# Effects of a Mandatory Local Currency Pricing Law on the Exchange Rate Pass-Through*

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**Abstract**

This paper discusses whether Law 28300 of 2004, that required Peruvian firms to express their prices in Peru's currency in a context of high price dollarization, affected the exchange rate pass-through (ERPT). We hypothesize that the enactment of the Law introduced menu costs for firms that used to set their prices in dollars, prompting several of them to make a permanent switch to pricing in local currency. Using disaggregated consumer price index (CPI) data, we find that, following passage of the Law, the ERPT was completely offset for non-durable goods with dollarized prices, and partially offset for durable goods with dollarized prices. These effects may vary due to differences in imported component shares, market power, and markup pricing.

Keywords: exchange-rate pass through, price dollarization, local currency pricing

JEL Codes: D04, D49

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# 1 Introduction

The hyperinflation episode and several macroeconomic imbalances endured by Peru in the late 1980s triggered a process of price dollarization across the economy (Quispe, 2000).[1] In a context of high inflation, pricing in dollars protects firms against the risk of depreciation and the loss of the real value of their goods and services (Armas, 2016; Drenik and Perez, 2018). The flip side is that consumers bear the depreciation risk because they are exposed to the variations in the exchange rate through the prices they pay.

The degree to which prices respond to exchange rate movements is known as the exchange rate pass-through (ERPT). For Peru's partially dollarized economy, previous works suggest that the ERPT ranged from 30-50 percent in the 1990s to 0-20 percent in the following decade.[2] This reflects how important exchange rate movements are in Peru. However, the fact that the ERPT fell throughout the 2000s also suggests changes in how the ERPT is determined.

This paper discusses whether Law 28300, enacted to tackle price dollarization, contributes to explaining the ERPT decline during the 2000s. The Law, first proposed by the Central Reserve Bank of Peru (BCRP) and passed in 2004, was a modified version of the Consumer Protection Law, which stipulated that all prices be denominated in soles, the local currency (and optionally in any other currency).

Using disaggregated consumer price index (CPI) data, we find that the enactment of the Law reduced the overall ERPT. Moreover, we find evidence of differentiated effects of the Law on the ERPT. Specifically, we find a complete offset for non-durable goods with dollarized prices, and a partial offset for durable goods with dollarized prices. In addition, we use the share of imported content as a proxy for the cost sensitivity to exchange rate movements. We find that a greater imported content implies a larger ERPT. After controlling for the Law on local currency pricing, we observe a reduction in the effect of the imported content on the ERPT. The results are robust when we control for two different events that occurred in Peru alongside the enactment of the Law: the adoption of an inflation targeting (IT) regime and a broader de-dollarization process.

To our best knowledge, this is the first paper to provide an analysis of ERPT in Peru using disaggregated CPI data, as previous ERPT studies for Peru were carried out at an aggregate level. Moreover, this is also the first paper to discuss

[1] For Peru, there are studies on overall dollarization (Armas et al., 2007) as well as on more specific issues such as financial dollarization (Castillo et al., 2016; Garcia-Escribano, 2010; Vega, 2015), and price dollarization (Castellares, 2017; Contreras et al., 2016). For a macroeconomic view on the effects of dollarization on small open economies, see Castillo et al. (2013), and Chang and Velasco (2002).

[2] Miller (2003) finds that the ERPT on consumer prices is situated at around 7 percent and 16 percent when the effect on consumer price is considered. Winkelried (2003) finds the ERPT related to consumer prices is highly non-linear and depends on the phase of the business cycle, the size of the exchange rate movements, and the inflation dynamics. Using rolling window estimations, Winkelried (2014) notes that the ERPT fell from around 50 percent at the end of the 1990s to around 10 percent a decade later. Perez Forero and Vega (2015) observe a non-linear 1-year accumulated ERPT of approximately 20 percent for depreciations and 10 percent for appreciations. Maertens et al. (2012) analyze how the ERPT interacts with the inflation targeting (IT) regime. They find that once the IT regime was adopted, the 1-year ERPT for the CPI fell from 30 percent to 0 percent, while the long-run ERPT fell from 43 percent to 6 percent.

the effects of Law 28300 on the ERPT.[3]

The structure of the paper is as follows. Sections 2 and 3 explain the price dollarization process in Peru and the Law for enforcing local currency pricing. Section 4 presents a brief literature review. Section 5 discusses the identification strategy regarding the Law's effect on the ERPT. Section 6 provides details on the data. Section 7 reports the results of the estimations. Section 8 presents the results of the robustness checks. Section 9 concludes.

## 2 Price dollarization in Peru

After a hyperinflation episode in the late 1980s and early 1990s, the Peruvian economy progressively dollarized as the value of the local currency, the sol, fell.[4] In this context, many firms adopted the practice of setting their prices in dollars.

As a way to illustrate price dollarization, Figure 1 shows a sample of advertisements before the enactment of the Law with prices in U.S. dollars ($) rather than in the local currency (S/.).[5]

Figure 1: Sample advertisements (1995-2004)


Source: El Comercio.

Based on advertisements published in El Comercio, a main Peruvian newspaper, we identify goods and services with dollar and non-dollar prices for the 10 years preceding the enactment of the Law. To this end we use the CPI, which is made up of 1 to 6 digit price sub-indices (from the most to the least aggregated groups, respectively). The procedure adopted is as follows:

[3]The only paper to have analyzed the effects of the Law is Montoro (2006), which finds that the correlation between the exchange rate and price indices for various goods and services fell after the enactment of the Law.

[4]In Peru, dollarization occurred at three different levels: financial dollarization, transactional dollarization and price dollarization (Montoro, 2006).

[5]Until 2016, the symbol for the sol was "S/.". In 2017 the symbol changed to "S/".

1. Obtaining information from advertisements published in El Comercio between 1995 and August 2004.
2. Identifying price advertisements in soles and dollars.
3. Matching the advertisements with the 174 price indices at the 6-digit CPI classification.
4. Aggregating the 6-digit price indices into the 4-digit CPI classification (made up of 55 price indices).
5. Considering a 4-digit price index to be dollarized if 15 percent or more of the 6-digit price indices comprising it are priced in dollars.

Table 1 shows the dollarized price indices at the 4-digit CPI level based on the above criteria. It also shows the dollarized goods and services further divided into three categories: non-durable goods, durable goods, and services. The set of non-durable goods with prices denominated in dollars includes mostly items sold in department stores and supermarkets. The durable goods group includes processed items, mostly technology-intensive and imported goods. Lastly, the group of services denominated in dollars includes mostly services used by relatively high-income consumers (see Figure A.1 in the Appendix).

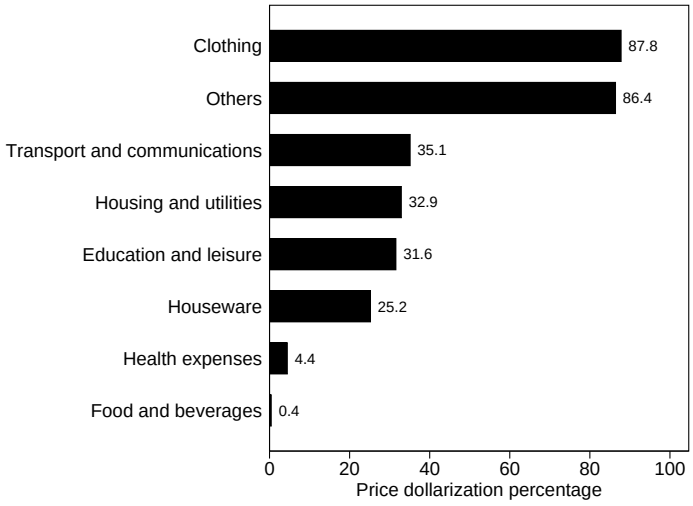
Table 1: Goods and services with dollarized prices (1995-2004)

| | |
|---|---|
| Non-durable goods | alcoholic beverages; clothing and textiles; personal care items; shoes |
| Durable goods | electrical 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.
Note: The classification uses 4-digit price indices. We consider a 4-digit price index to be dollarized if 15 percent or more of the 6-digit price indices that comprise it are priced in dollars, according to the advertisements published in El Comercio between 1995 and August 2004. Therefore, it is possible that some of the individual prices that compose these dollarized 4-digit price indices were actually denominated in soles. We further discuss this in the data section.

Figure 2 shows the aggregated price indices at the 1-digit CPI classification. The groups with the largest degree of price dollarization are clothing (88 percent) and others (86 percent), which includes most of the dollarized services.

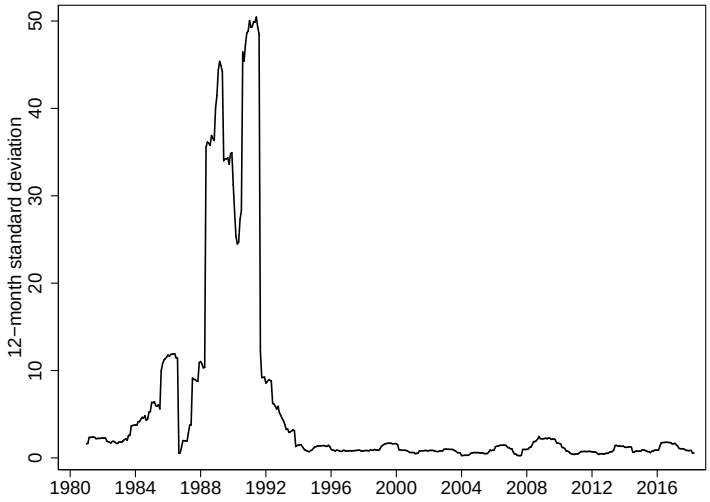
Figure 2: Price dollarization by category (1995-2004)




Source: Peru's National Statistics Institute (INEI).
Note: These are 1-digit price index groups. The values show the percentage of dollarized prices among the goods and services that compose each category according to the El Comercio advertisements between 1995 and August 2004.

Figure 3 shows the standard deviation of the monthly exchange rate variation for the previous 12 months. The month-to-month exchange rate volatility was very high during the late 1980s and early 1990s. This could be one of the reasons for price dollarization in Peru, since firms seek to set their prices in the more stable currencies to prevent real value losses (Drenik and Perez, 2018).[6]

Figure 3: 12-month standard deviation of the monthly exchange rate variation

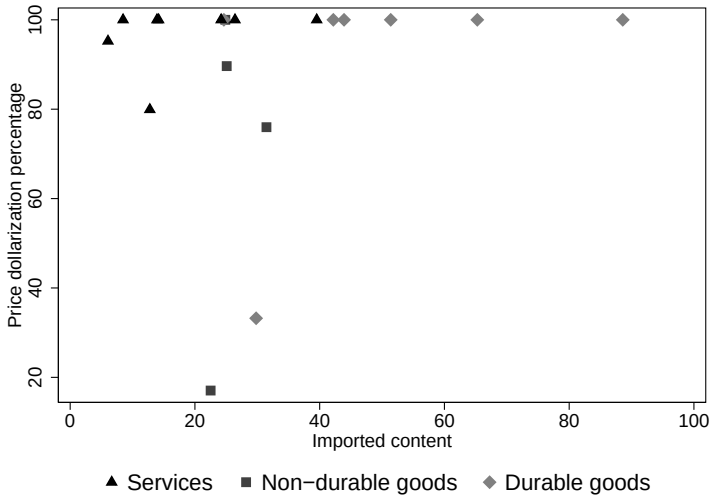



Source: Peru's National Statistics Institute (INEI).
Note: The figure shows the evolution of the standard deviation of the monthly exchange rate variation for the previous 12 months.

[6]The international economics literature reaches a similar conclusion, finding that exporters invoice their goods abroad in the less volatile currencies. See Devereux et al. (2004), Donnenfeld and Haug (2008), Engel (2006), Gopinath et al. (2010).

A high correlation between the exchange rate and prices through imported input costs is another important stylized fact. Using data from the 2007 input-output table, we define the imported content as the share of imported consumption (including intermediate and final goods) for each price index.[7] The imported content works as a proxy for dollarized costs, as most of Peru's imports are priced in dollars.[8] Figure 4 suggests a positive relation between price dollarization and imported content. This could be a second reason for price dollarization in Peru, with firms setting prices in dollars as a means of paying for their inputs (Armas, 2016; Contreras et al., 2016). In contrast, non-dollarized price indices have a lower average imported content (see Figure A.2 in the Appendix).

Figure 4: Price dollarization and imported content




Source: Peru's National Statistics Institute (INEI).
Note: The figure shows information for 19 of the 20 goods and services with dollarized prices listed in Table 1. Imported content is defined as the percentage of imported intermediate or final goods corresponding to each input-output table category for 2007. These categories are then matched with the 4-digit price indices. The price dollarization data corresponds to the period from January to August 21, 2004. The only omitted price index corresponds to postal and telephone services, for which we did not record any dollarized prices in 2004.

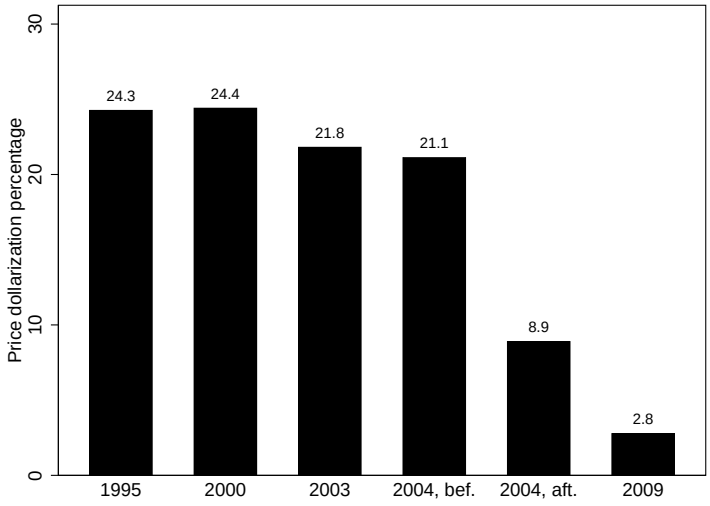
Figure 5 presents the evolution of price dollarization over time. The percentages are the proportion of the CPI that was dollarized in each year. From 1995 to August 2004, total price dollarization exceeded 20 percent of the CPI. Then there was a sudden drop in 2004. The cut-off date is August 22, the date the Law on local currency pricing went into effect. As we discuss in the next section, firms quickly changed their pricing currency upon enactment of the Law, reducing the level of price dollarization by more than half. By 2009, five years after the Law was enacted, the level of price dollarization was just 3 percent.[9]

[7] Carriere-Swallow et al. (2016) propose a similar measure.

[8] Castellares (2017) finds that 88 percent of Peru's 2016 imports were invoiced in dollars.

[9] After the passage of the Law, some firms began simultaneously posting prices in soles and dollars for the same goods or services, which fully complies with the Law. The percentages for 2004 after the Law and 2009 correspond mostly to these firms.

Figure 5: Price dollarization over time




Source: Peru's National Statistics Institute (INEI).
Note: The percentages represent the part of the headline CPI that was dollarized. The "2004, Before" label refers to the period from January to August 21, during which the Law was not in effect. The "2004, After" label refers to the period from August 22 to December, during which the Law was in effect.

# 3 The Law on local currency pricing

In July 2004, following a BCRP initiative, the Congress enacted Law 28300, which went into effect on August 22, 2004. The Law was a modified version of the Consumer Protection Law, which stipulated that all prices be displayed in soles (and optionally in any other currency), as a way of curbing price dollarization.[10] In practice, the Law introduced menu costs for firms that used to set their prices in dollars, prompting several of them to make a permanent switch from dollars to soles in the pricing of certain goods and services.[11] Thus, the Law changed the pricing behavior of Peruvian firms.[12]

Figures 6 and 7 show advertisements from the same store for the same goods, but shortly before and after passage of the Law.

[10]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 in the media.

[11]Since these firms must change their price tags in soles each time the exchange rate moves.

[12]As mentioned before, after the Law some firms simultaneously posted prices in soles and in dollars for the same good or service, which complies with the Law. In case there were differences in prices posted in soles and dollars due to variations in the exchange rate, these firms unilaterally assign a referential exchange rate. This referential exchange rate is usually set higher (in times of depreciation) or lower (in times of appreciation) than the spot, so it can absorb small and medium exchange rate shocks without needing to change. Then, a customer has the option to pay either in dollars or, after converting the price with the referential exchange rate, in soles. Moreover, in Peru customers can never be forced to pay in dollars.

Figure 6: Price dollarization in advertisements before the Law


Source: El Comercio, August 16, 2004.

Figure 7: Advertisements after the Law

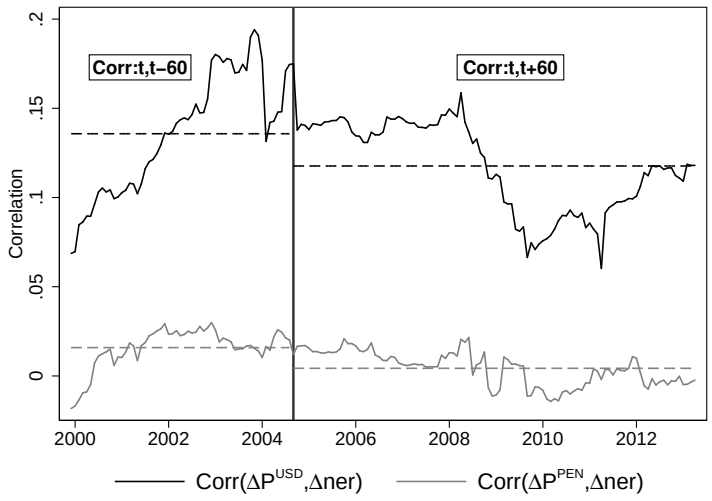

Source: El Comercio, August 28, 2004.

Figure 8 suggests that the Law reduced the correlation between the variation in the nominal exchange rate, $\Delta ner$, and the variation in the dollarized price indices, $\Delta P^{USD}$.[13] At the same time, the correlation between the variation in the exchange rate and the variation in the non-dollarized price indices, $\Delta P^{PEN}$, did not change with the enactment of the Law.[14] This analysis hints at a lower ERPT after the enactment of the Law, with an emphasis on dollarized goods and services.

[13] The variation refers to the 1-month percentage change in the variables. This follows the classification from Table 1.

[14] One could expect the correlation of the prices of these goods given the exchange rate to be 1 prior to the Law and 0 after the Law. This would be true if these aggregated price indices considered individual dollarized prices alone. Nonetheless, the aggregated price indices classified as dollarized also consider prices that are denominated in soles, thus obtaining a correlation different from 1. This is further discussed in the data section.

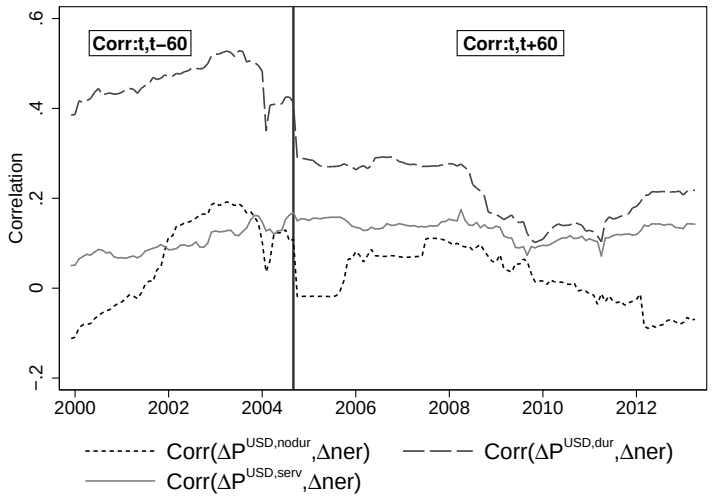
Figure 8: Correlation between prices and the nominal exchange rate (1)




Source: BCRP, Peru's National Statistics Institute (INEI).
Note: We plot the 60-month lagged correlation for the period prior to the enactment of the Law, and the 60-month ahead correlation for the period after its enactment. Horizontal lines denote the mean for the periods before and after the enactment of the Law. The variation refers to the 1-month percentage change in the variables. The vertical line denotes the enactment of the Law. We use September 2004 as the cut-off date, as it is the first full month to be affected by the Law.

Figure 9 displays the previous correlation, but for non-durable goods, $P^{USD,nodur}$; durable goods, $P^{USD,dur}$; and services, $P^{USD,serv}$. For dollarized durable goods and dollarized non-durable goods, the correlation fell after the enactment of the Law, but the correlation for dollarized services remained roughly the same. This suggests that the Law probably had heterogeneous effects on the ERPT, depending on the type of goods or services.

Figure 9: Correlation between prices and the nominal exchange rate (2)




Source: BCRP, Peru's National Statistics Institute (INEI).
Note: We plot the 60-month lagged correlation for the period prior to the enactment of the Law, and the 60-month ahead correlation for the period after its enactment. The variation refers to the 1-month percentage change in the variables. The vertical line denotes the enactment of the Law. We use September 2004 as the cut-off date, as it is the first full month to be affected by the Law.

# 4 Literature review

Figures 8 and 9 suggest that the ERPT may vary depending on the type of goods and services. In this regard, the literature proposes three main reasons why the ERPT could differ from one period to another or across goods and services: nominal rigidities, marginal costs, and markups.[15]

Nominal rigidities refer to the fact that firms cannot change prices in each period. Given that the ERPT measures changes in prices, it will vary if the firm is able to alter its prices. Thus, different degrees of price stickiness can explain why goods and services have different ERPTs. For instance, Gopinath and Itskhoki (2010) find that the ERPT to U.S. import prices is higher for goods whose prices change more frequently. This channel is also explored in Devereux et al. (2004) and Gopinath et al. (2010).

Marginal costs play a key role in price determination and, by extension, in the ERPT. The more sensitive marginal costs are to the exchange rate, the higher the ERPT. Therefore, different values of imported inputs (and local content, such as distribution costs) may imply that marginal cost sensitivity to the exchange rate can vary. The importance of imported inputs in price setting is discussed, for example, by Goldberg and Campa (2010), who use a sample of 21 OECD countries to show that the imported input channel is the main one through which exchange rate movements affect the CPI. The reason is that the share of imported inputs is 10-48 percent of the costs of tradable goods, and 3-22 percent of the costs of non-tradable goods.[16]

Finally, in response to an exchange rate shock, firms may choose to adjust their markups rather than their prices, thus providing an explanation for incomplete ERPTs. Theoretical discussions in this field include Arkolakis and Morlacco (2017) and Atkeson and Burstein (2008). Other papers, such as Copeland and Kahn (2012), Goldberg and Hellerstein (2013) and Nakamura and Zerom (2010), use micro data for specific markets to provide empirical evidence that varying markups are part of the explanation for incomplete ERPTs. However, varying markups could also help explain ERPT differences between firms or ERPT variation over time.

# 5 Estimation

To find the impact of the Law on the ERPT, we estimate the following reduced form equation:

[15] See Burstein and Gopinath (2014) for a survey and a baseline theoretical model.

[16] Similarly, Burstein et al. (2003) find that local distribution costs account for more than 40 percent of retail prices in the United States and 60 percent of retail prices in Argentina.

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

The dependent variable, $\triangle p_{it}$, is the percentage change of the price index $i$ between periods $t$ and $t-1$. The main independent variable, $\Delta ner_t$, is the percentage change of the nominal exchange rate between periods $t$ and $t-1$. We define the ERPT as the sum of the $\beta_j$ coefficients associated with $\Delta ner_t$. $X_t$ includes time-varying control variables common to all the price indices, while $Z_i$ represents price index-specific control variables.

The second row of Equation 1 controls for the heterogeneous price index-specific effects on the ERPT through the interaction term $Z_i \times \Delta ner_t$. The 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 in force (September 2004 and onwards).[17] The 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 the coefficient associated with $D_t^{Law} \times Z_i \times \Delta ner_t$ captures the heterogeneous effects of the Law on the ERPT for different groups of goods and services.[18] Lastly, $\varepsilon_{it}$ contains the price index fixed effects and the error term.

# 6 Data

For the exchange rate, we only take into account the bilateral soles/dollars nominal exchange rate, as the use of foreign currencies other than the dollar is very limited in Peru.[19]

We use individual 4-digit CPI indices from January 1995 to March 2018.[20] At this level there are 55 price indices, which are aggregations of lower-level price sub-indices and are denominated in soles.[21]

We use the imported content from the 2007 input-output table as a proxy for dollarized costs.[22] The imported content is defined as the share of imported consumption (including intermediate and final goods) for each price index.[23] Given that the input-output table is only available for one year, we assume constant values for this variable within $\pm$5-year and $\pm$7-year time windows.

[17] We use September 2004 as the cut-off date as it is the first full month to be affected by the Law.

[18] These are basically differences-in-differences estimators.

[19] See Contreras et al. (2016).

[20] The CPI data is collected by the Peru's National Statistics Institute (INEI). The CPI is classified into price sub-indices which follow a hierarchy that goes from the most disaggregated groups (6 digits) to the most aggregated groups (1 digit). For more details on the Peruvian CPI see Armas et al. (2009). We omit the tubers price index from our estimates because of its high volatility and strong seasonality.

[21] If one good or service has a price quoted in foreign currency, this index also takes into account the exchange rate to convert such price to soles.

[22] The table was published by the Peru's National Statistics Institute (INEI).

[23] See Carriere-Swallow et al. (2016) for an example on the use of input-output tables for ERPT calculations.

The control variables include the output gap, $y_t$, to control for economy-wide demand shocks; the percentage change in the oil price, $\triangle poil_t$, to control for economy-wide supply shocks; the percentage change in the aggregate CPI, $\pi_t$, to control for internal cost shocks; and the percentage difference in the trade partners' price index, $\pi_t^*$, to control for external cost shocks. We calculate all percentage change series between periods $t$ and $t-1$. We retrieved the series from the BCRP database, seasonally adjusted them, and checked them for stationarity (where applicable).

# 7 Results

## 7.1 Impact of the Law

In this section we assess the effects of the Law on the ERPT by estimating different specifications for Equation 1. From the estimations in column 1 of Table 2, before the Law, the ERPT was 19 percent. After the Law, the coefficients for the interaction term $D_t^{Law} \times \Delta ner_t$ and its lag imply that the ERPT fell by 13 percentage points.

The results in column 2 of Table 2 differentiate the ERPT between goods and services with dollarized and non-dollarized prices by multiplying the terms of column 1 by the indicator variable $D_i^{USD}$, which takes a value of 1 for goods and services that had dollarized prices before the Law, per Table 1. In this specification the value of the overall ERPT is 6 percent. The coefficients for the interaction term $D_i^{USD} \times \triangle ner_t$ and its lag are interpreted as the additional ERPT of goods and services with prices denominated in dollars. This additional ERPT is 27 percentage points above the original 6 percent. The coefficient for the lag of the interaction term $D_t^{Law} \times D_i^{USD} \times \triangle ner_t$ suggests that the ERPT fell by around 10 percentage points for dollarized goods and services after the enactment of the Law.

Table 2: Impact of the Law (1)

| | (1) | (2) |
|---|---|---|
| $\Delta ner_t$ | 0.110*** | 0.060* |
| $\Delta ner_{t-1}$ | 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 at the month-year level.

Table 3 shows the results when considering the classification of the dollarized price categories between durable goods, non-durable goods and services from Table 1. For these categories we introduce the indicator variables $D_i^{USD,nodur}$, $D_i^{USD,dur}$ and $D_i^{USD,serv}$, respectively. With this specification we find that the additional ERPT is 13 percentage points for dollarized non-durable goods, 35 percentage points for dollarized durable goods, and 16 percentage points for dollarized services. This points to the existence of heterogeneous ERPTs depending on the type of good or service.

After the enactment of the Law, the ERPT was fully offset for dollarized non-durable goods, while it was only partially offset for dollarized durable goods. One reason for this difference could be the different shares of dollarized costs. As shown in Figure 4, in 2007, dollarized durable goods had a greater imported content than dollarized non-durable goods.

In the case of dollarized services, the ERPT did not change significantly after the enactment of the Law. A tentative explanation for this result could be that firms providing dollarized services adjusted their markups to leave their ERPT almost unchanged. Unfortunately, there is no data on markups available to test this hypothesis.

Table 3: Impact of the Law (2)

| | $k = nodur$ | $k = dur$ | $k = serv$ |
|---|---|---|---|
| $D_i^{USD,k} \times \triangle ner_t$ | -0.028 | 0.207*** | 0.163** |
| $D_i^{USD,k} \times \triangle ner_{t-1}$ | 0.131*** | 0.143*** | 0.122 |
| $D_t^{Law} \times D_i^{USD,k} \times \triangle ner_t$ | 0.017 | -0.125** | -0.016 |
| $D_{t-1}^{Law} \times D_i^{USD,k} \times \triangle ner_{t-1}$ | -0.137*** | -0.112** | -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, $\Delta ner_t$, $\Delta ner_{t-1}$, $D_t^{Law} \times \Delta ner_t$ and $D_{t-1}^{Law} \times \Delta ner_{t-1}$. $k = [nodur, dur, serv]$ denotes the type of good or service. Robust standard errors clustered at the month-year level.

## 7.2 Imported content

In this section we use the imported content from the input-output table as a proxy for dollarized costs. Due to data limitations, the only information available is for the 2007 input-output table. Thus, we assume constant values for the imported content variable within ±5-year ($share_i^{m,5}$) and ±7-year ($share_i^{m,7}$) time windows starting from 2007.

The first column of Table 4 shows the estimated coefficient associated with the interaction term $share_i^{m,5} \times \triangle ner_t$, which indicates how sensitive the ERPT is to the imported content. When we consider the ±5-year time window, for each percentage point increase in the imported content, the ERPT increases by 0.2 percent. Therefore, considering that the average imported content is 24 percent, the average ERPT equals 4.8 percent. When we consider the ±7-year time

window in the second column, the term $share_i^{m,7} \times \triangle ner_t$ shows a similar result. Given the absence of a statistically significant effect of $\Delta ner_t$ or its lag in these specifications, one could infer that the ERPT is mainly due to the imported content.

Table 4: Imported content

| | $h=5$ | $h=7$ |
|---|---|---|
| $\Delta ner_t$ | 0.006 | 0.009 |
| $\Delta ner_{t-1}$ | 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 at the month-year level.

Table 5 shows the effect of the Law on the ERPT after controlling for the imported content. Considering the $\pm$5-year time window in the first column, the coefficient corresponding to the interaction term $share_i^{m,5} \times \triangle ner_t$ shows that the ERPT increases by 0.5 percentage points for each percentage point increase in the imported content. After passage of the Law, the coefficient for the interaction term $D_t^{Law} \times share_i^{m,5} \times \triangle ner_t$ indicates that the ERPT sensitivity fell by 0.4 percentage points.

The specification that considers the $\pm$7-year time window in the second column of Table 5 shows that the ERPT increases by 0.3 percentage points when the imported content increases by 1 percentage point ($share_i^{m,7} \times \triangle ner_t$). However, within this time window we find no evidence of lower ERPT sensitivity to imported content after passage of the Law.

Table 5: Imported content and impact of the Law (1)

| | $h=5$ | $h=7$ |
|---|---|---|
| $\Delta ner_t$ | -0.063 | 0.017 |
| $\Delta ner_{t-1}$ | 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 at the month-year level.

Table 6 builds upon the previous result by differentiating between dollarized and non-dollarized goods and services. The coefficient of $D_{it}^{USD} \times share_i^{m,h} \times \triangle ner_t$ shows that, before the enactment of the Law, dollarized goods and services had an ERPT sensitivity of 0.9 percentage points for each percentage point of imported content within the $\pm$5-year time window and 0.8 percentage points for each percentage point of imported content within the $\pm$7-year time window. The coefficient of $D_t^{Law} \times D_{it}^{USD} \times share_i^{m,h} \times \triangle ner_t$ shows that, after the enactment of the Law, the sensitivity of the ERPT fell by 0.6 percentage points for the $\pm$5-year time window and by 0.4 percentage points for the $\pm$7-year time window. Thus, the effect of the imported content is mainly channeled through goods and services with dollarized prices.

Table 6: Imported content and impact of the Law (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, $\Delta ner_t$, $\Delta ner_{t-1}$, $D_t^{Law} \times share_i^{m,h}$, $D_{t-1}^{Law} \times share_i^{m,h}$, $D_t^{Law} \times \Delta ner_t$ and $D_{t-1}^{Law} \times \Delta ner_{t-1}$. $h = [5,7]$ denotes the size of the time windows. Robust standard errors clustered at the month-year level.

We also performed exercises to show how the ERPT for dollarized non-durable goods, durable goods and services

responds to the imported content. These results appear in Tables A.4 and A.5 in the Appendix.

# 8 Robustness checks

## 8.1 Inflation targeting

One of Peru's most significant economic developments in recent times was the adoption of an IT regime.[24] The BCRP implemented the IT regime in January 2002, 12 years after the end of the hyperinflation episode. Initially, the inflation target was set at a 12-month inflation rate of 2.5 percent $\pm 1$ percentage point tolerance. In 2007 the inflation target was set at 2 percent. The consensus among experts is that IT adoption has been successful in controlling inflation (Armas et al., 2015; Dancourt, 2015). For example, the 2002-2017 year-end 12-month inflation average was 2.8 percent, lower than the 1992-2001 average of 15.3 percent.[25]

The previous works that study the impact of the IT adoption on the ERPT in Peru are Maertens et al. (2012) and Winkelried (2014). Both use the aggregate CPI and time series methodologies and find that the ERPT falls after implementation of the IT, because of the lower exchange rate uncertainty associated with the IT. Nonetheless, in their analysis, Maertens et al. and Winkelried do not take into account the local currency pricing Law. In this section we look into whether the results by Maertens et al. and Winkelried can also be obtained using disaggregated CPI data, and whether there is some degree of complementarity between the IT and the Law on local currency pricing on the ERPT.

To identify the effects of the IT within our empirical framework we introduce a dummy variable $D_t^{IT}$, which takes a value of 1 within the IT period. Column 1 of Table 7 shows the results when we control for this policy only: specifically, that it reduced the ERPT. Column 3 presents a similar result when controlling for goods and services with dollarized prices.

However, these conclusions change once we control for the enactment of the Law in columns 2 and 4. If we consider both policies at the same time, we find that the IT regime has no effect on the ERPT (no statistically significant effect of the coefficients of $D_t^{IT} \times \Delta ner_t$, $D_t^{IT} \times D_i^{USD} \times \triangle ner_t$ or their lags), while the Law on local currency pricing does (especially regarding the effect of $D_t^{Law} \times D_i^{USD} \times \triangle ner_t$).

[24] See Armas et al. (2015) for a discussion on the implementation of the IT regime in Peru.

[25] Also, there is evidence that suggests the IT regime helped to reduce other kinds of dollarization. For example, Catão and Terrones (2016) find that the adoption of the IT regime in Peru led to a reduction in financial dollarization.

Table 7: Inflation targeting

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| $\Delta ner_t$ | 0.116*** | 0.116*** | 0.072* | 0.072* |
| $\Delta ner_{t-1}$ | 0.080*** | 0.080*** | 0.029 | 0.029 |
| $D_t^{Law} \times \Delta ner_t$ | | -0.022 | | 0.037 |
| $D_{t-1}^{Law} \times \Delta ner_{t-1}$ | | -0.066 | | -0.061 |
| $D_t^{IT} \times \Delta ner_t$ | -0.065** | -0.045 | -0.058 | -0.094 |
| $D_{t-1}^{IT} \times \Delta ner_{t-1}$ | -0.060** | 0.002 | -0.021 | 0.037 |
| $D_i^{USD} \times \triangle ner_t$ | | | 0.124*** | 0.124*** |
| $D_i^{USD} \times \triangle ner_{t-1}$ | | | 0.143** | 0.143** |
| $D_t^{Law} \times D_i^{USD} \times \triangle ner_t$ | | | | -0.159* |
| $D_{t-1}^{Law} \times D_{i-1}^{USD} \times \triangle ner_{t-1}$ | | | | -0.013 |
| $D_t^{IT} \times D_i^{USD} \times \triangle ner_t$ | | | -0.021 | 0.129 |
| $D_{t-1}^{IT} \times D_{i-1}^{USD} \times \triangle ner_{t-1}$ | | | -0.111* | -0.100 |
| $N$ | 14,876 | 14,876 | 14,876 | 14,876 |
| $R^2$ | 0.020 | 0.020 | 0.024 | 0.024 |

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

Note: Omitted coefficients for control variables. Robust standard errors clustered at the month-year level.

The main difference between the results reported by Maertens et al. and Winkelried is that they use the aggregated CPI, while we use disaggregated CPI data, which allows us to differentiate between goods and services with dollarized and non-dollarized prices. These results may point to some degree of complementarity between both policies: the IT reduces the ERPT at the macro level, while the Law has a larger impact in diminishing the ERPT at the micro level, particularly for goods and services with dollarized prices.[26]

## 8.2 Financial de-dollarization

The Peruvian economy experienced a financial de-dollarization process around the time of the enactment of the Law.[27] Figure 10 shows a downward trend in financial dollarization in Peru, both in terms of loans and deposits.[28] In this regard, it could be argued that lower loan and deposit dollarization might be associated with a lower demand for goods and services priced in dollars and/or relatively less dollars in the economy with which to pay for goods and services priced in that currency.[29] Therefore, lower loan and deposit dollarization rates may force firms to choose local currency pricing, effectively reducing the ERPT.

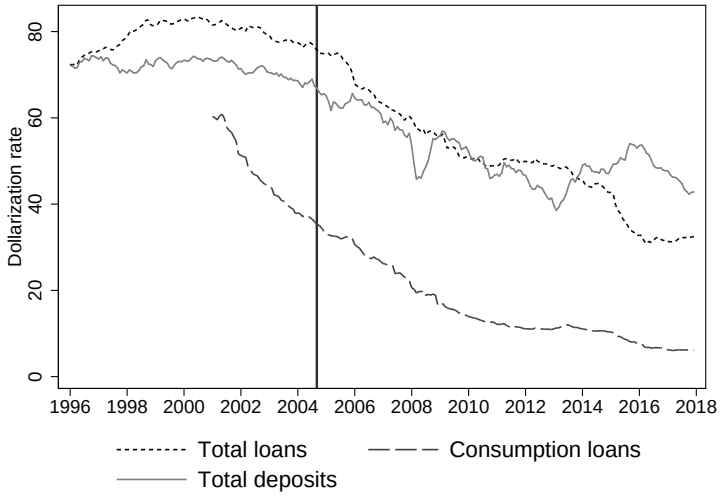
[26] These results do not mean that the IT regime was not effective in controlling inflation. As was stated previously, it successfully controlled the inflation rate in Peru.

[27] See Armas (2016), Castillo et al. (2016), and Catão and Terrones (2016) for a discussion on the reasons for financial de-dollarization in Peru.

[28] It should be noted that there are no statistics on loans or deposits denominated in other foreign currencies, as these loans or deposits are not available to the general public.

[29] Additionally, in Peru, the households that have access to loans are also the ones with higher levels of income. Coincidentally, according to Figure A.1 in the Appendix, these households are more likely to purchase goods and services with prices in dollars.

Figure 10: Loan and deposit dollarization




Source: BCRP.
Note: The dollarization rate consists in the percentage of dollar loans/deposits divided by the total loans/deposits (dollar loans/deposits plus soles loans/deposits). To be able to add together the two kinds of loans/deposits, we converted dollar loans/deposits to soles using the current exchange rate of each period.

To test whether the fall in the ERPT was more affected by financial de-dollarization than by the Law, Table 8 presents the results considering the variation between periods $t$ and $t-1$ of the dollarization coefficients for total deposits, $\Delta dol_t^{depo}$; total loans, $\Delta dol_t^{loan}$; and consumption loans, $\Delta dol_t^{cons}$. To identify the effects of financial dollarization on the ERPT, we introduce interaction terms that take into account the variation in the exchange rate and the variation in the deposit and loan variables.

Table 8: Financial de-dollarization

| | $k = depo$ | | $k = loan$ | | $k = cons$ | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\Delta ner_t$ | 0.049*** | 0.073** | 0.024 | 0.061* | 0.002 | 0.002 |
| $\Delta ner_{t-1}$ | 0.017 | 0.027 | 0.020 | 0.026 | -0.004 | 0.016 |
| $D_t^{Law} \times \Delta ner_t$ | | -0.043 | | -0.059 | | 0.001 |
| $D_{t-1}^{Law} \times \Delta ner_{t-1}$ | | -0.026 | | -0.021 | | -0.023 |
| $\Delta dol_t^k$ | -0.058*** | -0.048*** | 0.018 | 0.003 | -0.004 | -0.014 |
| $\Delta dol_{t-1}^k$ | 0.022 | 0.030* | 0.030 | 0.033 | 0.061** | 0.064** |
| $\Delta dol_t^k \times \Delta ner_t$ | 0.003 | 0.003 | -0.016 | -0.027 | -0.003 | -0.000 |
| $\Delta dol_{t-1}^k \times \Delta ner_{t-1}$ | 0.000 | -0.002 | 0.011 | 0.002 | -0.042 | -0.039 |
| $D_i^{USD} \times \triangle ner_t$ | 0.110*** | 0.140*** | 0.123*** | 0.132*** | 0.126*** | 0.281*** |
| $D_i^{USD} \times \triangle ner_{t-1}$ | 0.063** | 0.133** | 0.059* | 0.136** | 0.019 | 0.054 |
| $D_t^{Law} \times D_i^{USD} \times \triangle ner_t$ | | -0.049 | | -0.027 | | -0.163* |
| $D_{t-1}^{Law} \times D_{i-1}^{USD} \times \triangle ner_{t-1}$ | | -0.102* | | -0.119** | | -0.040 |
| $\Delta dol_t^k \times D_i^{USD} \times \triangle ner_t$ | -0.006 | -0.006 | 0.052* | 0.045* | 0.106* | 0.134** |
| $\Delta dol_{t-1}^k \times D_{i-1}^{USD} \times \triangle ner_{t-1}$ | -0.002 | -0.007 | 0.001 | -0.030 | -0.031 | -0.025 |
| $N$ | 14,876 | 14,876 | 14,876 | 14,876 | 11,060 | 11,060 |
| $R^2$ | 0.023 | 0.025 | 0.022 | 0.024 | 0.017 | 0.018 |

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

Note: Omitted coefficients for control variables. $k = [depo, cred, cons]$ denotes total deposits, total loans and consumption loans, respectively. Sample for consumption loans covers the period between January 2001 and March 2018. Robust standard errors clustered at the month-year level.

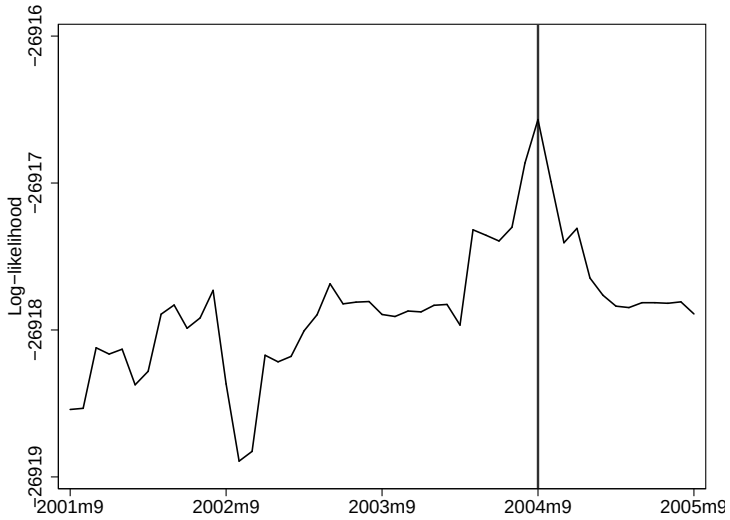
The coefficients associated with $\Delta dol_t^{loan} \times D_i^{USD} \times \triangle ner_t$ and $\Delta dol_t^{cons} \times D_i^{USD} \times \triangle ner_t$ evidence that lower total loan and consumption loan dollarization are associated with a lower ERPT for goods and services with dollarized prices. This effect is not found for total deposit dollarization. However, the coefficients for the $D_t^{Law} \times D_i^{USD} \times \triangle ner_t$ terms and their lags show that even after controlling for the financial de-dollarization, the Law on local currency pricing still reduced the ERPT of goods and services with dollarized prices.

## 8.3 Different enactment dates

In this section we test, in a different way, whether or not the estimated reduction of the ERPT is related mostly to the enactment of the Law. If the Law actually causes the lower ERPT, then the likelihood of observing the data should be maximized in a model that considers the actual enactment date.

Following the specification from column 2 of Table 2, Figure 11 shows the corresponding log-likelihood of a set of estimations that use different starting dates for the enactment of the Law as a placebo (from September 2001 to September 2005). For each estimation we use the full data sample. We find that the log-likelihood reaches its maximum in September 2004. This result seems to imply that the Law plays a crucial part in explaining the data-generating process, more than any other event that may have occurred in the months around the actual enactment date.

Figure 11: Different enactment dates




Note: Values correspond to the log-likelihood obtained by estimating column 2 of Table 2, but changing the Law's enactment date to each month shown. The vertical line denotes the actual month of the Law's enactment.

## 8.4 Immediate impact of the Law

To capture the immediate impact of the Law on the ERPT and rule out other possible subsequent reasons for the reduction in the ERPT, we confine the estimation sample period to 2 and 3 years after the enactment of the Law. Based on the specification in Table 3, the results in Table 9 show a reduction in the ERPT due to the enactment of the Law even after shortening the sample.[30] These results provide evidence that the ERPT decreased right after passage of the Law in 2004. These estimations are also consistent with the correlations in Figures 8 and 9, where the correlation between the variation in the price indices and the variation in the exchange rate fell after 2004; and with the rolling window estimations of the ERPT (see Figures A.3, A.4 and A.5 in the Appendix), where the ERPT also decreased after 2004.

[30] We also performed the same exercise but changing the end date of the sample from 2008 to 2017. However, the results remain the same.

Table 9: Immediate impact of the Law

| | 1995-2006 Sample | | | 1995-2007 Sample | | |
|---|---|---|---|---|---|---|
| | $k = nodur$ | $k = dur$ | $k = serv$ | $k = nodur$ | $k = dur$ | $k = serv$ |
| $D_i^{USD,k} \times \triangle ner_t$ | -0.025 | 0.206*** | 0.144** | -0.025 | 0.206*** | 0.145** |
| $D_i^{USD,k} \times \triangle ner_{t-1}$ | 0.136*** | 0.144*** | 0.101 | 0.135*** | 0.143*** | 0.103 |
| $D_t^{Law} \times D_i^{USD,k} \times \triangle ner_t$ | -0.085 | -0.217** | 0.038 | -0.018 | -0.173** | -0.000 |
| $D_{t-1}^{Law} \times D_i^{USD,k} \times \triangle ner_{t-1}$ | -0.241*** | -0.168** | -0.004 | -0.207*** | -0.135* | -0.022 |
| $N$ | 7,586 | | | 8,234 | | |
| $R^2$ | 0.036 | | | 0.035 | | |

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

Note: Samples begin in January 1995 and end in December of the last year shown. All columns in each set of results belong to the same regression. Omitted coefficients for control variables, $\Delta ner_t$, $\Delta ner_{t-1}$, $D_t^{Law} \times \Delta ner_t$ and $D_{t-1}^{Law} \times \Delta ner_{t-1}$. $k = [nodur, dur, serv]$ denotes the type of good or service. Robust standard errors clustered at the month-year level.

# 9 Conclusions

After a hyperinflation episode in the late 1980s and the early 1990s, the Peruvian economy became increasingly dollarized as the value of the local currency, the sol, decreased. A significant number of firms decided to set their prices in dollars to hedge against the risk of exchange rate depreciation and a decline in the real value of their goods and services. In July 2004, more than a decade after the hyperinflation episode, upon a proposal by the BCRP, the Peruvian Congress enacted Law 28300, which was a modified version of the Consumer Protection Law that stipulated that all prices be displayed in soles (and optionally in any other currency) as a measure to curb price dollarization.

Using disaggregated CPI data, we find that this Law reduced the overall ERPT. Moreover, we find evidence of heterogeneous effects of the Law on the ERPT for different goods and services. We find a complete offset for dollarized non-durable goods, and a partial offset for dollarized durable goods.

In addition, we measure the effect of the imported content, a proxy for dollarized costs, on the ERPT. We find that a larger imported content implies a larger ERPT. However, this effect falls after the enactment of the Law.

The results are robust to two different events that took place alongside the enactment of the Law: the IT adoption and the broader de-dollarization process. First, while there is prior evidence that the IT regime is associated with a lower ERPT at the aggregate level (Maertens et al., 2012; Winkelried, 2014), we find that the Law played a key role in reducing the ERPT for a specific set of goods at the disaggregate level. These results may point to some degree of complementarity between both policies: the IT regime played a role in reducing the ERPT at the macro level, while the Law on local currency pricing had the largest impact in diminishing the ERPT at the micro level, particularly for

goods and services with dollarized prices. In another exercise we find that our results do not change after controlling for the financial de-dollarization process.

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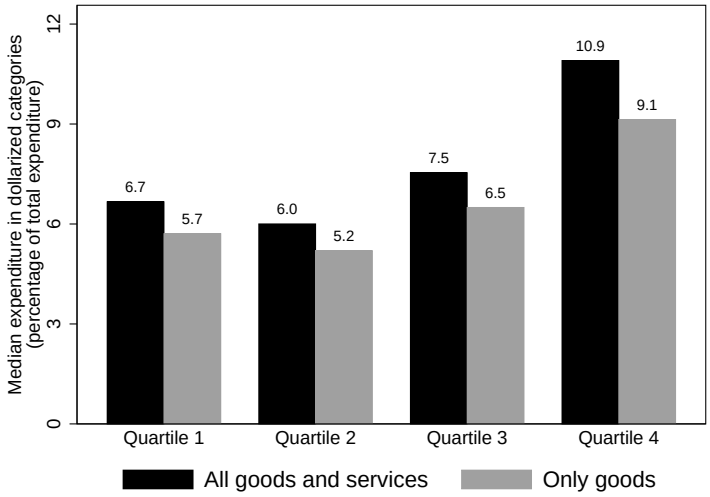
# A Appendix

## A.1 Expenditure dollarization

Drenik and Perez (2018) document that households with higher incomes are more likely to purchase goods with prices in dollars. Figure A.1 reports the median expenditure in dollarized goods and services by level of income for the Peruvian economy (quartiles). According to the figure, with the exception of the second quartile, the expenditure in dollarized goods and services increases as income grows.

Figure A.1: Expenditure dollarization by income (2004)

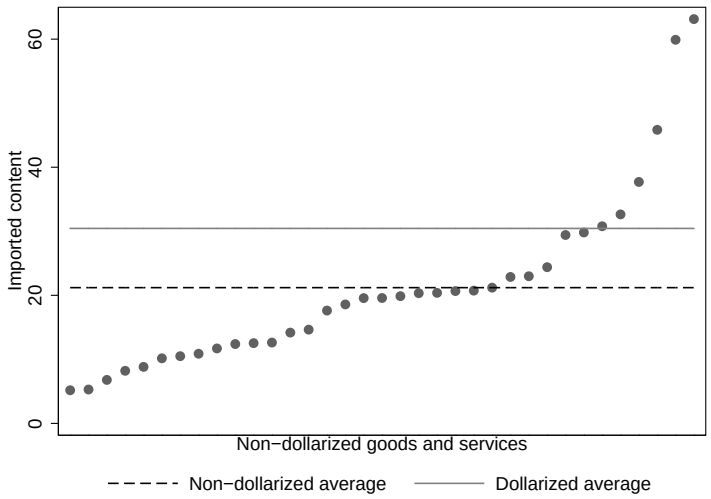



Source: Peru's National Statistics Institute (INEI).
Note: The quartiles correspond to the reported household income in the 2004 Peruvian Household Survey (ENAHO). The survey only takes into account 33 of the 55 4-digit price indices. The sample is composed by 19,305 households surveyed in any moment of the year.

## A.2 Non-dollarized prices and imported content

Figure A.2 shows the imported content for each of the non-dollarized price indices. The average imported content for the non-dollarized price categories is 21 percent. In contrast, the average imported content for the dollarized price categories is 30 percent. This shows that non-dollarized price indices tend to have lower percentages of imported content.

Figure A.2: Imported content for non-dollarized goods and services




Source: El Comercio, Peru's National Statistics Institute (INEI).
Note: The horizontal axis denotes each of the non-dollarized price indices. The imported content is defined as the percentage of imported intermediate or final goods corresponding to each 2007 input-output table category. These categories are then matched with the 4-digit price indices.

## A.3 Baseline results

Table A.1 shows the results of a baseline specification considering only the variation of the nominal exchange rate and the control variables. In this baseline specification the ERPT is 11 percent. An increase of 1 percentage point in the nominal exchange rate is met with an increase of 0.11 percentage points in the individual price indices, on average. As to the control variables, we find that increases in the lagged output gap, $y_{t-1}$, and the lagged variation of the oil price, $\triangle poil_{t-1}$, both have a positive relationship with the endogenous variable, implying that individual price indices are, on average, sensitive to demand and supply shocks at the economy-wide level. Additionally, there is a positive coefficient for the lagged value of the inflation rate, $\pi_{t-1}$, implying that the individual price indices are sensitive to what happens with the other price indices.[31]

[31] We consider first lags for the control variables to prevent a possible simultaneity issue.

Table A.1: Baseline results

| | (1) |
|---|---|
| $\Delta ner_t$ | 0.071*** |
| $\Delta ner_{t-1}$ | 0.042*** |
| $y_{t-1}$ | 1.222* |
| $\triangle poil_{t-1}$ | 0.005*** |
| $\pi_{t-1}$ | 0.292*** |
| $\pi^*_{t-1}$ | -0.009 |
| $N$ | 14,876 |
| $R^2$ | 0.019 |

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

Note: Robust standard errors clustered at the month-year level.

## A.4 Long-run exchange rate pass-through

In this section we estimate the long-run ERPT, which is defined as the sum of the coefficients for the current and lagged values of the nominal exchange rate variation up to a given period.[32] Column 1 of Table A.2 shows the results from an estimation up to the twelfth lag of the nominal exchange rate variation. The sum of all the statistically significant coefficients yields a long-run EPRT of 16 percent.[33]

The results also show that most of the coefficients stop being statistically significant at the 1 percent level after the first lag. Column 2 shows the results of an estimation that only considers the current and first lagged values for the nominal exchange rate variation, which is the number of lags we have used throughout all estimations. The sum of the coefficients yields an ERPT of 13 percent. We define this two-coefficient sum as the short-run ERPT.

[32] See Burstein and Gopinath (2014).

[33] This result is close to other long-run ERPT estimates for Peru, such as Miller (2003), Winkelried (2014), and Perez Forero and Vega (2015), among others.

Table A.2: Long-run and short-run ERPT

| | (1) | (2) |
|---|---|---|
| $\Delta ner_t$ | 0.061*** | 0.064*** |
| $\Delta ner_{t-1}$ | 0.040*** | 0.048*** |
| $\Delta ner_{t-2}$ | 0.001 | |
| $\Delta ner_{t-3}$ | 0.021 | |
| $\Delta ner_{t-4}$ | 0.033** | |
| $\Delta ner_{t-5}$ | -0.011 | |
| $\Delta ner_{t-6}$ | 0.021 | |
| $\Delta ner_{t-7}$ | -0.006 | |
| $\Delta ner_{t-8}$ | 0.019 | |
| $\Delta ner_{t-9}$ | -0.016 | |
| $\Delta ner_{t-10}$ | 0.005 | |
| $\Delta ner_{t-11}$ | 0.024* | |
| $\Delta ner_{t-12}$ | 0.003 | |
| $N$ | 14,293 | 14,293 |
| $R^2$ | 0.015 | 0.013 |

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

Note: We shorten the sample for column 2 so the number of observations is the same as in column 1. No control variables were considered. Robust standard errors clustered at the month-year level.

Table A.3 shows the specification from column 2 of Table 2, but considering 12 lags, to show how the impact from the Law varies with a greater number of lags. Considering only the statistically significant coefficients, the additional ERPT for goods and services with dollar prices equals 30 percent, similar to the results reported in Table 2 (27 percent). Table A.3 also shows that the Law reduced the effect of the ERPT by 13 percentage points, close to the results from Table 2 (10 percent). Thus, we find that the Law's effects do not change much if we consider a larger number of lags.

Table A.3: Long-run ERPT with impact of the Law

| | $D_i^{USD} \times \triangle ner_{t-k}$ | $D_{t-k}^{Law} \times D_i^{USD} \times \triangle ner_{t-k}$ |
|---|---|---|
| $k=0$ | 0.149*** | -0.055 |
| $k=1$ | 0.149*** | -0.110* |
| $k=2$ | -0.094*** | 0.089** |
| $k=3$ | -0.052 | 0.039 |
| $k=4$ | 0.060 | -0.081 |
| $k=5$ | 0.025 | -0.072 |
| $k=6$ | 0.047 | 0.016 |
| $k=7$ | -0.058 | 0.021 |
| $k=8$ | 0.010 | 0.035 |
| $k=9$ | 0.004 | -0.019 |
| $k=10$ | 0.081* | -0.079 |
| $k=11$ | 0.094** | -0.113** |
| $k=12$ | -0.080*** | 0.056 |
| $N$ | 14,293 | |
| $R^2$ | 0.032 | |

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

Note: All columns belong to the same regression. Omitted coefficients for control variables (up to the twelfth lag), $\Delta ner_t$, ..., $\Delta ner_{t-12}$, $D_t^{Law} \times \Delta ner_t$, ..., $D_{t-12}^{Law} \times \Delta ner_{t-12}$. $k$ denotes the lag. Robust standard errors clustered at the month-year level.

## A.5 Additional imported content results

Tables A.4 and A.5 show how ERPT sensitivity for dollarized non-durable goods, durable goods, and services responds to the imported content. After passage of the Law, within the $\pm$5-year and $\pm$7-year time windows, we find that ERPT sensitivity to the imported content falls only for dollarized durable goods. This could indicate that, for pricing decisions, the imported content is more relevant for dollarized durable goods (which have a higher percentage of imported inputs) than for dollarized non-durable goods (which have a lower percentage of imported inputs) and for dollarized services (which require a lower amount of imported inputs).

Table A.4: Imported content and effects of the Law, $\pm$5-year time window

| | $k = nodur$ | $k = dur$ | $k = serv$ |
|---|---|---|---|
| $D_{it}^{USD,k} \times share_i^{m,5} \times \triangle ner_t$ | 0.004 | 0.009*** | 0.013 |
| $D_{it}^{USD,k} \times share_i^{m,5} \times \triangle ner_{t-1}$ | -0.000 | -0.001 | 0.005 |
| $D_t^{Law} \times D_{it}^{USD,k} \times share_i^{m,5} \times \triangle ner_t$ | -0.004 | -0.007** | -0.003 |
| $D_{t-1}^{Law} \times D_{it}^{USD,k} \times share_i^{m,5} \times \triangle ner_{t-1}$ | -0.001 | 0.001 | -0.003 |
| $N$ | | 7,074 | |
| $R^2$ | | 0.027 | |

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

Note: All columns belong to the same regression. Omitted coefficients for control variables, $\Delta ner_t$, $\Delta ner_{t-1}$, $D_t^{Law} \times share_i^{m,5}$, $D_{t-1}^{Law} \times share_i^{m,5}$, $D_t^{Law} \times \Delta ner_t$, $D_{t-1}^{Law} \times \Delta ner_{t-1}$, $share_i^{m,5} \times \triangle ner_t$, $share_i^{m,5} \times \triangle ner_{t-1}$, $D_t^{Law} \times share_i^{m,5} \times \triangle ner_t$ and $D_{t-1}^{Law} \times share_i^{m,5} \times \triangle ner_{t-1}$. $k = [nodur, dur, serv]$ denotes the type of good or service. Robust standard errors clustered at the month-year level.

Table A.5: Imported content and effects of the Law, ±7-year time window

| | $k = nodur$ | $k = dur$ | $k = serv$ |
|---|---|---|---|
| $D_{it}^{USD,k} \times share_i^{m,7} \times \triangle ner_t$ | 0.001 | 0.006*** | 0.016*** |
| $D_{it}^{USD,k} \times share_i^{m,7} \times \triangle ner_{t-1}$ | 0.001 | -0.002 | 0.002 |
| $D_t^{Law} \times D_{it}^{USD,k} \times share_i^{m,7} \times \triangle ner_t$ | -0.001 | -0.004** | -0.007 |
| $D_{t-1}^{Law} \times D_{it}^{USD,k} \times share_i^{m,7} \times \triangle ner_{t-1}$ | -0.002 | 0.002 | -0.000 |
| $N$ | | 9,643 | |
| $R^2$ | | 0.021 | |

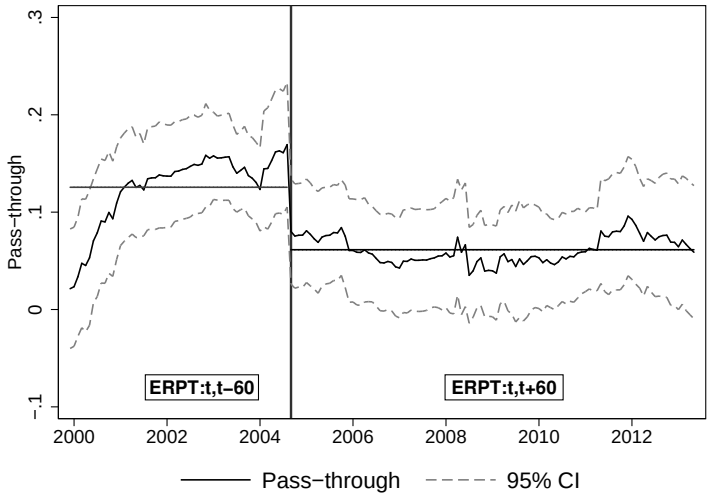
*** p<0.01, ** p<0.05, * p<0.1

Note: All columns belong to the same regression. Omitted coefficients for control variables, $\Delta ner_t$, $\Delta ner_{t-1}$, $D_t^{Law} \times share_i^{m,7}$, $D_{t-1}^{Law} \times share_i^{m,7}$, $D_t^{Law} \times \Delta ner_t$, $D_{t-1}^{Law} \times \Delta ner_{t-1}$, $share_i^{m,7} \times \triangle ner_t$, $share_i^{m,7} \times \triangle ner_{t-1}$, $D_t^{Law} \times share_i^{m,7} \times \triangle ner_t$ and $D_{t-1}^{Law} \times share_i^{m,7} \times \triangle ner_{t-1}$. $k = [nodur, dur, serv]$ denotes the type of good or service. Robust standard errors clustered at the month-year level.

## A.6 Rolling window estimations

To take into account the possibility that the ERPT may vary over time, we estimate the evolution of the ERPT. We present rolling window estimations with a 60-period time window following the baseline specification of Table A.1. Figure A.3 shows a lower mean for the rolling-window ERPT in the period following enactment of the Law.

Figure A.3: Rolling window ERPT (1)

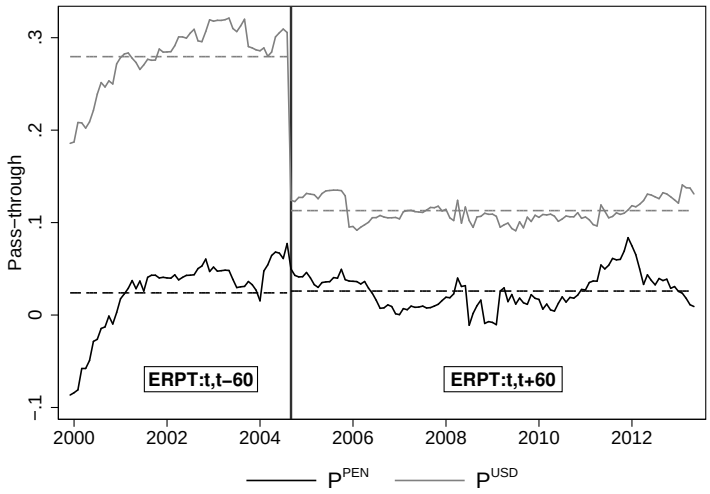



Note: For the period prior to the enactment of the Law, the estimated ERPT is based on the data corresponding to the 60 previous months. For the period after the enactment of the Law, the estimated ERPT is based on the data corresponding to the following 60 months. Horizontal lines denote the mean for the periods before and after the enactment of the Law. The vertical line denotes the enactment of the Law.

Figure A.4 shows the dynamics of dollarized and non-dollarized price indices. The rolling window ERPT for goods and services with non-dollarized prices ($P^{PEN}$) shows values close to 0 either before or after the Law. On the other

hand, there was a significant decrease in the average rolling window ERPT for goods and services with dollarized prices ($P^{USD}$) after the enactment of the Law. This is consistent with the previous results.

Figure A.4: Rolling window ERPT (2)

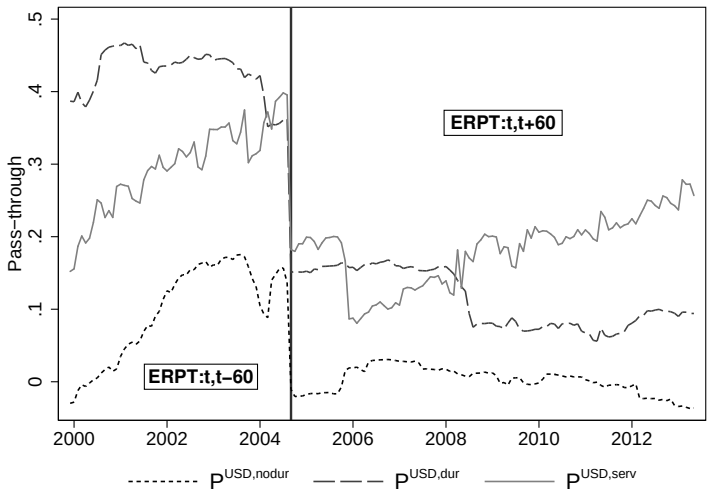



Note: For the period prior to the enactment of the Law, the estimated ERPT is based on the data corresponding to the 60 previous months. For the period after the enactment of the Law, the estimated ERPT is based on the data corresponding to the following 60 months. Horizontal lines denote the mean for the periods before and after the enactment of the Law. The vertical line denotes the enactment of the Law.

Figure A.5 separates dollarized goods and services into dollarized non-durable goods, $P^{USD,nodur}$; dollarized durable goods, $P^{USD,dur}$; and dollarized services, $P^{USD,serv}$; as presented in Table 1. Dollarized non-durable goods show the lowest ERPT before the enactment of the Law, but it is completely offset later. Dollarized durable goods show the highest initial ERPT, but it is partially offset after the enactment of the Law. These findings are consistent with the previous results.

In the case of dollarized services, there is a slight reduction in the ERPT in the period after the enactment of the Law. This variation is not captured by previous estimations.

Figure A.5: Rolling window ERPT (3)



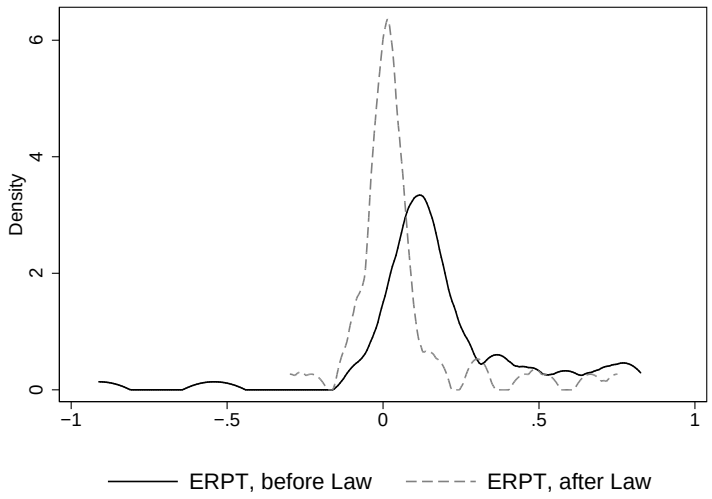

Note: For the period prior to the enactment of the Law, the estimated ERPT is based on the data corresponding to the 60 previous months. For the period after the enactment of the Law, the estimated ERPT is based on the data corresponding to the following 60 months. The vertical line denotes the enactment of the Law.

## A.7 Individual estimations

In this section we estimate the ERPT individually for the 4-digit price indices.[34] For each price index we perform an estimation for the periods before and after the enactment of the Law following the baseline specification in Table A.1. Figure A.6 shows the distribution of the individual ERPTs. First, we find that the enactment of the Law entailed an average reduction in the individual ERPTs, which is consistent with previous findings. Second, we find that the Law served to reduce the variance in the individual ERPTs. Thus, we find evidence that the Law may have diminished the uncertainty about how prices respond to exchange rate variations.

[34] As before, we omit the tubers price index from out estimations because of its high volatility and strong seasonality.

Figure A.6: Individual ERPT distributions




Note: The ERPT displayed is the sum of the coefficients corresponding to the current value and the first lagged value of the nominal exchange rate percentage variation.

Tables A.6 and A.7 outline the ERPT statistics for non-dollarized and dollarized goods and services. In each case, the mean, standard deviation, and median ERPT fall after the enactment of the Law. These results are consistent with previous findings.

Table A.6: ERPT for goods and services with non-dollarized prices

| | Mean | Std. dev. | Min. | Median | Max. |
|---|---|---|---|---|---|
| Before Law | 0.063 | 0.236 | -0.911 | 0.092 | 0.427 |
| After Law | 0.016 | 0.142 | -0.299 | -0.000 | 0.457 |

Note: The ERPT displayed is the sum of the coefficients corresponding to the current value and the first lagged value of the nominal exchange rate percentage variation.

Table A.7: ERPT for goods and services with dollarized prices

| | Mean | Std. dev. | Min. | Median | Max. |
|---|---|---|---|---|---|
| Before Law | 0.344 | 0.269 | -0.056 | 0.209 | 0.826 |
| After Law | 0.117 | 0.224 | -0.061 | 0.041 | 0.751 |

Note: The ERPT displayed is the sum of the coefficients corresponding to the current value and the first lagged value of the nominal exchange rate percentage variation.

Tables A.8, A.9, and A.10 summarize the statistics for goods and services with dollar prices. For each of the three groups, the mean, standard deviation, and median fall after the enactment of the Law. Dollarized non-durable goods, where the ERPT is completely offset, show the greatest mean and median reduction, which is consistent with the

previous results. Dollarized durable goods show the largest initial mean and median among the three groups, but these values fall after the enactment of the Law. These results are also consistent with the previous findings.

The mean and median ERPT for dollarized services also decrease after enactment of the Law, although not as drastically as for dollarized durable and non-durable goods. This partially contrasts with the previous estimations, which suggest that the ERPT for dollarized services did not significantly change after the enactment of the Law.

Table A.8: ERPT for non-durable goods with dollarized prices

| | Mean | Std. dev. | Min. | Median | Max. |
|---|---|---|---|---|---|
| Before Law | 0.169 | 0.027 | 0.138 | 0.172 | 0.194 |
| After Law | -0.013 | 0.032 | -0.061 | -0.000 | 0.008 |

Note: The ERPT displayed is the sum of the coefficients corresponding to the current value and the first lagged value of the nominal exchange rate percentage variation.

Table A.9: ERPT for durable goods with dollarized prices

| | Mean | Std. dev. | Min. | Median | Max. |
|---|---|---|---|---|---|
| Before Law | 0.448 | 0.278 | 0.109 | 0.411 | 0.792 |
| After Law | 0.119 | 0.244 | -0.026 | 0.048 | 0.665 |

Note: The ERPT displayed is the sum of the coefficients corresponding to the current value and the first lagged value of the nominal exchange rate percentage variation.

Table A.10: ERPT for services with dollarized prices

| | Mean | Std. dev. | Min. | Median | Max. |
|---|---|---|---|---|---|
| Before Law | 0.378 | 0.313 | -0.056 | 0.414 | 0.826 |
| After Law | 0.194 | 0.263 | -0.015 | 0.093 | 0.751 |

Note: The ERPT displayed is the sum of the coefficients corresponding to the current value and the first lagged value of the nominal exchange rate percentage variation.