

Rules for the PREA | IPD U.S. Property Fund Index

This document summarizes the rules that define the PREA | IPD U.S. Property Fund Index (USPFI), covering key issues including governance of the index, fund eligibility, calculation methodology, the index series, and publication schedule.

The USPFI covers open-ended commingled funds with a U.S. private equity real estate investment mandate. The index is produced on a quarterly basis and is value-weighted based on the weighted average equity used for the fund-level time weighted return denominator of its constituent funds. The index will be rebalanced quarterly by adjusting the weights of the constituent funds based on the periodic weighted average equity figures. The index provides a complete picture of fund performance, connecting gross fund level returns with fund level activities (e.g., impact of leverage, cash and other non-direct real estate investments) and the performance of direct unleveraged real estate, enabling robust and detailed attribution of performance.

The index enables the creation of suitable benchmarks for the performance measurement of U.S. direct property funds. It is designed to bring greater transparency and support the growth of the direct U.S. commercial real estate investment market.

Eligibility – Fund composition

1. The USPFI comprises funds that adhere to specific criteria relating to their investment mandate and their structure. The eligibility of individual funds is based on their current structure and investment portfolio but where funds are in the early stage of their investment period eligibility is based on the intended strategy as set out in fund documentation.
2. Only professionally managed commingled property funds providing access to direct property returns, where the fund meets the following criteria are eligible for inclusion in the index.
 - At the time of inclusion in the index each fund must have a GAV greater than US\$150m or that of the 9th decile of the current index sample, whichever is smaller.
 - At least at least 95% of the fund's GAV is invested in assets within the US,
 - At least 85% of the fund's GAV is invested in real estate, and
 - At least 70% of the fund's GAV is invested in private equity real estate assets, including joint ventures, but excluding investments in other property funds, mortgages, mezzanine debt investments, unfunded forward commitments, and investments in operating companies

Funds that invest primarily in public real estate securities, funds of property funds, and property derivative funds are not eligible or suitable for inclusion in the index though eligible funds may hold public real estate equities, cash, derivatives and indirect property.

3. Only funds marketed as open or semi open-ended structures, and marketed to institutional investors, will be eligible for inclusion in the index. Where a fund closes to new contributions or redemptions for a sustained period of time the fund's inclusion in the index will be reviewed.
 - Semi open-ended funds are classified as those where investors may be subject to an initial "lock up" period during which investors are not permitted to redeem their investment, or a "soft lock up" period during which investors can redeem early by paying a penalty.
 - Semi open-ended may also refer to funds that restrict contributions or redemptions by investors over defined time periods.
4. Only funds where the General Partner/Manager or equivalent for the fund has a discretionary mandate to manage its investments will be included in the index.
5. Constituent funds of the index should be incorporated using a recognized legal structure.

Inclusion of Eligible Funds –data requirements

6. Funds will be included in the index only if they are part of IPD's Portfolio Analysis Service, and satisfy all the requirements of participating in that services¹.
7. Funds are required to report their GAV and NAV at least quarterly and have done so for the whole of the period of their performance history within the index.
8. Each fund's GAV and NAV should be based on the quarterly revaluation of 100% of the assets and liabilities.
9. Constituents of the index must agree to calculate their GAV and NAV data on a consistent basis from quarter to quarter. The method of calculation should be either that specified in the fund's articles of incorporation or a recognized methodology as determined by international or local accounting standards. Constituent funds must agree to disclose the basis of GAV and NAV computation to IPD.
10. Constituent funds of the index must provide IPD independent confirmation of the fund's GAV and NAV. This validation can take the form of an external auditor's statement of GAV and NAV or statements of value from an independent external appraiser.
11. Constituents of the index must provide all required information for IPD to produce the index according to the data delivery timetable and format as specified by IPD.
12. Funds joining the index are required to provide data sufficiently complete to compile as long a history as possible of their investment performance, subject to a minimum of either 5 years or the period from the date of launch of the fund whichever is shorter.
13. Prior to formal inclusion in the calculation of the index, funds are required to prove their ability to comply with the rules of the index by delivering data to IPD according to the Rules.

¹ Funds that qualify for the index and choose not to participate in IPD's Portfolio Analysis Service and thus choose not to be included in the index must receive a license from IPD to use the index as a formal or informal benchmark.

Inclusion of new funds into the index will not occur until data delivery standards are satisfied.

14. Participating funds must agree to allow the fund's name, date of inclusion in the index, and date of exclusion from the index to be included in all index releases and associated materials.

The Index Series

15. The standard index publication will consist of two series; a U.S All Property Funds Index, and a U.S. Core Property Funds Index as defined below:
 - The U.S All Property Funds Index includes funds whose strategies, for new funds, and portfolios for established funds meet the criteria for inclusion as defined in the Criteria of Inclusion section above
 - The U.S. Core Property Fund Index includes funds whose strategies, for new funds, and portfolios for established funds meet the criteria for inclusion as defined in the Criteria of Inclusion section above, plus the additional criteria defined in Appendix (2), "Criteria of Core Open-End Commingled Funds"

Index Release

There will be two tiers of information released to the general public and PREA members. All index and data releases are for informational purposes only and will be accompanied an appropriate disclaimer as regards general solicitation.

16. Index Release to the general public

- Net and gross fund level performance of the index
- Average leverage of the index
- National performance of unleveraged direct real estate
 - All real estate

17. Index Release to PREA members

- Net and gross fund level performance of the index
 - Contribution to total return from fund structure, and weight (% GAV/GMV) of each component
 - Leverage
 - Cash
 - Other Investments
 - Other fund level activities
- Performance and contribution from direct real estate (Total, Income, Appreciation)
 - All real estate
 - By property type
 - By Census Region
 - By MSA
 - By MSA and property type
 - By stabilized and un-stabilized

Governance and Quality control

18. The index is owned, compiled, and calculated by IPD; the index is co-published with the Pension Real Estate Association
19. The index will be subject to the governance and oversight of two key groups. First, the PREA | IPD US Index Advisory Board (USIAB) that will govern all U.S. IPD fund indices in an advisory capacity and, second, IPD's Business Assurance Unit which governs IPD's outputs from a business perspective.
20. The USIAB will provide governance including the review of the rules governing the index and issues arising from interpretation of the rules.
21. Any proposed change in the information presented in the index will be subject to discussion by the USIAB before it is affected. In order to prevent their recurrence, any errors in the published index will be reviewed by the USIAB at its next meeting.
22. Any changes to index methodology will be agreed by the USIAB and constituent funds will be notified at least three months in advance
23. The index will be subject to the scrutiny of IPD's Business Assurance Unit. The director of that Unit will report periodically on its findings to the USIAB.
24. IPD retains all Intellectual Property Rights (IPRs) in the index methodologies and the index including those variations and derivative methodologies of IPD's standard methodologies as well as those methodologies that may be generated during the course of the Agreement.

Exclusion from the Index

25. IPD will aim to limit, where possible, the amount of turnover of live funds dropping in and out of the index. If any inclusion criteria, as specified in this document, are breached during a quarter IPD will discuss the circumstances and implications with the fund manager in question. Following three consecutive quarters of breach the fund will automatically be excluded from the index in the next quarter unless IPD agrees to provide the fund additional time to cure the breach. Such reprieves will only be considered in cases where the breach is market driven, or is a response to perceived market conditions, and an immediate cure of the breach would adversely affect existing investors in the fund. Should however the breach be due to a permanent change in the strategy or structure of the fund then IPD reserves the right to waive the three quarter exclusion period and immediately exclude the fund from the index. IPD will report breaches of the rules to the USIAB as a standard agenda item at their quarterly meetings. Withdrawal from IPD's Portfolio Analysis Services (PAS) will cause a fund to be removed from the index going forward, but its historical performance will remain in the index.
26. During a period when a fund is excluded from the index due to a breach of the rules, it may still receive services from IPD associated with its subscription to the Portfolio Analysis Service, but the delivery of such services will be accompanied by a qualification notice outlining the nature of the breach that led to the funds exclusion from the index. Prior to receiving services after a breach, the fund must agree to include this qualification notice in all public and private uses of the analysis. Alternatively, a fund may choose to stop

receiving services upon its exclusion from the index, in which case it must fulfill the remainder of its contractual financial obligation to IPD.

27. If under 25 above, a fund that has been excluded from the index for breach of rules, decides to use the index as a benchmark, it must receive a license from IPD to do so.
28. IPD reserves the right to make the decision as to when a fund may be readmitted into the index, following guidance from the USIAB.
29. Should a constituent of the index fail to provide the requisite data within the timeframe agreed by IPD following the quarter end or fail to sign off their IPD processed data by the appropriate date IPD reserves the right to exclude the fund from the index.
30. Should a constituent of the index be persistent in the provision of inaccurate data IPD may exclude the fund from the index.
31. IPD will provide public announcement of the exclusion of a fund from the index, and will make a reasonable effort to provide one quarter's notice prior to the exclusion.

Publication Schedule

32. IPD will aim to publish the index within 45 business days of the quarter end.
33. There will be two releases each quarter:
 - The U.S All Property Funds Index
 - The U.S. Core Property Funds Index
34. IPD as the compiler of the index retains ultimate editorial control of all elements of the index. This includes, but is not limited to, IPD retaining the right to refuse to include any comments provided by the Consultative Groups on any draft materials, the right to delay the calculation and publication of index values, and to alter the historic series of performance measures should it believe there are valid circumstances, or to suspend or discontinue the publication of index values, if it believes that there are circumstances that prevent the correct and consistent calculation of the index. IPD will consult the USIAB prior to taking any of these actions and provide public disclosure of the action being taken and the reasons supporting the decision. IPD's rights described here are subordinate to any relevant clause in the co-publishing agreement between IPD and PREA
35. IPD will publish at least one consultative release of the index and provide market participants the opportunity to provide feedback on the inclusion rules, composition of the index, calculation methodologies, and content of quarterly release.
36. After formal launch of the index, the index's historical performance will remain unfrozen for a brief period to provide constituent funds, and IPD, the opportunity to reconcile necessary historical performance. Once the index is frozen, it can only be unfrozen due to a material restatement by a constituent fund that is also reported to their investors. In these unique cases, the unfreezing and restatement of the index will occur in accordance with established IPD policies and procedures and will be publicly reported, although the name of the fund(s) causing the restatement will not be released.

37. Notwithstanding 36. above, IPD may allow for the unfreezing of the index for the general restatement of anomalies that have developed over time. Such unfreezing and restatement can only occur on every third year anniversary of the initial freezing of the index, and must be accompanied by a vote of support from no less than 75% the current constituent funds in the index.

Appendix 1: Fund & Direct Real Estate Return Calculations

FUND INDEX RETURN CALCULATIONS

PREA | IPD U.S. Property Index Rules implement a fund level time weighted return methodology based on quarterly reporting periods. The formula used to construct the index is an after-fee fund level return.

After-Fees Return (Net)

Net Fund Total Return

The Net Fund Total Return formula is the sum of Net Fund Appreciation Return and Net Fund Income Return, which are presented below.

$$NFTR_t = \frac{REAPP + DAPP - IFC + NII}{NAV_{t-1} + DWC - DWD}$$

Where,

NFTR _t	Total return after fees in period t
REAPP	is the appreciation, realized and unrealized, attributable to real estate investments, net of capital expenditures.
DAPP	is the appreciation, both realized and unrealized attributable to debt owned by the fund.
NII	Net Investment Income is the investment income after fees (advisory and incentive) and interest expenses on debt, but before any capital expenditures.
NAV _{t-1}	is defined as the beginning period Net Asset Value of the fund
IFC	is defined as the change in Capitalized Incentive Fees. The change in value that is attributable to any increase in capitalized fees must be carved out of the numerator in order to isolate the after fee appreciation figure.
DWC ²	is defined as the day weighted contributions. The weighting is based on the number of days cash flow was in the fund during the quarter.
DWD	is defined as the day weighted distributions. The weighting is based on the number of days the cash flow was out of the fund during the quarter.

² The date during the quarter in which the cash flow (contributions and distributions) occurs may vary across funds. Additionally, the frequency of cash flows will also vary. According to the formulas presented above, the cash flows should be timed to the day during the quarter in which the cash flow occurred. This eliminates any cash flow approximation and more accurate representation of the time-weighted denominator during the period.

Net Fund Income Return

$$NFIR_t = \frac{NII}{NAV_{t-1} + TWC - TWD}$$

Where,

NFIR _t	Income return after fees in period t
NII	Net Investment Income is the investment income after fees (advisory and incentive) and interest expenses on debt, but before any capital expenditures.
NAV _{t-1}	is defined as the beginning period Net Asset Value of the fund
DWC	is defined as the day weighted contributions. The weighting is based on the number of days cash flow was in the fund during the quarter.
DWD	is defined as the day weighted distributions. The weighting is based on the number of days the cash flow was out of the fund during the quarter.

Net Fund Appreciation Return

The denominator of the Net Fund Appreciation Return formula is consistent with the Net Fund Income Return formula.

$$NFAR_t = \frac{REAPP + DAPP - IFC}{NAV_{t-1} + TWC - TWD}$$

Where,

NFAR _t	Appreciation return after fees in period t
REAPP	is the appreciation, realized and unrealized, attributable to real estate investments, net of any capital expenditures.
DAPP	is the appreciation, both realized and unrealized attributable to debt owned by the fund.
IFC	is defined as the change in Capitalized Incentive Fees. The change in value that is attributable to any increase in capitalized fees must be carved out of the numerator in order to isolate the after fee appreciation figure.
NAV _{t-1}	is defined as the beginning period Net Asset Value of the fund
DWC	is defined as the day weighted contributions. The weighting is based on the number of days cash flow was in the fund during the quarter.
DWD	is defined as the day weighted distributions. The weighting is based on the number of days the cash flow was out of the fund during the quarter.

Before-Fees Return (Gross)

Gross Fund Total Return

Consistent with the Net Fund Total Return, the Gross Fund Total Return is the sum of Gross Fund Appreciation Return and Gross Fund Income Return, which are presented below.

$$GFTR_t = \frac{REAPP + DAPP + NII + AF + IFE}{NAV_{t-1} + TWC - TWD}$$

Where,

GFTR _t	total return in period t before fees
REAPP	is the appreciation, realized and unrealized, attributable to real estate investments, net of capital expenditures
DAPP	is the appreciation, both realized and unrealized attributable to debt owned by the fund.
NII	Net Investment Income is the investment income after fees (advisory and incentive) and interest expenses on debt, but before any capital expenditures.
AF	is the Advisory Fee Expense
IFE	is the Incentive Fee Expense
NAV _{t-1}	is defined as the beginning period Net Asset Value of the fund
DWC	is defined as the day weighted contributions. The weighting is based on the number of days cash flow was in the fund during the quarter.
DWD	is defined as the day weighted distributions. The weighting is based on the number of days the cash flow was out of the fund during the quarter.

Gross Fund Income Return

Advisory fees and Incentive fees are added back to Net Investment Income (NII) to derive the numerator of the Gross Fund Income Return formula.

$$GFIR_t = \frac{NII + AF + IFE}{NAV_{t-1} + TWC - TWD}$$

Where,

GFIR _t	Income return before fees in period t
NII	Net Investment Income is the investment income after fees (advisory and incentive) and interest expenses on debt, but before any capital expenditures.
NAV _{t-1}	is defined as the beginning period Net Asset Value of the fund

DWC	is defined as the day weighted contributions. The weighting is based on the number of days cash flow was in the fund during the quarter.
DWD	is defined as the day weighted distributions. The weighting is based on the number of days the cash flow was out of the fund during the quarter.
AF	is the Advisory Fee Expense
IFE	is the Incentive Fee Expense

Gross Fund Appreciation Return

The deduction of change in Capitalized Incentive Fees (IFC) is removed from the Gross Fund Appreciation Return to derive the Net Fund Appreciation Return.

$$GFAR_t = \frac{REAPP + DAPP}{NAV_{t-1} + TWC - TWD}$$

Where,

GFAR _t	Appreciation return before fees in period t
REAPP	is the appreciation, realized and unrealized, attributable to real estate investments, net of capital expenditures.
DAPP	is the appreciation, both realized and unrealized attributable to debt owned by the fund.
NAV _{t-1}	is defined as the beginning period Net Asset Value of the fund
DWC	is defined as the day weighted contributions. The weighting is based on the number of days cash flow was in the fund during the quarter.
DWD	is defined as the day weighted distributions. The weighting is based on the number of days the cash flow was out of the fund during the quarter.

DIRECT REAL ESTATE RETURN CALCULATIONS

Monthly-Based Periods – IPD’s database is based on monthly periods. This is universal across all global markets and allows for a consistent period of measurement. Data that is provided on a quarterly basis must be converted into monthly data.

Monthly Apportioning – cash flow information such as NOI and Capital Expenditures are apportioned equally across the three months of the quarter. For example, if a property produces \$90 of NOI during a quarter, \$30 dollars would be allocated to each month of the quarter (\$90 divided by 3 months).

Interpolation – Appraisal frequency for open-end funds is predominantly quarterly in the U.S. In order to derive monthly values for the months in the quarter prior to quarter-end, appraisal values are interpolated linearly. For example, assume that the previous appraisal value is \$1,000 and the current quarter-end appraisal value is \$1,300. The first month of the quarter would be computed as \$1,100 and the second month of the quarter would be \$1,200.

The index is based on monthly returns, but is produced quarterly. Monthly returns are geometrically chain linked to derive quarterly, annual and other multi-period returns. These compounded total returns are used for quarterly and annual indices.

Partial Period Returns -In the context of quarterly periods, if an asset does not have a full quarter of performance, the measurement period is often called a “partial period.” Due to monthly-based returns on which IPD indices are based, acquisitions and dispositions are timed to the month in which the transaction occurs. For example, if an asset is acquired in the second month of a quarter, the acquisition is timed to the first day of the month, regardless of the day during which the acquisition occurred. Similarly, if an asset is sold in the second month of the quarter, the disposition is timed to the last day of the month.

Direct Real Estate Total Return

The direct real estate total return is the sum of capital appreciation and net income in a single monthly period expressed as a percentage of capital employed, with income reinvested. Direct real estate includes all property types, not just traditional “core” property types; it also includes both operating and non operating assets, and partial periods.

With respect to a single month total return is defined as:

$$TR_t = \frac{(CV_t - CV_{(t-1)} - CEXP_t + CRPT_t + NOI_t)}{(CE_t)}$$

Where:

TR_t	is the total return in month t
CV_t	is the capital value at the end of month t
$CEXP_t$	Capital Expenditures in period t
$CRPT_t$	are capital receipts in period t
NOI_t	is the day-dated rent receivable during the month, net of property management costs, ground rent and other irrecoverable expenditure
CE_t	Capital Employed (defined below) in period t

Capital Employed - The denominator of the monthly total return equation. IPD captures capital events (acquisitions, dispositions, contributions and distributions) on a monthly basis, consistent with the monthly structure of our global database.

$$CE_t = CV_{(t-1)} + P_t + PP_t + CEXP_t$$

Where,

CE_t	is the capital employed in direct real estate in period t
$CV_{(t-1)}$	is the capital value at the end of the previous month
P_t	New purchases during the period
PP_t	New partial ³ purchases during the period
$CEXP_t$	Capital Expenditures, partial purchases in period t

Capital Appreciation

The increase in the value of properties net of capital expenditure, expressed as a percentage of the capital employed over the month. Monthly figures are compounded over twelve months to give the annual rate.

$$CAPP_t = \frac{(CV_t - CV_{(t-1)} - CEXP_t + CRPT_t)}{(CE_t)}$$

Where,

$CAPP_t$	is capital appreciation in period t
CV_t	is the capital value at the end of month t
$CEXP_t$	Capital Expenditures in period t
$CRPT_t$	are capital receipts in period t
CE_t	is the capital employed in direct real estate in period t

Income Return

The net income receivable for the month expressed as a percentage of the capital employed.

$$INCR_t = \frac{NOI_t}{(CE_t)}$$

Where,

$INCR_t$	Is the income return for period t
NOI_t	is the asset level net income for period t
CE_t	is the capital employed in direct real estate in period t

For all periods greater than a month, the Income Return is calculated as the difference between Total Return and Capital Growth output to 5 decimal places and rounded separately. Normally displayed to 1 decimal place.

³ A partial purchase is.....

Index values

Starting from a base value of 100, each successive index value is calculated by multiplying the preceding index value by (1+monthly return). Where index value at time t=100,

$$Index_{t+1} = 100 \times \left(\frac{1 + TR_{t+1}}{Index_t} \right)$$

Where,

TR_{t+1} is the total return in month t+1 expressed as a decimal.

Multi-period time-weighted total return – The basis for all of IPD’s annual and quarterly performance measures is time-weighted. Annual measures are the result of compounding twelve month’s figures and annual figures are shown only when twelve month’s figures are available. The measure gives an equal weight to each month. To calculate quarterly and annual returns it is necessary first to construct an index from the monthly values.

The 12-month return, for example, is calculated as the percentage change in the index (X t) over the relevant 12 months.

$$= \left(\left(\frac{X_{t+12}}{X_t} \right) - 1 \right) \times 100$$

Annualized rate - The geometric mean of the individual annual rates of change across a series of years. It is calculated as the nth root of the final indexed score converted back into a percentage:

$$= \left(\left(\frac{X_t}{100} \right)^{\frac{1}{n}} - 1 \right) \times 100$$

Where,

n is the number of years, and
 X_t is the final indexed score.

Contributions From Fund Structure

Contributions From Fund Structure is a bottom-up analysis beginning with direct unleveraged real estate time weighted returns and adding on the effects of other investments in real estate, leverage, cash, and finally joint venture waterfalls and other fund activities sequentially.

Other Real Estate Investments

Other real estate investments may include but are not limited to investments in other property funds, mortgages, mezzanine debt investments, unfunded forward commitments, and investments in operating companies. Appreciation from other real estate is added to the property-level appreciation formula.

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Total Return

$$\frac{(CV_t - CV_{t-1} - CEXP_t + CRPT_t) + (OREapp_t) + NOI_t + OREinc_t}{CE_t + ORE_{t-1}}$$

Where,

CV _t	is the capital value of the direct real estate
CEXP _t	is the capital expenditure during the period
CRPT _t	is the capital receipts during the period
OREapp _t	is appreciation from other real estate investments
NOI _t	is the property's net operating income
CE _t	is the capital employed in direct real estate in period t
OREinc _t	is the income/interest received from other real estate investments
ORE _{t-1}	is the beginning period value of other real estate investments

Appreciation Return

$$\frac{(CV_t - CV_{t-1} - CEXP_t + CRPT_t) + (OREapp_t)}{CE_t + ORE_{t-1}}$$

Where,

CV _t	is the capital value of the direct real estate
CEXP _t	is the capital expenditure during the period
CRPT _t	is the capital receipts during the period
CE _t	is the capital employed in direct real estate in period t
OREapp _t	is appreciation from other real estate investments
ORE _{t-1}	is the beginning period value of other real estate investments

Income Return

$$\frac{NOI_t + OREinc_t}{CE_t + ORE_{t-1}}$$

Where,

NOI _t	is the property's net operating income
CE _t	is the capital employed in direct real estate in period t
OREinc _t	is the interest received from other real estate investments
ORE _{t-1}	is the beginning period value of other real estate investments

The impact from other real estate investments is calculated as the spread between the property-level time-weighted return and the time weighted return after adding in other investments.

Going forward, real estate appreciation is the sum of the property-level appreciation return numerator and other real estate appreciation, as stated above. Therefore,

$$REAapp_t = (CV_t - CV_{t-1} - CEXP_t + CRPT_t) + (OREApp_t)$$

Real estate income is the sum of the property-level income return numerator and income/interest received from other real estate investments.

$$REinc_t = NOI_t + OREInc_t$$

And, capital employed now also includes any direct and indirect investments in real estate in the fund.

$$CE_t^* = CE_t + ORE_{t-1}$$

Where,

CE _t *	Capital employed, including other real estate investments in period (t)
CE _t	is the capital employed in direct real estate in period t
ORE _{t-1}	Other real estate assets owned at the end of period (t-1)

Impact of Asset Level Leverage

The impact of asset level leverage calculation is based on the spread between the leveraged real estate time-weighted total return and the unleveraged real estate time-weighted total return. The leveraged real estate time weighted total return is the sum of the leveraged income return and leveraged appreciation return and includes the mark-to-market impact.

Leveraged Total Return

$$\frac{(REapp_t) - (DFV_t - DFV_{t-1} - DLP_t + DRP_t) + REinc_t - DS_t}{CE_t^* - DFV_{t-1} - DLP_t}$$

Where:

REapp _t	is the appreciation of the real estate investment portfolio
CE _t [*]	Capital employed, including other real estate investments in period (t)
DFV _t	is the fair market value of the debt
DLP _t	is the new loan proceeds or draw downs during the period.
DRP _t	is the debt repayments during the period, both regularly scheduled repayments and additional payments of principal.
REinc _t	is the real estate investment income
DS _t	is the debt service (property-level interest payments)

Leveraged Income Return

$$\frac{REinc_t - DS_t}{CE_t^* - DFV_{t-1} - DLP_t}$$

Where,

REinc _t	is the real estate investment income
DS _t	is the debt service (property-level interest payments)
CE _t [*]	Capital employed, including other real estate investments in period (t)
DFV _{t-1}	is the fair market value of the debt
DLP _t	is the new loan proceeds or debt drawdowns during the period.

Leveraged Appreciation Return

$$\frac{(REapp_t) - (DFV_t - DFV_{t-1} - DLP_t + DRP_t)}{CE_t^* - DFV_{t-1} - DLP_t}$$

Where,

REapp _t	is the appreciation of the real estate investment portfolio
CE _t [*]	Capital employed, including other real estate investments in period (t)
DFV _t	is the fair market value of the debt
DLP _t	is the new loan proceeds or drawdowns during the period.
DRP _t	is the debt repayments during the period, both regularly scheduled repayments and additional payments of principal.

Impact of joint-venture structure

The impact of joint-venture waterfalls is the spread between the before-fee investment-level total return of each investment and the leveraged total return of each investment as calculated above.

Before-fee investment level total return

$$TRinc_t = \frac{TREapp_t + DBTapp_t + NII_t + AF_t + IFE_t}{NAV_{t-1}}$$

Where,

TREapp _t	is the total real estate appreciation, including promotions and dilutions from joint-venture structures
DBTapp _t	is the debt appreciation during the period
NII _t	is the net investment income (after interest expense, advisory fees and incentive fees)
AF _t	is the advisory fees expensed during the period
IFE _t	is the incentive fees expensed during the period.
NAV _{t-1}	is the net asset value of the investment at the beginning of the period

Before-fee investment level income return

$$IRinv_t = \frac{NII_t + AF_t + IFE_t}{NAV_{t-1}}$$

Where,

NII _t	is the net investment income (after interest expense, advisory fees and incentive fees).
AF _t	is the advisory fees expensed during the period
IFE _t	is the incentive fees expensed during the period.
NAV _{t-1}	is the net asset value of the investment at the beginning of the period

Note that advisory fees and incentive fees are added to the numerator of the investment-level income return formula when those fees are deducted from the investment's income to compute the investment's net investment income.

Before-fee investment level appreciation return

$$ARinv_t = \frac{TREapp_t + DBTapp_t}{NAV_{t-1}}$$

Where,

TREapp _t	is the total real estate appreciation, including promotions and dilutions from joint-venture structures
DBTapp _t	is the debt appreciation during the period
NAV _{t-1}	is the net asset value of the investment at the beginning of the period

We define the investment-level appreciation as the numerator of the investment-level appreciation return formula, from above. Therefore,

$$INVapp = TREapp_t + DBTapp_t$$

Similarly, we define real estate income as the numerator of the investment-level income return formula

$$INVinc = NII_t + AF_t + IFE_t$$

Impact of Fund-Level Leverage

Fund-level debt should be distinguished from property-level debt, when not accounted for at the investment-level. Fund debt reduces the fund's time-weighted income return by the amount of interest expense during the period. Appreciation return is also affected by the amount of debt appreciation or depreciation during the period. The method for computing fund-level debt effects is consistent with property-level debt impact computation methodology. For the purposes of reporting the impact of leverage on fund performance in quarterly releases of the index, the contributions of asset level debt and fund level debt are combined into a total impact from leverage.

From the investment-level income return formula above, the numerator is updated to reflect any interest expense paid on debt as follows:

$$INVinct_t - FDBTint_t$$

Where:

$INVinc_t$ is the investment-level income
 $FDBTint_t$ is the interest expense paid on fund-level debt.

From the investment-level appreciation return formula above, the numerator is updated to reflect any mark-to-market debt adjustments as follows:

$$INVapp_t + FDBTapp_t$$

Where:

$INVapp_t$ is the investment-level appreciation return numerator
 $FDBTapp_t$ is the appreciation from fund debt during the period.

In both investment-level appreciation and investment-level income return formulas, the denominators are updated to reflect the fund's debt position as follows:

$$NAV_{t-1} - FDFV_{t-1}$$

Where:

NAV_{t-1} is the investment-level net asset value at the beginning of the period.

$FDBT_{t-1}$ is the fair market value of fund-level debt at the beginning of the period.

The updated total return formula is as follows:

$$\frac{INVapp_t + FDBTapp_t + INVinc_t - FDBTint_t}{NAV_{t-1} - FDFV_{t-1}}$$

Where,

$INVapp_t$	is the investment-level appreciation
$FDBTapp_t$	is the fund-level debt appreciation during the period
$INVinc_t$	is investment-level income
$FDBTint_t$	is the interest expense paid on fund-level debt.
NAV_{t-1}	is the net asset value of the investment at the beginning of the period
$FDFV_{t-1}$	is the fair market value of the debt at the beginning of the period.

Impact of cash

The impact of cash calculation is computed by adding the fund's cash balance to the denominator of the leveraged return formula and adding any interest received from cash to the income return numerator. The spread between the leveraged total return formula and the leveraged total return formula after adding in cash equals the impact of cash.

From the income return formula above, the numerator is updated to reflect any interest received from cash as follows:

$$INVinc_t - FDBTint_t + CAint_t$$

Where:

$INVinc_t$	is the investment-level income
$FDBTint_t$	is the interest expense paid on fund-level debt.
$CAint_t$	is the interest received from cash.

From the investment-level appreciation and income return formulas above, the denominator is updated to reflect the fund's cash position as follows:

$$NAV_{t-1} + - FDFV_{t-1} CA_{t-1}$$

Where:

NAV_{t-1}	is the investment-level net asset value at the beginning of the period.
$FDFV_{t-1}$	is the fair market value of the debt at the beginning of the period.
CA_{t-1}	is the fund's cash balance at the beginning of the period.

The updated time-weighted total return is

$$\frac{INVapp_t + FDBTapp_t + INVinc_t - FDBTint_t + CAint_t}{NAV_{t-1} - FDFV_{t-1} + CA_{t-1}}$$

Where:

INVapp _t	is the investment-level appreciation of the real estate investment portfolio
FDBTapp _t	is the fund-level debt appreciation during the period
INVinc _t	is the property's net operating income
FDBTint _t	is the interest expense paid on fund-level debt.
CAint _t	is the interest received from cash.
NAV _{t-1}	is the net asset value of the investments at the beginning of the period
FDFV _{t-1}	is the fair market value of the debt at the beginning of the period.
CA _{t-1}	is the fund's cash balance at the beginning of the period.

Impact of Other Fund Activities

Other fund activities include components of fund structure that are not captured in the sections above. Examples include other assets and liabilities, other fund expenses, miscellaneous income, and accounting adjustments. These items are grouped together because, in aggregate they represent small contributions to the funds overall return.

Examples of other assets and liabilities include the following:

- Other assets include accounts receivable and prepaid expenses. Cash is classified into its own component of fund structure, so cash and cash equivalents should be excluded from other assets. Other Assets increase the fund's net asset value. And therefore increase the denominator of the fund's time-weighted return, by the beginning period carry value of other assets
- Other liabilities include accounts payable, accrued expenses, and minority interest. Although loans payable are a liability on the balance sheet, these accounts should be excluded from other liabilities as leverage is either accounted for at the investment-level or captured within the fund-level debt component of fund structure.

Fund expenses that are not attributable to individual assets within a fund's investment portfolio are classified as fund expenses. Advisory fees and incentive fees should not be classified as fund expenses. Fees may include legal fees or other general and administrative fees. Fund expenses reduce the fund's NAV and should be deducted from the fund's income return numerator.

Income or interest earned that is not attributable to an asset or other component of fund structure is classified as miscellaneous income. Income received increase the fund's NAV and should be added to the fund's income return numerator.

Accounting adjustments come primarily from the timing of cash flows, both contributions and distributions, in the fund. At the fund level, contributions and distributions are day weighted, but due to data availability issues, this is not possible at the asset level, where cash flows are monthly timed in IPD's direct real estate performance calculation.

Appendix 2: Definition of Core U.S. Property Funds

The following additional constraints, beyond those already identified in the document for inclusion in the USPFI, establish policy guidelines for funds included in the core USPFI.

- 80% of all assets must be invested in “core” property types
- 80% of all assets invested in “stabilized” assets. IPD’s global standard of 75% leased is used to define the difference between stabilized and non-stabilized assets. Assets can fall in or out of the stabilized category throughout their life. Over multiple time periods and assets status is based on the average leased percentage for the period being evaluated.
- No more than 50% of assets invested in one property type
- LTV of the fund not to exceed 40% over a six quarter rolling period.

Appendix 3: Attribution Math

Allocation Scores measure the relative performance from your top down strategy

- The score is positive if the fund overweight a outperforming sector, or underweight an underperforming sector
- The score is negative if the fund is overweight a underperforming sector or underweight an outperforming sector

Allocation scores are calculated as follows:

$$\text{Allocation Score} = (WT_{Fj} - WT_{BMj}) * \left[\frac{(1 + RBM_j)}{(1 + RBM)} \right] - 1$$

Where:

WT_{Fj}	is the weight of segment (j) in the fund over the period
WT_{BMj}	is the weight of segment (j) in the benchmark over the period
RBM_j	is the return of segment (j) in the benchmark
RBM	is the total return of the benchmark

Selection Score measures the relative performance from bottom up execution

- The score is positive if the fund's assets in a given segment outperform the assets in the benchmark in that segment
- The score is negative if fund's assets in a given segment underperform the assets in the benchmark in that segment

Selection scores are calculated as follows:

$$\text{Selection Score} = (\text{SegmentAdjustedWeight}) * \left[\frac{(1 + RF_j)}{(1 + BM_j)} \right] - 1$$

Where:

$$\text{SegmentAdjustedWeight} = WT_{Fj} * \left[\frac{1 + RBM_j}{1 + \sum_{j=1}^n (WT_{Fj} * RBM_j)} \right]$$

And,

WT_{Fj}
 WTB_{Mj}
 RBM_j
 RBM

is the weight of segment (j) in the fund over the period
is the weight of segment (j) in the benchmark over the period
is the return of segment (j) in the benchmark
is the total return of the benchmark

Appendix 4: Weighted Contribution Math

Weighted contributions are calculated at two levels; the weighted contribution to absolute return and the weighted contribution to relative return

Weighted Contribution to the Portfolio's Absolute Total Return – is the weighted contribution of individual assets or groups of assets to the return of the portfolio over a specified period. As example:

- The sum of the weighted contributions of all the assets in the portfolio equals to total return of the direct real estate in the portfolio
- The sum of the weighted contributions of all the office assets in the portfolio equals the weighted contribution of the office sector to the portfolios total return.
- The sum of the weighted contributions of all of the property sectors in the portfolio equal the portfolio's total return.

Weighted contribution to total return for each asset is calculated as follows:

$$WC_{i,t} = \frac{TR_{i,t}}{WT_{i,t}}$$

Where,

$WC_{i,t}$	Weighted contribution of asset (i)for period (t)
$TR_{i,t}$	Total return of asset (i) for period (t)
$WT_{i,t}$	weight of average capital employed for asset (i) for period (t)

And, the weighted contribution of and individual segment is:

$$WC_{j,t} = \sum_{i=1}^n WC_{i,j,t}$$

Where,

$WC_{j,t}$	Weighted contribution of segment (j)for period (t)
$WC_{i,j,t}$	Weighted contribution of asset (i) in segment (j) for period (t)

And, the total return of the portfolio is:

$$PR_t = \sum_{i=1}^n WC_{i,t}$$

Where,

PR_t	Total return of the direct real estate in the portfolio over period (t)
$WC_{i,t}$	Weighted contribution of segment (j) for period (t)

Weighted Contribution to the Portfolio's Relative Total Return – is the weighted contribution of individual assets or groups of assets to the return of the portfolio versus the return of its benchmark (relative return) over a specified period. As example:

- The sum of the weighted relative contributions of all the assets in the portfolio equals the difference in the total return of the direct real estate in the portfolio and the direct real estate in the benchmark
- The sum of the weighted relative contributions of all the office assets in the portfolio equals the weighted relative contribution of the total return of the office sector in the portfolio and the office sector in the benchmark
- The sum of the weighted relative contributions of all of the property sectors in the portfolio equals the difference between the portfolio's total return and the total return of the benchmark.

Weighted contribution to relative total return for each asset is calculated as follows:

$$WRC_{i,t} = \frac{RR_{i,t}}{ACE_{i,t}}$$

Where,

$WC_{i,t}$	Weighted contribution of asset (i) for period (t)
$RR_{i,t}$	Relative Total return of asset (i) for period (t) to the total return of the Benchmark
$ACE_{i,t}^4$	weight of average capital employed for asset (i) average period (t)

⁴ Capital Employed (CE) was defined previously. The average capital employed for the period is the simple chain linking of individual monthly CE values during the period.

And, the weighted relative contribution of and individual segment is:

$$WRC_{j,t} = \sum_{i=1}^n WRC_{i,j,t}$$

Where,

$WRC_{j,t}$ Weighted relative contribution of segment (j) for period (t)
 $WRC_{i,j,t}$ Weighted relative contribution of asset (i) in segment (j) for period (t)

And, the relative total return of the portfolio us:

$$PRR_t = \sum_{i=1}^n WRC_{i,t}$$

Where,

PRR_t Total relative return of the direct real estate in the portfolio over period (t)
 $WRC_{i,t}$ Weighted relative contribution of segment (j) for period (t)