Don’t Panic: The Hitchhiker’s Guide to Missing Import Price Changes

By Etienne Gagnon, Benjamin Mandel, and Robert Vigfusson
Federal Reserve Board

This research was conducted with restricted access to Bureau of Labor Statistics (BLS) data. The views in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Federal Reserve System or the BLS.
Introduction

- Are response of published import price indexes to exchange rate movements mismeasured because some price changes are missed when constructing the index?
- Using two popular price-setting models, we investigate selection biases that arise when items experiencing a price change are especially likely to exit or to enter the index.
- We derive empirical bounds on the magnitude of these biases.
- Our analysis suggests that the biases induced by selective exits and entries should not materially alter the literature’s view that pass-through to prices of U.S. imported finished goods is low over typical forecast horizons.
Related Literature

- Large empirical literature on estimating and modeling pass-through.

Most closely related paper.

- Nakamura and Steinsson (NS, 2009, now 2011) argue that standard estimates of exchange rate pass-through suffer from a *product replacement bias*.

- They claim that accounting for this bias would **double** estimates of exchange rate pass-through to non-oil U.S. imports (from an elasticity of 0.2-0.4 to 0.6-0.7).

- We provide a more general analysis. Based on both theory and empirical work, we conclude that pass-through for imported finished goods is low over the two year horizon most relevant for policy makers and also economic modelers.
New and Discontinued Items

Universe of items

New items → Entries → BLS Sample → Exits → Discontinued items
Entry and Exit from the price index sample.
A model of price setting where items exit and enter the price index.

- We consider a simple model of exchange rate pass-through with selection biases in item exit and entry in the BLS import sample.
- The universe of items is constant over time (i.e., no new or discontinued items). Item prices are set according to

\[
\Delta p_{it} = \begin{cases} 
  u_{it} + \beta \Delta x_t + \varepsilon_{it} & \text{if } I_{it}^f = 1 \\
  0 & \text{if } I_{it}^f = 0
\end{cases},
\]

where \( I_{it}^f \) indicator of nominal price adjustment; \( \Delta x_t \) exchange rate movement; \( u_{it} \) price pressure inherited from the previous period.
Price-setting

- The price pressure inherited from the previous period evolves according to

\[ u_{it+1} = \begin{cases} 
0 & \text{if } I_{it}^f = 1 \\
 u_{it} + \beta \Delta x_t + \varepsilon_{it} & \text{if } I_{it}^f = 0
\end{cases} \]

- We consider two price-setting mechanisms:
  - **Calvo**: constant probability of price change each period.
  - **Menu costs**: price is changed if and only if \( |u_{it} + \beta \Delta x_t + \varepsilon_{it}| > K \).
The BLS samples prices from the universe to estimate inflation. The sample is subject to selection biases in the exit and entry of items.

- Random entry
- Random exit
- Selective entry (item with unobserved price change)
- Selective exit (item with unobserved price change)
A model of item exits and entries

- Nature of exits and entries in the model:
  - **Random exits:** items face a constant exogenous probability $d$ of exiting sample every period (akin to scheduled replacements).
  - **Selective exits:** items with a price change face a constant probability $e$ of exiting the basket.
  - **Random entries:** a fraction $1-n$ of entering items are sampled randomly from the universe.
  - **Selective entries:** a fraction $n$ of entering items are sampled from items in the universe with $u_{it}=0$.

- We assume that every exit triggers an entry to keep the sample size constant. In total, a fraction $s = d + (1-d)f$ of items in the sample exits every period, where $f$ is the frequency of price changes.
A model of item exits and entries

- **Calibration**
  - $\Delta x_t$ is modeled as an AR(1) with Gaussian innovations matching the mean, variance, and persistence of U.S. nominal exchange rate innovations (broad dollar, end-of period).
  - Long-run exchange rate pass-through, $\beta$, is set to 0.3.
  - Conditional on $n$ and $e$, the remaining parameters ($K, f, \sigma_e$) are chosen to match the average frequency and absolute magnitude of individual price changes (about 6.5 percent).

- After generating data from the model, we estimate the following regression:

$$\Delta p_t = \int \Delta p_{it} di = a + \sum_{l=0}^{L} b_l \Delta x_{t-l} + r_t.$$
Four canonical cases

To gain some intuition, we consider four particular sets of assumptions about the selectivity of exits and entry:

- All exits and entries are random \((s=d, n=0)\)
- All exits and entries are selective \((s=fe, n=1)\)
- All exits are selective and all entries are random \((s=fe, n=0)\)
- All exits are random and all entries are selective \((s=d, n=1)\)
Case 1: All exits and entries are random

- As long as exits and entries occur randomly (i.e., $s=d$, $n=0$), there is no bias in standard pass-through regressions.
Case 1: All exits and entries are random

Under Calvo pricing, the (plim) coefficients in the pass-through regressions are

\[ b_l = f(1-f)^l \beta. \]

Under menu costs, pass through is more rapid.
Case 1: All exits and entries are random

Frequency of Price Change = 5 percent

Frequency of Price Change = 20 percent
Case 2: All exits and entries are selective

Intuitively, this case ($s=fe$, $n=1$) is akin to the censoring of some price changes, so that only a fraction of price changes taking place is observed.
Case 2: All exits and entries are selective

- Under Calvo, one can show that

\[ b_l = f(1 - f)^l \left( \frac{1-e}{1-fe} \right) \beta \]

- so that each coefficient is biased downwardly by the same factor.

- The size of the bias is similar under Calvo and menu-cost pricing.
Case 2: All exits and entries are selective

Frequency of Price Change = 5 percent

Frequency of Price Change = 20 percent
Case 3: Exits are selective and entries are random

- Under this case \((s=fe, n=0)\), some items with a price change exit the sample and are replaced by sampling randomly from the universe of items.

![Diagram showing random and selective entry and exit processes in the BLS sample.](image-url)
Case 3: Exits are selective and entries are random

Under Calvo,

\[ b_l = \left( \frac{1-e}{1-fe} \right)(1 + lfe)(1 - f)^lf \beta. \]

- One can show that cumulative pass-through remains downward biased, but less so than when entries are selective.
- Intuitively, prices of entering items may not have been adjusted in a while, making them responsive to past exchange rate movements.
- The bias reduction from resampling at random typically is larger in the Calvo model than the menu-cost model.
Case 3: Exits are selective and entries are random

**Calvo Model**

- Frequency of Price Change = 5 percent

**Menu-Cost Model**

- Frequency of Price Change = 20 percent
Case 4: Exits are random and entries are selective

- This special case \((s=d, n=1)\) corresponds to the environment considered by Nakamura and Steinsson (NS, 2009).

**Diagram:**
- Random entry
- Random exit
- Selective entry (item with unobserved price change)
- Selective exit (item with unobserved price change)
Case 4: Exits are random and entries are selective

- A bias occurs because entering items *systematically* are less sensitive to past exchange rate movements than items in the universe. NS call this effect the *product replacement bias*.

- Under Calvo, one can show that

\[ b_l = f(1 - f)^l (1 - s)^l \beta. \]

- Note that (a) the initial response is unbiased and (b) the accuracy decays exponentially with the number of lags, so that longer-run responses are more biased than short-run responses.

- The bias is smaller under menu-cost pricing because pass-through is relatively rapid.
Case 4: Exits are random and entries are selective

**Calvo Model**

Frequency of Price Change = 5 percent

**Menu-Cost Model**

Frequency of Price Change = 20 percent
Some observations

- For selective exits to be empirically important...
  - A non-negligible share of price changes must trigger exits \((e>0)\).
  - The number of selective exits does not have to be large relative to the total number of observations in the sample.

- For selective entries to be empirically important...
  - Pass-through must be slow (low \(f\)).
  - The horizon of interest must be the medium to long term.
  - A large proportion of entering item systematically must have had a recent (unobserved) price change \((n>>0)\).
Empirical importance of selective exits and selective entries

To assess biases in standard pass-through regressions and correct them, we must form a view on the value of $e$, $n$, and the right pricing model.

We employ three approaches:
- Review the BLS data and methodology.
- Compute bounds on the impulse response to an exchange rate shock;
- Construct an alternative index that should highlight the extent of the bias.
BLS Methods: International Price Program

- Same source as Gopinath & Rigobon (2008); Nakamura & Steinsson (2009); Neiman (2010).
- BLS collects prices through a monthly survey of U.S. establishments.
- Transaction prices for imported goods at a monthly frequency
- ~13,000 price observations per month for precisely defined items.
- Using the micro data, we compute statistics on average frequency of price updates, exit and entry rates.
Types of exit observed

*BLS-induced exits.* BLS resamples every two years and typically plans to retire items 5 years after entry.

- Regular phase-out
- Accelerated phase-out
- Sample dropped

*Business-led exits*

- Refusal
- Out of business
- Out of scope, replaced
- Out of scope, not replaced

Greatest likelihood of being a selective exit
Types of entry

*Exits are not generally accompanied by simultaneous entry.*

- Often, the BLS waits until the next biennial sample redrawing.
- When exits are *Out of Scope*, the BLS asks the reporting firm if another item could meet the sampling criterion.
  - Attempt to link the prices of the exiting and entering items.
  - Otherwise, the replacement enters as a new good.
  - These are the cases with the greatest likelihood of being a selective entry.
<table>
<thead>
<tr>
<th>Enduse</th>
<th>Relative Weight</th>
<th>Exit Rate</th>
<th>Entry Rate</th>
<th>Mean Freq. of Price Changes</th>
<th>Mean Absolute Size of Price Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>all reasons</td>
<td>out-of-scope</td>
<td>Others reasons</td>
<td></td>
</tr>
<tr>
<td>Capital Goods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>210 Oil drilling, mining &amp; const. machinery</td>
<td>1.9</td>
<td>2.5</td>
<td>0.9</td>
<td>1.6</td>
<td>2.9</td>
</tr>
<tr>
<td>211 Industrial &amp; service machinery, n.e.c.</td>
<td>10.6</td>
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<td>0.8</td>
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<td>2.5</td>
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<td>212 Agricultural machinery &amp; equip.</td>
<td>0.7</td>
<td>2.7</td>
<td>1.2</td>
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<td>3.1</td>
</tr>
<tr>
<td>213 Computers, periph. &amp; semiconductors</td>
<td>12.7</td>
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<td>3.6</td>
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<td>3.3</td>
<td>1.5</td>
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<td>2.5</td>
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<td>216 Scientific, hospital &amp; medical machinery</td>
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<td>3.2</td>
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<tr>
<td>Automotive</td>
<td></td>
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<tr>
<td>300 Passenger cars, new &amp; used</td>
<td>13.6</td>
<td>2.8</td>
<td>1.6</td>
<td>1.1</td>
<td>3.5</td>
</tr>
<tr>
<td>301 Trucks, buses, &amp; special-purp. vehicles</td>
<td>2.4</td>
<td>2.8</td>
<td>1.9</td>
<td>0.9</td>
<td>3.9</td>
</tr>
<tr>
<td>302 Parts, engines, bodies, &amp; chassis</td>
<td>9.3</td>
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<td>3.0</td>
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<tr>
<td>Consumer Goods (Ex. Food &amp; Auto.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 Apparel, footwear, &amp; household goods</td>
<td>11.2</td>
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<td>1.7</td>
<td>1.8</td>
<td>3.6</td>
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<td>401 Other consumer nondurables</td>
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<td>2.7</td>
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<tr>
<td>410 Household goods</td>
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<td>1.7</td>
<td>3.0</td>
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<td>3.1</td>
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<td>412 Home entertainment equip.</td>
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<td>3.7</td>
<td>2.2</td>
<td>1.5</td>
<td>4.1</td>
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<tr>
<td>413 Coins, gems, jewelry, &amp; collectibles</td>
<td>2.2</td>
<td>3.1</td>
<td>1.1</td>
<td>1.9</td>
<td>3.1</td>
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<tr>
<td>Total</td>
<td>100.0</td>
<td>3.0</td>
<td>1.5</td>
<td>1.5</td>
<td>3.4</td>
</tr>
</tbody>
</table>

210. Exit Rate All reasons 2.5, Out-of-Scope 0.9
301 Exit Rate All Reasons 2.8, Out-of-Scope 1.9
213 Freq of Price Changes 9.7
400 Freq of Price Changes 3.9
Out of Scope Exit and the Dollar

Nominal Broad Dollar

Out of Scope Exit Rate

Real Dollar Index

Frequency of Selective Exit

Year: 1995 to 2005.
Out of Scope Exit and the Dollar

- **Nominal Broad Dollar**
- **Out of Scope Exit Rate**
- **Real Dollar Index**
Empirical Estimation

- Use the published monthly BLS price indexes at 3-digit end-use specification. (Report results for the finished goods sectors.)

- For each individual 3-digit end-use category, we construct time-varying trade-weighted exchange rates and foreign inflation series.

- Estimate a 24-lag regression of import price changes on lags of exchange rate and foreign inflation series.

- Construct trade-weighted estimates of these pass-through coefficients.
Why the emphasis on finished goods?

- **Finished goods (capital goods, automotive products and consumer goods)**
  - Make up a large share of nominal imports.
  - Have low estimated pass-through rates.
  - Have low frequency of updating.

- **Material intensive goods (foods and industrial supplies (including oil))**
  - Have higher frequency of updating.
  - Prices of commodities often have very high estimated pass-through rates.
Why the emphasis on two year horizon?

- Most central bank forecasters have two year horizons.

- Differences between macroeconomic models are most stark in the first couple of years following a shock.
End-Use Specific Pass-through Estimates
Aggregate Estimates

Enduse categories

210 - Oil drilling mining and construction machinery and equipment
211 - Industrial and service machinery
212 - Agricultural machinery and equipment
213 - Computers peripherals and semiconductors
214 - Telecommunications equipment
215 - Business machinery and equipment except computers
216 - Scientific and medical machinery
300 - Passenger cars new and used
301 - Vehicles designed to transport goods
302 - Parts engines bodies and chassis
400 - Apparel footwear and household goods
401 - Other consumer nondurables
410 - Household goods
411 - Recreational equipment and materials
412 - Home entertainment equipment
413 - Coins gems jewelry and collectibles
Bounding standard estimates

- From microdata on each 3-digit end-use category, we have reported estimates of how frequently items are repriced and how frequently they exit.
- Therefore, we can use the calculations in our theory section to derive bounds.
Out-of-scope exits are selective, all entries are selective

Out-of-scope exits are selective, all entries are random

All exits are random, all entries are selective
Do the responses look more like Calvo or Menu-Cost Pricing

![Graphs showing responses over time](image-url)
Robustness Exercise

- The fraction of entries that are selective is unobservable.
- We try to infer how big the problem is by constructing an alternative price index using the BLS micro-data.
- Whereas the standard BLS index adds items to the index the period after they are initially sampled, we delay the entry of items to the index.
- Delaying entries most effectively reduce selective entries. When exits are random and entries are selective (i.e., product replacement bias), one can show that, under an $M$-period delay in the Calvo model,

$$b_l = \begin{cases} 
  f(1-f)^l \beta & \text{if } l \leq M \\
  f(1-f)^l(1-s)^{l-M} \beta & \text{if } l > M
\end{cases}.$$  

- Our trick eliminates the product replacement bias from the coefficients on the current and first $M$ lags of exchange rate movements, and lowers it by a factor of $(1-s)^M$ for subsequent lags.
Results for Our Alternative Indexes

Capital Goods

Automotive Products

Price Indexes

Pass-through

- Published BLS
- Constructed: No Delay
- Constructed: 6 Month Delay
- Constructed: 9 Month Delay


Graphs show the comparison between published BLS and constructed indexes with different delays.
Results for Our Alternative Indexes
Results for Our Alternative Indexes

Consumer Goods

Price Indexes

Pass-through
Concluding remarks

- Selection biases in the exit and entry of items in the import price index can downwardly bias the measured response of prices to an exchange rate movement (or any type of shock) over typical policy-relevant horizons.
- For policy purposes, biases induced by exit seem most concerning as they impact the short-term response of prices.
- Although biases associated with entry can potentially be important over long horizons, they have limited effects in the short-run.
- Future research should aim at better identifying the causes of item exits and the nature of entering items.
Additional slides
Exit, entry and price change in U.S. data

- Estimate frequency of price changes (for matched models) as:

\[
\text{frequency}(t) = \frac{\text{change}(t)}{\text{change}(t) + \text{no\_change}(t)}
\]

- Estimate exit and entry rates:

\[
\text{exit\_rate}(t) = \frac{\text{exit}(t)}{\text{entry}(t-1) + \text{change}(t-1) + \text{no\_change}(t-1)}
\]

\[
\text{entry\_rate}(t) = \frac{\text{entry}(t)}{\text{entry}(t-1) + \text{change}(t-1) + \text{no\_change}(t-1)}
\]
## Import price summary statistics

<table>
<thead>
<tr>
<th>Enduse</th>
<th>Weight</th>
<th>Freq.</th>
<th>Entry</th>
<th>Exit</th>
<th>Abs. Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital Goods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>210 Oil drilling, mining &amp; const. machinery</td>
<td>1.0</td>
<td>6.9</td>
<td>2.9</td>
<td>2.5</td>
<td>0.9</td>
</tr>
<tr>
<td>211 Industrial &amp; service machinery, n.e.c.</td>
<td>5.8</td>
<td>6.3</td>
<td>2.5</td>
<td>2.5</td>
<td>0.8</td>
</tr>
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<td>0.4</td>
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<td>3.1</td>
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<td>1.1</td>
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<td>500 Imports, N.E.S.</td>
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<td><strong>Total</strong></td>
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<td>3.3</td>
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Import price summary statistics
frequency of price changes (12 month MA; unweighted)
## Inflation objectives and policy horizons

<table>
<thead>
<tr>
<th>Economy</th>
<th>Target rate (%)</th>
<th>Target horizon</th>
<th>Forecast horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>2-3</td>
<td>average over business cycle</td>
<td>2 years</td>
</tr>
<tr>
<td>Canada</td>
<td>1-3</td>
<td>6 to 8 quarters</td>
<td>2 to 3 years</td>
</tr>
<tr>
<td>Euro area</td>
<td>just below 2</td>
<td>medium term</td>
<td>current year and next</td>
</tr>
<tr>
<td>Japan</td>
<td>0.2(^a)</td>
<td>medium to long term</td>
<td>current fiscal year and next</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1-3</td>
<td>medium term</td>
<td>3 years</td>
</tr>
<tr>
<td>Norway</td>
<td>2.5</td>
<td>1 to 3 years ahead</td>
<td>3 to 4 years</td>
</tr>
<tr>
<td>Sweden</td>
<td>1-3</td>
<td>2-year ahead</td>
<td>3 to 4 years</td>
</tr>
<tr>
<td>Switzerland</td>
<td>less than 2</td>
<td>medium term</td>
<td>3 years</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2</td>
<td>informal 2-year</td>
<td>3 years</td>
</tr>
<tr>
<td>United States(^b)</td>
<td>no target</td>
<td>n.a.</td>
<td>2 to 3 years</td>
</tr>
</tbody>
</table>

Notes: (a) 0-2% is consistent with the distribution of Board members' understanding of medium to long-term price stability. (b) Based on the forecasts released periodically by FOMC members. The staff's forecasts ("Greenbook") most recently made publicly available have horizons ranging from about 1 and half to 2 and half years.
Exit, entry and price change in U.S. data

- Estimate frequency of price changes as:

$$\text{frequency}(t) = \frac{\text{change}(t)}{\text{change}(t) + \text{no\_change}(t)}$$

- Estimate exit and entry rates:

$$\text{exit\_rate}(t) = \frac{\text{exit}(t)}{\text{entry}(t - 1) + \text{change}(t - 1) + \text{no\_change}(t - 1)}$$

$$\text{entry\_rate}(t) = \frac{\text{entry}(t)}{\text{entry}(t - 1) + \text{change}(t - 1) + \text{no\_change}(t - 1)}$$

$$\text{frequency\_alt}(t) = \frac{\text{change}(t) + \text{forced\_exit\_alt}(t)}{\text{change}(t) + \text{no\_change}(t) + \text{forced\_exit}(t)}$$
## Import price summary statistics (1/2)

<table>
<thead>
<tr>
<th>Enduse Weight</th>
<th>Enduse</th>
<th>Freq. Change</th>
<th>Entry</th>
<th>Exit</th>
<th>Abs. Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Std.</td>
<td>Alt.</td>
<td>All</td>
<td>Select.</td>
</tr>
<tr>
<td>0.010</td>
<td>210 Oil drilling, mining &amp; const. machinery</td>
<td>0.069</td>
<td>0.077</td>
<td>0.029</td>
<td>0.025</td>
</tr>
<tr>
<td>0.058</td>
<td>211 Industrial &amp; service machinery, n.e.c.</td>
<td>0.063</td>
<td>0.070</td>
<td>0.025</td>
<td>0.025</td>
</tr>
<tr>
<td>0.004</td>
<td>212 Agricultural machinery &amp; equip.</td>
<td>0.089</td>
<td>0.100</td>
<td>0.031</td>
<td>0.027</td>
</tr>
<tr>
<td>0.070</td>
<td>213 Computers, periph. &amp; semiconductors</td>
<td>0.097</td>
<td>0.117</td>
<td>0.050</td>
<td>0.037</td>
</tr>
<tr>
<td>0.022</td>
<td>214 Telecommunications equip.</td>
<td>0.058</td>
<td>0.074</td>
<td>0.036</td>
<td>0.034</td>
</tr>
<tr>
<td>0.005</td>
<td>215 Business mach. &amp; equip., ex. Computer</td>
<td>0.052</td>
<td>0.066</td>
<td>0.025</td>
<td>0.033</td>
</tr>
<tr>
<td>0.014</td>
<td>216 Scientific, hospital &amp; medical machinery</td>
<td>0.049</td>
<td>0.060</td>
<td>0.032</td>
<td>0.031</td>
</tr>
<tr>
<td>0.075</td>
<td>300 Passenger cars, new &amp; used</td>
<td>0.053</td>
<td>0.069</td>
<td>0.035</td>
<td>0.028</td>
</tr>
<tr>
<td>0.013</td>
<td>301 Trucks, buses, &amp; special-purp. vehicles</td>
<td>0.058</td>
<td>0.076</td>
<td>0.039</td>
<td>0.028</td>
</tr>
<tr>
<td>0.051</td>
<td>302 Parts, engines, bodies, &amp; chassis</td>
<td>0.080</td>
<td>0.092</td>
<td>0.030</td>
<td>0.028</td>
</tr>
<tr>
<td>0.062</td>
<td>400 Apparel, footwear, &amp; household goods</td>
<td>0.039</td>
<td>0.056</td>
<td>0.036</td>
<td>0.035</td>
</tr>
<tr>
<td>0.047</td>
<td>401 Other consumer nondurables</td>
<td>0.060</td>
<td>0.068</td>
<td>0.027</td>
<td>0.024</td>
</tr>
<tr>
<td>0.057</td>
<td>410 Household goods</td>
<td>0.046</td>
<td>0.057</td>
<td>0.030</td>
<td>0.029</td>
</tr>
<tr>
<td>0.021</td>
<td>411 Recreational equip. &amp; materials</td>
<td>0.048</td>
<td>0.065</td>
<td>0.031</td>
<td>0.032</td>
</tr>
<tr>
<td>0.029</td>
<td>412 Home entertainment equip.</td>
<td>0.056</td>
<td>0.077</td>
<td>0.041</td>
<td>0.037</td>
</tr>
<tr>
<td>0.012</td>
<td>413 Coins, gems, jewelry, &amp; collectibles</td>
<td>0.069</td>
<td>0.080</td>
<td>0.031</td>
<td>0.031</td>
</tr>
<tr>
<td>0.033</td>
<td>500 Imports, N.E.S.</td>
<td>0.052</td>
<td>0.058</td>
<td>0.018</td>
<td>0.027</td>
</tr>
<tr>
<td>0.937</td>
<td><strong>Total</strong></td>
<td>0.153</td>
<td>0.164</td>
<td>0.031</td>
<td>0.030</td>
</tr>
</tbody>
</table>
## Import price summary statistics (2/2)

<table>
<thead>
<tr>
<th>Enduse</th>
<th>Enduse Weight</th>
<th>Freq. Change</th>
<th>Entry</th>
<th>Exit</th>
<th>Abs. Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Std. Alt. All Select.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foods, Feeds &amp; Beverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>000 Green coffee, cocoa beans, cane sugar</td>
<td>0.003</td>
<td>0.470 0.476 0.030</td>
<td>0.028 0.011</td>
<td>0.087</td>
<td></td>
</tr>
<tr>
<td>001 Other agricultural foods</td>
<td>0.027</td>
<td>0.211 0.218 0.026</td>
<td>0.024 0.008</td>
<td>0.094</td>
<td></td>
</tr>
<tr>
<td>010 Nonagricultural products</td>
<td>0.010</td>
<td>0.205 0.212 0.024</td>
<td>0.022 0.008</td>
<td>0.071</td>
<td></td>
</tr>
<tr>
<td>100 Petroleum &amp; products, excluding gas</td>
<td>0.156</td>
<td>0.380 0.391 0.025</td>
<td>0.036 0.019</td>
<td>0.117</td>
<td></td>
</tr>
<tr>
<td>101 Fuels, n.e.s.-coal &amp; gas</td>
<td>0.017</td>
<td>0.559 0.568 0.040</td>
<td>0.034 0.021</td>
<td>0.134</td>
<td></td>
</tr>
<tr>
<td>110 Paper base stocks</td>
<td>0.002</td>
<td>0.365 0.377 0.032</td>
<td>0.036 0.016</td>
<td>0.061</td>
<td></td>
</tr>
<tr>
<td>111 Newsprint &amp; other paper products</td>
<td>0.006</td>
<td>0.196 0.207 0.025</td>
<td>0.033 0.012</td>
<td>0.050</td>
<td></td>
</tr>
<tr>
<td>120 Agricultural products</td>
<td>0.004</td>
<td>0.284 0.288 0.021</td>
<td>0.022 0.006</td>
<td>0.074</td>
<td></td>
</tr>
<tr>
<td>121 Textile supplies &amp; related materials</td>
<td>0.007</td>
<td>0.080 0.087 0.025</td>
<td>0.026 0.008</td>
<td>0.068</td>
<td></td>
</tr>
<tr>
<td>125 Chemicals, excl. meds., food additives</td>
<td>0.032</td>
<td>0.112 0.119 0.025</td>
<td>0.024 0.007</td>
<td>0.073</td>
<td></td>
</tr>
<tr>
<td>130 Lumber &amp; unfinished building materials</td>
<td>0.010</td>
<td>0.332 0.338 0.029</td>
<td>0.024 0.009</td>
<td>0.077</td>
<td></td>
</tr>
<tr>
<td>131 Building materials, finished</td>
<td>0.009</td>
<td>0.104 0.111 0.029</td>
<td>0.026 0.008</td>
<td>0.057</td>
<td></td>
</tr>
<tr>
<td>140 Steelmaking materials-unmanufactured</td>
<td>0.004</td>
<td>0.212 0.219 0.020</td>
<td>0.024 0.009</td>
<td>0.071</td>
<td></td>
</tr>
<tr>
<td>141 Iron &amp; steel mill products-semifinished</td>
<td>0.012</td>
<td>0.153 0.164 0.039</td>
<td>0.035 0.013</td>
<td>0.214</td>
<td></td>
</tr>
<tr>
<td>142 Major non-Fe metals-crude &amp; semifin.</td>
<td>0.025</td>
<td>0.434 0.442 0.025</td>
<td>0.030 0.014</td>
<td>0.058</td>
<td></td>
</tr>
<tr>
<td>150 Iron &amp; steel products, ex. advanced mf</td>
<td>0.005</td>
<td>0.095 0.103 0.024</td>
<td>0.026 0.008</td>
<td>0.071</td>
<td></td>
</tr>
<tr>
<td>151 Iron &amp; steel mfg.-advanced</td>
<td>0.004</td>
<td>0.132 0.138 0.024</td>
<td>0.029 0.007</td>
<td>0.072</td>
<td></td>
</tr>
<tr>
<td>152 Fin. metal shapes &amp; adv. mfg., ex. steel</td>
<td>0.009</td>
<td>0.133 0.139 0.024</td>
<td>0.027 0.006</td>
<td>0.055</td>
<td></td>
</tr>
<tr>
<td>161 Finished</td>
<td>0.014</td>
<td>0.071 0.081 0.028</td>
<td>0.027 0.011</td>
<td>0.079</td>
<td></td>
</tr>
</tbody>
</table>
Contribution to monthly import price inflation

Total Import Price Inflation

Percentage Point Contribution of:
- Non-Petroleum Material Intensive Goods
- Finished Goods*
- Petroleum

*Material-intensive categories are foods and non-petroleum industrial supplies; finished goods categories are automotive products, machinery, and consumer goods.
## Pass-through estimates for the U.S.
(2-year horizon)

<table>
<thead>
<tr>
<th></th>
<th>All Imports</th>
<th>Oil Imports</th>
<th>Material Intensive</th>
<th>Finished Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation Total</td>
<td>0.99</td>
<td>2.63</td>
<td>0.55</td>
<td>0.46</td>
</tr>
<tr>
<td>Exchange Rate Total</td>
<td>-0.32</td>
<td>-3.33</td>
<td>-0.53</td>
<td>-0.19</td>
</tr>
<tr>
<td>Nonfuel Commodity Price Total</td>
<td>0.41</td>
<td>0.26</td>
<td>0.35</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Correction factor