

ECO 403 – L0301

Developmental Macroeconomics

Lecture 7

Inflation, Interest Rate, and Currency Appreciation

Is Inflation Always “Bad”?

- What are the main **costs** of inflation? Who bears these costs?
 - It erodes the **value** of money
 - By creating greater **uncertainty**, it reduces investment
- The costs of **hyperinflation** are undisputable
 - For example, Germany (early 1920s), Hungary (1945), Argentina (late 1980s), Zimbabwe (2008)
- Mainstream economists have exploited people’s fear of high inflation to push for excessive **anti-inflationary policies**
 - Only zero inflation is both **low** and **stable**
- Some studies suggest that inflation rates up to 10 percent do not affect economic growth, while others suggest rates of up to 20 percent

What Is the Cause of Inflation?

- **Orthodox economists** believe that “inflation is always and everywhere a **monetary** phenomenon” (Friedman)
 - Too much **money** chasing too few goods
 - Inflation is the result of excessive **demand** due to too much money in the economy
 - The solution then is to implement **contractionary** monetary policy
- **Post-Keynesian economists** believe that inflation is the result of **cost** considerations
 - It is thus **supply**-determined rather than **demand**-determined
 - Therefore, **contractionary** monetary policy will not necessarily have the desired effects

Post-Keynesian View of Inflation

- According to this view, **demand** plays a relatively small role in the determination of prices
- They distinguish between two main types of goods:
 - **Flex-price goods** (e.g., commodities) whose prices are determined by the market
 - **Fixed-price goods** (e.g., manufactured goods) whose prices are set by firms as a **markup** over production costs
- If **wages** increase, for instance, the firm can:
 - Leave the **markup** unchanged and pass the increase to consumers → **Cost-push inflation**
 - Reduce the **markup** and absorb the higher cost (resulting in lower **profit** margins)

Some Comments on the Theory of Inflation (Bresser-Pereira et al)

- Theories of inflation distinguish among those factors that **accelerate** inflation, those that **sustain** inflation, and those that **sanction** inflation
- Factors that **accelerate** inflation include:
 - Excess **demand**
 - **Monopolistic** increases in prices
 - **Wage** increases above productivity
 - Changes in **relevant prices** (e.g., energy, exchange rate)
- Factors that **sustain** inflation include formal or informal **indexation** of the economy that results in **inertial** inflation
- Factors that **sanction** inflation include most particularly increases in the **supply of money**

Exchange Rate, Inflation and Real Wages

- Increases in nominal **wages** above **productivity** are the main cause of **acceleration** of inflation
 - Increases in unit labour costs reduce **profit** margins and firms react by increasing their **prices**

- If **nominal** wages (w) and **prices** (p) increase in the same proportion while **productivity** remains constant:
 - Then **real** wages (w/p) remain constant

- If **domestic** prices (p) and the **nominal** exchange rate (e) increase in the same proportion while **foreign** prices (p^*) remains constant:
 - Then the **real** exchange rate (ep^*/p) remains constant

Exchange Rates, Inflation and Real Wages (cont'd)

- A decrease in the *real* exchange rate (i.e., a real *appreciation* of the *currency*) implies:
 - A decrease in domestic *prices* of *tradable* goods
 - An increase in real *wages*
 - Lower *inflation*
 - This explains why currency *appreciation* is so attractive to policymakers:
 - It performs the “*miracle*” of simultaneously increasing *wages* and lowering *inflation*
- But lower *prices* of *tradable* goods implies lower *expected profit rates* and a decrease in *investment* in this sector

The Link Between the Exchange Rate and Real Wages

- Consider a small open economy producing just one good using *labour* and *imported* inputs
 - This good is both a *consumption* and an *investment* good
 - Firms set prices (p) as a constant markup (z) over unit costs

- $$p = (1 + z)(wa_1 + ep^*a_0) \quad (9.1)$$

(where w = nominal wage, e = nominal exchange rate, p^* = price of imported input in foreign currency, a_0 = imported input share in production, and a_1 = labour share in production)

- Labour *productivity* is assumed to be constant, and the good produced is also assumed to be an *imperfect substitute* for similar final goods produced abroad

The Link Between the Exchange Rate and Real Wages (cont'd)

- Let's call $V = w/p$ the real wage and $\theta = ep^*/p$ the real exchange rate
- A currency **devaluation** (i.e., $\Delta e > 0$ and thus $\Delta\theta > 0$) increases the **competitiveness** of domestic firms relative to foreign firms producing similar final goods abroad
 - Therefore, domestic firms can increase their **markups**

- The **markup** can thus be expressed as a function of θ

$$z = z_0 + z_1\theta \quad (9.2)$$

- Since $p = (1 + z)(wa_1 + ep^*a_0)$, as θ rises p increases even when z remains constant
 - If z rises, then p increases even more

The Link Between the Exchange Rate and Real Wages (cont'd)

- Let's divide equation (9.1) by p to obtain:

$$\mathbf{1} = (\mathbf{1} + \mathbf{z})(V\mathbf{a}_1 + \theta\mathbf{a}_0) \quad (9.3)$$

- And replacing equation (9.2) in equation (9.3) we obtain:

$$\mathbf{1} = (\mathbf{1} + \mathbf{z}_0 + \mathbf{z}_1\theta)(V\mathbf{a}_1 + \theta\mathbf{a}_0)$$

- And solving for V we get:

$$V = [(\mathbf{1} - \mathbf{a}_0(\mathbf{1} + \mathbf{z}_0)\theta - \mathbf{z}_1\mathbf{a}_0\theta^2)] / [\mathbf{a}_1(\mathbf{1} + \mathbf{z}_0) + \mathbf{z}_1\mathbf{a}_1\theta]$$

- And differentiating V with respect to θ we get:

$$\frac{\partial V}{\partial \theta} = - \frac{[(\mathbf{a}_0(\mathbf{1} + \mathbf{z}_0) + \mathbf{z}_1(\mathbf{a}_1V + 2\mathbf{a}_0\theta))]}{[\mathbf{a}_1(\mathbf{1} + \mathbf{z}_0) + \mathbf{z}_1\mathbf{a}_1\theta]} < 0$$

The Link Between the Exchange Rate and Inflation

- Assume workers have a **real wage** target (\bar{V}) that defines a value of θ compatible with a stable **inflation** rate
 - Let's call $\theta^{eq\ inf}$ to this real exchange rate
- Suppose $\theta^{eq\ inf}$ is the current **real** exchange rate but it's lower than the **industrial** equilibrium real exchange rate (θ_{ei})
- If the government **revalues** θ (i.e., **devalues** the **currency** in real terms) to align it with θ_{ei} then:
 - V will drop and workers will now demand higher w
 - Firms will transfer this higher cost to p and **inflation** will rise
 - Unions will demand further wage increases and a **wage-price spiral** will ensue leading to **hyperinflation**

The Link Between the Exchange Rate and Inflation (cont'd)

- The rate of change in *nominal* wages (\hat{w}_t) is determined by:

①
$$\hat{w}_t = \alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}$$

where \hat{p}_{t-1} is the inflation rate of the previous period

- The *inflation* rate (\hat{p}_t) will be a weighted average between \hat{w}_t and the rate of change of the nominal exchange rate (\hat{e}_t):

②
$$\hat{p}_t = \alpha_1 \hat{w}_t + (1 - \alpha_1) \hat{e}_t$$

- The rate of change in the *real* exchange rate ($\hat{\theta}_t$) is:

③
$$\hat{\theta}_t = \hat{e}_t + \hat{p}_t^* - \hat{p}_t$$

where \hat{p}_t^* is the foreign inflation rate

The Link Between the Exchange Rate and Inflation (cont'd)

- Suppose the government gradually revalues θ_t until it reaches the industrial equilibrium rate (θ_{ei})

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$$\hat{\theta}_t = \alpha_2(\theta_{ei} - \theta_t)$$

- We will show below that the rate of *inflation* will be:

$$\hat{p}_t = \hat{p}_{t-1} + \alpha_0(\bar{V} - V_t) + [(\alpha_2/\alpha_1)(1 - \alpha_1)](\theta_{ei} - \theta_t)$$

- This equation shows that \hat{p}_t depends on:
 - Inflationary *inertia* (\hat{p}_{t-1})
 - Wage *misalignment* ($\bar{V} - V_t$)
 - Degree of *undervaluation* of θ_t

The Link Between the Exchange Rate and Inflation (cont'd)

$$(1) \hat{w}_t = \alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}$$

$$(2) \hat{p}_t = \alpha_1 \hat{w}_t + (1 - \alpha_1) \hat{e}_t$$

$$(3) \hat{\theta}_t = \hat{e}_t + \hat{p}_t^* - \hat{p}_t$$

$$(4) \hat{\theta}_t = \alpha_2(\theta_{ei} - \theta_t)$$

- From (3) and assuming $\hat{p}_t^* = \mathbf{0}$, we get:

$$\hat{e}_t = \hat{\theta}_t + \hat{p}_t$$

- Plugging (1) and $\hat{e}_t = \hat{\theta}_t + \hat{p}_t$ into (2), we get:

$$\hat{p}_t = \alpha_1[\alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}] + (1 - \alpha_1)(\hat{\theta}_t + \hat{p}_t)$$

$$\hat{p}_t - (1 - \alpha_1)\hat{p}_t = \alpha_1[\alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}] + (1 - \alpha_1)\hat{\theta}_t$$

$$\alpha_1\hat{p}_t = \alpha_1[\alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}] + (1 - \alpha_1)\hat{\theta}_t$$

The Link Between the Exchange Rate and Inflation (cont'd)

$$(1) \hat{w}_t = \alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}$$

$$(2) \hat{p}_t = \alpha_1 \hat{w}_t + (1 - \alpha_1) \hat{e}_t$$

$$(3) \hat{\theta}_t = \hat{e}_t + \hat{p}_t^* - \hat{p}_t$$

$$(4) \hat{\theta}_t = \alpha_2(\theta_{ei} - \theta_t)$$

- Consider the equation from the previous slide:

$$\alpha_1 \hat{p}_t = \alpha_1 [\alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}] + (1 - \alpha_1) \hat{\theta}_t$$

- Plugging (4) into the above equation, we get:

$$\alpha_1 \hat{p}_t = \alpha_1 [\alpha_0(\bar{V} - V_t) + \hat{p}_{t-1}] + (1 - \alpha_1) \alpha_2 (\theta_{ei} - \theta_t)$$

- And dividing by α_1 , we get:

$$\hat{p}_t = \hat{p}_{t-1} + \alpha_0(\bar{V} - V_t) + [(\alpha_2/\alpha_1)(1 - \alpha_1)](\theta_{ei} - \theta_t)$$

The Link Between the Exchange Rate and Inflation (cont'd)

$$\hat{p}_t = \hat{p}_{t-1} + \alpha_0(\bar{V} - V_t) + [(\alpha_2/\alpha_1)(1 - \alpha_1)](\theta_{ei} - \theta_t)$$

- Therefore, the rate of inflation (\hat{p}_t) resulting from a currency devaluation depends on:
 - Last period's inflation (\hat{p}_{t-1}) which explains inflationary *inertia* (i.e., *expectations* of inflation)
 - Any wage *misalignment* with workers' target ($\bar{V} - V_t$)
 - Degree of *undervaluation* of θ_t (i.e., degree of real *overvaluation* of the *currency*)
- What would happen if workers successfully resist a decrease in their *real* wages (i.e., $V_t = \bar{V}$)?

The Link Between the Exchange Rate and Inflation (cont'd)

$$\hat{p}_t = \hat{p}_{t-1} + \alpha_0(\bar{V} - V_t) + [(\alpha_2/\alpha_1)(1 - \alpha_1)](\theta_{ei} - \theta_t)$$

- If workers resist the reduction in real wages, then $V_t = \bar{V}$ and the rate of inflation becomes:

$$\hat{p}_t = \hat{p}_{t-1} + [(\alpha_2/\alpha_1)(1 - \alpha_1)](\theta_{ei} - \theta_t)$$

- In this context, a continuous revaluation of θ_t will cause a continuous **acceleration** of the inflation rate (i.e., $\hat{p}_t > \hat{p}_{t-1}$)
- This **inflation** spiral is due to workers' demand for increases in w to offset the increase in θ , and firms passing these higher **costs** to **prices** to protect their **profit** margins

The Link Between the Exchange Rate and Inflation (cont'd)

- If workers successfully resist any decrease in V_t , then the θ_t cannot be revalued since \hat{p}_t also rises
 - To increase θ_t to the level of θ_{ei} requires keeping \hat{w}_t increases below \hat{e}_t increases
 - This will require a temporary **reduction** in the **demand** for labour or an agreement (**social pact**) with the unions
- For θ_t to be revalued and \hat{p}_t to remain constant, workers must be willing to accept the needed reduction in V_t

- Note that $\theta_{ei} > \theta_t$ implies $V_t > \bar{V}$, i.e., an overvalued V_t
 - If $\hat{p}_t = \hat{p}_{t-1}$, then $V_t = \bar{V} + \frac{\alpha_2}{\alpha_0 \alpha_1} (1 - \alpha_1)(\theta_{ei} - \theta_t)$

Using the Exchange Rate as an Anchor to Control Inflation

- The *exchange rate* is usually used to control *inflation* and particularly *hyperinflation*
- For this policy to be *successful* (and thus *credible*), the government must also:
 - Secure international *loans* to guarantee the policy
 - Adopt a firm *fiscal policy* of expenditure reduction
- The use of the *exchange rate* as an anchor during *hyperinflation* situations may be valid
 - But not in order to simply meet the *inflation target*
 - Maintaining θ_t around θ_{ei} is as important as controlling \hat{p}_t

Using the Exchange Rate as an Anchor to Control Inflation (cont'd)

- In order to control *inflation*, the central bank must gain *credibility*
 - But there is a *circular* problem: Its *credibility* depends on the *inflation target* being met
- It takes time for *interest rate* policy to control *inflation*
 - Thus it becomes tempting to use the *exchange rate* as well
- The use of the *exchange rate* as an anchor to control *inflation* is not always admitted
 - Neoclassical economics assumes the *interest rate* to be the only legitimate instrument

Using the Exchange Rate as an Anchor to Control Inflation (cont'd)

- But how can the domestic **currency** be appreciated in real terms when most countries have adopted a **floating exchange-rate** regime?
- The simplest way is doing nothing to allow the **currency** to **appreciate** and become **overvalued** (i.e., the natural **tendency**)
- After a violent currency **devaluation** following a balance-of-payment crisis, a short period of “**healthy**” appreciation follows and θ_{ei} is reached
 - Although further **appreciation** becomes **perverse**, this is welcome by those who prioritize **inflation** control over **employment** and **growth**

High Interest Rate Levels and Currency Appreciation

- High *interest rates* used to control *inflation* also result in currency *appreciation*
- High *interest rates* attract *foreign capital* but do not promote productive *investment*
 - Currency *appreciation* reduces *investment* opportunities
 - Opportunity cost of *investment* rises, and thus *investment* falls
 - High substitution of *foreign* for *domestic savings*
- Further, high *interest rates* increase cost of servicing government *debt* thus reducing *government spending*

Carry Trade and Currency Appreciation

Carry trade is defined as “a strategy in which an investor sells a certain **currency** with a relatively **low interest rate** and uses the funds to purchase a different **currency** yielding a **higher interest rate**” (*Investopedia*)

- Financial **crises** are characterized by a sharp **depreciation** of the currency (i.e., $\theta_{ei} < \theta_t$)
- The combination of **high interest rates** with expectations of a gradual **appreciation** of the **currency** attracts foreign capital
 - Thus investors engage in **carry trade** and the **currency** appreciates (i.e., it becomes a **self-fulfilling prophecy**)
- Eventually θ_t falls to the level where a deficit in the current account arises and a new financial crisis ensues

Budget Deficits and Currency Overvaluation

- Chronic and high **fiscal deficits** are not desirable
 - Public **debt** should be moderate and constant relative to GDP
 - **Expansionary** fiscal policy is necessary during **recessions** (i.e., when private sector is not spending)
- If a country neutralizes its **Dutch disease**, it should have:
 - A moderate **current account** surplus since $\theta_t = \theta_{ei} > \theta_{cc}$
 - A balanced **budget** (or a small surplus)
- Policy of high fiscal (**structural**) deficits is a cause of currency **overvaluation**
 - **Expansionary** fiscal policy during **economic booms** causes **inflation** to rise and θ_t to fall