Primary question:
What is the effect \( \frac{dTB}{dE} \) of a devaluation on the trade balance?

Secondary question:
How much must the exchange rate \( E \) change to clear \( TB \) by itself?
- e.g., if it floats, i.e., no forex intervention by the central bank
- and no offsetting capital flows.

Model: Elasticities Approach
Key derivation: Marshall-Lerner Condition
Goods market pricing in open-economy models: Overview of alternative assumptions in API120

(1) Traditional Two-good Models (X & M)

(1a) Producer Currency Pricing (Lectures 1-5):
Keynesian special case --
Supply of each good is infinitely elastic in short run =>
P is fixed in terms of its own currency: \( P = \overline{P} \), \( P^* = \overline{P^*} \).

+ Full and instantaneous pass-through =>
domestic price of import given by \( EP^* \),
where \( E = \) exchange rate (domestic units /foreign) and \( P^* = \) foreign price of good produced there.

Key relative price is foreign goods vs. domestic: \( EP^*/P = E\overline{P^*}/\overline{P} \).
Most imports are invoiced in foreign currency, (except for the US), which often means pass-through is immediate.

The fraction of each country’s imports invoiced in a foreign currency.

Gita Gopinath, 2015, “The International Price System,” (Jackson Hole). NBER WP No.21646, Figure 5
Goods market pricing in open-economy models: Alternative assumptions (continued)

(1b) **Local Currency Pricing special case:**
No passthrough --
Price of importable good in domestic market is fixed in terms of domestic currency, in short run.

(1c) **Pricing To Market:**
Partial passthrough --
Importers engage in price discrimination, depending on elasticity of substitution vs. local competing goods.
(2) Small Open Economy Models (Lectures 14-18):
All tradable goods prices are determined on world markets.

(2a) *Frictionless neo-classical model* (or equilibrium model):  
*All goods are tradable.*
Thus overall domestic price level is given: \( P = EP^* \)

(2b) *NTG or Salter-Swan model*:
There exists 2\(^{nd}\) class of goods, non-traded (internationally): NTGs.

Key relative price is now the relative price of NTGs vs. TGs.
The Marshall-Lerner Condition:

Under what conditions does devaluation improve the trade balance?

• We can express the trade balance either in terms of foreign currency: $TB^*$,
  – e.g., if we are interested in determining the net supply of foreign exchange in the fx market (balance of payments)

• Or in terms of domestic currency: $TB$
  – e.g., if we are interested in net exports as a component of $GDP \equiv C+I+G+(TB)$.

• We will focus on $TB^*$ here, and on $TB$ in Prob. Set 1.
# How the Exchange Rate, $E$, Influences BoP

## ASSUMPTIONS:

1. **No capital flows or transfers**
   - $\Rightarrow$ BoP = TB

2. **PCP**: Price in terms of producer’s currency;
   - Supply elasticity = $\infty$.

3. **Complete exchange rate passthrough**:
   - Price of $X$ in foreign currency $= \frac{P}{E}$
   - Price of Imports in domestic currency $= E \frac{P^*}{E}$

4. **Demand is a decreasing function of price**
   - $\Rightarrow$ $X = X_D \left( \frac{P}{E} \right)$
   - $\Rightarrow$ $M = M_D \left( E \frac{P^*}{E} \right)$

$\Rightarrow$ Net supply of FX = $TB$ expressed in foreign currency $\equiv TB^*$

\[
= \frac{P}{E} X_D \left( \frac{P}{E} \right) - \frac{P^*}{E} M_D \left( E \frac{P^*}{E} \right).
\]
Derivation of the Marshall-Lerner Condition

\[ TB^* = \left( \frac{1}{E} \right) X_D(E) - M_D(E). \]

Differentiate:

\[ \frac{dT B^*}{dE} = - \left( \frac{1}{E^2} \right) X + \left( \frac{1}{E} \right) \left( \frac{dX_D}{dE} \right) - \left( \frac{dM_D}{dE} \right) \]

Multiply by \( E^2/X. \)

This derivative > 0 iff:

\[ -1 + \left( \frac{E}{X} \right) \left( \frac{dX_D}{dE} \right) - \left( \frac{E^2}{X} \right) \left( \frac{dM_D}{dE} \right) > 0. \]

Define elasticities:

\[ \varepsilon_X \equiv \left( \frac{dX_D}{dE} \right) \left( \frac{E}{X} \right) \quad \varepsilon_M \equiv - \left( \frac{dM_D}{dE} \right) \left( \frac{E}{M} \right). \]

The condition becomes:

\[ -1 + \left( \varepsilon_X \right) + \left( \frac{EM}{X} \right) \left( \varepsilon_M \right) > 0. \]
Assume for simplicity we start from an initial position of balanced trade: $EM = X$.

Then the inequality reduces to:

$$-1 + (\varepsilon_X) + \left(\frac{EM}{X}\right)(\varepsilon_M) > 0.$$  

This is the Marshall Lerner condition.

If the initial position is trade deficit (or surplus), then the necessary condition for $dTB^*/dE > 0$ will be a bit easier (or harder) for the elasticities to meet.
Alternate approaches to determination of external balance

- Elasticities Approach to the Trade Balance
- Keynesian Approach to the Trade Balance
- Mundell-Fleming Model of the Balance of Payments
- Monetary Approach to the Balance of Payments
- NonTraded Goods Model of the Trade Balance
- Intertemporal Approach to the Current Account
END OF LECTURE 1: THE MARSHALL-LERNER CONDITION