## F/Rbar and Rbar

In[•]:=
```
X[zbarb_] = 1 + 1.3 Log[zbarb]
```

Out[•]=
$$1 + 1.3\ \text{Log}[\text{zbarb}]$$

In[•]:=
```
D[X[zbarb], zbarb]
```

Out[•]=
$$\frac{1.3`}{\text{zbarb}}$$

In[•]:=
```
Y[zbarb_] = 0.2 + 0.005 zbarb
```

Out[•]=
$$0.2 + 0.005\ \text{zbarb}$$

In[•]:=
```
D[Y[zbarb], zbarb]
```

Out[•]=
$$0.005`$$

In[•]:=
```
FoRbar[zbarb_, U0_] = 1 + (Xx[zbarb] Log[1 + Yy[zbarb] (1 - U0^-0.42)])/Log[1 + Yy[zbarb]]
```

Out[•]=
$$1 + \frac{\text{Log}\left[1 + \left(1 - \frac{1}{U0^{0.42}}\right) \text{Yy}[\text{zbarb}]\right] \text{Xx}[\text{zbarb}]}{\text{Log}[1 + \text{Yy}[\text{zbarb}]]}$$

In[•]:=
```
D[FoRbar[zbarb, U0], zbarb]
```

Out[•]=
$$\frac{\text{Log}\left[1 + \left(1 - \frac{1}{U0^{0.42}}\right) \text{Yy}[\text{zbarb}]\right] \text{Xx}'[\text{zbarb}]}{\text{Log}[1 + \text{Yy}[\text{zbarb}]]} - \frac{\text{Log}\left[1 + \left(1 - \frac{1}{U0^{0.42}}\right) \text{Yy}[\text{zbarb}]\right] \text{Xx}[\text{zbarb}]\ \text{Yy}'[\text{zbarb}]}{\text{Log}[1 + \text{Yy}[\text{zbarb}]]^2\ (1 + \text{Yy}[\text{zbarb}])} + \frac{\left(1 - \frac{1}{U0^{0.42}}\right) \text{Xx}[\text{zbarb}]\ \text{Yy}'[\text{zbarb}]}{\text{Log}[1 + \text{Yy}[\text{zbarb}]]\ \left(1 + \left(1 - \frac{1}{U0^{0.42}}\right) \text{Yy}[\text{zbarb}]\right)}$$

In[•]:=
```
Simplify[
 D[FoRbar[zbarb, U0], zbarb] == D[FoRbar[zbarb, U0], Xx[zbarb]] D[Xx[zbarb], zbarb] +
  D[FoRbar[zbarb, U0], Yy[zbarb]] D[Yy[zbarb], zbarb]]
```

Out[•]=
```
True
```

In[•]:=
```
Simplify[D[FoRbar[zbarb, U0], Xx[zbarb]]]
```

Out[•]=
$$\frac{\text{Log}\left[1 + \text{Yy}[\text{zbarb}] - \frac{\text{Yy}[\text{zbarb}]}{U0^{0.42`}}\right]}{\text{Log}[1 + \text{Yy}[\text{zbarb}]]}$$

In[•]:=
```
Simplify[D[FoRbar[zbarb, U0], Yy[zbarb]]]
```

Out[•]=
$$\frac{\text{Xx}[\text{zbarb}] \left(-\frac{\text{Log}\left[1+\text{Yy}[\text{zbarb}]-\frac{\text{Yy}[\text{zbarb}]}{U0^{0.42`}}\right]}{1+\text{Yy}[\text{zbarb}]} + \frac{\left(-1+U0^{0.42`}\right) \text{Log}[1+\text{Yy}[\text{zbarb}]]}{U0^{0.42`} + \left(-1+U0^{0.42`}\right) \text{Yy}[\text{zbarb}]}\right)}{\text{Log}[1 + \text{Yy}[\text{zbarb}]]^2}$$

In[•]:=
```
D[FoRBar[zbarb, U0], U0]
```

Out[•]=
$$\frac{0.42\,\text{Xx}[\text{zbarb}]\,\text{Yy}[\text{zbarb}]}{\text{U0}^{1.42}\,\text{Log}[1+\text{Yy}[\text{zbarb}]]\,\left(1+\left(1-\frac{1}{\text{U0}^{0.42}}\right)\text{Yy}[\text{zbarb}]\right)}$$

In[•]:=
```
D[FoRBar[zbarb, U0], U0] == 0.42 Xx[zbarb] Yy[zbarb] / (U0 U0^0.42 Log[1 + Yy[zbarb]] (1 + (1 - 1/U0^0.42) Yy[zbarb]))
```

Out[•]=
```
True
```

In[•]:=
```
F[R_, OoS_, Qla_] = R OoS / Qla
```

Out[•]=
$$\frac{\text{OoS}\,\text{R}}{\text{Qla}}$$

In[•]:=
```
D[F[R, OoS, Qla], R]
```

Out[•]=
$$\frac{\text{OoS}}{\text{Qla}}$$

In[•]:=
```
D[F[R, OoS, Qla], OoS]
```

Out[•]=
$$\frac{\text{R}}{\text{Qla}}$$

In[•]:=
```
D[F[R, OoS, Qla], Qla]
```

Out[•]=
$$-\frac{\text{OoS}\,\text{R}}{\text{Qla}^2}$$

In[•]:=
```
RBar[zbarb_, U0_] = F / FoRBar
```

Out[•]=
$$\frac{\text{F}}{\text{FoRBar}}$$

In[•]:=
```
D[RBar[zbarb, U0], FoRBar]
```

Out[•]=
$$-\frac{\text{F}}{\text{FoRBar}^2}$$