1 Money Taxation

Consider an economy with a single commodity, \( \ell = 1 \), chocolate. There are 5 consumers, so \( n = 5 \). The endowments are defined by
\[
\omega = (\omega_1, \omega_2, \omega_3, \omega_4, \omega_5)
\]
\[
= (900, 800, 700, 600, 500)
\]
measured in ounces of chocolate.

1.1 A Single Currency

There is one money, dollars. The chocolate price of money is \( P^m \geq 0 \). In each of the following cases, solve for the set \( P^m \) of equilibrium prices \( P^m \), given the following tax policies \( \tau \), and the set of equilibrium commodity allocations, \( x = (x_1, x_2, \ldots, x_5) \). Provide the units in which the variables are measured.

a) \( \tau = (\tau_1, \tau_2, \tau_3, \tau_4, \tau_5) = (2, 1, 0, 0, -3) \)

b) \( \tau = (10, 5, 0, -8, -7) \)

c) \( \tau = (20, 2, 1, -2, -20) \)

1.2 Two Monies

Consider a scenario where there are 2 monies, red dollars \( R \) and blue dollars \( B \), with respective chocolate prices of money, \( P^R \geq 0 \) and \( P^B \geq 0 \).

In each of the following cases, solve for the equilibrium exchange rate between \( B \) and \( R \). Do these depend on the endowments \( \omega \)? Give the economic explanation for your answer.

For each of the 3 cases, solve for the set of equilibrium allocations.

a) \( \tau^R = (1,1,1,1,-3) \) and \( \tau^B = (1,0,0,0,-2) \)

b) \( \tau^R = (1,1,0,-1,-2) \) and \( \tau^B = (1,1,1,0,-2) \)

c) \( \tau^R = (3,2,1,0,-6) \) and \( \tau^B = (4,0,-1,-1,-2) \)