Effects of a Mandatory Local Currency Pricing Law On the Exchange Rate Pass-Through[1]

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Introduction

- Following a hyperinflationary process in the late 80s and the early 90s, the Peruvian economy progressively dollarized as the value of the Peruvian sol fell.
- Many firms chose foreign currency pricing to cover themselves against the exchange rate depreciation risk and against the loss of the real value of their goods or services sold.
- This price dollarization had an impact over the exchange rate pass-through (ERPT).

Introduction

- ▶ What would happen if firms suddenly were forced to follow local currency pricing? This is what happened in Peru with Law 28300.
- ▶ Using the enactment of a mandatory law to follow local currency pricing in Peru in 2004 as an experiment, we analyze whether this policy had an impact over the (short-run) ERPT.
- ▶ We propose a simple model and reduced form estimations for our analysis.
- ▶ We find that the introduction of this policy revealed the heterogeneity among goods and services: the ERPT falls for some and stays the same for others.

Price Dollarization

Figure: Price Dollarization in Advertisements

Source: El Comercio.

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Price Dollarization

- We classify the goods and services by separating between those priced in soles and those priced in dollars before 2004.
- We use individual price indices at the 4-digit CPI classification (55 goods and services).
- We consider a price category to be dollarized if 15% or more of the goods and services in that category are priced in dollars. We do this based on the advertisements that were published between 1995 and 2004 in El Comercio, the main newspaper in Peru.

Price Dollarization

Table: Goods and Services with Dollarized Prices (1995-2004)

Non-Durables	Alcoholic Beverages, Clothing and Textiles, Personal Care Items, Shoes
Durables	Electric Appliances, Electronic Equipment, Furniture, Jewelry, Tableware, Therapeutic Equipment, Vehicles
Services	Air Transportation, Entertainment, Ground Transportation, Hotels, Housing Rental and Home Improvement, Insurance, Personal Care Services, Postal and Telephone Services, Tourist Services

Source: El Comercio.

Price Dollarization

Figure: Price Dollarization by Category (1995-2004)
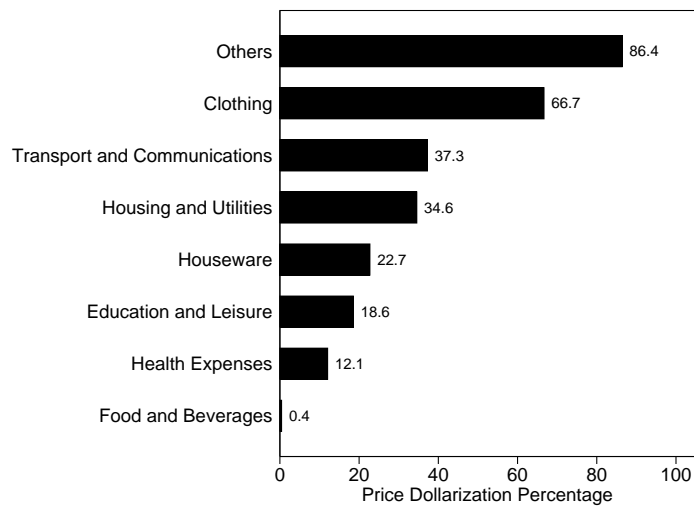
Source: El Comercio.

Price Dollarization

Figure: Price Dollarization and Imported Content
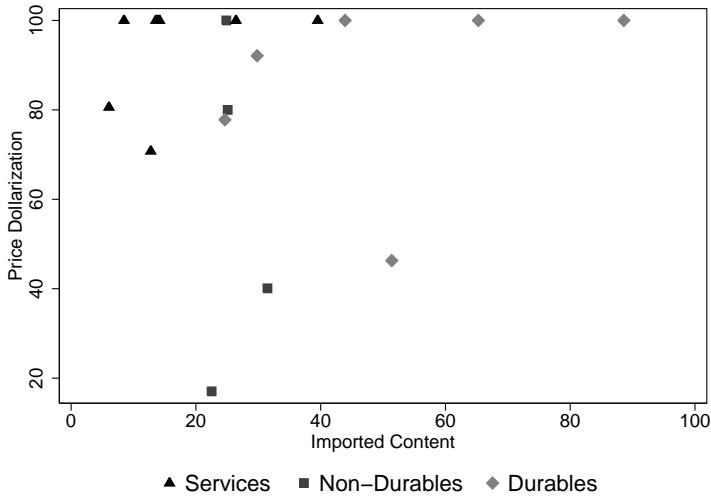
Source: El Comercio.

Mandatory Law on Local Currency Pricing

▶ In September 2004, upon a proposal from the CRBP, the Peruvian congress enacted Law 28300.

▶ It was a modification to the Consumer Protection Law which implied that all prices had to be displayed in soles (and optionally in any other currency), as a measure to curb price dollarization.

▶ We use this fact as a break in the pricing behavior.

▶ The period between the Law's proposal and approval was barely a month, so firms could not anticipate the effects of this Law. In addition, this Law seemed of minor interest since there was no news or discussion about it on the media.

Evidence on the Effects of the Policy

Figure: Correlation Between Prices and Exchange Rate
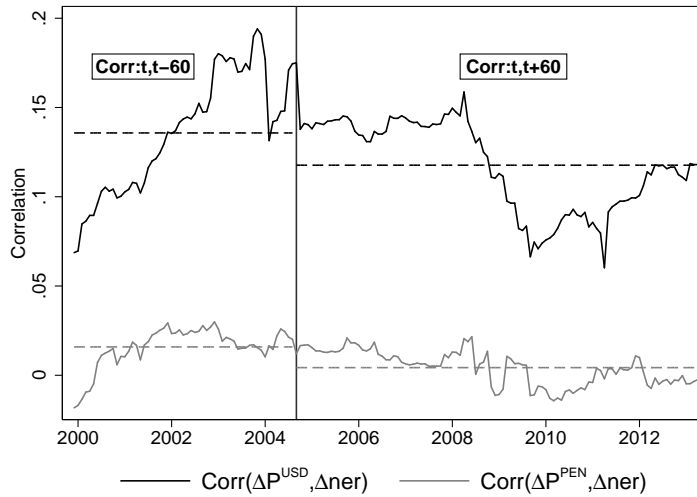
Source: CRBP, National Statistics Institute.

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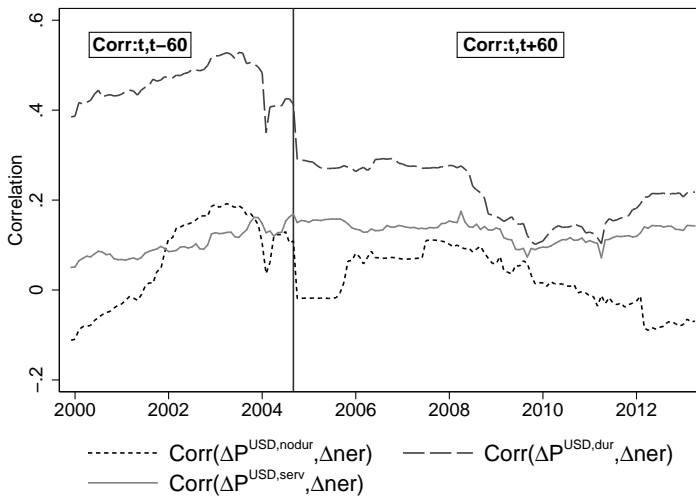
Source: CRBP, National Statistics Institute.

A Theoretical Model On Different Pass-Throughs

- ▶ Why do the correlations fall after the introduction of the Law?
- ▶ Why are there differentiated effects?
- ▶ In general, the economic literature proposes three different sources for different short-run ERPTs among goods and services.
  - ▶ Dollarized costs
  - ▶ Market power
  - ▶ Menu costs
- ▶ We propose a simple model of firm pricing behavior under monopolistic competition with the first two characteristics.

A Theoretical Model On Different Pass-Throughs

- We follow a standard partial equilibrium static ERPT model (see Burstein & Gopinath 2014).
- We assume an economy inhabited by an infinite number of firms and consumers.
- Each firm produces a differentiated good or service: a unique variety indexed by $z \in [0, 1]$.
- Firms compete under a monopolistic competition structure, so each firm has enough market power in order to decide over their prices.
- We focus on an specific firm i that before the Law follows foreign currency pricing and after the Law switches to local currency pricing.
- Customers have their income in soles. So, if they buy a good or service in dollars, they must convert the currency beforehand.

A Theoretical Model On Different Pass-Throughs

- Before the Law, the price was expressed in dollars.

$$p_{it} = e_t + p_{it}^* = e_t + \mu_{it}(p_{it} - p_t) + c_{it}(q_{it}, e_t)$$

- p_{it} is the log-price in soles, p_{it}^* is the log-price in dollars, p_t is the log-aggregate price level, q_{it} is the log-demand, e_t is the log-exchange rate, μ_{it} is the log-mark-up and c_{it} are the log-costs.
- The ERPT would be:

$$\frac{\Delta p_{it}}{\Delta e_t} = \frac{1 + \alpha_{it}}{1 + \Gamma_{it}}$$

- $\alpha_{it} = \partial c_{it}/\partial e_t$ is the exchange rate elasticity of the costs (the dollarized costs of i) and $\Gamma_{it} = -\partial \mu_{it}/\partial(p_{it} - p_t)$ is the price elasticity of the mark-up.
- Different values for the ERPT can be achieved through different values of α_{it} and Γ_{it}.

A Theoretical Model On Different Pass-Throughs

▶ After the law, customers only pay in soles.

$$p_{it} = \mu_{it} \left(p_{it} - p_t \right) + c_{it} \left(q_{it}, e_t \right)$$

▶ The ERPT now becomes

$$\frac{\Delta p_{it}}{\Delta e_t} = \frac{\alpha_{it}}{1 + \Gamma_{it}}$$

▶ Leaving everything else constant, for a specific firm i that before the Law follows foreign currency pricing and after the Law follows local currency pricing, the ERPT falls as $\frac{1 + \alpha_{it}}{1 + \Gamma_{it}} > \frac{\alpha_{it}}{1 + \Gamma_{it}}$.

Estimation

- To find the effects of the Law on the ERPT we estimate the following reduced form panel data estimation:

$$\Delta p_{it} = \sum_{j=0}^{J} \beta_j \Delta ner_{t-j} + \sum_{j=0}^{J} \gamma_j X_{t-j} + \sum_{i=1}^{N} \delta_i Z_i$$
$$+ \sum_{n=1}^{N} \sum_{j=0}^{J} \zeta_{ij} Z_i \times \Delta ner_{t-j}$$
$$+ \sum_{j=0}^{J} \eta_j D_{t-j}^{law} \times \Delta ner_{t-j} + \sum_{i=1}^{N} \sum_{j=0}^{J} \theta_{ij} D_{t-j}^{law} \times Z_i \times \Delta ner_{t-j} + \varepsilon_{it}$$

- Dependent variable, $\triangle p_{it}$, is the percentage change of the price index i between periods t and $t-1$.
- Main independent variable, Δner_t, is the percentage change of the nominal exchange rate between periods t and $t-1$. We define the ERPT as the sum of the β_j coefficients associated to Δner_t.
- X_t represents time-varying control variables common for all the price indices, while Z_i represents price index-specific control variables.
- Second row controls for the heterogeneous price index-specific effects on the ERPT through the interaction term $Z_i \times \Delta ner_t$.
- Third row includes interaction terms that consider the indicator variable D_t^{law}, which equals 1 for the period in which the Law has been active (September 2004 and onwards).
- Coefficient related to $D_t^{law} \times \Delta ner_t$ is interpreted as the differential of the overall ERPT before and after the Law, while coefficient associated to $D_t^{law} \times Z_i \times \Delta ner_t$ captures the heterogenous effects of the Law on the ERPT for different groups of goods and services.

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Data

- For the calculus of the exchange rate we only take into account the bilateral soles / US dollars nominal exchange rate, as the use of foreign currencies other than the US dollar is very limited in the Peruvian economy.
- We use individual price indices at the 4-digit CPI classification from January 1995 to March 2018. There are 55 price indices, which are aggregations of lower level price sub-indices and are expressed in soles.
- We use the imported content from the 2007 input-output table as a proxy for dollarized costs. The imported content is defined as the share of imported consumption (including intermediate and final goods) corresponding to each price index.

Law Effects

Table: Law Effects (1)

	(1)	(2)
Δner_t	0.110***	0.060*
Δner_{t-1}	0.080***	0.033
$D_t^{law} \times \Delta ner_t$	-0.061**	-0.045
$D_{t-1}^{law} \times \Delta ner_{t-1}$	-0.064**	-0.028
$D_i^{USD} \times \triangle ner_t$		0.139***
$D_i^{USD} \times \triangle ner_{t-1}$		0.131**
$D_t^{law} \times D_i^{USD} \times \triangle ner_t$		-0.046
$D_{t-1}^{law} \times D_{i-1}^{USD} \times \triangle ner_{t-1}$		-0.102*
N	14,876	14,876
R^2	0.020	0.024

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Note: Omitted coefficients for control variables. Robust standard errors clustered by month.

Law Effects

Table: Law Effects (2)

	$k = dur$	$k = nodur$	$k = serv$
$D_i^{USD,k} \times \triangle ner_t$	0.207***	-0.028	0.163**
$D_i^{USD,k} \times \triangle ner_{t-1}$	0.143***	0.131***	0.122
$D_t^{law} \times D_i^{USD,k} \times \triangle ner_t$	-0.125**	0.017	-0.016
$D_{t-1}^{law} \times D_i^{USD,k} \times \triangle ner_{t-1}$	-0.112**	-0.137***	-0.077
N		14,876	
R^2		0.025	

*** p<0.01, ** p<0.05, * p<0.1

Note: All columns belong to the same regression. Omitted coefficients for control variables, Δner_t, Δner_{t-1}, $D_t^{law} \times \Delta ner_t$ and $D_{t-1}^{law} \times \Delta ner_{t-1}$. $k = [dur, nodur, serv]$ denotes the type of good or service. Robust standard errors clustered by month.

Imported Content

Table: Imported Content

	$h = 5$	$h = 7$
Δner_t	0.006	0.009
Δner_{t-1}	0.010	0.013
$share_i^{m,h} \times \triangle ner_t$	0.002***	0.002***
$share_i^{m,h} \times \triangle ner_{t-1}$	0.001	0.001
N	7,074	9,643
R^2	0.020	0.015

*** p<0.01, ** p<0.05, * p<0.1

Note: Omitted coefficients for control variables. $h = [5, 7]$ denotes the size of the time windows. Robust standard errors clustered by month.

Imported Content

Table: Imported Content and Law Effects (1)

	$h = 5$	$h = 7$
Δner_t	-0.063	0.017
Δner_{t-1}	0.096*	0.013
$share_i^{m,h} \times \triangle ner_t$	0.005***	0.003*
$share_i^{m,h} \times \triangle ner_{t-1}$	-0.001	0.002
$D_t^{law} \times \triangle ner_t$	0.073	-0.010
$D_{t-1}^{law} \times \triangle ner_{t-1}$	-0.092	-0.002
$D_t^{law} \times share_i^{m,h} \times \triangle ner_t$	-0.004*	-0.002
$D_{t-1}^{law} \times share_i^{m,h} \times \triangle ner_{t-1}$	0.002	-0.002
N	7,074	9,643
R^2	0.021	0.016

*** p<0.01, ** p<0.05, * p<0.1

Note: Omitted coefficients for control variables, $D_t^{law} \times share_i^{m,h}$ and $D_{t-1}^{law} \times share_i^{m,h}$. $h = [5, 7]$ denotes the size of the time windows. Robust standard errors clustered by month.

Imported Content

Table: Imported Content and Law Effects (2)

	$h = 5$	$h = 7$
$share_i^{m,h} \times \triangle ner_t$	-0.002	-0.003
$share_i^{m,h} \times \triangle ner_{t-1}$	-0.001	0.003
$D_t^{law} \times share_i^{m,h} \times \triangle ner_t$	0.001	0.002
$D_{t-1}^{law} \times share_i^{m,h} \times \triangle ner_{t-1}$	0.002	-0.002
$D_{it}^{USD} \times share_i^{m,h} \times \triangle ner_t$	0.009***	0.008***
$D_{it}^{USD} \times share_i^{m,h} \times \triangle ner_{t-1}$	0.000	-0.001
$D_t^{law} \times D_{it}^{USD} \times share_i^{m,h} \times \triangle ner_t$	-0.006*	-0.004*
$D_{t-1}^{law} \times D_{it}^{USD} \times share_i^{m,h} \times \triangle ner_{t-1}$	0.000	0.001
N	7,074	9,643
R^2	0.023	0.018

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Note: Omitted coefficients for control variables, Δner_t, Δner_{t-1}, $D_t^{law} \times share_i^{m,h}$, $D_{t-1}^{law} \times share_i^{m,h}$, $D_t^{law} \times \Delta ner_t$ and $D_{t-1}^{law} \times \Delta ner_{t-1}$. $h = [5,7]$ denotes the size of the time windows. Robust standard errors clustered by month.

Results

- With the enactment of Law 28300:
  - ERPT, in general, falls because of the switch from foreign currency pricing to local currency pricing.
  - ERPT for dollarized non-durable goods is completely offset, while ERPT for dollarized durable goods is partially offset.
    - This difference could be related to the higher imported content of the dollarized durables.
  - ERPT for dollarized services does not change after the enactment of the Law.
    - A first explanation could be that firms providing dollarized services adjusted their mark-ups to leave their ERPT almost unchanged.
    - A second explanation could be that the imported content for the services increased after the enactment of the Law.
    - Unfortunately, there is no data available to test these hypotheses.
- Additional exercises:
  - Individual estimations
  - Dynamic estimations
- Results are robust to:
  - Inflation targeting (IT) regime adoption
  - Credit de-dollarization process

Conclusions

- Using disaggregated CPI data we find that Law 28300 reduced the overall ERPT in Peru.
- We find a complete offset for dollarized non-durable goods and a partial offset for dollarized durable goods.
- We find no significant effects of the Law on the ERPT for dollarized services.
- We find a larger imported content implies a larger ERPT. However, this effect falls after the enactment of the Law.