Does this imply as p_b increases Q should decrease?

Let's analyze the relationship between p_b and the optimal quantity Q based on the result we derived:

$$Q = L - \frac{(p_b - 1) \cdot \mu_w (Q)^{2\gamma+1}}{\gamma \cdot \sigma^2}$$

Understanding the Relationship between p_b and Q:

- p_b is the price at which the agent can sell the quantity Q of the risky asset.
- Q is the quantity of the risky asset that the agent chooses to sell.

In the expression for Q, the term $(p_b - 1)$ appears in the numerator of the fraction that is subtracted from L. Here's what happens when p_b increases:

1. **Increase in p_b**:
   - As p_b increases, the term $(p_b - 1)$ increases.
   - This increase in $(p_b - 1)$ makes the entire fraction $\frac{(p_b-1)\cdot\mu_w(Q)^{2\gamma+1}}{\gamma\cdot\sigma^2}$ larger.
2. **Effect on Q**:
   - Since Q is given by L minus this fraction, a larger fraction (due to a higher p_b) implies that Q will decrease.

Therefore, **as p_b increases, Q decreases**. This result is intuitive because when the selling price p_b is higher, the agent finds it more attractive to sell more of the asset immediately at the higher price. Consequently, the agent will sell fewer units later at the uncertain future price $p = 1 + z$, which has a risky component.

Conclusion:

Yes, the derived relationship implies that as the selling price p_b increases, the optimal quantity Q that the agent should sell will decrease.

It seems odd that as p_b (the market price of the risky asset)