Listed Infrastructure Funds –
An Empirical Review

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Agenda

- Motivation
- Sample
- Corporate Finance
- Fee Structure
- Risk-Return
- Summary

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Motivation

- Infrastructure financing gap
- Infrastructure investments offer long-term and constant returns, low correlation to markets
- Listed infrastructure funds
  - Liquid investment opportunity in illiquid and capital intensive assets
  - New and innovative way to raise private capital
- **But recently:**
  - Three funds delisted in the last two years
  - Critique against (Davis, 2008; Lawrence/Stapledon, 2008): :
    - Corporate governance, stapled structure
    - Debt ratio, dividends exceeding cash flows

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Data Sample: 1996 - 2009

IIV - Infrastructure Investment Vehicles (47)

- **IIC - Infrastructure Investment Companies (7)**
- **IIF - Infrastructure Investment Funds (39)**

LPE - Listed Private Equity Vehicles (239)

- **Investment Companies (119)**
- **Investment Funds (120)**

- Infrastructure Investment Vehicles = managed vehicles that claim to invest in infrastructure

Following Kaserer / Lahr / Herschke (2009):
- Investment Companies = internally managed vehicles
- Investment Funds = externally managed vehicles

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Complex Fund Structures

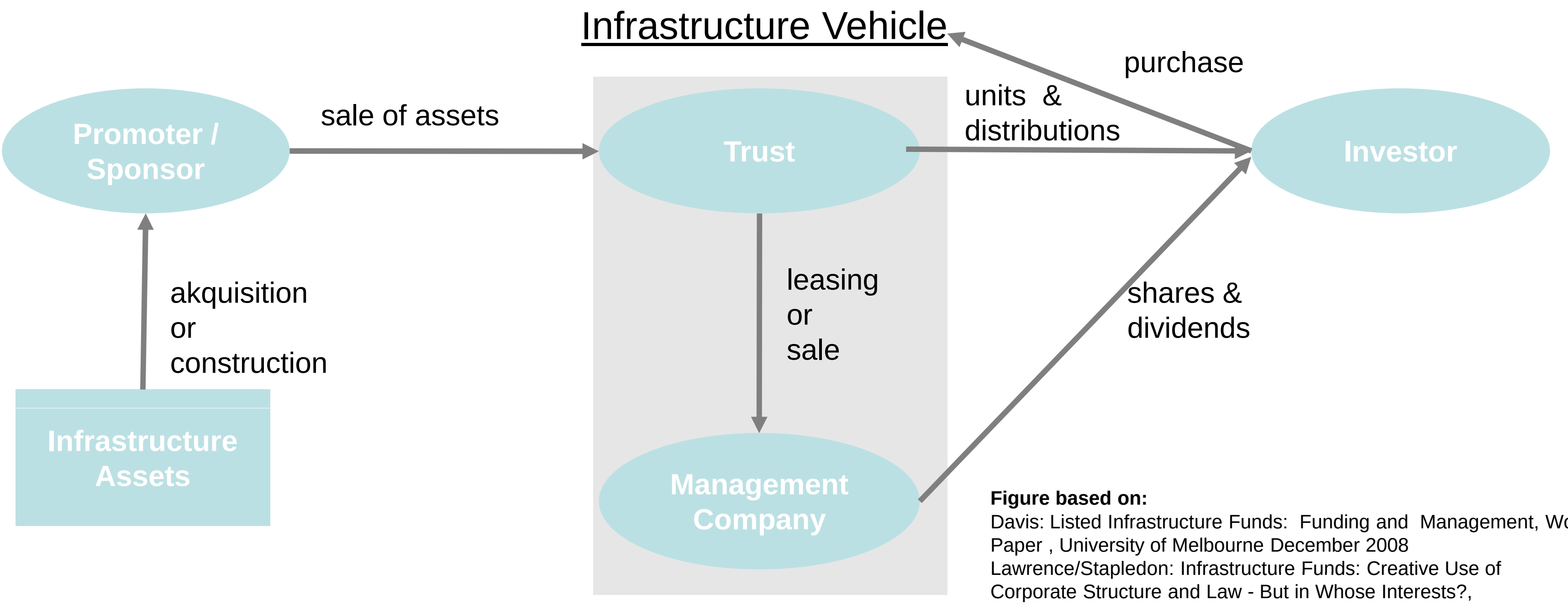

Figure based on:
Davis: Listed Infrastructure Funds: Funding and Management, Working Paper , University of Melbourne December 2008
Lawrence/Stapledon: Infrastructure Funds: Creative Use of Corporate Structure and Law - But in Whose Interests?, Working Paper, University of Melbourne February 2008

- Most common fund structures are stapled securities (AUS) and income funds (CA)
- Tax efficiency based on leasing and debt structures
- Alternative organizational combinations are used
- Equivalent principle for canadian income trusts
- Replacement of management of vehicles is complicated and expensive

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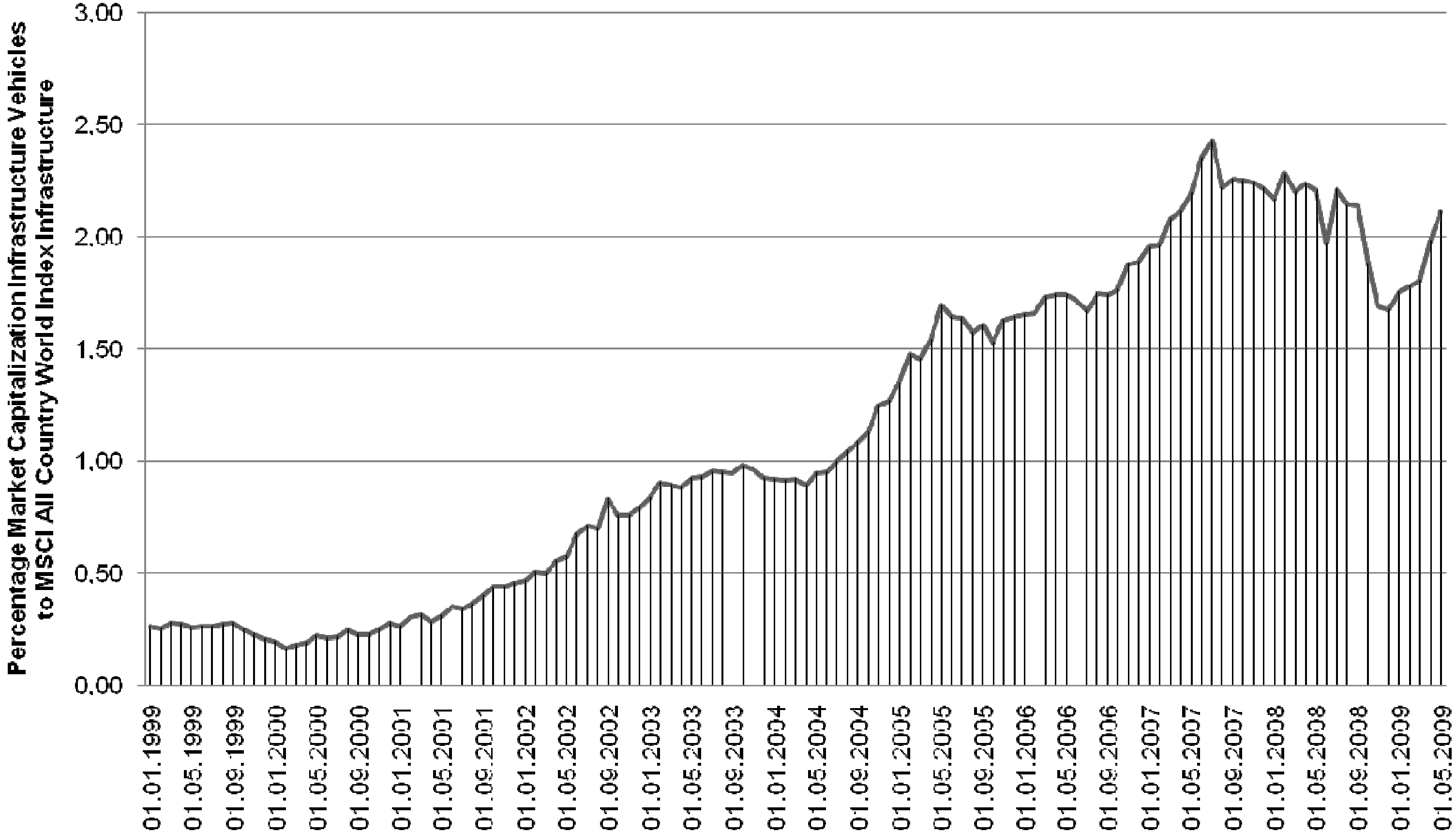
Relative Importance Has Grown Over Time



- Importance of IIVs relative to infrastructure stocks has increased from 0.30% up to 2.00% within 10 years

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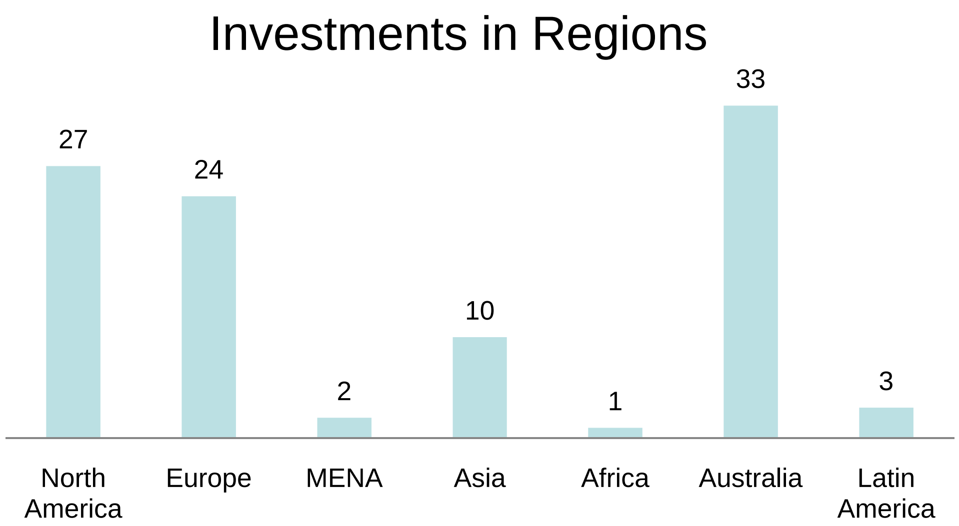
Australia as Leading Market



- Most vehicles are listed in Australia
- Australia mostly preferred for investments
- Almost no investments in emerging markets

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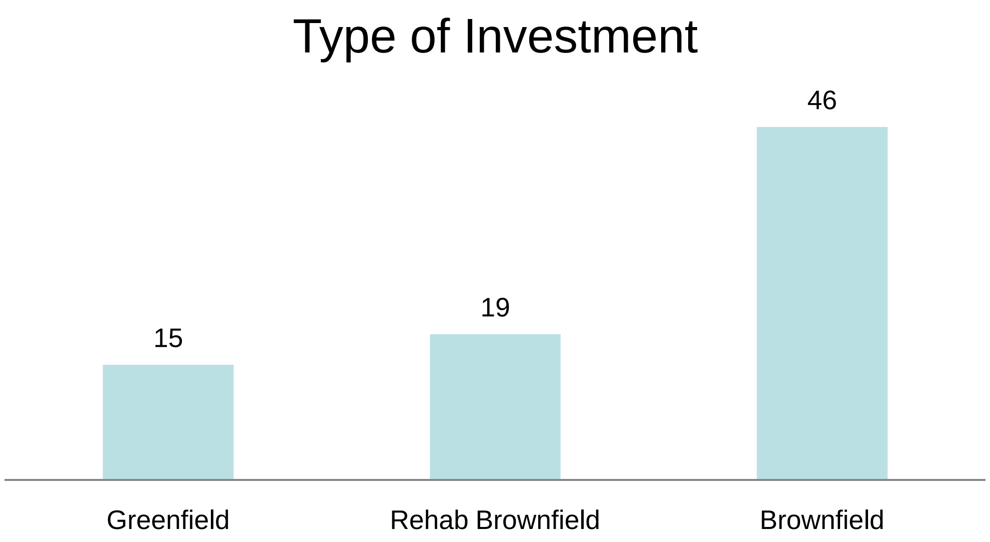
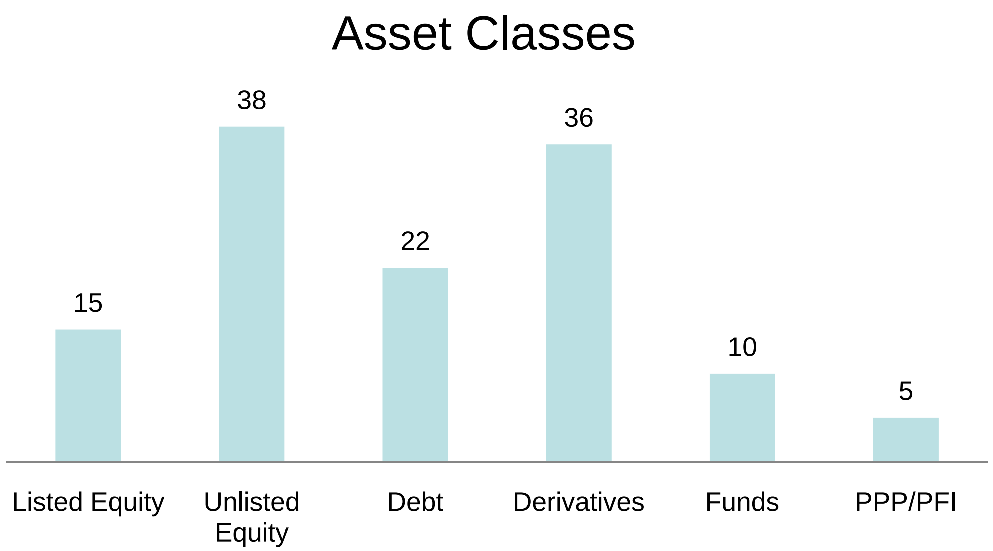
Conservative and Diversified Investment Strategy



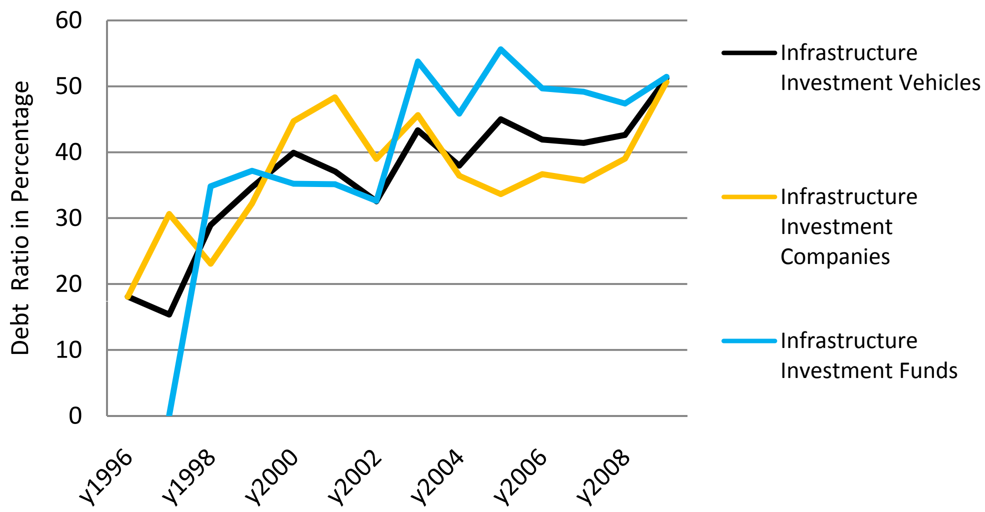


- Brownfield investment is preferred and used by every vehicle
- No vehicle invests in Greenfield exclusively
- Highe diversification through investments in different asset classes
- Derivatives are mostly used for hedging purposes
- Only five funds are engaged in PPPs/PFIs

Debt Ratios Differ Across Time and Subsamples

Debt Ratio (Total Debt to Total Assets)

	Mean	Median	Standard Deviation
Infrastructure Investment Vehicles	36.45%	38.95%	10.01%
Infrastructure Investment Company	36.70%	36.55%	9.19%
Infrastructure Investment Fund	40.61%	45.84%	14.58%



- Increasing debt ratios over time
- IIFs have higher debt ratio on average than IICs
- Distribution for IIFs is right–skewed with a high standard deviation

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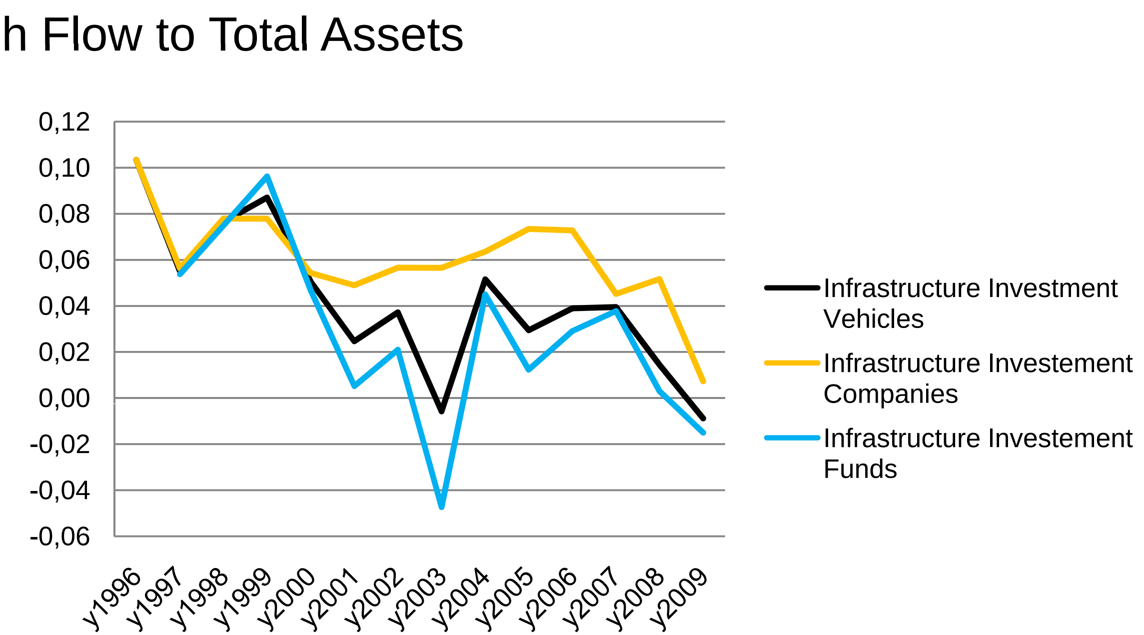
Cash Flow Ratios Differ Across Time and Subsamples

	Mean	Median	Standard Deviation
Infrastructure Investment Vehicles	4.24%	3.92%	3.2%
Infrastructure Investment Company	6.40%	5.66%	2.17%
Infrastructure Investment Fund	2.79%	2.91%	3.78%



- Decreasing cash flow ratios over time
- IICs have higher cash flow ratios on average than IIFs
- Distribution for IICs is left–skewed with a low standard deviation

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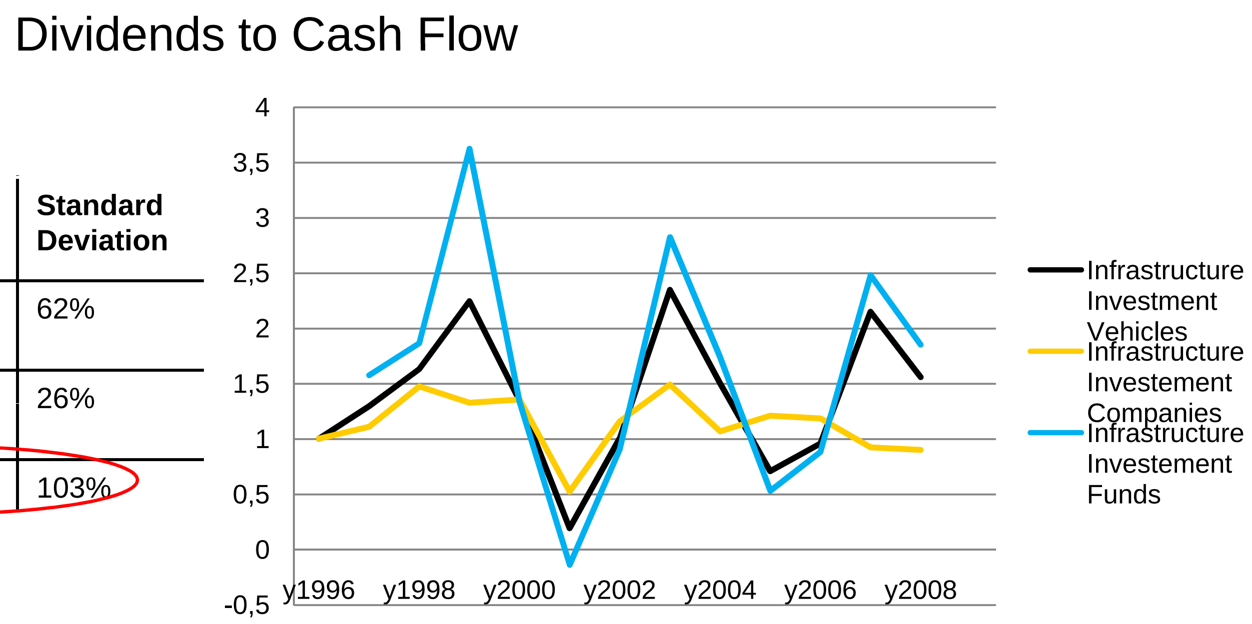
Dividends Exceed Cash Flows Mostly

	Mean	Median	Standard Deviation
Infrastructure Investment Vehicles	138%	134%	62%
Infrastructure Investment Company	113%	116%	26%
Infrastructure Investment Fund	162%	166%	103%



- Dividends of IIFs exceed cash flows more than dividends of IICs
- IIFs face a high standard deviation in their ratio
- IIFs have a right-skewed distribution of dividend ratios

Differing Fee Structure Across Samples

- Common critique: “cash cow for fund sponsors”
- Principal-agent relationship between fund manager and investor (Ross, 1973)
- Potential for misalignment of interests between manager and shareholder by fee structure:
  - High incentive fees and hurdle rates can lead to excessive risk taken by manager
  - Also: alignment of interests and increasing returns through participation in profit by manager (e.g. shown for hedge funds by Ackerman et al., 1999)

	Management Fee			Performance Fee		
	Mean	**Median**	**Most common basis**	**Mean**	**Median**	**Most common Hurdle Rate / Benchmark**
Infrastructure Funds	1.28%	1.23%	Net Investment Value	16.26%	20%	Excess Return over ASX200
LPE funds	1.69%	1.75%	Net Asset Value	11.80%	12.25%	Hurdle Rate for NAV Performance
Hedge Funds	1.25%	1%	Net Asset Value	13.87%	20%	Hurdle Rate for NAV Performance

Infrastructure Investment Funds
- show the highest percentage performance fees
- show a higher percentage management fee than hedge funds
- mostly have Net Investment Value as basis for management fee
  (Net Investment Value= aggregate market cap plus debt minus cash equivalents)

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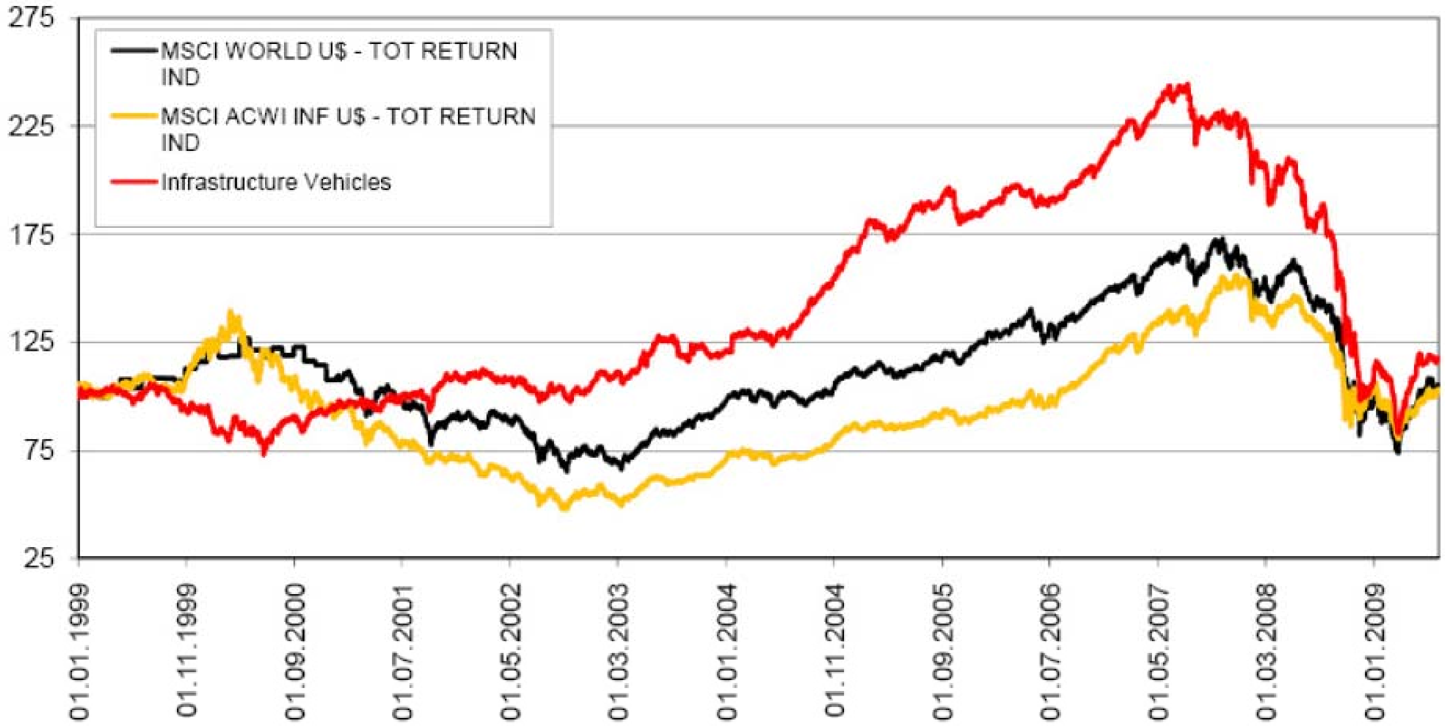
Differing Risk and Return on Index Level



01.01.1999 – 30.06.2009, based on annualized ln daily returns

- Equally weighted index of IIVs shows an absolute return superior to global stocks as well as global infrastructure stocks between 01.01.1999 and 30.06.2009 (118% vs. 105% vs. 102% cumulative return)

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Differing Risk and Return on Entity Level

1999 - 2009	Mean Return p.a.	Mean Volatility p.a.	Mean Sharpe Ratio
Infrastructure Vehicles	-.1078	.4383	-.1892
- Funds	-.1476	.4532	-.2591
- Investment Companies	.0762	.3695	.1341
Private Equity Vehicles	-.1809	.5466	-.3857
- Funds	-.1430	.3891	-.4687
- Investment Companies	-.2192	.7054	-.3020

01.01.1999 – 30.06.2009, based on annualized ln daily returns

- IIVs outperform LPEs in terms of risk and return
- IIFs underperform IICs in terms of risk and return
- The opposite holds for LPEs
- IICs is the subsample with highest return, lowest risk and the only positive sharpe ratio

Statistically Significant Differences in Volatility on Entity Level

Time Period	mean	SD	N	mean	SD	N	p-Value for Diff=0	p-Value for Diff>0	p-Value for Diff<0
Panel A: LPE versus Infrastructure Investment Vehicles									
Total	0.5466	0.3901	239	0.4382	0.2073	45	0.01	0.00	1.00
1	0.5540	0.4090	158	0.3489	0.2214	10	0.02	0.01	0.99
2	0.4163	0.3707	214	0.2074	0.1266	36	0.00	0.00	1.00
3	0.6004	0.4747	213	0.5067	0.2245	45	0.05	0.02	0.98
Panel B: Infrastructure Investment Funds versus Infrastructure Investment Companies									
Total	0.4531	0.2186	37	0.3697	0.1330	8	0.18	0.09	0.91
1	0.4134	0.2721	6	0.2521	0.5376	4	0.21	0.11	0.89
2	0.1973	0.1325	28	0.2430	0.10.28	8	0.22	0.84	0.16
3	0.5216	0.2403	37	0.4378	0.1147	8	0.15	0.08	0.92
Panel C: LPE Investment Funds versus LPE Investment Companies									
Total	0.3891	0.3161	120	0.7054	0.2943	119	0.00	1.00	0.00
1	0.3659	0.4120	72	0.7115	0.2338	86	0.00	1.00	0.00
2	0.2392	0.2350	106	0.5901	0.2927	108	0.00	1.00	0.00
3	0.4502	0.3664	111	0.7638	0.5244	102	0.00	1.00	0.00

Total: 01.01.1999 – 30.06.2009
T=1: 01.01.1999 – 31.12.2002
T=2: 01.01.2003 – 31.12.2006
T=3: 01.01.2007 – 30.06.2009

based on annualized
In daily returns

- Volatility of IIVs is lower than volatility of LPEs
- No difference in volatility between IICs and IIFs
- But: LPE investment companies riskier than LPE investment funds

- No consistent and statistically significant differences for returns and sharpe ratios
- All results hold for total time period (1999-2009) as well as all sub-periods 1-3

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Summary

Market

- IIVs prefer conservative and diversified investments
- Australia is most important market in terms of investments and fund listings

Capital Structure

- IIVs bear high debt
- Dividends exceed cash flows (although cash flows seem stable and positive)
- IIFs pay higher dividens and face smaller cash flows than IICs

Fee Structure

- IIFs show an especially high performance fee (Net Investment Value as basis for management fee could lead to excessive debt)

Risk and Return

- IIVs were less risky than LPEs

Also:

- No clear over- / underperformance of IIF vs. IIC
- IIV yielded higher returns than LPEs (not significant)

→ <u>no final conclusions about critiques against IIVs justified</u>

Outlook / Further Research Questions

- LPEs or REITs as reference group?

- How homogenous are these results within the infrastructure investment universe?
  - Country specific?
  - Sector specific?

- What determines the payout behavior?
  - Cashflow structure

- What is driving the volatility?
  - Existence of statistical differences
  - Simply a size effect?
  - Induced by leverage? **But:** infrastructure showed higher debt ratios and less volatility than LPE
  - Induced by level of management or performance fee?

- Is investment value as fee basis an incentive to increase debt ratio?