Using labels

Display labels on statements, layers, reinsurance, expenses, and premium with the DecL as clause

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2026-10-30

Every DecL statement that defines an object has a name, the bare word after its kind, which identifies the object and is the handle another program uses to refer to it. A **label** is the text shown for it in output. The clause `as LABEL` follows the item it labels: the name of a statement, an occurrence layer, a reinsurance layer, an expense group, or a premium. A label is presentation only and changes no computed value. The `label` property returns the label, or a default, or the name, so it is never blank, and `qd` shows it in the heading of its description.

A label that is a single word, such as `as GWP`, needs no quotes. A label with spaces or punctuation is quoted, `as "Motor Deal"`, and may contain any character except a double quote or a line break; a reserved word such as `premium` must also be quoted. Without a label the output uses a default: `Gross` for the first step of a P&L walk, `Premium` and `Loss` for its premium and loss legs, the basis for an expense group, such as `fixed expense`, and the layer, such as `occ 1750 xs 250`, for a reinsurance step.

```
xpnl Deal as "Motor Deal" 10000 premium as GWP less ...     # statement and premium
agg Deal.Book as "Motor Book" ...                           # the wrapped aggregate
2000 xs 0 as "Policy Limit"                                 # occurrence layer
occurrence net of 1750 xs 250 rate 0.325 as "Occ Re"        # reinsurance layer
0.15 premium expenses as Acquisition                        # expense group
```

```
import re
from aggregate import build, qd, __version__
from style import wprint, GT, figures
figures()
print(__version__)
```

```
1.43.1
```

Labels in a P&L walk

The example is the ceding commission treaty of Using pnl and xpnl, with a label at every site and the expense split into two groups. In the `qd` description the first step is the label of the `xpnl`, `Motor Deal`, and the cover step is the label of the reinsurance layer, `Occ Re`.

```
program = '''xpnl Deal as "Motor Deal"
  10000 premium as GWP
  less
    agg Deal.Book as "Motor Book"
      10000 premium at 0.7 lr
```

```
      2000 xs 0 as "Policy Limit"
      sev lognorm 150 cv 2.5
      occurrence net of
        1750 xs 250 rate 0.325 cede 0.1 as "Occ Re"
      mixed gamma 0.25
  less
    0.15 premium expenses as Acquisition
    1000 fixed expenses as "General Expense"'''
x = build(program)
qd(x)
print(x.name, x.label, sep=', ')
```

```
PnL('Motor Deal': 2 groups, 7 legs -> 'margin')

                             EX     SD       CV     Skew    P01  Median   P99
Step       Side
Motor Deal Consideration  10000      0        0           10000   10000 10000
           Obligation     -9500 2706.5 -0.28489 -0.67617 -17060   -9180 -4620
           Margin           500 2706.5   5.4129 -0.67617  -7060     820  5380
Occ Re     Consideration  -3250      0        0           -3250   -3250 -3250
           Obligation      2844 1619.5  0.56944  0.94221    405    2605  7645
           Margin          -406 1619.5  -3.9889  0.94221  -2845    -645  4395
           Net           93.999 1426.7   15.178  -0.5251  -3745     215  2855
All        Consideration   6750      0        0            6750    6750  6750
           Obligation     -6656 1426.7 -0.21435  -0.5251 -10495   -6535 -3895
           Margin        93.999 1426.7   15.178  -0.5251  -3745     215  2855
           Impact          -406 1619.5  -3.9889  0.94221  -2845    -645  4395
Deal, Motor Deal
```

The ledger `economic_df` shows the labels in its `Label` level. The premium leg is `GWP`, the loss leg and the margin of the first step take the label of the wrapped aggregate, `Motor Book`, each expense group is its own leg, and the legs of the cover are `Occ Re premium`, `Occ Re recovery`, and `Occ Re commission`. The rows `Total`, `Net`, and `Impact` are derived and keep their names. The rows of `economic_ratios_df` are the steps, under the same labels.

```
GT(x.economic_df[['EX', 'SD']], float_format=',.0f')
```

Step	*Side*	*Label*	EX	SD
Motor Deal	Consideration	GWP	10,000	0
	Obligation	Motor Book	-7,000	2,706
		Acquisition	-1,500	0
		General Expense	-1,000	0
		Total	-9,500	2,706
	Margin	Motor Book	500	2,706
Occ Re	Consideration	Occ Re premium	-3,250	0
	Obligation	Occ Re recovery	2,519	1,619
		Occ Re commission	325	0
		Total	2,844	1,619
	Margin	Total	-406	1,619
		Net	94	1,427
All	Consideration	Net	6,750	0
	Obligation	Net	-6,656	1,427
	Margin	Net	94	1,427
		Impact	-406	1,619

```
GT(x.economic_ratios_df[['P', 'L', 'E', 'M', 'LR', 'CR']],
   float_format=',.0f', ratio_cols=['LR', 'CR'])
```

Step	P	L	E	M	LR	CR
Motor Deal	10,000	7,000	2,500	500	70.0%	95.0%
Occ Re	-3,250	-2,519	-325	-406	77.5%	87.5%
All	6,750	4,481	2,175	94	66.4%	98.6%

Default labels and labels on the wrapped aggregate

The same program with every `as` clause removed shows the defaults, first for the steps and then in the `Label` level of the ledger. The labels of the occurrence layer and of the reinsurance layer are stored on the wrapped aggregate, in its `labels`.

```
plain = build(re.sub(r' as ("[^"]*"|\w+)', '', program).replace('Deal', 'Plain'))
print(list(plain.economic_ratios_df.index))
wprint(list(plain.economic_df.index.get_level_values('Label').unique()))
print(x.engine.labels)
```

```
['Gross', 'occ 1750 xs 250', 'All']
['Premium', 'Loss', 'premium expense', 'fixed expense', 'Total', 'Gross', 'occ
1750 xs 250 premium', 'occ 1750 xs 250 recovery', 'occ 1750 xs 250 commission',
'Net', 'Impact']
labels({'layer': 'Policy Limit', 'occ_reins': {0: 'Occ Re'}})
```