



Invesco Alternatives Solutions Platform

Approach to modelling private assets

This presentation is exclusively for use by Professional Clients and Financial Advisers in Continental Europe (as defined in the important information), Qualified Investors in Switzerland, Professional Clients in Dubai, Ireland, Isle of Man, Jersey, Guernsey and the UK. This document is not for consumer use, please do not redistribute.

Introduction

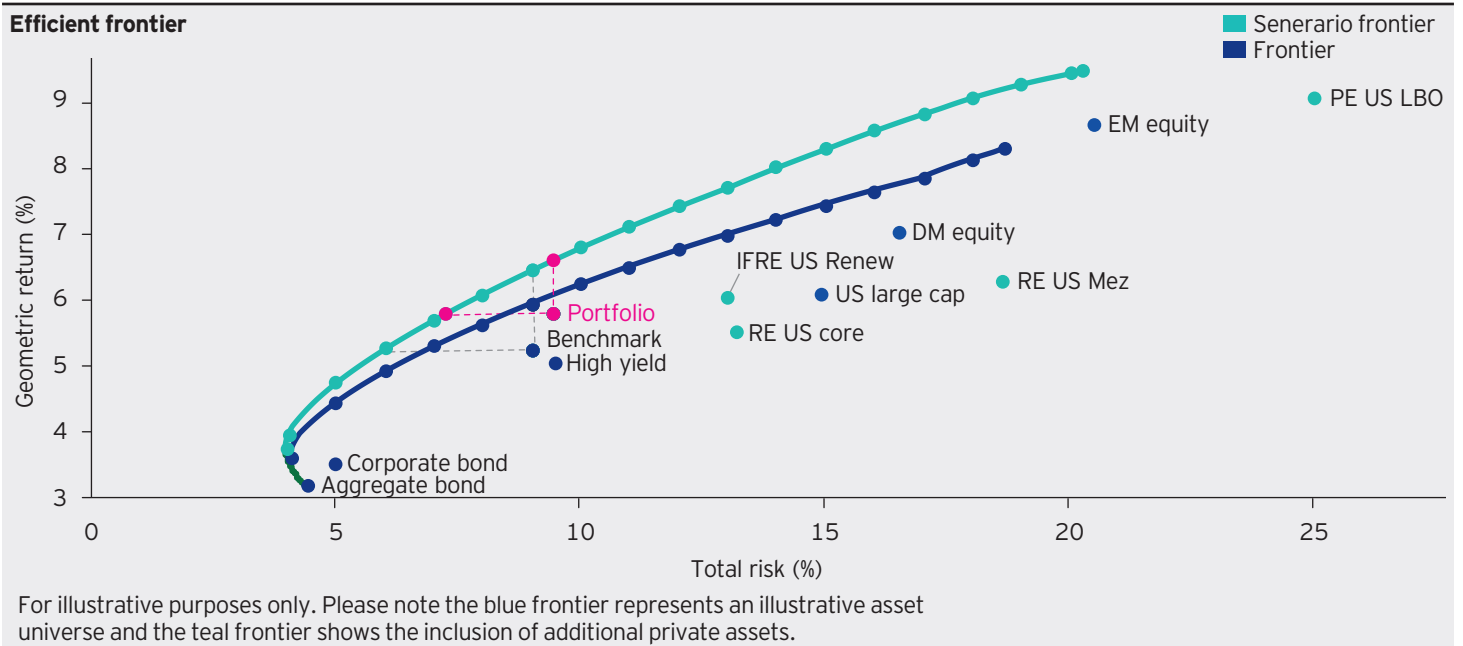
Invesco Investment Solutions develop Capital Market Assumptions for over 150 traditional asset classes globally, however, in addition to this the team are now able produce quarterly risk and return estimates across a variety of alternative investment strategies.

In this document we aim to showcase our ability to model private assets within our portfolio analysis tool, Vision, as well as introducing the methodology behind it.

Invesco Vision

Invesco Vision is a proprietary web-based portfolio management decision making platform that allows investors to make better informed investment decisions while helping to answer topical questions such as:

- How can alternatives improve my efficient frontier?
- How can I achieve more diversified factor exposures?
- How can I practically implement alternatives?



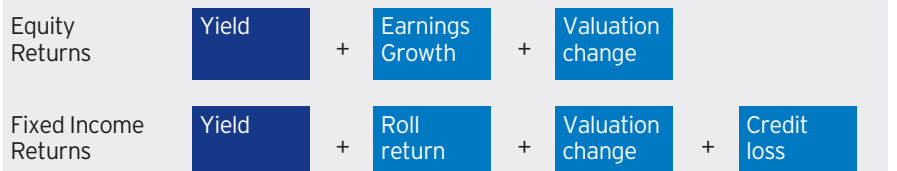
Capital Market Assumptions (CMA) methodology

Before addressing alternatives, we find it helpful to provide background on our approach to traditional markets. Invesco Investment Solutions develops CMAs that provide long-term estimates for the behaviour of over 150 traditional asset classes globally.

The assumptions, which are based on a 10-year investment time horizon, are intended to guide strategic asset allocations. For each selected asset class, we develop assumptions for expected return, standard deviation of return (volatility) and correlation with other asset classes.

Building block approach to public market returns

Identifying drivers of income and capital appreciation



For illustrative purposes only.

Approach to modelling private assets

Invesco Investment Solutions produce quarterly risk and return estimates across a variety of alternative investment strategies.

Our objective is to capture the expected behaviour of each strategy as represented by a broad proxy rather than a particular manager or fund.

Granular data within private markets is difficult, and often impossible, to find. As such, we use objective, observable data from public proxies wherever possible as an input into our process; where data is not available, our alternatives specialists set forward-looking assumptions informed by their own experience.

Private asset methodology

Overall objective

Systematic	Based on objective observable data where available
Representative	Ensuring a reasonable proxy for a given asset class broadly
Practical	Simple methodology given the inherent imprecision/uncertainty for alternatives

Return assumptions vary by category

Private Equity strategies

In the case of equity strategies, we use a building-block approach for US leveraged buyouts that captures earnings growth, valuation multiple expansion / contraction, fund leverage (and cost of financing), and fees to derive expected net returns. For other equity strategies such as venture capital, we compare historical returns to buyouts and then apply that difference to our forward-looking estimate for buyout returns on the assumption that return differences in the future will be consistent with the past.

CMA building block approach

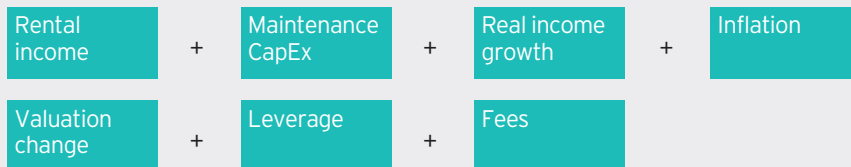


For illustrative purposes only.

Real Assets

For select real assets, namely Core US Real Estate and Core US Infrastructure, we utilise a building-block approach capturing rental income, maintenance CapEx, expected real income growth, expected inflation, expected valuation changes, leverage (and cost of financing), and fees to derive expected net returns. For other real assets, we utilise historical returns from NCREIF and Burgiss.

CMA building block approach



For illustrative purposes only.

Private Credit

For most private credit proxies, we start with gross yields on underlying debt holdings and adjust for expected losses (based on historical averages), fund leverage (and cost of financing), and fees to derive expected net returns. For a few private credit proxies, such as distressed debt, we utilise historical relationships to derive forward-looking assumptions as described above.

CMA building block approach



For illustrative purposes only.

Approach to risk

A key principle of our risk methodology is to represent alternatives as a combination of both private and public exposures. This captures a distinct private element that is not correlated with traditional assets, while at the same time recognising the underlying exposures themselves are often more public or traditional in nature.

Taking private credit as an example, our methodology assumes exposure to a private debt factor as well as a public credit spread factor. The result is a private credit correlation with traditional assets that is greater than 0, but less than what would be suggested by public credit spread exposure alone.

Because our Vision modeling platform extensively leverages the Barra framework, absolute risk for a number of alternative strategies is a byproduct of the Barra factor exposures.

For alternative strategies not explicitly captured by Barra, we assume overall risk is consistent with history, with factors being mapped to the private and public factors that our alternatives specialists believe best represent the strategy.

Conclusion

Invesco Investment Solutions are able to produce quarterly risk and return estimates across a variety of alternative investment strategies.

From robust research and analysis to bespoke investment solutions, this team brings insight and innovation to your portfolio construction process by:

- Delivering insightful and thorough analytics
- By putting analytics into practice by developing investment approaches specific to your needs.
- Working as an extension of your team to engage across functions and implement solutions.

Private asset 10- year return & risk assumptions (US exposures)

Strategy	Estimated Return p.a. (USD, geometric)	Economic Risk p.a. (USD, terms, unhedged)
Private Equity US Large Buyout	12.3%	24.7%
Private Equity Middle Market	13.3%	26.8%
Private Equity US Late Ventures VenturesPrivate Equity Middle	13.3%	31.3%
Private Equity US Early Ventures	14.3%	33.7%
Private Equity US Growth	11.3%	22.6%
Private Equity US CLO	13.8%	29.8%
Private Equity HF / PE Seeding	12.6%	25.2%
Private Equity Impact Investing	12.3%	25.1%
Real Estate Core	8.0%	13.2%
Real Estate Value-Add	10.0%	16.5%
Real Estate Opportunistic	13.0%	20.6%
Infrastructure Core	8.9%	12.4%
Infrastructure Core Plus	9.9%	14.2%
Natural Resources Agriculture	8.0%	11.2%
Natural Resources Energy	8.5%	17.7%
Natural Resources Timber	5.5%	12.3%
Private credit Senior Corporate	7.5%	5.3%
Private credit Senior Real Estate	6.6%	4.8%
Private credit Mezz Corp (middle market)	9.9%	6.9%
Private credit Mezz Real Estate	9.6%	6.2%
Private credit Distressed	11.4%	14.6%
Private credit Special Situations	11.4%	14.6%
Private credit Infrastructure HY	6.3%	6.0%
Other credit Aircraft Leasing	6.9%	6.7%
Other credit Insurance Linked	6.9%	4.5%
Other credit Venture Lending	6.9%	6.7%
Hedge Fund US HFRI Event-Driven	5.2%	4.3%
Hedge Fund US HFRI Macro	2.8%	5.5%
Hedge Fund US HFRI Equity Hedge	6.1%	7.9%
Hedge Fund US HFRI Equity Market Neutral	2.4%	2.5%

Source: Invesco. Data as at 31 December 2019 and in USD (unhedged). This information is not intended as a recommendation to invest in a specific asset class or strategy, or as a guarantee of future performance.

Investment Risks

The value of investments and any income will fluctuate (this may partly be the result of exchange rate fluctuations) and investors may not get back the full amount invested.

Important information

This presentation is exclusively for use by Professional Clients and Financial Advisers in Continental Europe (as defined below), Qualified Investors in Switzerland, Professional Clients in Dubai, Ireland, Isle of Man, Jersey, Guernsey and the UK. This document is not for consumer use, please do not redistribute.

For the distribution of this document, Continental Europe is defined as Austria, Belgium, Finland, France, Germany, Italy, Luxembourg, Netherlands, Norway, Spain and Sweden.

Forecasts are not reliable indicators of future performance. This does not constitute a recommendation of any investment strategy or product for a particular investor. Investors should consult a financial professional before making any investment decisions.

This overview contains general information only and does not take into account individual objectives, taxation position or financial needs. Nor does this constitute a recommendation of the suitability of any investment strategy or product for a particular investor. Investors should consult a financial professional before making any investment decisions.

It is not an offer to buy or sell or a solicitation of an offer to buy or sell any security or instrument or to participate in any trading strategy to any person in any jurisdiction in which such an offer or solicitation is not authorized or to any person to whom it would be unlawful to market such an offer or solicitation.

Where individuals or the business have expressed opinions and forecasts, they are based on current market conditions, they may differ from those of other investment professionals and are subject to change without notice. As with all investments, there are associated inherent risks. Please obtain and review all financial material carefully before investing.

Asset management services are provided by Invesco in accordance with appropriate local legislation and regulations. This material may contain statements that are not purely historical in nature but are "forward-looking statements." These include, among other things, projections, forecasts, estimates of income, yield or return or future performance targets.

These forward-looking statements are based upon certain assumptions, some of which are described herein. Actual events are difficult to predict and may substantially differ from those assumed. All forward looking statements included herein are based on information available on the date hereof and Invesco assumes no duty to update any forward-looking statement. Accordingly, there can be no assurance that estimated returns or projections can be realized, that forward-looking statements will materialize or that actual returns or results will not be materially lower than those presented.

By accepting this document, you consent to communicate with us in English, unless you inform us otherwise.

All information is sourced from Invesco, unless otherwise stated. All data as of 31 December 2019 in USD.

Further information

Further information on our products is available using the contact details shown.

Issued in Austria by Invesco Asset Management Österreich - Zweigniederlassung der Invesco Asset Management Deutschland GmbH, Rotenturmstrasse 16-18, 1010 Wien, Austria. Issued in Belgium, Finland, France, Italy, Luxembourg, Netherlands, Norway, Spain and Sweden by Invesco Asset Management S.A., 16-18 rue de Londres, 75009 Paris, France. Issued in Dubai by Invesco Asset Management Limited PO Box 506599, DIFC Precinct Building No 4, Level 3, Office 305, Dubai, United Arab Emirates. Regulated by the Dubai Financial Services Authority. Issued in Germany by Invesco Asset Management Deutschland GmbH An der Welle 5, 60322 Frankfurt am Main, Germany. Issued in Ireland by Invesco Asset Management Limited, Perpetual Park, Perpetual Park Drive, Henley-on-Thames, Oxfordshire RG9 1HH, UK. Authorised and regulated by the Financial Conduct Authority. Issued in the Isle of Man by Invesco Management S.A. 37A Avenue JF Kennedy, L-1855 Luxembourg. Issued in Jersey and Guernsey by Invesco International Limited 2nd Floor, Orviss House, 17a Queen Street, St Helier, Jersey, JE2 4WD. Regulated by the Jersey Financial Services Commission. Issued in Switzerland by Invesco Asset Management (Schweiz) AG, Talacker 34, 8001 Zurich, Switzerland. Issued in the UK by Invesco Asset Management Limited Perpetual Park, Perpetual Park Drive, Henley-on-Thames, Oxfordshire RG9 1HH, UK. Authorised and regulated by the Financial Conduct Authority.