Traded and non-traded goods
ECON4330 Spring 2013 Lecture 12A

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Different market structures

Mundell-Fleming

- all goods are traded
- law of one price holds for all goods
- producers are price setters, even small countries have market power

Alternatives

- non-traded goods
- competitive international markets
- pricing to market (price discrimination)
- local currency pricing
- multinationals, outsourcing

Assumptions

- Small open economy
- Two goods:
  - ▶ traded, subscript t
  - ▶ non-traded, subscript n
- Producers of traded goods are price takers
- Labor is mobile between sectors
- Nominal wage given
- Fixed exchange rate

Short-run equilibrium

$$\Pi_t$$

$C_t + G_t$

X

Y_t

EP_*/W

Traded goods

Y_t

$$\Pi_n$$

$C_n + G_n$

Y_n

Non-traded goods
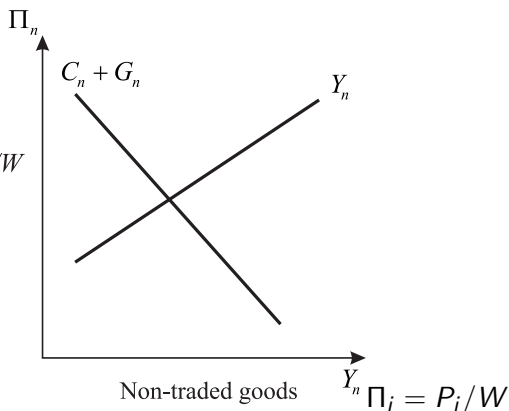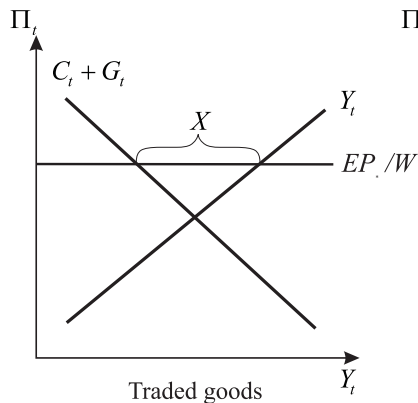
Y_n $\Pi_i = P_i/W$

= real price, Y_i = output, C_i, G_i = consumption, $\Pi_t = EP*/W$

Effect of increased G_n

Π_t

$C_t + G_t$ Y_t

$EP_{\cdot}/W$

Traded goods Y_t

Π_n

$C_n + G_n$ Y_n

$G_n \nearrow$

Non-traded goods Y_n Start with
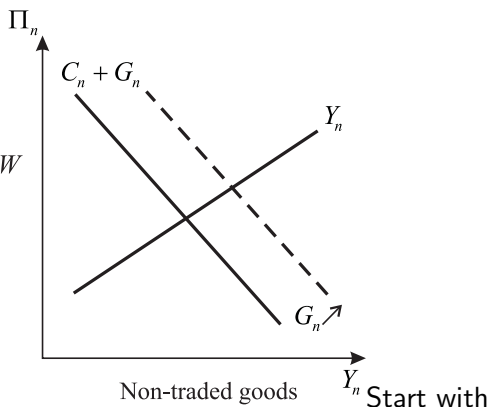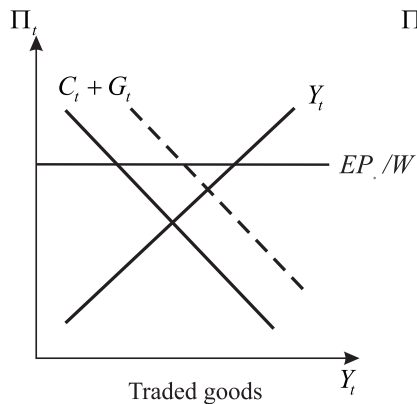
Y_t, then Y_n, then C_t, then X_t

Devaluation

Π_t

$C_t + G_t$

Y_t

$E \nearrow$ $EP_/W$

Traded goods Y_t

Π_n

$C_n + G_n$

Y_n

Non-traded goods Y_n A wage
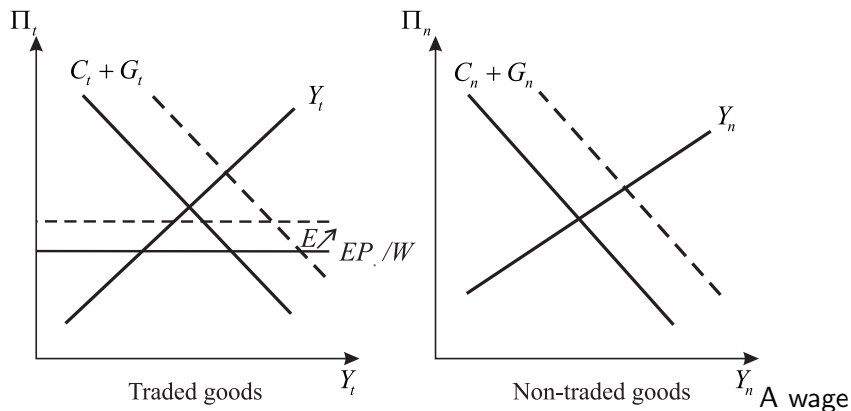
increase has the opposite effect of a devaluation

Medium-run dynamics

The temporary equilibrium:

$$N = N(\underset{-}{\omega_t}, \underset{+}{G_n}, \underset{-}{\tau}) \tag{1}$$

$\omega_t = W/EP_* = \Pi_t^{-1} = $ real wage
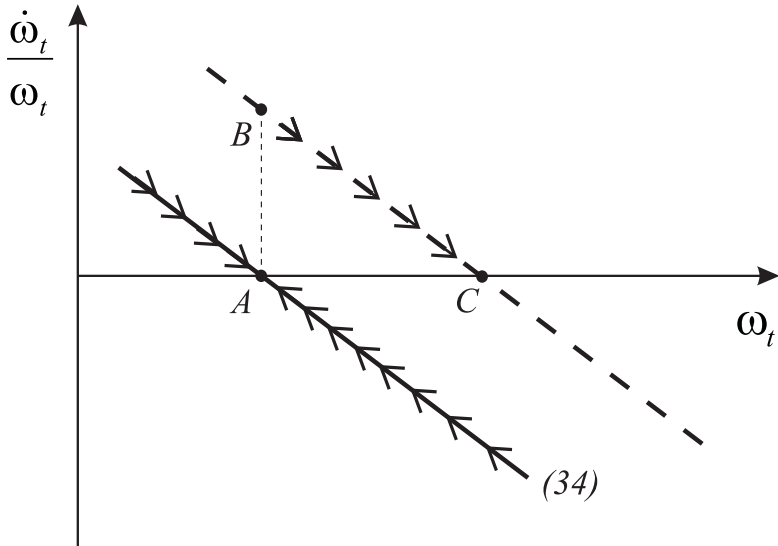Phillips curve:

$$\frac{\dot{\omega}_t}{\omega_t} = \gamma[N(\omega_t, G_n, \tau) - \bar{N}] \tag{2}$$

Negative feed-back: High ω_t means $\dot{\omega}_t$ negative
Stationary equilibrium:

$$N(\omega_t, G_n, \tau) = \bar{N} \tag{3}$$

Wage dynamics

government expenditure - Smaller traded-goods sector

Reconsidering wage cuts

- Debt burden increased
- Real income may suffer
- Income distribution may matter

Real income effects

$$Y_{RD} = \frac{\Pi_t Y_t + \Pi_n Y_n + N_g}{\Pi_t C_t^0 + \Pi_n C_n^0} \tag{4}$$

How does an increase in Π_t shift demand for non-traded goods?

- Supply effect: Y_t up $\rightarrow$ Demand for Y_n up
- Substitution effect: $\rightarrow$ Demand up
- Real income effect 1: $\rightarrow$ Demand down if $C_t^0/C_n^0 > Y_t/Y_n$
- Real income effect 2: $\rightarrow$ Demand down if $N_g > 0$
- Income distribution effect: $\rightarrow$ Demand down if marginal propensity to consume higher for wages than profits

$$Y_{RD} = \frac{N_t + N_n + N_g}{\Pi_t C_t^0 + \Pi_n C_n^0} \tag{5}$$

Contractionary devaluations and expansionary wage increases?

Short run: Employment effect of wage cut small or negative if

- Low supply elasticity in t-industry
- Low elasticity of substitution between t- and n-goods
- Deficit on trade balance is large (small t-industry)
- Workers have higher propensities to consume than capitalists
- Investment in t-industry unresponsive to profits there

Challenge for inflation targeting

- Make savings rate in model depend on interest rate
- Interest rate up $\rightarrow$
  - Less demand for non-traded goods
  - Appreciation of currency

Effects of shocks

- Positive domestic demand shock
  - Keep total employment at $\bar{N}$?
  - Employment shifts from traded to non-traded
  - Good or bad?
- Cost-push shock
  - Raise interest rate
  - Disproportional effect on t-industry

Wage formation as a stabilizing mechanism

Simplify:

- No productivity growth
- Prices on n-goods always grow with the same rate as wages

Assume wage growth determined by:

$$\dot{W}/W - \dot{P_t}/P_t = G(N(W/P_t), W/P_t) \tag{6}$$

1. Demand pressure in the labor market, $G_1 > 0$
2. Profitability in traded goods industry, $G_2 < 0$

Define real wage $\omega_t = W/P_t$, write (16) as

$$\dot{\omega}_t = G(N(\omega_t), \omega_t) \tag{7}$$

$$\dot{\omega}_t = G(N(\omega_t), \omega_t)$$

Stable differential equation in ω_t (assuming $N' < 0$)

$$\frac{d\dot{\omega}_t}{d\omega_t} = G_1 N' + G_2 < 0$$

Conclusions

▷ In steady state $\dot{\omega}_t = 0$, $\dot{w} = \dot{e} + \dot{p}_{t*}$, and the equations of the Scandinavian model holds

▷ Concern in wage bargaining for profitability of t-industry contributes to stability irrespective of monetary regime

▷ Shifts in labor demand may produce equilibria with different levels of N and ω_t (see Ch. 7.3).

▷ Active use of the interest rate still required to produce nominal stability both with an exchange rate target and an inflation target

Caution: An equilibrium with a high W/P_t can be undermined in the long run by lack of investment in traded-goods industry.

Purchasing power parity, exchange rate pass-through and pricing-to-market

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Three concepts:

Absolute purchasing power parity - the same broad basket of goods and services costs the same

Relative purchasing power parity - the price ratio between similar broad baskets of goods and services is constant over time

The law of one price - the same commodity costs the same

Law of one price holds for all goods

$\Rightarrow$ Absolute purchasing power holds

$\Rightarrow$ Relative purchasing power holds when the basket is the same

Real exchange rates and PPP

A real exchange rate is a measure of the relative price levels of two countries.

Can be measured in terms of:

- Consumer prices
- Producer prices
- Wage costs

Not to be confused with:

▷ the terms of trade, the relative price between exports and imports (coincides in Mundell-Fleming)

▷ the relative price between traded and non-traded goods (an alternative, less common definition)

Relative purchasing power parity ⇔ Constant real exchange rate (CPI)

Do LOP and PPP hold in the standard models?

Home and foreign goods (Mundell-Fleming)

Law of one price holds

Absolute PPP holds

Relative PPP holds for CPI if no home bias in consumption

Traded and non-traded goods (Two sector)

Law of one price holds for traded goods

LOP does not hold for non-traded goods

PPP does not hold

Digression: Is PPP a theory of exchange rate determination?

PPP one equation between three variables - Not enough to determine the exchange rate on its own

Classical quantity theory: Money supply determines national price levels, PPP determines the exchange rate (Gustav Cassel)

Compare simple monetary model

Does LOP and PPP hold in practice

LOP does not even hold for traded goods

Absolute PPP does not hold

Relative PPP in consumer prices somtimes a good approximation over long horizons

Comparisons of price levels available from OECD, World Bank, EUROSTAT, Penn World Tables

Some empirical results on real exchange rates (consumer prices)

For economies with low or moderate inflation

▷ Changes in real and nominal exchange rates closely correlated (> 0.98) in monthly or yearly data

▷ Volatility in real and nominal exchange rates roughly the same

▷ Few significant trends in real effective exchange rates of rich countries over recent decades (Japan an exception)

▷ Convergence to (relative) PPP over time, but slow (halving time 4 years)

▷ The band of variation over the last 30 years have often been $\pm$ 20 per cent or more

Some empirical results on real exchange rates (consumer prices)

For economies with high and volatile inflation

▷ Lower correlation between changes in real and nominal exchange rates

▷ Volatility lower for real than for nominal exchange rates

▷ Real exchange rates tend to move fairly quickly towards relative PPP

Some lessons

Nominal rigidities are important in low-inflation countries

Short run effect of nominal exchange rate on real exchange rate:

▷ Mundell-Fleming: Share of home goods in home consumption minus share of home goods in foreign consumption

▷ Two-sector: Share of non-traded goods in home consumption (small country)

▷ In data: Close to one

How to explain this?

Exchange rate pass-through: Definition

The share of a change in the nominal exchange rate of a country that is *passed through* to prices in the same country.

Studies of pass-through at different levels:

1. to import prices at border
2. to consumer prices of imported goods
3. to the consumer price index

Our focus: Import prices at border

Pass-through in standard models

MFT-model: Pass-through complete ($=1$) in both directions

Two-sector model: Complete ($=1$) for imports to the small country, none ($= 0$) for imports to the rest of the world
Perfect competition and small country

Empirical results on pass-through to import prices

 ▷ Pass-through to US import prices: 0.5 - 0.6
 ▷ Mostly within the first year or two
 ▷ May have declined lately
 ▷ Higher for smaller countries
 ▷ Estimate for Norway (Naug and Nymoen: 0.6
 ▷ Higher for raw materials
 ▷ Higher and quicker for high-inflation countries

Pass-through to consumer prices of imported goods is lower and slower than to import prices

Reasons for deviations from law of one price

Non-traded goods

Transport and distribution costs

Customs duties, excise taxes

Lags in the adaptation to price changes

Price discrimination

Return to non-traded goods next lecture

Now: 1) Local currency pricing, 2) Pricing to market
Monopolistic competition, differentiated goods

Standard Mundell-Fleming

Exporters set prices in their own currency

Constant demand elasticity

Constant mark-up on marginal costs

$$P = \frac{\varepsilon}{\varepsilon - 1} \frac{W}{A} \qquad (1)$$

A = productivity

Dixit-Stiglitz-preferences

Local currency pricing

Mechanism

- ▷ Costly to change prices
- ▷ Prices set for extended periods
- ▷ In currency of consumer's country
- ▷ Deviations from LOP because of unexpected and transitory movements in exchange rates
- ▷ Slow pass-through for the same reasons
- ▷ Complete pass-through in long run

Objection: International trade used to be invoiced in dollars or the exporter's currency

Answer:

1. Deeper forward markets, easier to hedge exchange rate risk.
2. Pass-through to consumers may still be slow (importers hedging).
3. Slow pass-through to US consistent with dollar's special status

Pricing to market

Price setting based on

   A demand elasticity higher when own price is high relative to competitors' prices

   B demand elasticity differ between countries

A makes mark-up depend on competitor's prices as in

$$P = B(W/A)^{\alpha}(EP_*)^{1-\alpha} \qquad (2)$$

α lower when there is more competition, e.g. closer substitutes
More competitors in bigger markets because of fixed costs of entry?

Objection: Reexport may set narrow limits for price discrimination

Pricing to market

$$P_{hj} = B_{hj}(W/A)^{\alpha_j}(EP_{fj})^{1-\alpha_j} \quad j = h, f \tag{3}$$

First subscript: Origin; Second subscript: Destination

$$P_{fj} = B_{fj}(W_*/A_*)^{\beta_j}(P_{hj}/E)^{1-\beta_j} \quad j = h, f \tag{4}$$

In reduced form:

All prices proportional to weighted average of unit wage costs at home and abroad

In each market the foreign producer has a higher weight on foreign costs than the domestic producer

Pricing to market: Some consequences:

▷ Less pass-through to import prices

▷ More pass-through to domestic price of home goods (often overlooked)

▷ In both markets: Effect of exchange rate on relative price between home and foreign goods less than one to one

▷ Smaller effect on volumes of exports and imports

▷ Effect on terms of trade ambiguous, likely to worsen

Effect of a devaluation of the home currency

Assuming nominal wages and productivity constant.

  At home both prices go up, but
    - less than one for one
    - home goods less than foreign goods

  Abroad both prices go down, but
    - less than one for one
    - home goods more than foreign goods

  Home goods become relatively cheaper everywhere

  Imports to home more expensive in domestic currency

  Exports from home also more expensive in domestic currency

  Terms of trade deteriorate if own cost has higher weight than foreign competitors' cost in price setting

Qualitatively, real effects are the same as in standard MF-models.

Pricing to market: Achievements

Potential explanation for:

   ▷ deviation from law of one price

   ▷ low pass-through to import prices

   ▷ higher pass-through in small countries

   ▷ low response of trade balance to exchange rate

   ▷ low response of inflation to exchange rate in large countries

Policy implications?

Afterthoughts

The same differentiated goods can be produced in different locations
Relative costs may have direct effect on location of production

Price differences exist also when there is no domestic production of close
substitutes. Perhaps demand elasticity depend and mark-up depend on
consumers' income level.

PPP-puzzle (Rogoff): High short run volatility of real exchange rate,
deviations die out slowly