Discussion of:
Auer, Burstein, and Lein
Exchange Rates and Prices

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The paper

- Anatomy of price adjustments following a large exchange rate change
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  - Multiple, distinct data collection exercises
    - Novel: IPI + scanner in the same paper, matched
    - Novel: identifies imported goods in scanner data
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    - Novel: IPI + scanner in the same paper, matched
    - Novel: identifies imported goods in scanner data
  - Currency invoicing used as an instrument for the price change “at the dock”
  - Extensive range of exercises: all the facts you might want to know
Exchange rates and prices

- Consumer prices change far less than exchange rates:

\[ |\Delta p^c| \ll |\Delta \varepsilon| \]
Exchange rates and prices

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\[ |\Delta p^c| \ll |\Delta \mathcal{E}| \]

- Why?
  - Domestic content:
    \[ \Delta p^c = \alpha \Delta p^{dock} + (1 - \alpha) \Delta p^{dom} \]
    \[ \Delta p^{dock} \approx \Delta \mathcal{E} \]
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    \[ \Delta p^{dock} \approx \beta \Delta \varepsilon + (1 - \beta) \Delta P^{consum} \]
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  - Pricing to market:
    \[ \Delta p^{dock} \approx \beta \Delta \mathcal{E} + (1 - \beta) \Delta P^{consum} \]
  
  - Price stickiness:
    \[ \Delta p^{dock} \approx \theta \Delta \mathcal{E} + (1 - \theta) \times 0 \]
Large devaluations

\[ \Delta p^{\text{dock}} \approx \Delta \mathcal{E} \Rightarrow \beta \approx 0, \theta \approx 0 \]

Figure 1.—Exchange rates and prices in large devaluations

Table 1 shows that there is substantial comovement between the prices of imports and exports and the nominal exchange rate. In Argentina, Brazil, and Mexico, this comovement is present at all the horizons we consider. For Korea and Thailand, the comovement is stronger in the first few months after the devaluation. Figure 1 plots the time series for the cumulative logarithmic change of the trade-weighted nominal exchange rate, import prices, and export prices. Figure 1 makes clear that relative PPP is a reasonable description of the behavior of prices of pure

Source: Burstein, Eichenbaum, and Rebelo (2005)
But, actually...

$$\Delta p^{dock} \approx 0.5 \times \Delta \epsilon \Rightarrow \beta > 0, \theta > 0$$

Figure 3: EUR/CHF and consumer prices

- The red solid line shows the log-difference in the exchange rate between December 2014 and a given month.
- The blue dashed line is the price index for retail prices produced in Switzerland.
- The solid black line shows retail prices of imported goods.
- The green dots show the border price index for the matched product categories, weighted by the same expenditure shares as retail prices (Dec 2014=0).

Sources: calculations based on SNB, SFSO, and AC Nielsen data.

Figure 3 displays cumulative retail price changes since December 2014 for imports and Swiss-produced goods. Figure A.2 in the Appendix presents corresponding estimates of exchange rate pass-through into retail import prices (as well as for Swiss-produced goods) of the form:

$$k_{p_{retimp}} = k_p e + q_i$$

where $$k_p$$ now denotes monthly differences in prices relative to December 2014.

Retail prices for imported goods fell by 2.9% in the first three months and 2.8% in the first...
But, actually...

\[ \Delta p^{dock} \approx 0.5 \times \Delta \epsilon \Rightarrow \beta > 0, \theta > 0 \]

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\[ \Delta p^{dock} \approx \theta \beta \Delta \epsilon + \theta (1 - \beta) \Delta P^{consum} + (1 - \theta) \times 0 \]

Notes: The red solid line shows the log-difference in the exchange rate between December 2014 and a given month. The blue dashed line is the price index for retail prices produced in Switzerland, the solid black line shows retail prices of imported goods and the green dots show the border price index for the matched product categories, weighted by the same expenditure shares as retail prices (Dec 2014=0). Sources: calculations based on SNB, SFSO, and AC Nielsen data.
Invoicing: evidence of stickiness or flexibility?

- Pass-through by invoicing:

$\Delta p_{EUR}^{dock} \approx 1 \times \Delta \varepsilon$

$\Delta p_{CHF}^{dock} \approx 0.3 \times \Delta \varepsilon$

Figure 2: EUR/CHF and border prices

Notes:
The red solid line shows the log difference in the exchange rate between December 2014 and a given month. The crosses and diamonds show the log difference in border prices of EUR- and CHF-invoiced products between the period in the horizontal axis and December 2014 (Dec 2014=0). Source: SNB (exchange rate), and own calculations based on SFSO data.

Figure 2 displays cumulative changes in quarterly aggregate border prices, separately for EUR and CHF-invoiced products, relative to December 2014. The EUR/CHF appreciated by 14.0% in the first three months and by 14.7% in the first six months after December 2014. EUR-invoiced border prices fell by 12.7% and 11.6% in the first and second quarters, respectively, while CHF-invoiced border prices fell by 4.0% and 4.5%, respectively.

In contrast, CHF- and EUR-invoiced prices display similar trends before January 2015, a period of EUR/CHF stability.

Table 3 presents coefficient estimates from a regression of the form

$kp_{border} = ke + \epsilon_i$.

Here, $kp_{border}$ denotes imported product $i$’s log change in border price $k=1, \ldots, 4$ quarters after December 2014, and $ke$ is the corresponding log change in the EUR/CHF exchange rate.

If we aggregate all foreign-currency invoiced products (EUR and other currencies), as we do in our cross-section analysis in Sections 4 to 6, the decline in border prices is 12.6% in the first quarter and 12.2% in the second quarter (rather than 12.7% and 11.6%, respectively).
Invoicing: evidence of stickiness or flexibility?

- Pass-through by invoicing:
  \[
  \Delta p_{EUR}^{dock} \approx 1 \times \Delta \epsilon \\
  \Delta p_{CHF}^{dock} \approx 0.3 \times \Delta \epsilon
  \]

- Can’t be: marginal cost/constant markup pricing with flexible prices
- Can’t be: same pricing-to-market for all exporters with flexible prices
- Either:
  - quite a bit of stickiness
  - CHF-invoiced goods are systematically different from EUR-invoiced goods in market structure (i.e., \( \beta_{CHF} < \beta_{EUR} \))
Exclusion restriction: across industries, CHF invoicing share is uncorrelated with the error term for:

- retail prices of imports
- retail price of domestic goods
- expenditure shares on imports
- fraction and size of price changes

Sellers invoice in CHF if they have a higher markup elasticity with respect to the exchange rate

- could it be that these goods also have a different markup elasticity on the part of the retailers?
Taking stock

- A master class in dissecting price adjustments following an exchange rate change
- Invoicing heterogeneity seems to tell us a lot about why border prices adjust less than 1-1
  - At the moment, not sure exactly what
- In the long run it should say more about this heterogeneity, if only to buttress the instrument