Effects of the Exchange-Rate Regime on Trade: The Role of Price Setting

Alexander Mihailov
University of Lausanne
Plan of talk

• **introduction**
  – literature: traditional, recent (GE vs. PE, ad-hoc vs. micro, rigidity)
  – motivation: new tools to revisit an old debate (in theory, in policy)

• **model**
  – baseline: stochastic NOEM set-up
  – extension: alternative price setting

• **results**
  – relative prices: pass-through $\Rightarrow$ expenditure switching
  – trade shares in output: level and volatility effects

• **conclusion**: a peg cannot increase trade but can stabilise it
Literature

- *trade* and *welfare* comparisons of **exchange-rate regimes**
- *(monetary) uncertainty* => **exchange-rate risk**: inherent in *GE* analysis with risk-*averse* agents
  - **NOEM**: Obstfeld-Rogoff (1995, 1996) exchange-rate *dynamics* “redux” model with *diversified production* of varieties of *one* good
  - Corsetti-Pesenti (1997, 2001): “redux” version under national *specialisation* but *unit* substitutability solvable *without* linearising
  - Obstfeld-Rogoff (1998, 2001): *explicitly stochastic* *GE* framework
- **price setting** in *open* economies => **microfounded** equilibrium allocations
  - Helpman and Razin (1984): *seller’s vs. buyer’s* currency pricing
Objective and approach

- **aim:** to derive and compare the effects of the exchange-rate regime on trade under (monetary) uncertainty in microfounded GE across alternative invoicing conventions, consumer’s currency pricing (CCP) vs. producer’s currency pricing (PCP)

- **methodology:** a stochastic NOEM model of exchange rate and *intra*-industry trade determination as simple as possible so as to allow the insights of a closed-form analytical solution, essentially extending Bacchetta-van Wincoop (2000)
What do I model?

- (joint) distributional assumptions
- exchange-rate regime (policy) assumptions
- price setting (and timing) assumptions
- trade costs assumptions
- trade (share and balance) assumptions
- social welfare
- separability and aggregation assumptions
- cross-country substitutability assumptions
- optimal consumption (split-up)
- leisure (residually determined)
- utility
- pass-through => expenditure switching

The diagram illustrates the relationships between various assumptions and outcomes in a model, including exchange rates, price setting, trade costs, and social welfare.
Preview of principal findings

- under symmetry, monetary shocks and separable utility, the exchange-rate regime does not matter for the expected level of the trade-to-output ratio in any of the two countries (or currency areas)
- but it matters under PCP, and not CCP, in terms of the ex-post volatility of national trade shares
- a peg would thus stabilise them (across states of nature), by preventing exchange rate pass-through on relative prices and, ultimately, expenditure switching
A stochastic NOEM model of intra-industry trade: general set-up

- the “world” exists in a single period, with an initial state 0 and multiple ex-post states $s$ drawn from a state-space $S$
- (ex-ante) symmetry
  - in size: 2 countries (or currency areas), H and F
  - and in economic structure: households preferences, firms technology, government “policy” (modelled via money shocks)
- a continuum of differentiated brands of the same good-type is produced by monopolistic firms, optimising ex-ante
- households consume all brands s.t. standard – time (2), CiA (3), and budget (5) – constraints, optimising ex-post
- governments randomly distribute cash (jointly under peg)
A stochastic NOEM model of intra-industry trade: CCP vs. PCP versions

- **timing** of events: unlike CCP, under PCP (=>LOP=>PPP) the *forex* market opens *before* the *goods* market (F1)
  - the *NER* enters household optimisation, “flexibilizing” the sticky-price framework via import prices, hence consumer price levels
  - this *pass-through* then induces expenditure switching

- H (and F) **households** maximise (1) $u(c_s, l_s)$ with (8):
  \[
  c_s \equiv \left[ \left( \frac{1}{2} \right)^{\frac{1}{\varphi}} (c_{H,s})^{\varphi - 1} + \left( \frac{1}{2} \right)^{\frac{1}{\varphi}} (c_{F,s})^{\varphi - 1} \right]^{\frac{\varphi}{\varphi - 1}}
  \]

- S.t. technology (7), H (and F) **firms** maximise expected real profits by presetting *two* prices under CCP (14) and *one* price under PCP (15): due to symmetry, they are *equal*
Equilibrium NER and trade shares under float: CCP vs. PCP

- **NER:** (23)
  \[
  S_s^C = \frac{M_s}{M^*_s} \quad S_s^P = \left(\frac{M_s}{M^*_s}\right)^{\frac{1}{\phi}}
  \]

- **trade-to-GDP:** CCP (32) and (34) vs. PCP (33) and (35)

  \[
  (ft)^C_{H} = \frac{2}{\left(\frac{P^C_H}{P^*_C_H}\right)^{1-\phi} + 1} = \frac{2}{\left(\frac{E_0[u_{1,s}M_s^*]}{E_0[u_{1,s}M^*_s]}\right)^{1-\phi} + 1} = \frac{2}{\left(\frac{E_0[u^*_1M^*_s]}{E_0[u^*_1M^*_s]}\right)^{1-\phi} + 1} = \frac{2}{\left(\frac{P^*_C}{P^*_H}\right)^{1-\phi} + 1} = (ft)^C_F
  \]

  \[
  (ft)^P_{H,s} = \frac{2}{\left(\frac{P^P_s}{P^*_P_s}\right)^{\phi-1} + 1} = \frac{2}{\left(\frac{M_s}{M^*_s}\right)^{\phi-1} + 1} = \frac{2}{\left(\frac{M^*_s}{M_s}\right)^{\phi-1} + 1} = (ft)^P_{F,s}
  \]

  \[
  (ft)^P_{F,s} = \frac{2}{\left(\frac{P^P_s}{P^*_P_s}\right)^{\phi-1} + 1} = \frac{2}{\left(\frac{1}{S^P_s}\right)^{\phi-1} + 1} = \frac{2}{\left(\frac{M^*_s}{M_s}\right)^{\phi-1} + 1}
  \]
Microfounded macroresults under \textit{float}

• \textbf{price setting does not matter} for relative real consumption (P1), trade balances (P3), world trade-to-output (P6) and expected national trade shares (P7)

• \textbf{price setting matters}, in the following sense
  – consumption bias for the products of the expansionary country generally arises in both countries under PCP but is always absent under CCP (P2)
  – output, employment and leisure are generally not equal across nations under PCP but are always equal under CCP (P4)
  – monetary expansion has always beggar-thy-neighbour impact under CCP but may be beggar-thyself under PCP (P5)
Effects of peg under PCP

• **on relative prices:** *equalises* them across countries, at 1 under *full* symmetry, by preventing *pass-through* (C1)

• **on trade shares:** stabilises them across states of nature, at 1 under *full* symmetry, by shutting down the *expenditure switching* channel (C1)
  – this *trade* stabilisation effect is quantitatively important
  – but its *welfare* implications are sensitive to the specification of utility and money shock distributions
  => need for further study (under stronger restrictions...)


What have we learnt?

- a peg **cannot increase** expected trade measured in terms of output relative to a float, *no matter* the richer price-setting menu available to monopolistic producers in *open* economies
- with *some* degree of PCP in (bilateral) trade, a peg **can** nevertheless **stabilise** national trade shares at their expected level, identical under symmetry
- this **difference** in the impact of the exchange-rate regime on intra-industry trade originates in the *pass-through* and *expenditure-switching* channel