The Shock Matter: Improving our Estimates of Exchange Rate Pass Through
Kristin Forbes Ida Hjortsoe and Tsveti Nenova (FHN)

Discussion by Giancarlo Corsetti
Cambridge University and CEPR

Rethinking the Link Between Exchange Rates and Inflation: Misperceptions and New Approaches
Bank of England, 28 September 2015
What does a stronger pound mean for UK inflation?
This paper: summary and praise

- What does a stronger pound mean for UK inflation?
  - Warning against “rule-of-thumb” approach to assessing pass through
What does a stronger pound mean for UK inflation?

- Warning against “rule-of-thumb” approach to assessing pass through
- ‘not constant’
What does a stronger pound mean for UK inflation?

- Warning against “rule-of-thumb” approach to assessing pass through
- ‘not constant’
- depends on what causes the pound to appreciate
This paper: summary and praise

- What does a stronger pound mean for UK inflation?
  - Warning against “rule-of-thumb” approach to assessing pass through
  - ‘not constant’
  - depends on what causes the pound to appreciate
  - need to identify shocks

Evidence from theory-consistent VAR exercise

large differences across identified shocks (long-run and sign restrictions)

pass-through highest in response to monetary policy shocks and 'global shocks'

A most welcome back-to-basics exercise
This paper: summary and praise

- What does a stronger pound mean for UK inflation?
  - Warning against “rule-of-thumb” approach to assessing pass through
    - ‘not constant’
    - depends on what causes the pound to appreciate
    - need to identify shocks

- Evidence from theory-consistent VAR exercise
This paper: summary and praise

- What does a stronger pound mean for UK inflation?
  - Warning against “rule-of-thumb” approach to assessing pass through
  - ‘not constant’
  - depends on what causes the pound to appreciate
  - need to identify shocks

- Evidence from theory-consistent VAR exercise
  - large differences across identified shocks (long-run and sign restrictions)

A most welcome back-to-basics exercise
This paper: summary and praise

- What does a stronger pound mean for UK inflation?
  - Warning against “rule-of-thumb” approach to assessing pass through
  - ‘not constant’
  - depends on what causes the pound to appreciate
  - need to identify shocks

- Evidence from theory-consistent VAR exercise
  - large differences across identified shocks (long-run and sign restrictions)
  - pass-through highest in response to monetary policy shocks and ‘global shocks’
What does a stronger pound mean for UK inflation?
- Warning against “rule-of-thumb” approach to assessing pass through
- ‘not constant’
- depends on what causes the pound to appreciate
- need to identify shocks

Evidence from theory-consistent VAR exercise
- large differences across identified shocks (long-run and sign restrictions)
- pass-through highest in response to monetary policy shocks and ‘global shocks’

A most welcome back-to-basics exercise
Outline of discussion

In the same spirit of the paper, back-to-basics:

- Pass-through: marginal costs and markups
Outline of discussion

In the same spirit of the paper, back-to-basics:

- Pass-through: marginal costs and markups
- Different measures address different questions: structural vs contingent
Outline of discussion

In the same spirit of the paper, back-to-basics:

- Pass-through: marginal costs and markups
- Different measures address different questions: structural vs contingent
- Firm’s pricing and pass through: macro implications of simple models
Outline of discussion

In the same spirit of the paper, back-to-basics:

- Pass-through: marginal costs and markups
- Different measures address different questions: structural vs contingent
- Firm’s pricing and pass through: macro implications of simple models
- Nominal rigidities
Outline of discussion

In the same spirit of the paper, back-to-basics:

- Pass-through: marginal costs and markups
- Different measures address different questions: structural vs contingent
- Firm’s pricing and pass through: macro implications of simple models
- Nominal rigidities
- More evidence
Exchange rate pass-through (ERPT)

Let $\mathcal{E}$ be the exchange rate. The price of Home imports $f$ in Home currency at the border $\bar{p}$ is:

$$
\bar{p}(f) = \underbrace{\text{Foreign firms’ markup in the Home market}}_{\text{MKP}} \cdot \underbrace{\mathcal{E} \cdot MC^*}_{\text{Foreign marginal costs in Home currency}}
$$

ERPT is the \textit{elasticity of import prices} (at the border) with respect to the exchange rate

$$
\frac{\partial \bar{p}(f)}{\bar{p}(f)} \cdot \frac{\partial \mathcal{E}}{\mathcal{E}}
$$

- Shocks generally move $\mathcal{E} \ MC^*$ and $\text{MPK} \ (\cdot)$ differently: the ERPT is shock contingent.
- It also vary with structural characteristics of the economy.
Exchange rate pass-through (ERPT): the disconnect puzzle

\[ \bar{p}(f) = \frac{\text{Foreign firms’ markup in the Home market}}{\text{Foreign marginal costs MC}^*} \cdot E \cdot MC^* \]

- **MKP (f)** for some exporters may move even if the relevant bilateral exchange rate does not move—per effects of movements in a third currency.
Exchange rate pass-through (ERPT): the disconnect puzzle

\[ p(f) = \frac{\text{MKP}(f)}{\text{MC}^*} \cdot \mathcal{E} \cdot \text{MC}^* \]

- \( \text{MKP}(f) \) for some exporters may move even if the relevant bilateral exchange rate does not move—per effects of movements in a third currency.

- If one believes that \( \mathcal{E} \) is ‘disconnected’ from fundamentals, she/he should treat \( \mathcal{E} \) as exogenous in regression analysis.
Exchange rate pass-through (ERPT): the disconnect puzzle

\[ p(f) = \frac{\text{MKP}(f)}{\epsilon \cdot MC^*} \]

- \( \text{MKP}(f) \) for some exporters may move even if the relevant bilateral exchange rate does not move—per effects of movements in a third currency.
- If one believes that \( \epsilon \) is ‘disconnected’ from fundamentals, she/he should treat \( \epsilon \) as exogenous in regression analysis.
  - This is NOT the belief underlying the paper (although FHN allow for non-fundamental shocks).
Language: structural vs contingent pass-through

- Structural ERPT from regression analysis captures an average correlation between two endogenous variables, as a function of
Language: structural vs contingent pass-through

- Structural ERPT from regression analysis captures an average correlation between two endogenous variables, as a function of
  - structural features of the economy (determining e.g. mkp, distribution margins, rigidities etc.), hence structural changes (more differentiated manufacturing goods in trade, trade reforms, supply chains) — hardly constant
Language: structural vs contingent pass-through

- Structural ERPT from regression analysis captures an average correlation between two endogenous variables, as a function of
  - structural features of the economy (determining e.g. mkp, distribution margins, rigidities etc.), hence structural changes (more differentiated manufacturing goods in trade, trade reforms, supply chains) — hardly constant
  - all shocks hitting the economy in the sample period
Structural ERPT from regression analysis captures an average correlation between two endogenous variables, as a function of:

- structural features of the economy (determining e.g. mkp, distribution margins, rigidities etc.), hence structural changes (more differentiated manufacturing goods in trade, trade reforms, supply chains) — hardly constant
- all shocks hitting the economy in the sample period

An example of coefficient from Corsetti Dedola Leduc JME 2008:

\[
\begin{align*}
\hat{P}_F,t &= \frac{1}{1 + \mu (mkp_F - 1) + \kappa_F^p \pi^2 (mkp_F - 1) (1 + \beta)} \left( \hat{E}_t + \hat{MC}_{F,t}^* \right) \\
&+ \frac{\mu (mkp_F - 1) \left( \hat{P}_N,t \right) + \kappa_F^p \pi^2 (mkp_F - 1) \left( \beta E_t \hat{P}_F,t+1 + \hat{P}_F,t-1 \right)}{1 + \mu (mkp_F - 1) + \kappa_F^p \pi^2 (mkp_F - 1) (1 + \beta)}
\end{align*}
\]
Structural vs contingent pass-through

Structural pass through not useful in addressing policy questions such as: what is the inflationary impact of a fall in oil prices? For this question, you need to calculate ERPT contingent on specific shock: oil, monetary, financial.

- Requires a model and/or VAR analysis (as in FHN)
Structural vs contingent pass-through

Structural pass through not useful in addressing policy questions such as: what is the inflationary impact of a fall in oil prices? For this question, you need to calculate ERPT contingent on specific shock: oil, monetary, financial.

- Requires a model and/or VAR analysis (as in FHN)
- Model-based example from Corsetti Dedola JIE 2008:
Firm pricing and pass through

- Movements in markup reflecting optimal destination-specific adjustment by firms (Pricing to Market PTM)
Firm pricing and pass through

- Movements in markup reflecting optimal destination-specific adjustment by firms (Pricing to Market PTM)
  - Imperfect pass-through: the elasticity of demand is increasing in import (border) prices (e.g., see Marston [1990])
Firm pricing and pass through

- Movements in markup reflecting optimal destination-specific adjustment by firms *(Pricing to Market PTM)*
  - Imperfect pass-through: the elasticity of demand is increasing in import (border) prices (e.g., see Marston [1990])

- Nominal (information?) rigidities constraining price adjustment in local currency

\[
\text{sticky ex-post markup} = \frac{\bar{p}(f)}{\varepsilon_t} \cdot MC_t^*.
\]

EPRT is incomplete when import border prices are sticky in local currency.
What determines markup adjustment?

Complex question, but rough distinction across types of models helpful

1. ‘**horizontal**’ competition by producers of close substitutes
   ▶ (as in Akteson and Burstein AER 2008)

2. ‘**vertical interactions**’ by monopolistic upstream firms with downstream producers or distributors
   ▶ (as in Corsetti and Dedola JIE 2005)
Horizontal competition by producers of close substitutes

Well known example with ‘limit pricing’:

- Heterogenous productivity (or heterogeneous trade costs) among firms.
- In each market, only the firm with the lowest marginal costs will be producing.
  - If incumbent firm has a large marginal costs advantage over the second-most-productive firm, incumbent able to charge optimal markup and pass through MC* shocks completely
  - Otherwise, incumbent has to adjust markup, to prevent entry by the less productive competitor.
Empirical implications

- Pass through lower where cost differentials small and less barrier to entry
  - change structurally with tariff reduction and emerging market product development

- Pass through higher with shocks that move $\mathcal{E}$ symmetrically across currencies, affecting costs of all competing exporters
  - see recent work by Auer and Schoenle (2012 +)
  - key to read FHN results: pass-through is higher conditional on monetary and ‘global’ shocks.
EPRT with vertical interactions (distribution, supply chain)

- Import price at consumer level include local costs (Lcost) in local currency.
EPRT with vertical interactions (distribution, supply chain)

- Import price at consumer level include local costs (Lcost) in local currency.
- With sufficient high degree of complementarity of local input, e.g.

$$p_t(f) = \bar{p}_t(f) + LCost_t.$$ 

a constant-elasticity of substitution demand for good $f$ looks like:

$$C_t(f) = \left( \frac{\bar{p}_t(f) + LCost_t}{P_{F,t}} \right)^{-\theta} C_{F,t},$$
EPRT with vertical interactions (distribution, supply chain)

- Import price at consumer level include local costs (Lcost) in local currency.
- With sufficient high degree of complementarity of local input, e.g.
  
  \[ p_t(f) = \bar{p}_t(f) + LCost_t. \]

  a constant-elasticity of substitution demand for good \( f \) looks like:

  \[ C_t(f) = \left( \frac{\bar{p}_t(f) + LCost_t}{P_{F,t}} \right)^{-\theta} C_{F,t}, \]

- Price elasticity of demand not constant, but lower than \( \theta \) and increasing in the supply price (hence incomplete pass-through)

  \[ \zeta_{C_t(f),\bar{p}_t(f)} \equiv -\frac{\partial C / C}{\partial p(f) / p(f)} = \theta \frac{\bar{p}_t(f)}{\bar{p}_t(f) + LCost_t} < \theta \]
Distribution cost model

Home producer of $h$
- charges markup over $mc$

Home distributors
- combines with Home distribution services

Home consumers
- $\bar{p}(h)$
- $p(h)$

Foreign distributors
- combines with Foreign distribution services

Foreign consumers
- $\bar{p}^*(h)$
- $p^*(h)$

NO ARBITRAGE: $\bar{p}(h) < p^*(h)\epsilon$
EPRT with vertical interactions (distribution, supply chain)

Large increase in manufacturing differentiated goods:

Empirical evidence on the model: Berman Martin and Mayer QJE (2012)
Frontier

- Frontier: understanding pricing along supply chain. Intermediate vs final products.
Frontier

- Frontier: understanding pricing along supply chain. Intermediate vs final products.
- Interaction horizontal vertical:
Frontier

- Frontier: understanding pricing along supply chain. Intermediate vs final products.
- Interaction horizontal vertical:
Frontier

- Frontier: understanding pricing along supply chain. Intermediate vs final products.
- Interaction horizontal vertical:
  - strategic substitutes/complements
Pass through not independent of monetary/stabilization regime

LCP and PCP choice at the margin influenced by stabilization policy Corsetti and Pesenti 2002
A lingering question: global inflationary effects of US monetary shocks

Dedola Rivolta and Stracca ECB wp (2015) (but also Mackowiak JME 2007): the response of selected variables in Advanced Economies (solid red) and Emerging Market Economies (dotted blue) to a U.S. contractionary monetary shock (nominal and real exchange rates, interest rates, and CPI)
Close-up analysis of the UK

Similar methodology as DRS (Cesa-Bianchi, very preliminary), inflationary impact!
Conclusions

- Towards a world with large capital flows (portfolio) and exchange rate adjustment
- Inflationary impact key to understand trade-offs faced by policymakers
- FHN paper stresses all the relevant chords to avoid logical traps
- Correct direction of policy-relevant research
  - not necessarily easy