

# FINCAD Python

Fixed Income, Derivative & Risk Analytics Framework

FINCAD Python empowers clients to solve complex derivative analytics challenges with unparalleled simplicity. Natively built in Python, our framework provides all the modelling capabilities of FINCAD's libraries while also encapsulating integration, configuration and more advanced use cases.

## Who uses it and what for?

WHO IT'S FOR	BASE CALCULATIONS	USE CASES
Quants	Valuation	Backtesting
Strategists	Sensitivity (Greeks)	xVA
Risk Managers	Cash Flows	VAR
Traders	Scenario Analysis	Model Configuration

## Create value from day one with:

### 1) SIMPLICITY

- FINCAD Python allows for lightweight installation
- Instrument and market data integration is straightforward
- All modelling and valuation is pre-configured and validated
- Deployable on desktop, server, or cloud

### 2) POWER

- Users can fully configure modelling and valuation
- Users can extend the FINCAD Python via the Python ecosystem
- Best-in-class derivative analytics allow you to understand all risk in your portfolio

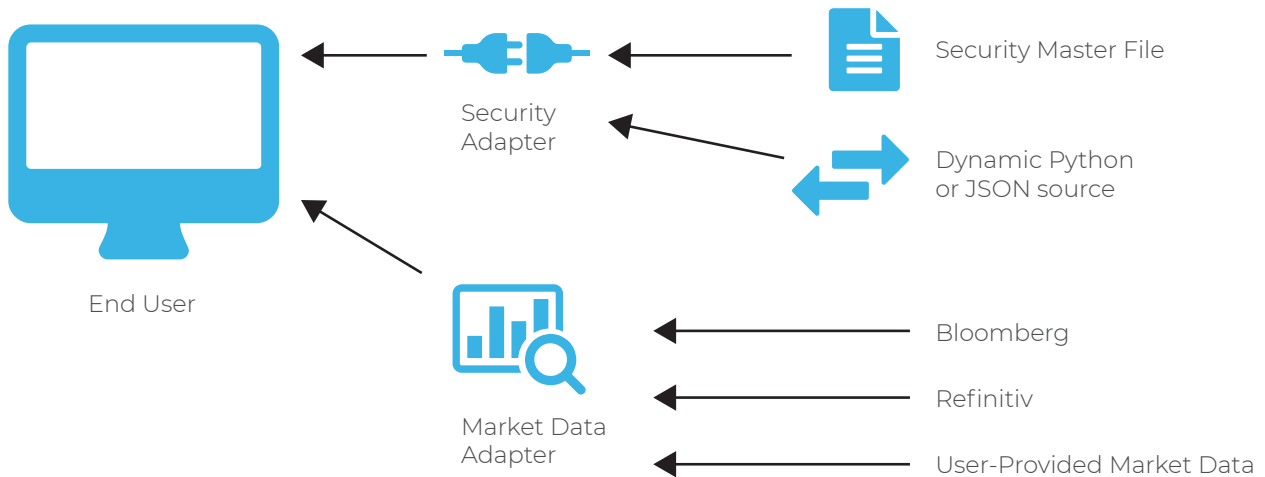
### 3) SUPPORT

- Documentation allows for full self-sufficiency
- Expert team of quantitative developers and analysts to ensure success



## Integrations & Connectivity

Connect market data & security detail through built-in adapters.



## What does it look like?

Below are five samples of the application in-use.

### 1. Simple Example: Define Trades and submit for calculation, with a few lines of code.

## Python Analytics - Swap Valuation

```
# instrument
swap_instrument = ir.FixFloatSwap(notional="10Mio",
                                   floating_rate_index=indices.LiborUSD3m,
                                   maturity = "2y",
                                   fixed_coupon =types.percent(1.5))

# trade
swap = swap_instrument.enter()
result = swap.calculate()
result.value
```

245,644.46 USD

## 2. Request other metrics of interest, such as the cash flows:

```
result.cashflows.to_dataframe()
```

	PaymentDate	PaymentCurrency	CashflowAmount	Notional	AccrualFraction	ImpliedAmount	IsFixedFlow	PayRecBuySell	DiscountFactor	DiscountedCashflow
0	2022-04-28	USD	75000.000000	10000000.0	0.500000	0.015000	True	rec	0.999063	74929.746696
1	2022-10-28	USD	75000.000000	10000000.0	0.500000	0.015000	True	rec	0.998616	74896.196611
2	2023-04-28	USD	75000.000000	10000000.0	0.500000	0.015000	True	rec	0.998628	74897.104381
3	2023-10-30	USD	75833.333333	10000000.0	0.505556	0.015000	True	rec	0.998654	75731.298411
4	2022-01-28	USD	-17379.180062	10000000.0	0.255556	0.006801	False	pay	0.999262	-17366.347780
5	2022-04-28	USD	-10413.896882	10000000.0	0.250000	0.004166	False	pay	0.999063	-10404.142073
6	2022-07-28	USD	-7704.073784	10000000.0	0.252778	0.003048	False	pay	0.998826	-7695.030432
7	2022-10-28	USD	-7763.141748	10000000.0	0.255556	0.003038	False	pay	0.998616	-7752.397209
8	2023-01-30	USD	-8424.333253	10000000.0	0.261111	0.003226	False	pay	0.998576	-8412.340740
9	2023-04-28	USD	-7288.006215	10000000.0	0.244444	0.002981	False	pay	0.998628	-7278.007496

## 3. Request sensitivities:

```
result.sensitivities.to_dataframe()
```

	Instrument	Currency	RawExposure	DV01	HedgeAmount
2	Futures LiborUSD3m MarchQuarterly4	USD	34980.113835	-349.801138	-13.992046
3	Futures LiborUSD3m MarchQuarterly5	USD	22448.086536	-224.480865	-8.979235
4	Futures LiborUSD3m MarchQuarterly6	USD	26574.128164	-265.741282	-10.629651
5	Futures LiborUSD3m MarchQuarterly7	USD	26666.953299	-266.669533	-10.666781

## 4. Request more advanced analytics, such as Scenario Analysis; Define a trade and scenario shifting market data, and see the effect on value.

```
basis_scenario = scenarios.InstrumentTypeMarketScenario(  
    instrument_type=ref_data.instrument_types.USD_BasisSwap_USFedFunds_Libor_3m, amount=0.0025  
)
```

```
with basis_scenario:  
    basis_scenario_result = swap_trade.calculate(snapshot_selector=valuation_snapshot)
```

```
basis_scenario_result.value
```

```
228,537.36 USD
```

```
basis_scenario_result.value - swap_trade.calculate(valuation_snapshot).value
```

```
716.54 USD
```

## 5. Explore custom configuration, in this case by making adjustments to this notebook by adding meeting dates to the central bank index curve.

```
custom_meeting_dates = [  
    f3.MoveBusinessDays(TODAY, ref_ind.USFedFunds, 20).strftime("%Y-%m-%d"),  
    f3.MoveBusinessDays(TODAY, ref_ind.USFedFunds, 50).strftime("%Y-%m-%d"),  
    f3.MoveBusinessDays(TODAY, ref_ind.USFedFunds, 90).strftime("%Y-%m-%d"),  
    f3.MoveBusinessDays(TODAY, ref_ind.USFedFunds, 130).strftime("%Y-%m-%d"),  
    f3.MoveBusinessDays(TODAY, ref_ind.USFedFunds, 170).strftime("%Y-%m-%d"),  
]
```

```
usd_config.meeting_dates = custom_meeting_dates  
VAL_ENV.update_valuation_config(config)
```

## Instruments coverage

### RATES

Futures (and options)

Deposits, FRA

Swaps (basis, Libor, CMS)

Caps / Floors

Swaption (vanilla, bermudan)

Spread option (CMS, mid-curves)

Exotic IR

### FX

Forward, futures, x-ccy swap

American/European option  
(straddle, butterfly)

Basket

Variance, volatility swap

Barrier (touch, single, dual,  
window)

PRDC

TARN, TARF

### INFLATION

CPI/LPI, Year-on-year swaps

Year-on-year cap/floor

Zero-coupon, swap/cap-floor

Inflation linked bonds

Exotic inflation

*Rates and FX products are also provided as Quanto.*

### BONDS

Bonds (gvt, corporate)

Bond futures / options

### CREDIT

Asset swap

CDS & CDS Index/Option

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