Short Sales:

Shortseller

\[ t=0 \]
Sell stock

\[ t=T \]
Buy stock

Return stock

Shareholder

\[ t=T \]

Credit Risk

\[ \Rightarrow \text{THE MARGIN ACCOUNT} \]
At \( t=0 \): The initial margin is deposited (a percentage of the borrowed stock \( S(0) \)).
Interest is earned.
At \( t=T \): The balance is withdrawn by the shortseller.

From now on assume no margin account:

\[ \Rightarrow \text{We will focus on only two cases:} \]
- no dividends
- continuous dividends.
Case #1: No dividends.

Initial Cost: \(-S(0)\)  
Payoff: \(-SCT\)  
* per share *

\[ \Rightarrow \text{Profit} = \text{Payoff} - FV_{0,T} (\text{Init. Cost}) \]
\[ = -SCT - FV_{0,T} (-S(0)) \]
\[ = -SCT + FV_{0,T} (S(0)) \]

The payoff and profit curves:

If the payoff/profit is a nonincreasing function of the final asset price \(s\), we say that the financial position is SHORT with respect to the underlying (asset).
Case #2. Continuous dividends

\( \delta \) ... dividend yield

\[ \begin{align*}
\text{Initial Cost:} & \quad - S(0) \text{ per share} \\
\text{Profit} & \quad = \text{Payoff} - FV_{0,T} (\text{Initial Cost}) \\
& \quad = - e^{\delta T} S(T) + FV_{0,T} (S(0)) \\
& \quad = - e^{\delta T} S(T) + FV_{0,T} (S(0)) \\
\end{align*} \]

Payoff / Profit Curves:

\[ v(s) = - se^{\delta T} \]

\( v(s) = v(0) e^{r-t} = e^{\delta T} FV_{0,T} (S(0)) \)

Q: How many shares to be returned? \( e^{\delta T} \)

\( \Rightarrow \) The payoff function:

\[ v(s) = - se^{\delta T} \]