# The Phillips Curve

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## Shifts of the Phillips curve.

- We studied in class that changes in the unemployment rate ($U$) are reflected in movements along the Phillips curve.
- Whenever these movements imply that $U \neq U_n$, we also have shifts of the Phillips curve, since expectations about inflation in the following period change.
- The curve stops shifting when $U_t = U_n$ again, because inflation expectations remain unchanged.

**Example**

For each period $t$ and with no supply shocks ($\rho = 0$), the Phillips curve is given by:

$$\pi_t = \pi_t^e - \omega(U_t - U_n)$$

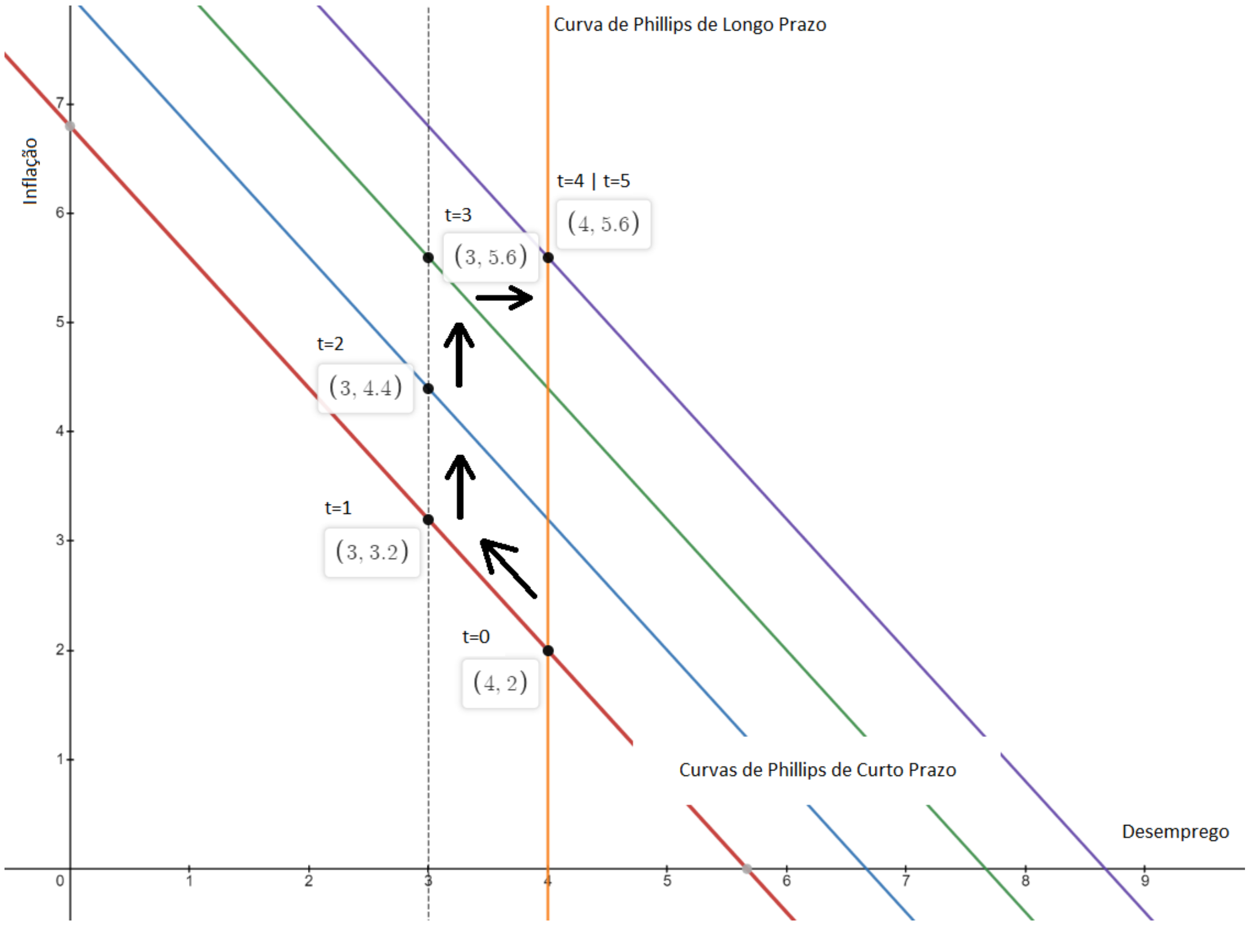
Assume adaptive expectations ($\pi_t^e = \pi_{t-1}$). If $\pi_0^e = \pi_{-1} = 2$, $U_n = 4$, $\omega = 1.2$, define the Phillips curve for each period $t = 0, \ldots, 5$, and calculate the inflation rate when:

1. At $t = 0$, $U_t = 4 \Rightarrow$ Long Run ($U_t = U_n$);
2. At $t = \{1; 2; 3\}$, $U_t = 3$;
3. At $t = \{4; 5\}$, $U_t = 4$.

Represent graphically the curves and the calculated ordered pairs $(U, \pi)$.

**We can summarize the solution to the example in the following table and graph:**

| $t$ | $\pi_t^e = \pi_{t-1}$ | $U_n$ | Phillips Curve | $U_t$ | $\pi_t$ | Curve color |
|---|---|---|---|---|---|---|
| 0 | 2 | 4 | $\pi_0 = 2 - 1.2(U_0 - 4)$ | 4 | 2 | Red |
| 1 | 2 | 4 | $\pi_1 = 2 - 1.2(U_1 - 4)$ | 3 | 3.2 | Red |
| 2 | 3.2 | 4 | $\pi_2 = 3.2 - 1.2(U_2 - 4)$ | 3 | 4.4 | Blue |
| 3 | 4.4 | 4 | $\pi_3 = 4.4 - 1.2(U_3 - 4)$ | 3 | 5.6 | Green |
| 4 | 5.6 | 4 | $\pi_4 = 5.6 - 1.2(U_4 - 4)$ | 4 | 5.6 | Purple |
| 5 | 5.6 | 4 | $\pi_5 = 5.6 - 1.2(U_5 - 4)$ | 4 | 5.6 | Purple |




**In a less condensed way:**

- At $t = 0$ we are in a situation where $U_0 = U_n = 4$ and $\pi_0 = 2$. There is no change in inflation expectations for the next period, which will again be equal to 2;
- At $t = 1$, $(U_1 = 3) < (U_n = 4)$, which generates a movement along the red curve (the expression of the Phillips curve remains unchanged), with the inflation rate changing to $\pi_1 = 3.2$ – this will be the expected inflation rate for the next period;
- At $t = 2$, expected inflation is now different, which translates into a shift from the red curve to the blue curve (the expression of the Phillips curve has changed). Here, we still have $(U_2 = 3) < (U_n = 4)$, so $\pi_2 = 4.4$ – this will be the expected inflation rate for the next period.
- At $t = 3$, expected inflation is now different, which translates into a shift from the blue curve to the green curve (the expression of the Phillips curve has changed). Here, we still have $(U_3 = 3) < (U_n = 4)$, so $\pi_3 = 5.6$ – this will be the expected inflation rate for the next period.
- At $t = 4$, expected inflation is now different, which translates into a shift from the green curve to the purple curve (the expression of the Phillips curve has changed). Now, we have $U_4 = U_n = 4$, so $\pi_4 = 5.6$. There is no change in inflation expectations for the next period, which will again be equal to 5.6;
- At $t = 5$, expected inflation remains unchanged (the expression of the Phillips curve remains unchanged). We still have $U_5 = U_n = 4$, so $\pi_5 = 5.6$. We remain on the purple curve.