Currency Choice and Exchange Rate Pass-through

Gita Gopinath
Harvard and NBER

Oleg Itskhoki
Harvard

Roberto Rigobon
MIT and NBER

Motivation

- Central assumption of international macro models: Currency of Pricing
  - Local Currency Pricing, Producer Currency Pricing
- Important Implications: Exchange Rate and Monetary Policy.
- Exchange Rate Pass-through
  - When prices don't adjust ER pass-through's very different.
  - Conditional on adjusting, pass-through's the same.
- Empirically and theoretically examine the relation between currency of pricing and exchange rate pass-through.

Main Findings

- Conditional on a price change pass-through into dollar priced goods is (25%) and into non-dollar priced goods is (95%)
- Consistent with endogenous currency choice: “Medium-run Pass-through” is a sufficient statistic for currency choice.
- Document important effects of real rigidities: For dollar firms long-run pass-through is significantly higher than medium-run pass-through
- Numerically can match the low long-run pass-through. Menu-cost model only modest success in matching the dynamics.

Aggregate ERPT

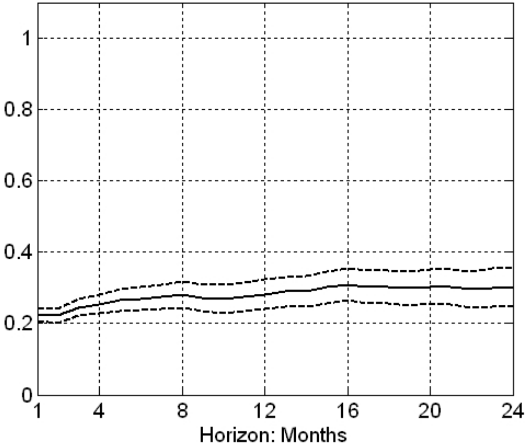


Figure: Conventional Measure of ERPT at different horizons T:

$$\Delta p_t = a + \sum_{\tau=0}^{T} b_\tau \Delta e_{t-\tau} + z_t' \gamma + \varepsilon_t \quad \longrightarrow \quad \beta_T \equiv \sum_{\tau=0}^{T} b_\tau$$

Aggregate ERPT

Splitting by Currency

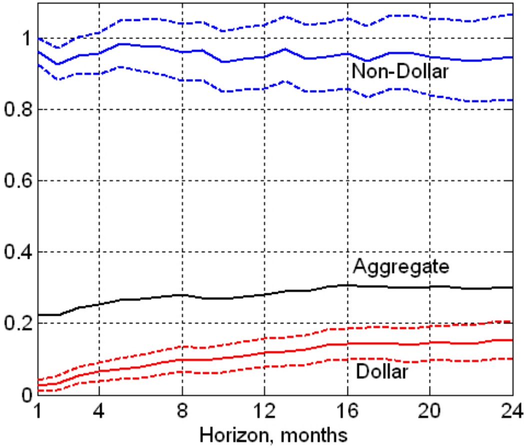


Figure: ERPT at different horizons by currency of pricing

Aggregate ERPT

. . . and by Country

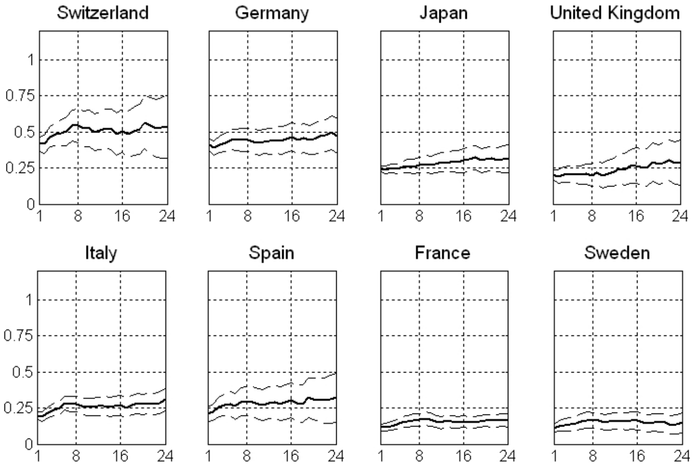


Figure: ERPT at different horizons by country and currency

Aggregate ERPT

. . . and by Country

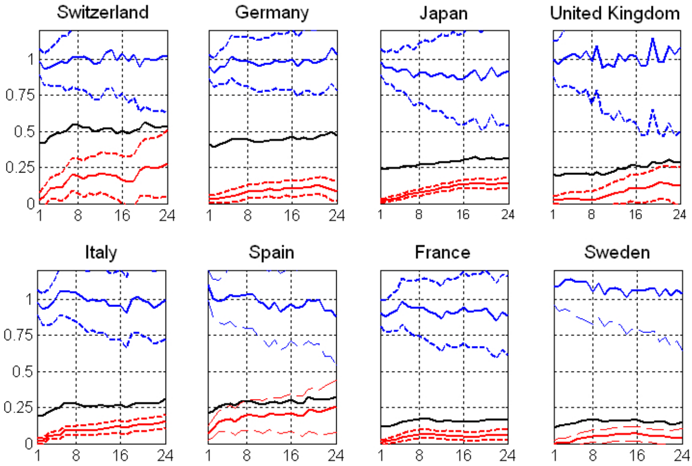
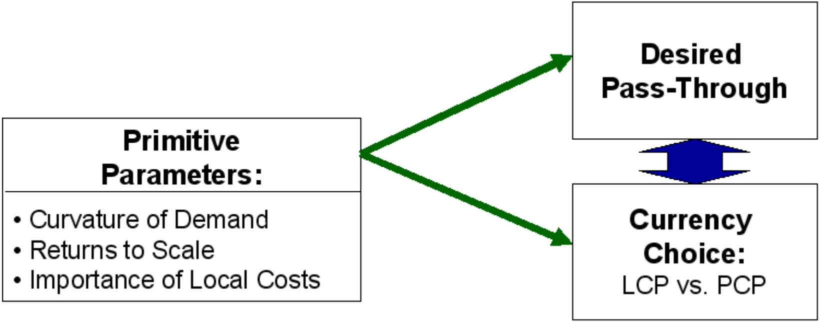


Figure: ERPT at different horizons by country and currency

Theory

Pass-Through and Currency Choice



Proposition

Up to the second order,

$$\bar{p}(s^t) = (1-\delta\theta)\sum_{\ell=0}^{\infty}(\delta\theta)^{\ell}\mathbb{E}\left\{\tilde{p}(s_{t+\ell})\middle|s^t, \vartheta_{t+1}{=}\ldots{=}\vartheta_{t+\ell}{=}0\right\},$$

$$\bar{p}^*(s^t) = (1-\delta\theta)\sum_{\ell=0}^{\infty}(\delta\theta)^{\ell}\mathbb{E}\left\{\tilde{p}^*(s_{t+\ell})\middle|s^t, \vartheta_{t+1}{=}\ldots{=}\vartheta_{t+\ell}{=}0\right\},$$

so that

$$\bar{p}(s^t) = \bar{p}^*(s^t) + e_t.$$

The desired price of the firm

$$\tilde{p}(s_t) \equiv \arg\max_p \Pi(p; s_t), \qquad \tilde{p}(s_t) = \tilde{p}^*(s_t) + e_t.$$

Theory

Currency Choice

$$\mathcal{L} \equiv V_L\big(\bar{p}(s^t); s^t\big) - V_P\big(\bar{p}^*(s^t); s^t\big) \gtrless 0$$

Proposition

The firm should choose local currency pricing whenever

$$\mathcal{L} \propto \sum\nolimits_{\ell=0}^{\infty} (\delta\theta)^{\ell} \ell \left[\frac{1}{2} - \frac{\mathrm{cov}_t\big(\tilde{p}(s_{t+\ell}), e_{t+\ell}\big)}{\mathrm{var}_t(e_{t+\ell})} \right] > 0$$

and producer currency pricing otherwise.

Theory

Medium-run Pass-through and Currency Choice

Define Medium-run Pass-through:

$$\bar{\Psi}_0 = \frac{\mathrm{d}\bar{p}(s_t)}{\mathrm{d}e_t} = (1-\delta\theta)\sum_{\ell=0}^{\infty}(\delta\theta)^{\ell}\mathbb{E}_t\left\{\frac{\mathrm{d}\tilde{p}(s_{t+\ell})}{\mathrm{d}e_t}\right\}$$

Proposition

A sufficient statistic for currency choice is the medium-run pass-through, $\bar{\Psi}_0$. Specifically, the firm will choose LCP whenever

$$\bar{\Psi}_0 < 1/2$$

and PCP otherwise.

Theory

Medium-Run Vs. Long-Run Pass-through

- Desired Pass-through

$$\tilde{\Psi}_\ell \equiv \frac{\mathrm{d}\tilde{p}_{t+\ell}}{\mathrm{d}e_t} = \frac{\phi}{1+\Gamma} + \frac{\Gamma_P}{1+\Gamma}\frac{\mathrm{d}P_{t+\ell}}{\mathrm{d}e_t}$$

- Medium-run Pass-through

$$\bar{\Psi}_0 \equiv \frac{\mathrm{d}\bar{p}_t}{\mathrm{d}e_t} = \frac{\phi}{1+\Gamma} + \frac{\Gamma_P}{1+\Gamma}(1-\delta\theta)\sum_{\ell=0}^{\infty}(\delta\theta)^\ell \frac{\mathrm{d}P_{t+\ell}}{\mathrm{d}e_t}$$

- Long-run Pass-through

$$\bar{\Psi}_\infty = \tilde{\Psi}_\infty = \frac{\phi}{1+\Gamma} + \frac{\Gamma_P}{1+\Gamma}\frac{\mathrm{d}P_{t+\infty}}{\mathrm{d}e_t}$$

Micro-Level Evidence

Medium-run Pass-through

	$\hat{\Psi}_0^{LCP}$	$\hat{\Psi}_0^{PCP}$	$\hat{\Psi}_0^{PCP} - \hat{\Psi}_0^{LCP}$
Full Sample	0.25 (0.032)	0.88 (0.059)	0.62 (0.065)
Euro	0.23 (0.043)	0.88 (0.120)	0.64 (0.128)
Non-Euro	0.26 (0.045)	0.86 (0.062)	0.59 (0.069)
Differentiated	0.22 (0.044)	0.89 (0.083)	0.67 (0.096)

$$\bar{p}_t - \bar{p}_{t-\tau_1} = \hat{\Psi}_0[e_t - e_{t-\tau_1}] + \left(\hat{\Psi}_1 - \hat{\Psi}_0\right)[e_{t-\tau_1} - e_{t-\tau_1-\tau_2}] + \dots$$

Micro-Level Evidence

Real Rigidities

	$\hat{\Psi}_1^{LCP}$	$\hat{\Psi}_1^{LCP} - \hat{\Psi}_0^{LCP}$	$\hat{\Psi}_1^{PCP}$
Full Sample	0.46 (0.043)	0.21 (0.020)	0.82 (0.063)
Euro	0.37 (0.054)	0.14 (0.032)	0.92 (0.107)
Non-Euro	0.51 (0.058)	0.24 (0.025)	0.76 (0.081)
Differentiated	0.43 (0.050)	0.21 (0.027)	0.87 (0.094)

$$\bar{p}_t - \bar{p}_{t-\tau_1} = \hat{\Psi}_0[e_t - e_{t-\tau_1}] + \left(\hat{\Psi}_1 - \hat{\Psi}_0\right)[e_{t-\tau_1} - e_{t-\tau_1-\tau_2}] + \ldots$$

Micro-Level Evidence

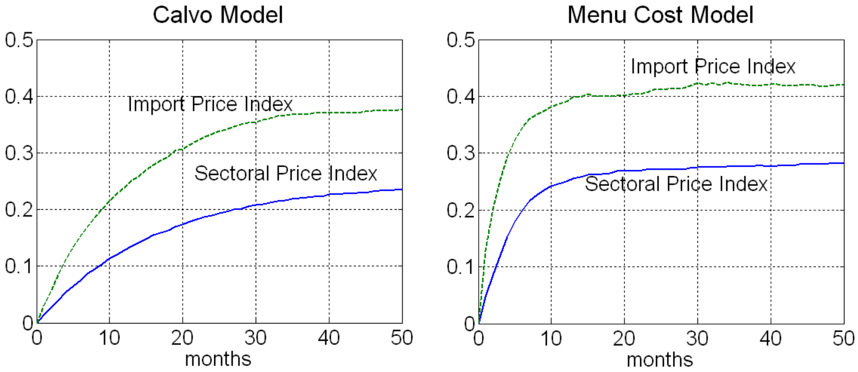
Long-run Pass-through

	$\hat{\Psi}_{\infty}^{LCP}$	$\hat{\Psi}_{\infty}^{PCP}$
Full Sample	0.51	0.92
	(0.063)	(0.061)
Euro	0.42	0.89
	(0.086)	(0.077)
Non-Euro	0.59	0.93
	(0.088)	(0.113)
Differentiated	0.52	0.99
	(0.093)	(0.078)

$$\bar{p}_T - \bar{p}_0 = \hat{\Psi}_{\infty}[e_T - e_0] + \dots$$

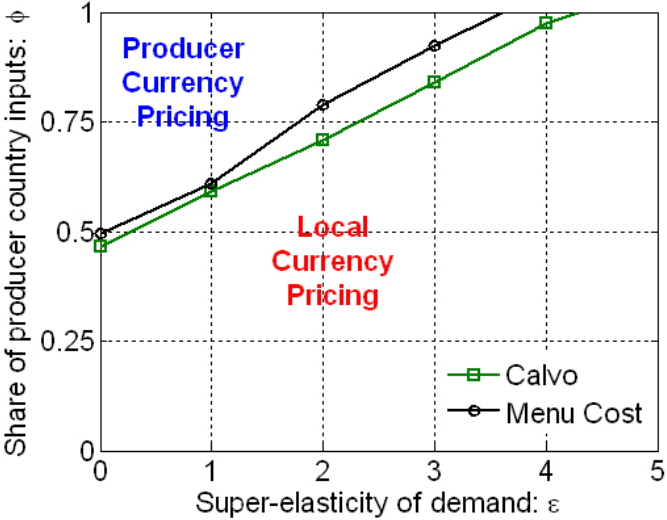
Numerical Illustration

Calvo vs Menu Cost



Numerical Illustration

Currency Choice



Numerical Illustration

Currency Choice in the Data

Country	Heterogenous Goods	Homogenous Goods
Switzerland	0.48	0.31
Germany	0.35	0.10
Italy	0.21	0.08
Japan	0.24	0.08
UK	0.26	0.04
Belgium	0.13	0.00
France	0.08	0.06
Sweden	0.14	0.00
Spain	0.13	0.00
Austria	0.13	0.00
Netherlands	0.12	0.00
Canada	0.05	0.05
Average	**0.19**	**0.06**

Table: Fraction PCP (Non-Dollar)