  - Small daily errors go “under the radar”; and can be identified only if significant in the longer run
  - Tool has lower precision for funds with higher tracking errors (50 basis points perhaps)
  - One off errors can be “hidden” by random noise in the other direction
  - Reading the graphs requires judgement
- ADUP can identify anomalies that are not errors:
  - Big movements in price of shares in which the fund has a large holding, but this signifies a concentration risk
  - Tax adjustments, but these should be easy to identify as such, and comforting to know about
  - Experience shows that a high proportion of statistically significant outliers need explanation
- ADUP does not work for long/short funds and unlisted assets:
  - But it can monitor long/short funds if the portfolios are decomposed into long and short components
  - It will identify the size of periodic adjustments to unlisted prices and so identify the risks of arbitrage
- ADUP is not essential if the unit pricing team already does something similar:
  - But it has the advantage of being independent of the people, the assumptions and the systems of the pricing process
  - And it is not expensive in time or money

# Pricing and terms

We suggest - normally - a three step process

- 1 Deloitte prepares ADUP workbook and report – using its standard indices
- 2 Deloitte presents workbook and report to unit pricing team
- 3 Report for senior management prepared by unit pricing team, with endorsement or comment by Deloitte on specific issues

Further meetings and work on specific issues will be charged at Deloitte's normal rates.

<b>PRICING for steps 1 and 2</b>	<b>Annual charge</b>	<b>For each additional run within year</b>
Up to 20 price series	\$14,000	\$7,000
Add for each additional series over 20	\$20	\$20
Further charges will be required to extract prices from websites and for additional meetings or investigations		

# Our services

Deloitte provides a wide range of services addressing unit pricing issues:

- **Policy development/review** – unit pricing policies, discretions policies, error correction policies
- **Reviews of policies/practices vs standards** – benchmarking against ASIC/APRA Guide to Good Practice, recently revised IFSA standards
- **Reviews of policies/practices vs disclosure documents** – ensuring compliance with Product Disclosure Statements, constitutions, life policy documents, testing of performance fee calculations
- **Process reviews** – assessing controls and identifying improvements and efficiencies
- **Transition services** – moving from crediting rate approach, pre/post implementation reviews of new systems, vendor selection
- **Enforceable undertakings** – acting as independent compliance expert, assisting with remedial action programs
- **Error compensation calculation/review** – quantification of errors, assurance on compensation payments
- **Advice on complex technical issues** - tax treatment of corporate actions, valuation of unlisted assets, valuation of deferred tax assets



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