Time Discounting – *Harry R. Lloyd, August 1, 2019*

1 Factors and Rates

Let r denote the time discount **rate**, and δ the time discount **factor**.

$$\delta = \frac{1}{1+r} \qquad\qquad r = \frac{1-\delta}{\delta}$$

2 PDV

PDV of the amount A to be received in t periods' time $= \delta^t A$

PDV of A in perpetuity, beginning *this* period $= \dfrac{A}{1-\delta}$

PDV of A in perpetuity, beginning *next* period $= \dfrac{A}{r}$

We can use the perpetuities formulae to work out the PDV of a time-limited 'annuity'.

3 Earning interest

Value in t periods' time of an amount P invested today:

…with interest compounded once per period $= (1+r)^t P$

…with interest compounded n times per period $= \left(1 + \dfrac{r}{n}\right)^{nt} P$

…with continuous compounding $= \left(\lim_{n\to\infty}\left(1 + \dfrac{r}{n}\right)^n\right)^t P = e^{rt}P$