Online Appendix to "Exchange Rates and Prices: Evidence from the 2015 Swiss Franc Appreciation"

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A Macroeconomic indicators

Table A.1: *Main macroeconomic indicators for Switzerland 2013–2016*

	2012	**2013**	**2014**	**2015**	**2016**
Real GDP growth	1.0%	1.9%	2.4%	1.3%	1.7%
Real consumption growth	2.3%	2.6%	1.3%	1.7%	1.4%
Real export growth	3.0%	-0.1%	5.2%	2.6%	6.5%
Real import growth	4.4%	1.4%	3.3%	3.0%	4.4%
Exports/GDP	52.5%	51.6%	52.7%	50.9%	52.8%
Imports/GDP	41.6%	41.8%	42.0%	39.5%	41.0%
Exports of goods/GDP	31.0%	30.3%	30.7%	29.5%	30.4%
Imports of goods/GDP	28.7%	28.4%	28.1%	25.7%	26.4%
Inflation rate	-0.7%	-0.2%	0.0%	-1.1%	-0.4%

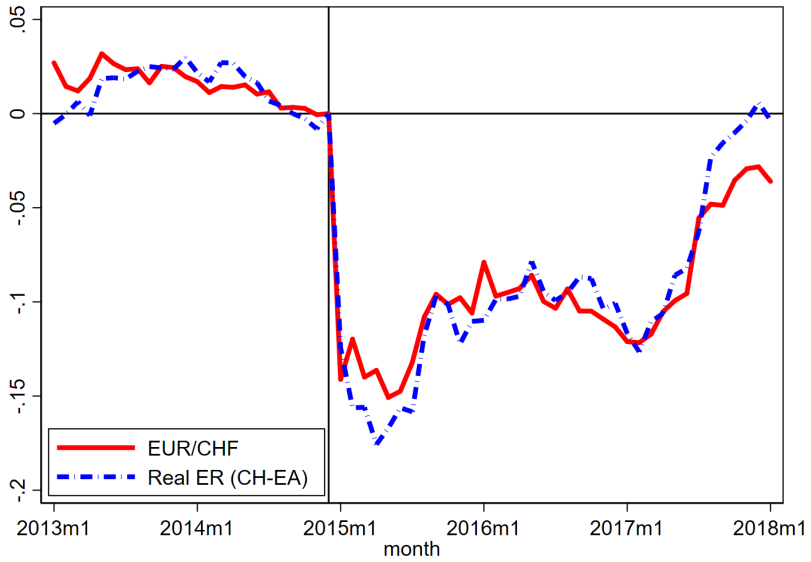
Sources: Quarterly GDP data (State Secretariat of Economic Affairs , 2020), inflation data from Swiss Federal Statistical Office (2020). Exports and imports include all goods and services, excluding "valuables" such as gold, which increase volatility significantly. In addition, we report exports and imports of goods excluding "valuables".

B Data: supplemental information

The sources for the data used in this paper are as follows. Information on border prices and invoicing at the border is from the SFSO (see Swiss Federal Statistical Office (2016)). The homescan retail data is obtained from Nielsen Switzerland (see Nielsen Switzerland (2016)). In the readme file in the replication material we provide information on how to obtain these two proprietary datasets. We augment the Nielsen data with information on the location of the good's production obtained from codecheck.info, a consumer information portal (see Codecheck (2016)). Real and effective exchange rate data is from the Bank for International Settlement (see Bank for International Settlements (2016)). Nominal exchange rate data and data on official producer and consumer price indices are from the data portal of the Swiss National Bank (see Swiss National Bank (2016)). Forward rates for the EUR/CHF exchange rate are from Datastream (see Datastream (2015)).

This appendix provides additional information on the border and retail data complementing Section 2.

Figure A.1: *The 2015 CHF appreciation*



Notes: This red line is the EUR/CHF nominal exchange rate and the blue line is the EUR/CHF real exchange rate. Sources: Swiss National Bank (2016), Bank for International Settlements (2016).

B.1 Border price and invoicing data

Adjustments to the data The border price survey by the SFSO asks firms to quote price and invoicing currency of the good that typically accounts for the firm's highest volume of imports (larger firms are asked to quote prices for several goods). We make four types of adjustments to the prices in the data, where only the first and second apply to the subset of products matched to Nielsen categories. First, products may be replaced by newer or quality-adjusted versions over time. For many of these goods, the dataset includes the price of the new or quality-adjusted good and the one-month lagged price of the new good. Thus, for these goods we can calculate a price change during the month in which the product was replaced (we drop these price changes in our calculations of price stickiness and non-zero price changes). If the lagged price of the new good is unobserved, we drop the observation because we cannot construct a price change. Second, prices may not be observed in a given quarter due to survey non-responses. In this case, the SFSO raw data pulls forward observations from past survey responses in a specific quarter. We drop these observations (identifying them by an unchanged price both in CHF and the foreign currency). Third, we drop prices that show a price in foreign currency but no currency of invoicing information, or that are invoiced in foreign currency but show a zero price in foreign currency. Fourth, we make the following manual adjustments. i) one product has a break in the stated invoicing currency that is inconsistent with the constant foreign currency price and the CHF price showing only a small change in the price. We replace the apparently wrong invoicing currency entry (DKK) with

EUR (consistent with the exchange rate and stated as invoicing currency after the break). ii) we drop a product for which the foreign currency price randomly takes three very distinct values that are at times disconnected from the Swiss franc price. iii) for one product, the euro price changes from 159 to 572 for the first six months of 2014, without a corresponding change in the Swiss franc price. We pull forward the December 2013 foreign currency price of 159 euro for the next six months. iv) we changed prices for nine products with obvious digit errors in entered prices — instances in which the implied exchange rate (comparing CHF price and foreign exchange rate price) jumps within a price series by a factor of exactly 10, 100, or 1000.[A1]

One caveat with the border price data that we mention in footnote 13 of the main text regards the conversion of foreign-invoiced prices into CHF. The raw data for border prices and the invoicing information are entered manually by external contractors hired by the SFSO. The contractors enter the price both in CHF and in the invoiced currency. For prices invoiced in foreign currency, we must choose whether to use the price in CHF converted by the SFSO or the foreign price and the exchange rate used in the rest of our analysis to convert prices invoiced in foreign currency into CHF. In the former case, the implied exchange rates can deviate from the actual range of exchange rates prevailing during the two-week sampling period for two reasons. First, they deviate because of changes in the digits of the conversion rates used (i.e. fluctuations in the implied exchange rates by a factor of exactly 10, 100 or 1000), as mentioned in the previous paragraph. Second, the exchange rates used might not be the correct ones for the given sample period (for example, the exchange rate used to convert prices into CHF may not have been updated). The latter choice suffers from the problem that, for the case of product replacements of foreign-invoiced goods, the lagged prices of newly introduced goods are reported only in CHF (but neither the lagged price in foreign currency nor the lagged exchange rate that was used in the conversion is recorded). We can thus calculate a CHF price change only when taking the data and the implied exchange rates at face value. In our baseline estimates we use the raw prices in CHF and foreign currency (given the adjustments described in the previous paragraph), and thus rely on the exchange rate conversion made by the SFSO. In sensitivity analysis, we use foreign currency-invoiced prices and convert them using the exchange rate prevailing at the end of the quarter, and drop product replacements (we label this sensitivity "official EUR/CHF" in the text).

Non-commodity products in the border data are defined as products excluding the product categories "agricultural products", "coals", "petroleum and natural gas", "petroleum products", "basic metals, semi-finished products", and "electricity, gas".

Additional summary statistics on currency of invoicing

[A1] These digit errors are sometimes fixed by the SFSO when converting foreign-invoiced prices to CHF.

Table B.1: *Invoicing patterns in the full SFSO data weighting*

	% CHF-invoiced	% EUR-invoiced	% USD-invoiced
2013	66.8	28.9	3.5
2014	63.4	32.2	3.5
2015	54.9	38.3	5.5
2016	51.7	40.9	5.9

Notes: This table shows the share of import border prices invoiced in different currencies for various years, in the sample of non-commodity products, where border categories are weighted by December 2015 2-digit NAICS weights from the SFSO.

Table B.1 displays shares of border observations by currency of invoicing per year between 2013 and 2016 for the sample of non-commodity products, weighting border product categories by NAICS two-digit weights in December 2015, which is the first period the SFSO reports weights in our data. Invoicing shares are very similar to our unweighted shares reported in Table 1.

Table B.2 displays shares of observations by currency of invoicing per year between 2013 and 2016, as in Table 1, but including both non-commodities and commodities. Even though the share of commodities invoiced in CHF is higher than that of non-commodities, commodity prices tend to be more flexible, so currency of invoicing matters less. Specifically, in Figure C.2 we show that commodity prices change very frequently, and in Table C.8 we show that conditional pass-through does not vary significantly by invoicing currency.

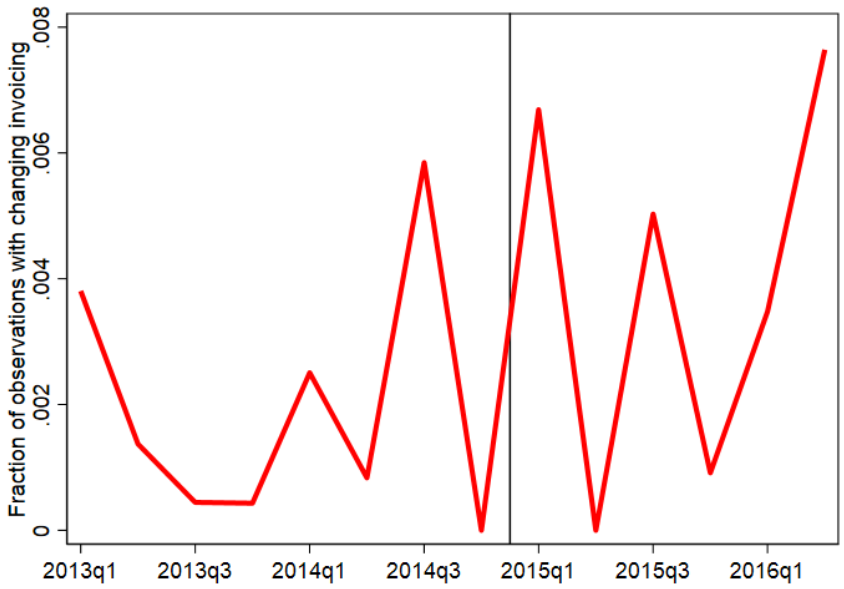
Table B.2: *Invoicing patterns in the full SFSO data (including commodities and non-commodities)*

	Number of observations	% CHF-invoiced	% EUR-invoiced	% USD-invoiced
2013	17,336	71.4	26.2	2.0
2014	17,417	69.1	28.4	2.1
2015	20,025	60.0	34.9	4.1
2016	20,595	55.9	38.4	4.6

Notes: This table shows the share of import border prices invoiced in different currencies for various years, in the sample that combines non-commodity and commodity products.

Figure B.1 shows that the fraction of observations switching invoicing currency between quarters is very low, on average roughly 0.5% per quarter in 2015. Hence, the rise over time in the share of EUR-invoiced goods displayed in Tables 1, B.1, and B.2 is largely due to the entry of new goods into the sample that are invoiced in EUR.

Figure B.1: *Invoicing currency switching (EUR and CHF only)*



Notes: This figure shows the fraction of border prices switching invoicing currency from CHF to EUR or vice versa between quarters, for the balanced sample of non-commodity products.

Table B.3 displays the number of imported products at the border in each year for various samples that we use in our analysis.

Table B.3: *Number of products per year for various samples in the border price data*

	Noncommodity		Nielsen (min0+)		Nielsen (baseline)	
	all	bal	all	bal	all	bal
2013	4,259	2,362	732	531	697	504
2014	4,414	2,394	796	534	758	507
2015	5,507	2,370	913	534	838	507
2016	5,113	2,046	832	488	764	461

Notes: Number of imported products at the border observed in each year for various samples. Columns 1, 3, and 5 consider the unbalanced sample ('all') including only CHF- and EUR-invoiced goods. Columns 2, 4, and 6 consider the balanced sample ('bal') observed every quarter in the period 13Q4-15Q3 and no change in invoicing currency. The balanced sample size falls in 2016 because the SFSO conducted a re-sampling of products in the import price index in December 2015. Columns 1 and 2 consider the non-commodity sample. Columns 3-6 consider the sample of products that we match to the Nielsen dataset without requiring a minimum number of border prices per quarter in 2014 (min0+). Columns 5 and 6 exclude border categories with seven or fewer border observations per quarter on average in 2014.

B.2 Nielsen retail data

We provide additional details that are not included in the main text.

One household in the sample represents roughly 1,000 households in the total population. The selection of panelists is based on the Swiss census conducted by the SFSO and excludes the Italian-speaking canton of Ticino. The sample of households fluctuates over time due to entry and exit. During the period January 2012 to June 2016, a total of 3,187 distinct household entries exist in the dataset.

The Nielsen data reports a "WEMF" region identifier by household. WEMF regions, defined by the media and advertisement research agency WEMF (Werbemedienforschungs AG), are geographically comparable, though not identical, to the 26 cantons of Switzerland. For a map of these regions, see `https://wemf.ch/de/downloads/gebietskarten/wemf-gebiete.pdf`.

In the Nielsen data, each transaction records the day of the purchase. We shift the date of the analysis by 14 days so that month 1 of 2015 starts on January 15, 2015.

We make the following adjustments to the Nielsen data. We drop newspapers and magazines, which have a separate article number coding scheme. We also exclude in-store EANs, except in cases where we can find the origin of such EANs via codecheck.info. The reason for doing so is that - as they can be assigned locally in a single retail store - the same in-store EAN can be used for different goods across retail stores, so no price comparison can be made unless we can find product-specific information (via codecheck.info). We also drop fresh fruits and vegetables products that are not pre-packaged. For those goods, the weight, volume or quantity is not recorded consistently so we cannot construct informative price series. Finally, we drop cross-border shopping transactions (instances in which a Swiss household purchases

abroad).

We keep only transactions for which both price and quantity purchased are non-missing and positive, and remove clear price outliers via the following two-step procedure. First, we drop observations in which prices are equal to 1 and the natural logarithm of the price is 2 or below -2 (e.g. a factor of 7.4) the average log price for the same EAN in all other transactions, which may correspond to instances in which quantity and price have been switched. Second, we drop observations for which the natural logarithm of the price is 2 or below -2 the average log price for the same EAN paid in all other transactions.

To address inconsistencies over time in how goods are assigned to product categories, we use the modal entry for each EAN. We also merge the product classes "wheat beer", "lager beer", "strong beer" and "special beer" into the productclass "beer with alcohol".

In the sensitivity analysis, we further exclude from our regressions the top 1% of observations ranked by the dependent variable in the corresponding regression.

The use of coupons that offer a discount for specific goods is reflected in the Nielsen data as participating households are asked to enter the price paid net of any discount. Intensive use of coupons for a specific good in a specific retail outlet hence shows up as a temporary price change. We smooth out temporary price movements by using quarterly average prices in our baseline analysis. Vouchers or loyalty schemes that apply to the whole purchase, such as a lump-sum rebate voucher, are not reflected in the Nielsen data. For the time period we consider, consumers accumulated such vouchers at a rate of 1% of their purchase value. We are unaware of changes in the loyalty schemes after the 2015 appreciation.[A2] Selected goods may earn higher rewards in selected weeks. We do not have information on how important the purchase of these goods during those weeks is. However, this margin of price adjustment would only bias our results if good-specific rewards are disproportionately concentrated on imported goods and goods that are invoiced at the border in either EUR or CHF.

The homescan dataset we use does not include the universe of products sold by supermarkets. Entry and exit of products over time in these data reflects not only entry and exit of products in the marketplace, but also the fact that panelists do not buy the same set of goods over time even if these goods continue to be offered by retailers. We consider monthly and annual balanced panels constructed as described in the main text, and hence exclude seasonal items, products which supermarkets sell only occasionally, and newly entered goods. The ratio of expenditures on products in the monthly balanced sample relative to expenditures on products in the unbalanced sample in 2014 is 79% (70% for imports and 83% for domestic goods).

[A2] For example, for the case of Migros, vouchers are accumulated via loyalty cards offering a voucher of 5 CHF for every 500 CHF in purchases. For a description of these loyalty cards, see Jacob (2014), `https://www.aargauerzeitung.ch/wirtschaft/supercard-punkte-belasten-coop-bilanz-migros-macht-es-mit-cumulus-besser-128868942` and `https://livingingeneva.wordpress.com/2018/08/14/store-loyalty-cards-are-they-worth-the-hassle`.

Table B.4: *Nielsen data summary statistics for the 'min0+' sample*

Summary Statistics Nielsen Samples

	Non-balanced	Balanced yearly	Balanced monthly
No. of Imported Goods	5,032	3,010	1,045
No. of EU Imported Goods	4,544	2,634	883
No. of Domestic Goods	4,199	4,070	2,376
Expenditure share imports 2014	28	27	24
Expenditure share EU imports 2014	23	23	20
No. Product classes	274	256	205
No. Product classes (imports)	253	223	155
No. of Transactions - Imports	896,879	853,873	670,013
No. of Transactions - Domestic	2,593,829	2,586,708	2,278,048

Notes: This table reproduces Table 2 for the larger 'min0+' sample of products which does not drop categories with a small number of border price observations in 2014. The sum of imports and domestic products in the last column (3,421) is slightly lower than the number mentioned in footnote 18 (3,481) because some of the products with country of origin information could not be matched to border categories with invoicing information in 2014.

Recall that in our baseline analysis that combines border and retail data, we drop 6 (out of 43) border product categories (and the matched retail product categories) for which we observe 7 or fewer observations per quarter on average in 2014. We refer to this sample as 'min7+'. Table B.4 displays the same information as Table 2 but without dropping these product categories. We refer to this sample as 'min0+'.

When matching the Nielsen product categories with the border categories, we combine the border categories "game meat", "rabbit meat", "horse meat", and "mutton and lamb meat" to a category "other meat". We do so because the Nielsen data does not distinguish between these categories. For the same reason, we combine the border categories "draft beer", "bottled beer", and "canned beer" in one category "beer", and add the border category "fresh dairy products" to "other milk products" (which includes all dairy products other than cheese). Table B.5 reports the list of matched border product categories and retail product categories, as well as the EUR invoicing share of each category.

Table B.5: *List of matched border and retail product categories, and associated EUR-invoicing share in 2014*

Retail class	Border category	EURShare
Accessories grain proc.	Other grain mill products	0.11
Air refresher	Products for laundering, dishw. & cleaning	0.74
Alkali	Batteries and accumulators	0.11
Aperitif	Spirits	0.18
Appetizers	Other proc. fruits and vegetables	0.16
Apple juice	Fruit and vegetable juices	0.08
Aspic	Condiments and seasonings	0.40
Assorted tea	Tea	0.06
Bakery products - long shelf live	Bakery products	0.46
Bakery products - lose ware	Bakery products	0.46
Bakery products - snacks	Bakery products	0.46
Baking ingredient	Other grain mill products	0.11
Baking paper	Household & hygiene prod. from pulp & paper	0.33
Beef charcuterie	Meat products	0.44
Beer variegated	Beer	0.66
Beer with alc	Beer	0.66
Beer without alc	Beer	0.66
Bin bags	Household & hygiene prod. from pulp & paper	0.33
Black tea	Tea	0.06
Bouillon uncooked	Soups and broths	0.00
Bread products	Bakery products	0.46
Bread, loafes	Bakery products	0.46
Butter	Oils and fats (without margarine)	0.10
Candy	Confectioneries	0.00
Canned fish	Fish and fish products	0.33
Canned meat/poultry	Meat products	0.44
Cat food	Pet food	0.00
Cereals	Other grain mill products	0.11
Chewing gum	Confectioneries	0.00
Chicken charcuterie	Poultry meat	0.05
Chicken eggs	Eggs	0.50
Chicken meat	Poultry meat	0.05
Chips	Other proc. fruits and vegetables	0.16
Chocolate	Coffee and chocolate products	0.04
Chocolate bars	Coffee and chocolate products	0.04
Chocolate branches	Coffee and chocolate products	0.04
Chocolate dragees	Coffee and chocolate products	0.04
Chocolate marshmallow	Coffee and chocolate products	0.04
Chocolate other	Coffee and chocolate products	0.04
Chocolate pralines	Coffee and chocolate products	0.04
Chocolate/Cocoa powder	Coffee and chocolate products	0.04
Cider	Sparkling wine	0.11
Cleaning additive	Products for laundering, dishw. & cleaning	0.74

Cleaning agent	Products for laundering, dishw. & cleaning	0.74
Cleaning aids	Products for laundering, dishw. & cleaning	0.74
Cleansing tissue	Household & hygiene prod. from pulp & paper	0.33
Coffee beans	Coffee	0.11
Coffee complements	Coffee	0.11
Coffee filter	Household & hygiene prod. from pulp & paper	0.33
Convencience food	Convencience food	0.33
Convencience food at home	Convencience food	0.33
Cook set/Meal kits	Convencience food	0.33
Cooked convenience sauces	Soups and broths	0.00
Cookies	Bakery products	0.46
Cooking fat	Oils and fats (without margarine)	0.10
Cooking oil	Oils and fats (without margarine)	0.10
Cotton	Household & hygiene prod. from pulp & paper	0.33
Cotton pads	Household & hygiene prod. from pulp & paper	0.33
Cream	Other milk products	0.59
Cream cheese	Cheese	0.47
Crispy bread	Bakery products	0.46
Curd	Other milk products	0.59
Dessert products	Confectioneries	0.00
Desserts	Other milk products	0.59
DF Bakery products	Convencience food	0.33
DF Fish	Convencience food	0.33
DF Fruits	Convencience food	0.33
DF Ice cream	Convencience food	0.33
DF Meat	Convencience food	0.33
DF Pasta	Convencience food	0.33
DF Pizza	Convencience food	0.33
DF potatoes	Convencience food	0.33
DF Poultry	Convencience food	0.33
DF Vegetables/Mushrooms	Convencience food	0.33
Disposable bags	Household & hygiene prod. from pulp & paper	0.33
Dog food	Pet food	0.00
Dried soups	Condiments and seasonings	0.40
Dry Pasta	Pasta	0.00
Dry toilet paper	Household & hygiene prod. from pulp & paper	0.33
Fish	Fish and fish products	0.33
Flour	Other grain mill products	0.11
Foil	Household & hygiene prod. from pulp & paper	0.33
Foreign red wine	Red wine	0.10
Foreign wine rose	Red wine	0.10
Foreign wine white	White wine	0.14
Fruit gum	Confectioneries	0.00
Fruit juice	Fruit and vegetable juices	0.08
Fruit tins	Other proc. fruits and vegetables	0.16
Fruit/Nut mix	Other proc. fruits and vegetables	0.16
Fruits dried	Other proc. fruits and vegetables	0.16

Gellant	Starches and starch products	0.29
Grain/products	Other grain mill products	0.11
Hard cheese	Cheese	0.47
HB/pastries	Bakery products	0.46
Health medicine	Pharmac. specialities & other pharm. prod.	0.38
Herbal/fruit tea	Tea	0.06
Honey	Other foods	0.71
Horseradish	Condiments and seasonings	0.40
Ice-Tea	Soft drinks	0.00
Instant coffee	Coffee	0.11
Instant salad	Convencience food	0.33
Intimate	Body care products and perfumes	0.57
Jam	Other proc. fruits and vegetables	0.16
Ketchup	Condiments and seasonings	0.40
Lemon juice/concentrate	Fruit and vegetable juices	0.08
Liqueur	Spirits	0.18
Margarine	Other milk products	0.59
Mashed potatoes	Convencience food	0.33
Mayonnaise	Condiments and seasonings	0.40
Meat, beef	Other meat	0.11
Meat, veal	Other meat	0.11
Milk concentrate	Other milk products	0.59
Milk drinks	Other milk products	0.59
Milk fresh	Other milk products	0.59
Molasses	Homogenized and dietetic food	0.00
Mustard	Condiments and seasonings	0.40
Nectar	Fruit and vegetable juices	0.08
Nuts	Homogenized and dietetic food	0.00
Nuts/Nut mixes	Other foods	0.71
Olives	Other proc. fruits and vegetables	0.16
One-way diapers	Household & hygiene prod. from pulp & paper	0.33
Ordinary table wine red	Red wine	0.10
Ordinary table wine white	White wine	0.14
Other bakery products	Bakery products	0.46
Other charcuterie	Meat products	0.44
Other confectionery	Confectioneries	0.00
Other health care	Homogenized and dietetic food	0.00
Other household items	Household & hygiene prod. from pulp & paper	0.33
Other meat	Other meat	0.11
Other oral hygiene	Body care products and perfumes	0.57
Other pastries	Bakery products	0.46
Other pet food	Pet food	0.00
Other poultry	Poultry meat	0.05
Other sausage products	Meat products	0.44
Panty liners	Household & hygiene prod. from pulp & paper	0.33
Pasta	Pasta	0.00
Pasta products	Pasta	0.00

Pasta tins	Pasta	0.00
Pet food	Pet food	0.00
Pickled items	Other proc. fruits and vegetables	0.16
Pies (Wähen)	Bakery products	0.46
Pizza	Convencience food	0.33
Pork charcuterie	Pork meat	0.43
Pork meat	Pork meat	0.43
Pork sausage	Meat products	0.44
Portions	Tea	0.06
Power food	Homogenized and dietetic food	0.00
Processed cheese	Cheese	0.47
Razors	Small devices	0.22
Rice	Rice	0.00
Rtec	Other grain mill products	0.11
Rusk	Bakery products	0.46
Salad dressing uncooked	Condiments and seasonings	0.40
Salmon	Fish and fish products	0.33
Salt	Condiments and seasonings	0.40
sanitary napkins	Household & hygiene prod. from pulp & paper	0.33
Seafood	Fish and fish products	0.33
Seasoning	Condiments and seasonings	0.40
Semi hard	Cheese	0.47
Shopping help	Household & hygiene prod. from pulp & paper	0.33
Sirup	Soft drinks	0.00
Small bread	Bakery products	0.46
Snacks other	Other foods	0.71
Soda concentrate	Soft drinks	0.00
Soft cheese	Cheese	0.47
Sparkling water	Mineral water	0.00
Sparkling wine pure	Sparkling wine	0.11
Special products	Products for laundering, dishw. & cleaning	0.74
Sport/Energy drinks	Soft drinks	0.00
Starch products	Starches and starch products	0.29
Sticks	Household & hygiene prod. from pulp & paper	0.33
Still water	Mineral water	0.00
Styling	Body care products and perfumes	0.57
Sugar	Sugar	0.08
Swedish bread	Bakery products	0.46
Sweetened	Confectioneries	0.00
Sweetened water	Soft drinks	0.00
Sweeteners	Homogenized and dietetic food	0.00
Table deco	Household & hygiene prod. from pulp & paper	0.33
Table juice	Fruit and vegetable juices	0.08
Table vinegar	Condiments and seasonings	0.40
Tampons	Household & hygiene prod. from pulp & paper	0.33
Tinfoil	Tinfoil	0.67
Tofu/Soja	Other foods	0.71

Toilet stones	Products for laundering, dishw. & cleaning	0.74
Tomato puree	Condiments and seasonings	0.40
Toothbrushes	Body care products and perfumes	0.57
Tortillas/Tacos	Bakery products	0.46
Torts/Pies/Cake	Bakery products	0.46
uncooked seasoning	Condiments and seasonings	0.40
Unsweetend food supplements	Homogenized and dietetic food	0.00
Veal sausage	Meat products	0.44
Vegetable juice	Fruit and vegetable juices	0.08
Vegetable tins	Other proc. fruits and vegetables	0.16
Vegetables dried	Other proc. fruits and vegetables	0.16
Vegetables/Antipasti	Other proc. fruits and vegetables	0.16
Vitamines	Homogenized and dietetic food	0.00
Warm unc.	Condiments and seasonings	0.40
Wet soups uncooked	Condiments and seasonings	0.40
Wet wipes	Household & hygiene prod. from pulp & paper	0.33
Whisky	Spirits	0.18
White spirits	Spirits	0.18
Whole-grain cracker	Bakery products	0.46
Wine/Sparkling wine mix	Sparkling wine	0.11
Yoghurt	Other milk products	0.59

C Border prices: additional results

C.1 Regression (1) in subsections 3.1 and 3.3

We report tables with our baseline results and a wide range of sensitivity analysis. Specifically, we (i) include time × importing firm fixed effects (which implies similar point estimates as including × category fixed effects, but larger standard errors due to the small number of firms that report invoicing in both EUR and CHF),[A3] (ii) include non-CHF invoiced products in all currencies (not only EUR), (iii) restrict our sample to product categories that can be matched to our Nielsen retail product categories (and weighting border product categories based on Nielsen consumer expenditures in 2014), (iv) weight border categories by 2015 2-digit NAICS weights provided by the SFSO, (v) convert EUR-invoiced prices into CHF prices based on the official quarterly EUR/CHF rate rather than using CHF prices provided by the SFSO (which are subject to measurement error as discussed above), and (vi) consider the unbalanced sample. We also report pass-through rates adjusting EUR/CHF by changes in the euro area producer price index, which makes very little difference since inflation is very low in this period.

Table C.1: *Border and retail pass-through rates adjusted for euro area producer price index*

	Changes				Rates			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1) EUR/CHF	-14.6	-15.5	-10.3	-11.4				
2) All EUR inv.	-12.4	-13.8	-12.0	-11.0	85.5	88.6	116.8	96.4
3) Non-zero price changes	-15.7	-15.2	-13.2	-12.4	108.0	97.9	128.7	109.4
4) All CHF inv.	-3.4	-4.5	-5.2	-5.5	23.1	29.2	50.5	48.0
5) Non-zero price changes	-5.8	-6.9	-7.3	-7.2	40.1	44.2	70.9	63.8
6) Retail imports	-1.3	-2.9	-2.7	-3.9	8.9	18.4	26.7	34.1
7) Retail domest.	-0.3	-0.7	-0.4	-0.8	2.1	4.3	3.9	7.0

Notes: This table presents the same information as Table 3 in the main text, but in the calculations of pass-through rates adjusts the EUR/CHF change by the change in the producer price index in the euro area.

[A3] Our non-commodity sample includes a total of 616 unique importing firm indicators, and only 30 report prices in both EUR and CHF in any given quarter between 15Q1 and 16Q2. Conditional on non-zero price changes, our sample includes 475 importing firms and only 19 report prices in both EUR and CHF.

Table C.2: *Border price changes by invoicing currency, baseline sample*

	All			Non-zero		
	(1)	(2)	(3)	(4)	(5)	(6)
2015Q1	-0.091***	-0.092***	-0.086***	-0.099***	-0.106***	-0.094***
	[0.010]	[0.011]	[0.015]	[0.019]	[0.022]	[0.036]
2015Q2	-0.092***	-0.084***	-0.087***	-0.084***	-0.068***	-0.065*
	[0.008]	[0.009]	[0.020]	[0.014]	[0.017]	[0.036]
2015Q3	-0.068***	-0.060***	-0.063***	-0.059***	-0.045***	-0.053*
	[0.008]	[0.009]	[0.017]	[0.014]	[0.016]	[0.028]
2015Q4	-0.055***	-0.048***	-0.042*	-0.052***	-0.032**	-0.034
	[0.009]	[0.010]	[0.023]	[0.014]	[0.015]	[0.039]
2016Q1	-0.035***	-0.031***	-0.025	-0.031**	-0.010	-0.007
	[0.010]	[0.011]	[0.024]	[0.015]	[0.016]	[0.038]
2016Q2	-0.038***	-0.034***	-0.022	-0.035**	-0.010	0.013
	[0.011]	[0.012]	[0.030]	[0.016]	[0.018]	[0.043]
Observations	15424	15353	14478	10498	10403	9598
Adjusted R^2	0.13	0.21	0.45	0.13	0.22	0.46
Avg effect 15 Q1-Q3	0.084***	0.079***	0.079***	0.078***	0.069***	0.069**
	[0.007]	[0.009]	[0.016]	[0.015]	[0.017]	[0.030]
Adjusted R^2	0.23	0.32	0.54	0.22	0.32	0.54
Observations	9466	9414	8907	6425	6366	5892
Unique products	2394	2394	2394	2394	2394	2394
Quarter × category fixed effect	NO	YES	NO	NO	YES	NO
Quarter × firm fixed effect	NO	NO	YES	NO	NO	YES

Notes: The upper panel shows estimates of β_t in equation (1) for t=15Q1,...,16Q2, where β_t represents the difference in the average price change of EUR-invoiced goods and CHF-invoiced goods. The bottom panel shows the average effect (imposing common β_t) in 15Q1, 15Q2, and 15Q3. Columns 4-6 include only non-zero price changes. Columns 1 and 4 include time fixed effects. Columns 2 and 5 category × time fixed effects, and columns 3 and 6 importing firm × time fixed effects. Observations are not weighted. Standard errors are clustered by importing firm in columns 3 and 6 and by border product category in all other columns.

Table C.3: *Border price changes by invoicing currency, all non-CHF invoiced goods*

	All		Non-zero	
	(1)	(2)	(3)	(4)
2015Q1	-0.084***	-0.087***	-0.093***	-0.104***
	[0.009]	[0.010]	[0.019]	[0.021]
2015Q2	-0.086***	-0.080***	-0.078***	-0.067***
	[0.007]	[0.009]	[0.014]	[0.017]
2015Q3	-0.062***	-0.057***	-0.055***	-0.045***
	[0.007]	[0.008]	[0.013]	[0.015]
2015Q4	-0.046***	-0.043***	-0.043***	-0.032**
	[0.009]	[0.009]	[0.014]	[0.015]
2016Q1	-0.028***	-0.029***	-0.024	-0.012
	[0.010]	[0.011]	[0.016]	[0.016]
2016Q2	-0.034***	-0.033***	-0.030*	-0.012
	[0.011]	[0.011]	[0.016]	[0.018]
Observations	15783	15713	10674	10584
Adjusted R^2	0.12	0.20	0.12	0.22
Avg effect 15 Q1-Q3	0.078***	0.075***	0.073***	0.068***
	[0.007]	[0.008]	[0.014]	[0.016]
Adjusted R^2	0.22	0.30	0.21	0.32
Observations	9688	9636	6534	6477
Unique products	2449	2449	2449	2449
Border categories	150	150	149	149
Quarter × category fixed effects	NO	YES	NO	YES

Notes: This table repeats Table C.2 (excluding firm fixed effect specifications) but including border prices invoiced in all currencies (instead of only EUR- and CHF-invoiced prices).

Table C.4: *Border price changes by invoicing currency, Nielsen categories weighted by 2014 expenditures*

	All		Non-zero	
	(1)	(2)	(3)	(4)
2015Q1	-0.103***	-0.099***	-0.092***	-0.063***
	[0.013]	[0.012]	[0.025]	[0.020]
2015Q2	-0.094***	-0.081***	-0.064**	-0.036**
	[0.012]	[0.011]	[0.026]	[0.014]
2015Q3	-0.055***	-0.041**	-0.038	-0.021
	[0.019]	[0.016]	[0.040]	[0.036]
2015Q4	-0.070	-0.076	0.029	0.049
	[0.059]	[0.087]	[0.033]	[0.043]
2016Q1	-0.110*	-0.172**	-0.026*	-0.070**
	[0.058]	[0.069]	[0.015]	[0.031]
2016Q2	-0.123**	-0.202***	-0.032*	-0.086*
	[0.058]	[0.069]	[0.017]	[0.044]
Observations	3225	3224	2367	2359
Adjusted R^2	0.13	0.16	0.11	0.15
Avg effect 15 Q1-Q3	0.084***	0.073***	0.061**	0.036*
	[0.013]	[0.012]	[0.030]	[0.018]
Adjusted R^2	0.21	0.25	0.18	0.26
Observations	2028	2028	1464	1461
Unique products	507	507	507	507
Border categories	32	32	32	32
Quarter × category fixed effects	NO	YES	NO	YES

Notes: This table presents the same information as Table C.2 (excluding firm fixed effect specifications), but the sample is restricted to border categories matched to goods in the Nielsen retail data, excluding those with 7 or less border price observations per quarter on average in 2014 ('min7+' sample). Border categories are weighted by 2014 consumer expenditures, and observations within category are equally weighted.

Table C.5: *Border price changes by invoicing currency, baseline sample weighted by 2015 2-digit NAICS weights*

	All		Non-zero	
	(1)	(2)	(3)	(4)
2015Q1	-0.076***	-0.081***	-0.086***	-0.098***
	[0.013]	[0.011]	[0.022]	[0.022]
2015Q2	-0.086***	-0.079***	-0.079***	-0.063***
	[0.008]	[0.008]	[0.015]	[0.018]
2015Q3	-0.075***	-0.068***	-0.068***	-0.051***
	[0.008]	[0.009]	[0.013]	[0.016]
2015Q4	-0.056***	-0.052***	-0.047***	-0.024
	[0.009]	[0.010]	[0.017]	[0.022]
2016Q1	-0.037***	-0.038***	-0.028	-0.006
	[0.010]	[0.011]	[0.019]	[0.022]
2016Q2	-0.043***	-0.043***	-0.033	-0.012
	[0.013]	[0.013]	[0.023]	[0.028]
Observations	15414	15343	10488	10393
Adjusted R^2	0.13	0.21	0.12	0.22
Avg effect 15 Q1-Q3	0.079***	0.076***	0.077***	0.067***
	[0.008]	[0.007]	[0.015]	[0.016]
Adjusted R^2	0.22	0.33	0.22	0.34
Observations	9458	9406	6417	6358
Unique products	2392	2392	2392	2392
Quarter × category fixed effects	NO	YES	NO	YES

Notes: This table presents the same information as Table C.2 (excluding firm fixed effect specifications), but non-commodity border categories are weighted by December 2015 2-digit NAICS weights from the SFSO.

Table C.6: *Border price changes by invoicing currency, unbalanced sample*

	All		Non-zero	
	(1)	(2)	(3)	(4)
2015Q1	-0.093***	-0.098***	-0.097***	-0.098***
	[0.009]	[0.009]	[0.017]	[0.017]
2015Q2	-0.095***	-0.087***	-0.084***	-0.063***
	[0.007]	[0.008]	[0.014]	[0.015]
2015Q3	-0.067***	-0.059***	-0.057***	-0.040***
	[0.007]	[0.007]	[0.012]	[0.013]
2015Q4	-0.054***	-0.043***	-0.048***	-0.020
	[0.008]	[0.009]	[0.013]	[0.015]
2016Q1	-0.033***	-0.031***	-0.026**	-0.010
	[0.008]	[0.009]	[0.013]	[0.013]
2016Q2	-0.036***	-0.032***	-0.029**	-0.010
	[0.009]	[0.010]	[0.014]	[0.014]
Observations	19531	19475	13155	13071
Adjusted R^2	0.15	0.23	0.14	0.24
Avg effect 15 Q1-Q3	0.086***	0.082***	0.078***	0.064***
	[0.007]	[0.007]	[0.013]	[0.014]
Adjusted R^2	0.26	0.34	0.24	0.34
Observations	12426	12386	8316	8265
Unique products	3406	3406	3406	3406
Border categories	152	152	151	151
Quarter × category fixed effects	NO	YES	NO	YES

Notes: This table repeats Table C.2 (excluding firm fixed effect specifications) but based on the non-balanced sample of border prices.

Table C.7: *Border price changes by invoicing currency, EUR-invoiced prices converted using official EUR/CHF*

	All		Non-zero	
	(1)	(2)	(3)	(4)
2015Q1	-0.115***	-0.114***	-0.122***	-0.125***
	[0.008]	[0.009]	[0.018]	[0.021]
2015Q2	-0.108***	-0.098***	-0.098***	-0.081***
	[0.007]	[0.009]	[0.014]	[0.017]
2015Q3	-0.047***	-0.042***	-0.035**	-0.025
	[0.008]	[0.009]	[0.014]	[0.016]
2015Q4	-0.055***	-0.050***	-0.052***	-0.034**
	[0.009]	[0.010]	[0.013]	[0.016]
2016Q1	-0.034***	-0.031***	-0.032**	-0.011
	[0.010]	[0.011]	[0.016]	[0.017]
2016Q2	-0.040***	-0.036***	-0.037**	-0.011
	[0.011]	[0.011]	[0.016]	[0.019]
Observations	15355	15284	10464	10366
Adjusted R^2	0.15	0.22	0.13	0.22
Avg effect 15 Q1-Q3	0.090***	0.085***	0.080***	0.071***
	[0.007]	[0.009]	[0.015]	[0.017]
Adjusted R^2	0.26	0.32	0.22	0.32
Observations	9417	9365	6401	6340
Unique products	2376	2376	2376	2376
Border categories	150	150	149	149
Quarter × category fixed effects	NO	YES	NO	YES

Notes: This table repeats Table C.2 (excluding firm fixed effect specifications) but converting EUR-invoiced prices into CHF prices based on the official quarterly EUR/CHF rate rather than using CHF prices provided by the SFSO.

Table C.8: *Border price changes by invoicing currency, commodity sample*

	All		Non-zero	
	(1)	(2)	(3)	(4)
2015Q1	-0.086***	-0.026**	-0.081**	-0.021**
	[0.028]	[0.010]	[0.031]	[0.008]
2015Q2	-0.083*	-0.005	-0.079*	-0.006
	[0.041]	[0.013]	[0.044]	[0.015]
2015Q3	-0.037	0.026**	-0.036	0.026**
	[0.023]	[0.011]	[0.025]	[0.011]
2015Q4	-0.036*	0.004	-0.028	0.008
	[0.021]	[0.018]	[0.019]	[0.017]
2016Q1	-0.029	0.017	-0.019	0.021
	[0.025]	[0.018]	[0.025]	[0.017]
2016Q2	-0.044*	0.005	-0.037	0.008
	[0.025]	[0.009]	[0.025]	[0.009]
Observations	4031	4007	3802	3773
Adjusted R^2	0.15	0.42	0.15	0.43
Avg effect 15 Q1-Q3	0.068**	0.002	0.064*	-0.001
	[0.030]	[0.011]	[0.033]	[0.011]
Adjusted R^2	0.09	0.38	0.09	0.39
Observations	2340	2328	2197	2182
Unique products	588	588	588	588
Border categories	29	29	29	29
Quarter × category fixed effects	NO	YES	NO	YES

Notes: This table repeats Table C.2 (excluding firm fixed effect specifications) but based on the commodity sample of products.

C.2 Regression (2) in subsection 3.2

We report estimates of regression (2) when using the quarterly EUR/CHF exchange rate from the SNB to convert EUR-invoiced prices into prices in CHF.

Table C.9: *Border price changes and EUR invoicing intensity across border product categories, EUR-invoiced prices converted using official EUR/CHF*

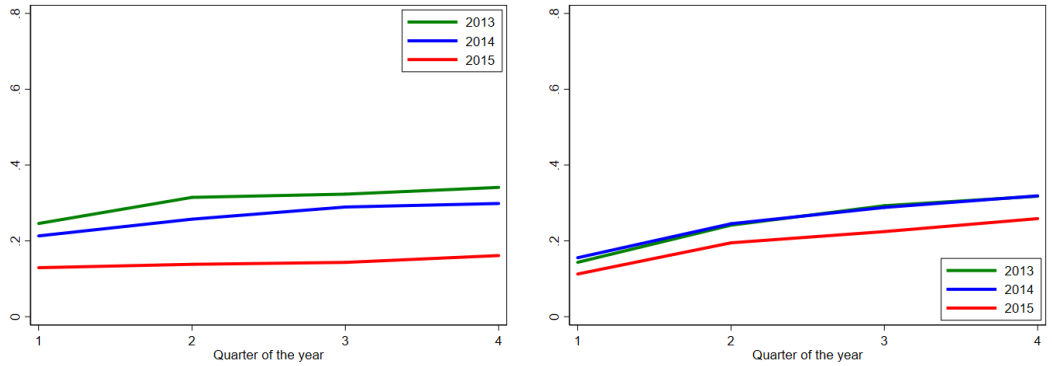
	noncommodity	Nielsen unw.	Nielsen weighted
2015Q1	-0.099***	-0.096***	-0.115***
	[0.015]	[0.025]	[0.029]
2015Q2	-0.096***	-0.101***	-0.146***
	[0.018]	[0.027]	[0.033]
2015Q3	-0.024	-0.046*	-0.104***
	[0.022]	[0.026]	[0.036]
2015Q4	-0.025	-0.032	-0.041
	[0.026]	[0.023]	[0.026]
2016Q1	-0.009	-0.009	-0.005
	[0.030]	[0.028]	[0.029]
2016Q2	-0.009	-0.017	-0.022
	[0.030]	[0.030]	[0.030]
Observations	888	220	220
Adjusted R^2	0.23	0.31	0.49
Avg effect 15 Q1-Q3	-0.073***	-0.081***	-0.122***
	[0.011]	[0.015]	[0.019]
Observations	544	128	128
Adjusted R^2	0.36	0.45	0.63
Unique categories	136	32	32
Border categories	150	32	32

Notes: This table repeats Table 4 but converting EUR-invoiced prices into CHF prices based on the official quarterly EUR/CHF rate rather than using CHF prices provided by the SFSO.

C.3 Price stickiness in subsection 3.3

We present additional results for the border price stickiness analysis in subsection 3.3. We show the fraction of border price increases and the fraction of border price changes for commodities, since the baseline includes only non-commodities. Furthermore, we consider additional regressions on the frequency and size of price changes.

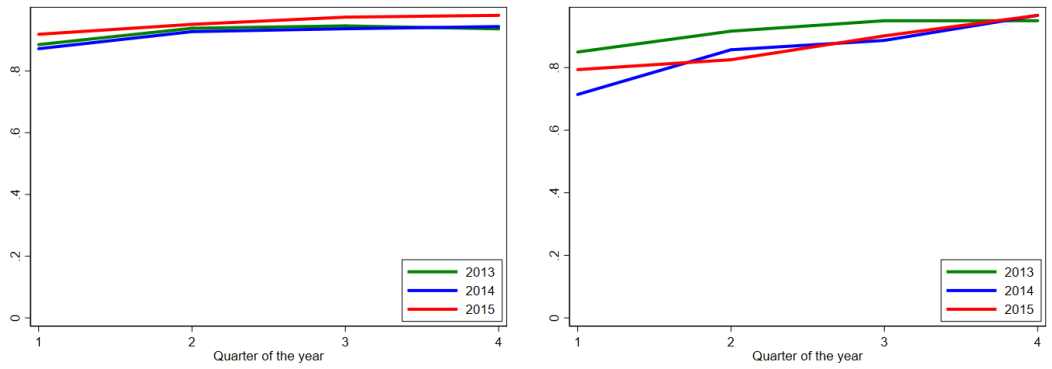
Figure C.1: *Fraction of border price increases by currency of invoicing in the baseline sample*



(a) Increases CHF-inv. (b) Increases EUR-inv.

Notes: This figure reports the fraction of products with increases in the invoicing price compared with Q4 of the previous year, in the same format as Figure 3.

Figure C.2: *Fraction of border price changes by currency of invoicing in the commodities sample*



(a) Changes CHF-inv. (b) Changes EUR-inv.

Notes: This figure reports the fraction of products with changes in the invoicing price compared with Q4 of the previous year in the sample of commodity products, in the same format as Figure 3.

Additional regressions on the frequency and size of border price changes

We consider regressions of the form:

$$f_{iyh} = \mathbb{I}_{y=14} \times (\alpha_{14} + \beta_{14} f_{iy-1h}) + \mathbb{I}_{y=15} \times (\alpha_{15} + \beta_{15} f_{iy-1h}) + \varepsilon_{iyh} \tag{A1}$$

where f_{iyh} is equal to 1 if the price of product i changes between Q4 of year $y-1$ and quarter h of year y, and 0 otherwise. We include $y = 14, 15$ and $h = 1, ..., 4$. Results are reported in Table C.10.

Table C.10: *Fraction of price changes given previous year price change*

CHF invoiced	(1) 1Q	(2) 2Q	(3) 3Q	(4) 4Q
α_{14}	0.218***	0.266***	0.262***	0.272***
	[0.014]	[0.017]	[0.018]	[0.019]
β_{14}	0.447***	0.458***	0.516***	0.534***
	[0.023]	[0.023]	[0.023]	[0.023]
α_{15}	0.442***	0.483***	0.517***	0.542***
	[0.016]	[0.018]	[0.019]	[0.021]
β_{15}	0.339***	0.343***	0.345***	0.338***
	[0.022]	[0.022]	[0.022]	[0.023]
Observations	3275	3223	3149	3032
R^2	0.59	0.67	0.72	0.75
Wald $\alpha_{14} = \alpha_{15}$	0.000	0.000	0.000	0.000
Wald $\alpha_{14} + \beta_{14} = \alpha_{15} + \beta_{15}$	0.000	0.000	0.000	0.000

EUR invoiced	(1) 1Q	(2) 2Q	(3) 3Q	(4) 4Q
α_{14}	0.201***	0.258***	0.259***	0.314***
	[0.021]	[0.026]	[0.028]	[0.031]
β_{14}	0.396***	0.382***	0.430***	0.407***
	[0.050]	[0.045]	[0.043]	[0.044]
α_{15}	0.218***	0.299***	0.308***	0.340***
	[0.020]	[0.025]	[0.026]	[0.031]
β_{15}	0.321***	0.279***	0.331***	0.312***
	[0.045]	[0.042]	[0.040]	[0.045]
Observations	1039	1014	1003	892
R^2	0.384	0.467	0.535	0.568
Wald $\alpha_{14} = \alpha_{15}$	0.567	0.252	0.207	0.543
Wald $\alpha_{14} + \beta_{14} = \alpha_{15} + \beta_{15}$	0.327	0.204	0.244	0.114

Notes: Estimates of regression (A1) for CHF-invoiced goods (top panel) and EUR-invoiced goods (bottom panel). The last two rows report the p-values of Wald tests. Observations are unweighted and standard errors are clustered at the level of border product categories.

According to the estimates in Table C.10, for every horizon, $\beta_{14} > 0$ and $\beta_{15} > 0$ for both CHF-invoiced goods and EUR-invoiced goods. That is, for each quarterly horizon, products for which prices in the invoicing currency changed in 2013 (relative to 4Q of the previous year) are more likely to display a price change in 2014 (relative to 4Q of the previous year). Similarly, products for which the price changed in 2014 are more likely to display a price change in 2015. Moreover, for CHF-invoiced goods, we have $\alpha_{15} > \alpha_{14}$, and $\alpha_{15} + \beta_{15} > \alpha_{14} + \beta_{14}$. That is, for each horizon, the likelihood of a CHF-invoiced price change rises in 2015 irrespective of whether the price did change in the previous year. In contrast, there is no statistically significant change in the likelihood of a price change for EUR-invoiced goods (see Wald tests at the bottom of the table).

We next consider regressions of the form:

$$s_{iyh} = \mathbb{I}_{y=14} \times (\alpha_{14} + \beta_{14} f_{iy-1h}) + \mathbb{I}_{y=15} \times (\alpha_{15} + \beta_{15} f_{iy-1h}) + \varepsilon_{iyh} \tag{A2}$$

where s_{iyh} is equal to absolute value of the log price change if the price of product i changes between Q4 of year $y-1$ and quarter h of year y. We include $y = 14, 15$ and $h = 1, ..., 4$. Results are reported in Table C.11.

We see that α_{14} is close to zero (no trends in price changes before 15Q1) and $\alpha_{15} < 0$ (on average, non-zero price changes become negative in 2015 since the fraction of price reductions fell as of 15Q1). More importantly, β_{14} and β_{15} are roughly zero. That is, the size of non-zero price changes does not differ systematically between more and less flexible price goods. We use this result to motivate our assumption, in our counterfactuals, that the size of non-zero price changes does not vary systematically across products with the likelihood of a price change in previous year (a measure of the product's price flexibility).

Table C.11: *Size of nonzero price changes for goods that changed price in previous year*

CHF invoiced	(1) 1Q	(2) 2Q	(3) 3Q	(4) 4Q
α_{14}	-0.010	-0.005	0.004	0.007
	[0.007]	[0.008]	[0.009]	[0.009]
β_{14}	0.011	0.005	-0.010	-0.011
	[0.008]	[0.009]	[0.010]	[0.010]
α_{15}	-0.061***	-0.072***	-0.081***	-0.076***
	[0.004]	[0.005]	[0.006]	[0.006]
β_{15}	0.005	0.005	0.012*	0.004
	[0.006]	[0.007]	[0.007]	[0.008]
Observations	1645	1907	2028	2052
R^2	0.19	0.19	0.20	0.19
Wald $\alpha_{14} = \alpha_{15}$	0.000	0.000	0.000	0.000
Wald $\alpha_{14} + \beta_{14} = \alpha_{15} + \beta_{15}$	0.000	0.000	0.000	0.000

EUR invoiced	(1) 1Q	(2) 2Q	(3) 3Q	(4) 4Q
α_{14}	0.014**	0.011	0.019	0.032**
	[0.006]	[0.013]	[0.012]	[0.014]
β_{14}	-0.026**	-0.004	0.000	-0.019
	[0.011]	[0.016]	[0.014]	[0.016]
α_{15}	-0.029***	-0.010	-0.001	-0.015
	[0.010]	[0.011]	[0.012]	[0.012]
β_{15}	-0.006	-0.009	-0.009	0.003
	[0.016]	[0.014]	[0.015]	[0.015]
Observations	315	409	459	448
R^2	0.08	0.02	0.02	0.03
Wald $\alpha_{14} = \alpha_{15}$	0.000	0.227	0.234	0.010
Wald $\alpha_{14} + \beta_{14} = \alpha_{15} + \beta_{15}$	0.116	0.052	0.015	0.024

Notes: Estimates of regression (A2) for CHF-invoiced goods (top panel) and EUR-invoiced goods (bottom panel). The last two rows report the p-value of Wald tests. Observations are unweighted and standard errors are clustered at the level of border product categories.

C.4 Counterfactuals in subsection 3.4

We present additional information for the counterfactuals in subsection 3.4. We first show the results for all quarters of 2015 (the main text reports only the first and the fourth quarter). We then report results when we assume that average changes in border prices are calculated using a lower CHF invoicing share than the one we assume in our baseline. Finally, we report results based on EUR-invoiced prices converted using the quarterly EUR/CHF exchange rate from the SNB.

Table C.12: *Baseline counterfactual results for all quarters*

	15Q1			15Q2		
	CHF	EUR	2\3 CHF +1\3 EUR	CHF	EUR	2\3 CHF +1\3 EUR
1) Actual	-3.4	-14.5	-7.1	-4.5	-14.9	-8.0
2) All sticky	0.0	-14.0	-4.7	0.0	-14.7	-4.9
3) All flexible	-5.8	-15.7	-9.1	-6.9	-15.2	-9.7
4) All flex - all sticky			-4.5			-4.7
5) All CHF	-3.4	-9.1	-5.3	-4.5	-10.0	-6.4
6) All EUR	-11.5	-14.5	-12.5	-11.6	-14.9	-12.7
7) All EUR - all CHF			-7.2			-6.3

	15Q3			15Q4		
	CHF	EUR	2\3 CHF +1\3 EUR	CHF	EUR	2\3 CHF +1\3 EUR
1) Actual	-5.2	-11.2	-7.2	-5.4	-11.5	-7.4
2) All sticky	0.0	-9.6	-3.2	0.0	-10.6	-3.5
3) All flexible	-7.3	-13.2	-9.3	-7.2	-12.4	-9.0
4) All flex - all sticky			-6.1			-5.4
5) All CHF	-5.2	-9.4	-6.6	-5.4	-9.3	-6.7
6) All EUR	-8.5	-11.2	-9.4	-8.9	-11.5	-9.8
7) All EUR - all CHF			-2.9			-3.1

Notes: See main text for a description of each counterfactual.

Recall that we calculate changes in border prices as a weighted average of changes in CHF-invoiced border prices and changes in EUR-invoiced border prices. In our baseline, we assume a CHF invoicing share of 2/3, obtained from the SFSO data. We now consider a lower CHF invoicing share of 32%, as reported in Federal Customs Administration (2015).

In 15Q1, the average change in border prices due to a shift from "All sticky" to "All flex" is -3% and the average change in border prices due a shift in invoicing from "All CHF" to

"All EUR" is −6.3%. In 15Q2, these statistics are −2.5% and −5.6%, respectively. In 15Q3, these statistics are −4.8% and −2.3%, respectively. In 15Q4, these statistics are −3.6% and −2.6%, respectively. While these differences are smaller than our baseline, we still obtain the result that in the first two quarters of 2015, a shift in invoicing from "All CHF" to "All EUR" has a bigger impact on average changes in border prices than a shift from "All sticky" to "All flex".

Table C.13: *Counterfactuals for all for quarters, EUR-invoiced prices converted using official EUR/CHF*

	15Q1			15Q2		
	CHF	EUR	2\3 CHF +1\3 EUR	CHF	EUR	2\3 CHF +1\3 EUR
1) Actual	-3.4	-15.2	-7.3	-4.5	-15.5	-8.2
2) All sticky	0.0	-14.0	-4.7	0.0	-14.7	-4.9
3) All flexible	-5.8	-18.0	-9.9	-6.9	-16.7	-10.2
4) All flex - all sticky			-5.2			-5.2
5) All CHF	-3.4	-10.5	-5.7	-4.5	-11.0	-6.7
6) All EUR	-11.5	-15.2	-12.8	-11.6	-15.5	-12.9
7) All EUR - all CHF			-7.0			-6.2

	15Q3			15Q4		
	CHF	EUR	2\3 CHF +1\3 EUR	CHF	EUR	2\3 CHF +1\3 EUR
1) Actual	-5.2	-10.1	-6.8	-5.4	-11.5	-7.5
2) All sticky	0.0	-9.6	-3.2	0.0	-10.6	-3.5
3) All flexible	-7.3	-10.8	-8.4	-7.2	-12.5	-9.0
4) All flex - all sticky			-5.2			-5.5
5) All CHF	-5.2	-7.7	-6.0	-5.4	-9.3	-6.7
6) All EUR	-8.5	-10.1	-9.1	-8.9	-11.5	-9.8
7) All EUR - all CHF			-3.1			-3.1

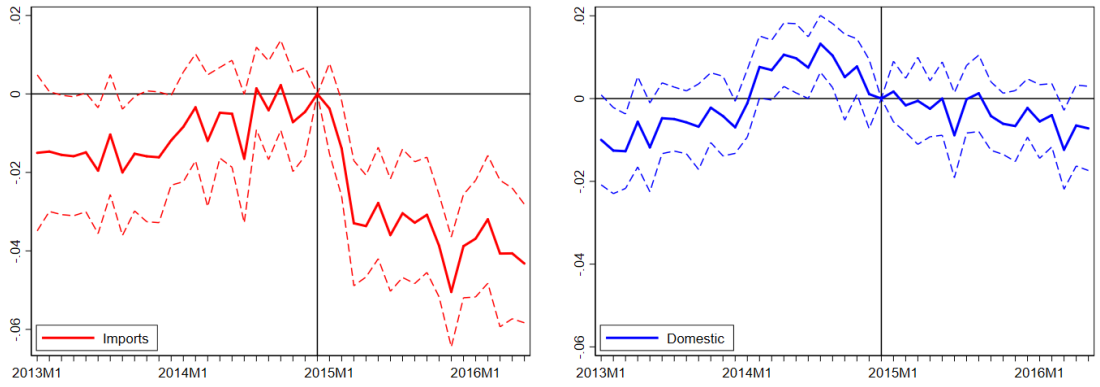
Notes: Same as Table C.12 but using EUR-invoiced prices converted by the end of quarter EUR/CHF rate.

D Retail prices: additional results

D.1 Cumulative average price changes in subsection 4.1

We present additional figures for the average price changes reported in subsection 4.1 in the main text. We show average retail price changes at a monthly frequency, average prices changes for EU imports only (rather than all imports in our baseline analysis), and average price changes including all product categories (rather than dropping categories with 7 or less border prices per quarter in 2014).

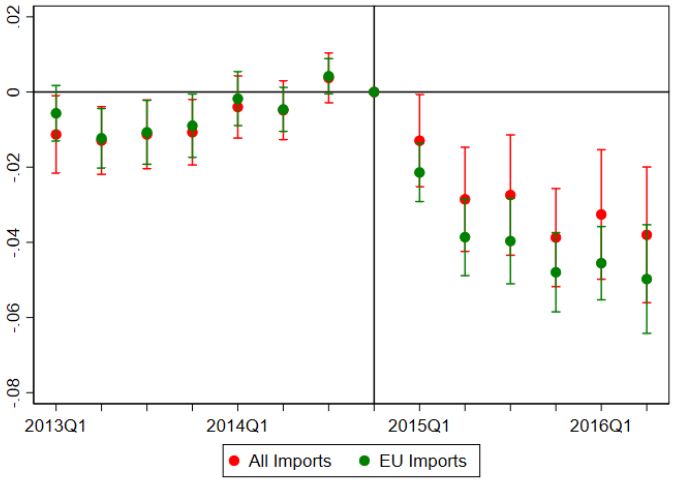
Figure D.1: *Average retail price changes, monthly*



(a) Imports (b) Domestic

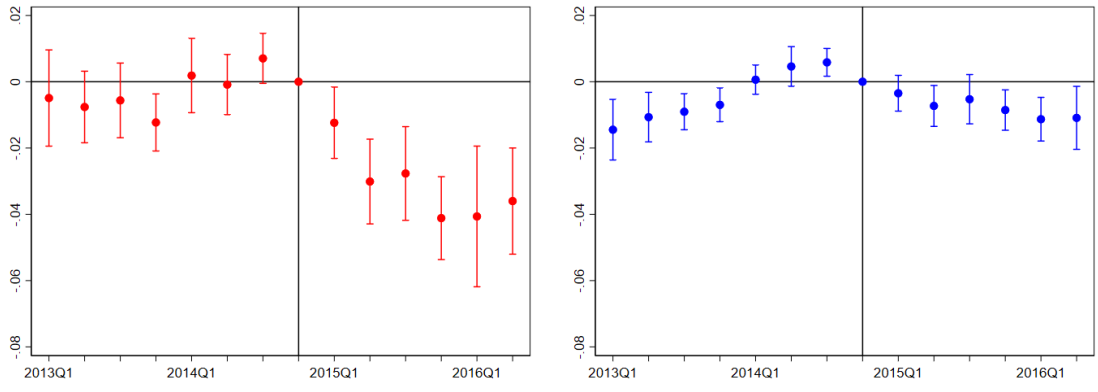
Notes: The solid lines display monthly time fixed effects (or cumulative average price changes) relative to 14Q4 of imports in panel (a) and Swiss-produced goods in panel (b), weighting goods by 2014 Nielsen expenditures and using the baseline sample clustering at the level of retail product class. Dashed lines present the upper and lower bound of a 95% confidence interval for each coefficient estimate. Standard errors are clustered at the level of retail product class.

Figure D.2: *Average retail price changes with EU imports*



Notes: This figure repeats Figure 4 including only imports from the EU (green), compared with all imports baseline (red).

Figure D.3: *Average retail price changes, all border categories*



(a) Imports (b) Domestic

Notes: This figure repeats Figure 4, but based on the 'min0+' sample of product categories (that is, including all product categories rather than dropping product categories with 7 or less border prices per quarter in 2014).

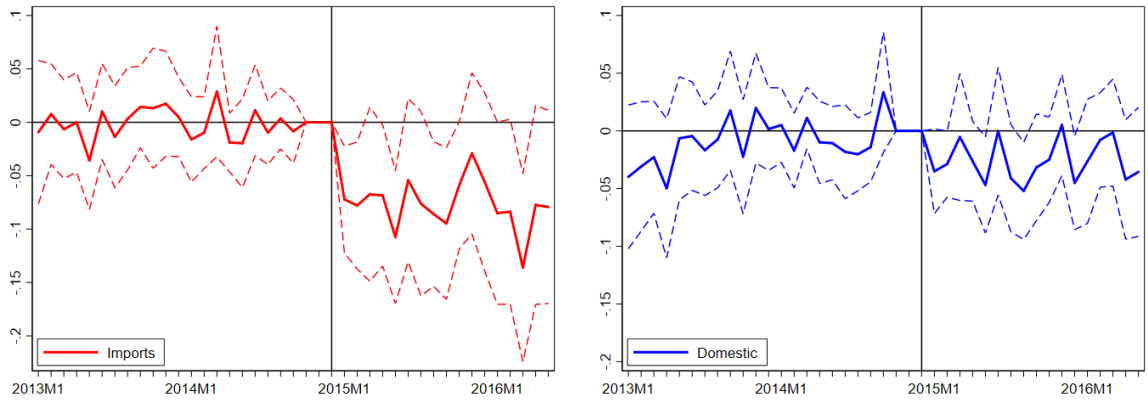
D.2 Regression (3) in subsection 4.2

We report various sensitivities for the estimated relationship between invoicing and retail price responses during the first three quarters of 2015 given in equation (3) in subsection 4.2. We first show the table form of the regression coefficients reported graphically in the main text (we also report estimates at the monthly level). We then consider (i) different weighting schemes (weighting all observations equally or weighting observations equally within border product category) and clustering (border categories), (ii) alternative restrictions in terms of minimum number of quarterly invoicing observations per border product category, (iii) different balanced samples, (iv) alternative aggregations of prices over weeks, regions and stores, (v) different baseline periods (December 2014, average in 2014, and monthly estimates), vi) all non-CHF foreign currency invoiced observations (rather than only EUR), imports from the EU (rather than all imports), and (vii) trimming the dependent variable to exclude very large price changes.

We note that, as we include additional border categories that have a low number of border price observations, estimates of β_t tend to be smaller. If we consider all border product categories (including categories with only 2 or 4 quarterly observations), the estimate of β_t in 15Q1 is -0.049 rather than -0.073 in our baseline, and the average effect in 15Q1-15Q3 is -0.043 (10% significance) rather than -0.078 (5% significance).

We also note that if we restrict our sample to imports from the EU, the magnitude and significance of our estimates is diminished (the average effect in 15Q1-15Q3 is -0.044 (5% significance). In our baseline we include all imports because we do not observe country of origin in our border price data.

Figure D.4: *Invoicing and retail prices, monthly*



(a) Imports (b) Domestic

Notes: This figure repeats 4 but based on monthly rather than quarterly fixed effects. The solid lines display monthly time fixed effects relative to 14Q4. Dashed lines depict 95% confidence intervals.

Table D.1: *Invoicing and retail prices*

	(1) Imports	(2) Domestic
2015Q1	-0.073***	-0.023
	[0.027]	[0.014]
2015Q2	-0.077**	-0.024
	[0.032]	[0.015]
2015Q3	-0.086**	-0.042**
	[0.037]	[0.020]
2015Q4	-0.048	-0.022
	[0.032]	[0.015]
2016Q1	-0.102**	-0.012
	[0.042]	[0.018]
2016Q2	-0.078*	-0.039
	[0.045]	[0.026]
Adjusted R^2	0.40	0.42
Observations	13113	30643
Avg effect 15 Q1-Q3	-0.078**	-0.030*
	[0.031]	[0.015]
Adjusted R^2	0.547	0.479
Observations	3748	8756
Unique products	937	2189
Retail classes	132	151
Border categories	32	34

Notes: This table reports estimates of β_t from equation (3) for t=15Q1,...,16Q2. The dependent variable is the cumulative change in the price compared with 14Q4. The independent variables include time dummies and time dummies interacted with the 2014 invoicing share. The left column displays results for imported goods, and the right column those for Swiss-produced goods. The bottom panel shows the average effect (imposing common β_t) in 15Q1, 15Q2, and 15Q3. Observations are weighted by 2014 Nielsen expenditures. Standard errors are clustered at the level of retail product class.

Table D.2: *Invoicing and retail prices, alternative weighting and clustering*

	Unweighted		Weights border cat.		Cluster border cat.	
	(1)	(2)	(3)	(4)	(5)	(6)
	imports	domestic	imports	domestic	imports	domestic
2015Q1	-0.062***	-0.015	-0.071***	-0.015	-0.073**	-0.023*
	[0.021]	[0.010]	[0.023]	[0.010]	[0.030]	[0.012]
2015Q2	-0.060**	-0.019	-0.081***	-0.013	-0.077**	-0.024
	[0.029]	[0.015]	[0.028]	[0.011]	[0.035]	[0.015]
2015Q3	-0.063*	-0.029	-0.081**	-0.021	-0.086**	-0.042**
	[0.033]	[0.019]	[0.035]	[0.015]	[0.041]	[0.019]
2015Q4	-0.047*	-0.022	-0.060*	-0.012	-0.048	-0.022
	[0.028]	[0.019]	[0.031]	[0.013]	[0.036]	[0.016]
2016Q1	-0.075**	-0.012	-0.089**	-0.003	-0.102**	-0.012
	[0.035]	[0.018]	[0.040]	[0.014]	[0.045]	[0.017]
2016Q2	-0.078**	-0.029	-0.092**	-0.020	-0.078	-0.039
	[0.035]	[0.020]	[0.040]	[0.019]	[0.048]	[0.024]
Adjusted R^2	0.40	0.42	0.40	0.43	0.40	0.42
Observations	13113	30643	13113	30643	13113	30643
Avg effect 15 Q1-Q3	-0.061**	-0.021	-0.078***	-0.016	-0.078**	-0.030**
	[0.027]	[0.014]	[0.028]	[0.011]	[0.035]	[0.014]
Adjusted R^2	0.51	0.44	0.52	0.45	0.55	0.48
Observations	3748	8756	3748	8756	3748	8756
Unique products	937	2189	937	2189	937	2189
Retail classes	132	151	132	151	132	151
Border categories	32	34	32	34	32	34

Notes: This table repeats Table D.1, but with different weights and/or using different clustering. Columns (1) and (2) weight all observations equally, (3) and (4) weight by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category), and (5) and (6) cluster by border product categories and weight by 2014 Nielsen expenditures as in the baseline.

Table D.3: *Invoicing and retail prices, alternative border category samples*

	Min 8+		Min 4+		All (Min0+)	
	(1)	(2)	(3)	(4)	(5)	(6)
	imports	domestic	imports	domestic	imports	domestic
2015Q1	-0.055***	-0.022	-0.059**	-0.023	-0.049**	-0.017
	[0.020]	[0.015]	[0.028]	[0.014]	[0.024]	[0.013]
2015Q2	-0.061**	-0.022	-0.063**	-0.024	-0.041	-0.018
	[0.027]	[0.015]	[0.031]	[0.015]	[0.030]	[0.014]
2015Q3	-0.067**	-0.042**	-0.069*	-0.041**	-0.052	-0.031
	[0.030]	[0.021]	[0.036]	[0.020]	[0.032]	[0.019]
2015Q4	-0.027	-0.019	-0.036	-0.021	-0.016	-0.014
	[0.024]	[0.016]	[0.031]	[0.015]	[0.030]	[0.014]
2016Q1	-0.076***	-0.009	-0.085**	-0.012	-0.029	-0.004
	[0.024]	[0.018]	[0.041]	[0.017]	[0.054]	[0.017]
2016Q2	-0.053	-0.037	-0.059	-0.038	-0.051	-0.026
	[0.034]	[0.027]	[0.044]	[0.026]	[0.037]	[0.025]
Adjusted R^2	0.42	0.43	0.39	0.42	0.39	0.42
Observations	11801	29229	13925	31385	14623	33259
Avg effect 15 Q1-Q3	-0.061**	-0.028*	-0.064**	-0.029*	-0.047*	-0.022
	[0.025]	[0.015]	[0.031]	[0.015]	[0.028]	[0.014]
Adjusted R^2	0.53	0.47	0.54	0.48	0.54	0.47
Observations	3372	8352	3980	8968	4180	9504
Unique products	843	2088	995	2242	1045	2376
Retail classes	119	137	150	171	155	177
Border categories	29	31	36	38	38	40

Notes: This table repeats Table D.1 for alternative samples according to the minimum number of border price observations per quarter in 2014. Columns (1) and (2) include only product classes matched to border categories with more than 8 border observations, (3) and (4) include only border categories with more than 4 border observations, (5) and (6) include all border categories.

Table D.4: *Invoicing and retail prices, alternative sample balancing periods*

	(1) Balanced from Jan 2013	(2) Balanced from Jan 2014
2015Q1	-0.073***	-0.069**
	[0.028]	[0.027]
2015Q2	-0.077**	-0.068**
	[0.032]	[0.031]
2015Q3	-0.088**	-0.075**
	[0.037]	[0.036]
2015Q4	-0.049	-0.043
	[0.032]	[0.031]
2016Q1	-0.103**	-0.097**
	[0.043]	[0.041]
2016Q2	-0.079*	-0.074*
	[0.045]	[0.044]
Adjusted R^2	0.40	0.39
Observations	12726	13690
Avg effect 15 Q1-Q3	-0.079**	-0.071**
	[0.032]	[0.031]
Adjusted R^2	0.55	0.54
Observations	3636	3924
Unique products	909	981
Retail classes	132	135
Border categories	32	32

Notes: This table repeats Table D.1 for alternative samples. The baseline regression uses a balanced sample of goods observed each month from June 2013 to May 2016. Column (1) considers a balanced sample of goods from January 2013 to May 2016, while column (2) considers a balanced sample from January 2014 to May 2016.

Table D.5: *Invoicing and retail prices, alternative aggregations of transaction-level prices to price series*

	(1) Median within rst	(2) Mode within rst	(3) Median within it
2015Q1	-0.068**	-0.065**	-0.068**
	[0.027]	[0.025]	[0.027]
2015Q2	-0.073**	-0.074**	-0.065**
	[0.031]	[0.031]	[0.031]
2015Q3	-0.082**	-0.081**	-0.078**
	[0.036]	[0.035]	[0.036]
2015Q4	-0.044	-0.045	-0.043
	[0.033]	[0.032]	[0.032]
2016Q1	-0.101**	-0.098**	-0.092**
	[0.043]	[0.041]	[0.043]
2016Q2	-0.080*	-0.080*	-0.066
	[0.044]	[0.043]	[0.045]
Adjusted R^2	0.40	0.38	0.40
Observations	13113	13113	13113
Avg effect 15 Q1-Q3	-0.074**	-0.073**	-0.070**
	[0.031]	[0.030]	[0.031]
Adjusted R^2	0.54	0.54	0.52
Observations	3748	3748	3748
Unique products	937	937	937
Retail classes	132	132	132
Border categories	32	32	32

Notes: This table repeats Table D.1 for alternative aggregations of transaction-level prices to EAN-specific price series. In the baseline, we average P^{ret}_{irst} across households, weeks, and stores in triplet rst. We then average P^{ret}_{irst} across regions and retailers in month t to obtain a measure of the retail price of product i in month t, P^{ret}_{it}. Here, in column (1), we take the median across households, weeks, and stores in triplet rst and then average P^{ret}_{irst} across regions and retailers in month t to obtain a measure of the retail price of product i in month t, P^{ret}_{it}. In column (2), we take the mode across households, weeks, and stores in triplet rst and then average P^{ret}_{irst} across regions and retailers in month t to obtain a measure of the retail price of product i in month t, P^{ret}_{it}. In column (3), we average P^{ret}_{irst} across households, weeks, and stores in triplet rst. We then take the median of P^{ret}_{irst} across regions and retailers in month t to obtain a measure of the retail price of product i in month t, P^{ret}_{it}.

Table D.6: *Invoicing and retail prices, alternative base periods for price changes*

	(1) Rel. to Dec 2014	(2) Rel. to average 2014
2015Q1	-0.059**	-0.069***
	[0.027]	[0.025]
2015Q2	-0.063**	-0.073**
	[0.029]	[0.030]
2015Q3	-0.072**	-0.082**
	[0.034]	[0.035]
2015Q4	-0.034	-0.045
	[0.027]	[0.031]
2016Q1	-0.088**	-0.098**
	[0.039]	[0.041]
2016Q2	-0.065*	-0.075*
	[0.038]	[0.044]
Adjusted R^2	0.03	0.40
Observations	13113	13113
Avg effect 15 Q1-Q3	-0.065**	-0.075**
	[0.029]	[0.029]
Adjusted R^2	0.05	0.62
Observations	3748	6559
Unique products	937	937
Retail classes	132	132
Border categories	32	32

Notes: This table repeats Table D.1 for different base periods (the base period in our baseline is 14Q4): December 2014 in column (1) and average 2014 price in column (2).

Table D.7: *Invoicing and retail prices, other sensitivities*

	(1) All currencies	(3) EU imports	(2) Trim
2015Q1	-0.074**	-0.042**	-0.065***
	[0.029]	[0.017]	[0.024]
2015Q2	-0.077**	-0.044*	-0.067**
	[0.034]	[0.025]	[0.029]
2015Q3	-0.086**	-0.046*	-0.083**
	[0.040]	[0.027]	[0.035]
2015Q4	-0.050	-0.016	-0.042
	[0.034]	[0.026]	[0.031]
2016Q1	-0.106**	-0.054**	-0.094**
	[0.046]	[0.024]	[0.040]
2016Q2	-0.085*	-0.034	-0.083**
	[0.045]	[0.034]	[0.038]
Adjusted R^2	0.40	0.42	0.40
Observations	13113	11111	12996
Avg effect 15 Q1-Q3	-0.079**	-0.044**	-0.073**
	[0.034]	[0.022]	[0.030]
Adjusted R^2	0.55	0.51	0.52
Observations	3748	3176	3719
Unique products	937	794	935
Retail classes	132	129	132
Border categories	32	32	32

Notes: This table repeats Table D.1 with two different adjustments to the baseline. In column (1) we include in border invoicing shares products that are invoiced in non-EUR foreign currencies (as compared with the baseline, where we include only EUR and CHF). In column (2) we trim the dependent variable by excluding the 1% largest changes in absolute values from the regression. In column (3) we include only imports from EU countries.

D.3 Regression (4) in subsection 4.2

We consider sensitivity analysis to using (i) different weighting schemes, clustering, and trimming, (ii) different border category samples, (iii) alternative price aggregations, (iv) EUR-invoiced border prices obtained by using the official EUR/CHF exchange rate, and (v) EU imports. In all cases, the 2SLS estimates of β_t remain significant, range between 0.48 and 0.60 (or roughly 0.35 if we restrict the sample to EU imports) in the first two quarters of 2015.

Table D.8: *Sensitivity of retail import prices to border prices, unweighted*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ border price	0.469***	0.551***	0.444***	0.475**	0.410**	0.789**	0.451**	2.149
	[0.151]	[0.166]	[0.136]	[0.207]	[0.181]	[0.371]	[0.204]	[1.438]
Observations	937	937	937	937	937	937	937	937
F first stage		90.8		77.0		18.1		1.9
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6, but weighting all observations equally.

Table D.9: *Sensitivity of retail import prices to border prices, border category weights*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ border price	0.497***	0.598***	0.489***	0.599***	0.461**	0.901***	0.496**	2.178*
	[0.156]	[0.167]	[0.145]	[0.183]	[0.208]	[0.344]	[0.235]	[1.190]
Observations	937	937	937	937	937	937	937	937
F first stage		101.8		92.3		25.3		2.9
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6, but weighting border product categories by 2014 expenditures (and weighting observations equally within category).

Table D.10: *Sensitivity of retail import prices to border prices, standard errors clustered by border category*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ border price	0.527**	0.609***	0.472**	0.568**	0.355	0.951*	0.374	1.741
	[0.193]	[0.203]	[0.177]	[0.234]	[0.265]	[0.500]	[0.269]	[1.782]
Observations	937	937	937	937	937	937	937	937
F first stage		35.5		30.1		7.0		1.0
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6, but clustering standard errors by border product category.

Table D.11: *Sensitivity of retail import prices to border prices, Min 8+*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta p^{bor}_{g(i)t}$	0.386***	0.499***	0.357***	0.463**	0.165	0.825**	0.098	1.242
	[0.121]	[0.169]	[0.130]	[0.202]	[0.174]	[0.386]	[0.150]	[1.263]
Observations	843	843	843	843	843	843	843	843
F first stage		64.1		59.5		15.7		1.8
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6, but including only product classes matched to border categories with more than 8 border observations per quarter in 2014.

Table D.12: *Sensitivity of retail import prices to border prices, Min 4+*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta p^{bor}_{g(i)t}$	0.500***	0.511**	0.440***	0.486**	0.363	0.822**	0.399*	2.501
	[0.180]	[0.209]	[0.163]	[0.218]	[0.231]	[0.387]	[0.212]	[2.546]
Observations	995	995	995	995	995	995	995	995
F first stage		87.4		82.4		21.7		0.6
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6, but including only product classes matched to border categories with more than 4 border observations per quarter in 2014.

Table D.13: *Sensitivity of retail import prices to border prices, alternative aggregations of transaction-level prices to price series*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta p^{bor}_{g(i)t}$	0.475***	0.546***	0.482***	0.549***	0.366*	0.900**	0.379	1.645
	[0.162]	[0.180]	[0.167]	[0.208]	[0.212]	[0.353]	[0.245]	[1.074]
Observations	937	937	937	937	937	937	937	937
F first stage		82.5		78.6		22.1		2.5
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6 with an alternative aggregation of retail prices. Here we take the mode (instead of the mean as in the baseline) across households, weeks, and stores in triplet rst and then average P^{ret}_{irst} across regions and retailers in month t to obtain a measure of the retail price of product i in month t, P^{ret}_{it}.

Table D.14: *Sensitivity of retail import prices to border prices, official exchange rate*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta p^{bor}_{g(i)t}$	0.530***	0.586***	0.452***	0.526***	0.365	0.988**	0.382	1.801
	[0.186]	[0.191]	[0.163]	[0.199]	[0.236]	[0.394]	[0.243]	[1.146]
Observations	937	937	937	937	937	937	937	937
F first stage		98.4		94.2		20.1		2.3
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6, but converting EUR-invoiced prices into CHF prices based on the official quarterly EUR/CHF rate rather than using CHF prices provided by the SFSO.

Table D.15: *Sensitivity of retail import prices to border prices, trimming largest price changes*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta p^{bor}_{g(i)t}$	0.472***	0.507***	0.451***	0.479**	0.338	0.923**	0.358	1.499
	[0.147]	[0.165]	[0.146]	[0.196]	[0.223]	[0.362]	[0.232]	[0.984]
Observations	928	928	928	928	928	928	928	928
F first stage		83.3		78.6		22.2		2.5
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 6, but trimming the 1% largest absolute value of retail price changes.

Table D.16: *Sensitivity of retail import prices (EU only) to border prices*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ border price	0.325***	0.375***	0.316***	0.343*	0.231	0.511*	0.340*	0.614
	[0.105]	[0.144]	[0.115]	[0.186]	[0.151]	[0.297]	[0.173]	[0.925]
Observations	794	794	794	794	794	794	794	794
F first stage		80.4		72.6		24.1		2.4
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table reports estimates of β_t from equation (4). The dependent variable is the cumulative change in the retail price of imported goods (EU imports only) relative to 14Q4, $\Delta p_{it}^{ret} = p_{it}^{ret} - p_{i14Q4}^{ret}$. Under OLS, the independent variable is the change in the border price of the corresponding border category over the same time window, $\Delta p_{g(i)t}^{bor}$. Under 2SLS, the border price change is instrumented with EUR invoicing intensity in 2014 of the corresponding border category. Standard errors are clustered at the level of retail product class.

D.4 Regression (5) in subsection 4.3

We consider sensitivity analysis to using different weighting schemes, clustering, trimming, and border category samples.

Table D.17: *Invoicing, import penetration, and retail prices*

	Baseline		Min 8+		Min 4+		All (Min0+)	
	(1) imports	(2) domestic	(3) imports	(4) domestic	(5) imports	(6) domestic	(7) imports	(8) domestic
2015Q1	-0.145***	-0.116**	-0.108***	-0.089**	-0.105*	-0.101**	-0.089*	-0.062
	[0.055]	[0.053]	[0.040]	[0.042]	[0.058]	[0.049]	[0.052]	[0.048]
2015Q2	-0.152**	-0.167**	-0.118**	-0.128**	-0.113*	-0.143**	-0.075	-0.104
	[0.061]	[0.075]	[0.049]	[0.060]	[0.061]	[0.069]	[0.060]	[0.063]
2015Q3	-0.176**	-0.242***	-0.139**	-0.238***	-0.127*	-0.215**	-0.100	-0.145*
	[0.074]	[0.092]	[0.057]	[0.090]	[0.075]	[0.085]	[0.067]	[0.082]
2015Q4	-0.118*	-0.154**	-0.084*	-0.124**	-0.083	-0.130**	-0.046	-0.084
	[0.062]	[0.072]	[0.044]	[0.063]	[0.059]	[0.066]	[0.059]	[0.064]
2016Q1	-0.217**	-0.140*	-0.167***	-0.108	-0.166*	-0.125*	-0.069	-0.068
	[0.087]	[0.084]	[0.047]	[0.069]	[0.086]	[0.075]	[0.105]	[0.073]
2016Q2	-0.179**	-0.243**	-0.138**	-0.223*	-0.121	-0.216**	-0.108	-0.131
	[0.086]	[0.109]	[0.056]	[0.119]	[0.087]	[0.100]	[0.076]	[0.099]
Adjusted R^2	0.40	0.42	0.43	0.43	0.40	0.42	0.39	0.41
Observations	13113	29691	11801	28319	13925	30363	14623	32237
Avg effect 15 Q1-Q3								
$ImpShare$	0.034	0.045*	0.021	0.031*	0.032	0.042	0.027	0.018
	[0.024]	[0.027]	[0.020]	[0.018]	[0.023]	[0.027]	[0.022]	[0.026]
$ImpShare \times EURShare$	-0.158**	-0.175***	-0.122**	-0.152***	-0.115*	-0.153**	-0.088	-0.103*
	[0.062]	[0.067]	[0.047]	[0.053]	[0.064]	[0.062]	[0.059]	[0.060]
Adjusted R^2	0.55	0.49	0.53	0.48	0.54	0.48	0.54	0.48
Observations	3748	8484	3372	8092	3980	8676	4180	9212
Unique products	937	2121	843	2023	995	2169	1045	2303
Retail classes	132	151	119	137	150	171	155	177
Border categories	32	34	29	31	36	38	38	40

Notes: This table reports estimates of β_t from equation (5), for imports (odd-numbered columns) and Swiss-produced goods (even-numbered columns). Standard errors are clustered at the level of retail product class. Columns (1) and (2) include only border categories with 7 or more border observations in 14Q4 (baseline), columns (3) and (4) include only product classes matched to border categories with more than 8 border observations, (5) and (6) include only border categories with more than 4 border observations, and (7) and (8) include all border categories.

Table D.18: *Invoicing, import penetration, and retail prices; alternative weighting and clustering*

	Unweighted		Weight cat BFS		Cluster BFS	
	(1) imports	(2) domestic	(3) imports	(4) domestic	(5) imports	(6) domestic
2015Q1	-0.127***	-0.062*	-0.147***	-0.066*	-0.145**	-0.116**
	[0.045]	[0.036]	[0.049]	[0.036]	[0.055]	[0.053]
2015Q2	-0.123**	-0.092**	-0.160***	-0.080**	-0.152**	-0.167**
	[0.057]	[0.043]	[0.056]	[0.040]	[0.064]	[0.079]
2015Q3	-0.135*	-0.131**	-0.167**	-0.124**	-0.176**	-0.242**
	[0.069]	[0.063]	[0.075]	[0.056]	[0.078]	[0.096]
2015Q4	-0.114*	-0.092*	-0.142**	-0.070	-0.118*	-0.154**
	[0.058]	[0.050]	[0.064]	[0.046]	[0.067]	[0.073]
2016Q1	-0.162**	-0.080	-0.187**	-0.063	-0.217**	-0.140
	[0.075]	[0.060]	[0.086]	[0.058]	[0.089]	[0.089]
2016Q2	-0.171**	-0.154**	-0.200**	-0.131*	-0.179**	-0.243**
	[0.072]	[0.072]	[0.081]	[0.070]	[0.087]	[0.107]
Adjusted R^2	0.41	0.41	0.41	0.42	0.40	0.42
Observations	13113	29691	13113	29691	13113	29691
Avg effect 15 Q1-Q3						
$ImpShare$	0.028	0.009	0.032	0.013	0.034	0.045
	[0.021]	[0.019]	[0.022]	[0.018]	[0.024]	[0.027]
$ImpShare \times EURShare\mathbb{I}t$	-0.128**	-0.095**	-0.158***	-0.090**	-0.158**	-0.175**
	[0.055]	[0.042]	[0.059]	[0.039]	[0.065]	[0.070]
Adjusted R^2	0.51	0.45	0.52	0.45	0.55	0.49
Observations	3748	8484	3748	8484	3748	8484
Unique products	937	2121	937	2121	937	2121
Retail classes	132	151	132	151	132	151
Border categories	32	34	32	34	32	34

Notes: This table repeats columns (1) and (2) of Table D.17, but with different weights and/or using different clustering. Columns (1) and (2) weight all observations equally, (3) and (4) weight by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category), and (5) and (6) cluster by border product categories and weight by 2014 Nielsen expenditures as in the baseline.

Table D.19: *Invoicing, import penetration, and retail prices; trimming largest price changes*

	(1)	(2)
	imports	domestic
2015Q1	-0.132***	-0.092**
	[0.049]	[0.043]
2015Q2	-0.133**	-0.122**
	[0.055]	[0.061]
2015Q3	-0.168**	-0.197**
	[0.071]	[0.081]
2015Q4	-0.110*	-0.125**
	[0.060]	[0.061]
2016Q1	-0.209**	-0.107
	[0.082]	[0.070]
2016Q2	-0.181**	-0.242**
	[0.079]	[0.108]
Adjusted R^2	0.41	0.39
Observations	12996	29439
Avg effect 15 Q1-Q3		
$ImpShare$	0.032	0.033*
	[0.022]	[0.018]
$ImpShare \times EURShare$	-0.147**	-0.138**
	[0.059]	[0.054]
Adjusted R^2	0.52	0.44
Observations	3719	8419
Unique products	935	2114
Retail classes	132	151
Border categories	32	34

Notes: This table repeats columns (1) and (2) of Table D.17, but trimming the 1% largest absolute value of retail price changes.

D.5 Regression (6) in subsection 4.3

We report sensitivity analysis to using our different border category samples and alternative weighting schemes, clustering, and trimming.

Table D.20: *Sensitivity of domestic retail prices to import retail prices, unweighted*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ImpS \times \Delta$ imppr retPC	0.935***	0.695**	0.691***	0.974***	0.768***	1.209***	0.750***	0.980**
	[0.290]	[0.329]	[0.244]	[0.368]	[0.276]	[0.436]	[0.231]	[0.438]
Observations	1972	1972	1972	1972	1972	1972	1972	1972
F first stage		16.2		19.9		21.8		18.0
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 7, but weighting all observations equally.

Table D.21: *Sensitivity of domestic retail prices to import retail prices, border category weights*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ImpS \times \Delta$ imppr retPC	0.994***	0.641**	0.668***	0.732***	0.766***	0.983***	0.629***	0.705**
	[0.278]	[0.293]	[0.220]	[0.259]	[0.246]	[0.326]	[0.226]	[0.343]
Observations	1972	1972	1972	1972	1972	1972	1972	1972
F first stage		24.4		36.9		36.7		18.4
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 7, but weighting by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category).

Table D.22: *Sensitivity of domestic retail prices to import retail prices, cluster border categories*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ImpS \times \Delta$ imppr retPC	1.240***	0.939**	0.937***	1.250***	0.668	1.518***	0.739**	1.119**
	[0.398]	[0.474]	[0.324]	[0.470]	[0.457]	[0.540]	[0.344]	[0.461]
Observations	1972	1972	1972	1972	1972	1972	1972	1972
F first stage		22.0		31.2		30.5		19.1
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 7, but standard errors are clustered by border product categories.

Table D.23: *Sensitivity of domestic retail prices to import retail prices, Min 8+*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ImpShare_{g(i)} \times \Delta p^{retimp}_{g(i)t}$	0.982**	0.870*	0.699***	1.177**	0.366	1.480***	0.543	1.054*
	[0.422]	[0.514]	[0.255]	[0.525]	[0.430]	[0.569]	[0.328]	[0.543]
Observations	1883	1883	1883	1883	1883	1883	1883	1883
F first stage		22.7		39.4		36.5		26.6
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 7, but including only product classes matched to border categories with more than 8 border observations.

Table D.24: *Sensitivity of domestic retail prices to import retail prices, Min 4+*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ImpShare_{g(i)} \times \Delta p^{retimp}_{g(i)t}$	1.194***	1.087*	0.943***	1.380**	0.681	1.772***	0.765**	1.148**
	[0.356]	[0.605]	[0.302]	[0.563]	[0.421]	[0.656]	[0.327]	[0.562]
Observations	2013	2013	2013	2013	2013	2013	2013	2013
F first stage		5.4		12.8		10.8		13.2
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 7, but including only product classes matched to border categories with more than 4 border observations.

Table D.25: *Sensitivity of domestic retail prices to import retail prices, trimming largest price changes*

	1Q		2Q		3Q		4Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ImpShare_{g(i)} \times \Delta p^{retimp}_{g(i)t}$	1.028***	0.761	0.757***	1.103**	0.359	1.269**	0.595**	1.007*
	[0.277]	[0.489]	[0.241]	[0.537]	[0.379]	[0.561]	[0.288]	[0.546]
Observations	1956	1956	1955	1955	1952	1952	1952	1952
F first stage		23.3		37.4		35.3		24.8
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table 7, but trimming the 1% largest absolute value of domestic retail price changes.

D.6 Simple model of pricing complementarities

Here we consider a simple flexible price model with variable markups, following Gopinath et al. (2010) and Burstein and Gopinath (2014), to motivate the reduced-form regression (6).

Consider product i in product category g. Suppose that the log price change Δp_{ig} can be expressed, up to a first-order approximation, as

$$\Delta p_{ig} = \frac{1}{1+\Gamma_{ig}} \Delta c_{ig} + \frac{\Gamma_{ig}}{1+\Gamma_{ig}} \Delta p_g, \tag{A3}$$

where Δc_{ig} denotes the log change in marginal cost, Γ_{ig} denotes the markup elasticity, and Δp_g denotes the log change in the aggregate price index in product category g, which we assume is given by $\Delta p_g = \sum_i S_{ig} \Delta p_{ig}$ where S_{ig} denotes expenditure share of product i in g.

We now assume that all domestic firms in g have a common markup elasticity Γ_g^{dom}.[A4] Aggregating equation (A3) across all domestic products, the expenditure-weighted average of domestic prices in g, denoted by Δp_g^{dom}, is

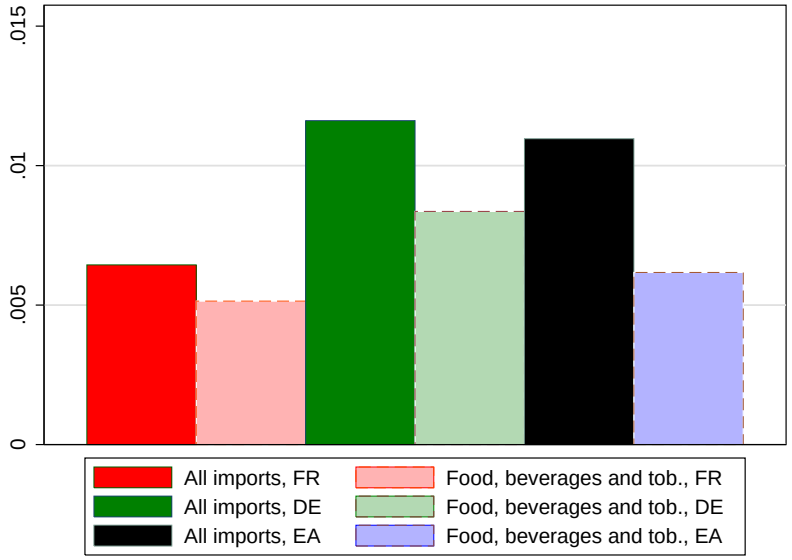
$$\Delta p_g^{dom} = \frac{1}{1 + ImpShare_g \times \Gamma_g^{dom}} \Delta c_g^{dom} + \frac{ImpShare_g \times \Gamma_g^{dom}}{1 + ImpShare_g \times \Gamma_g^{dom}} \Delta p_g^{imp}. \tag{A4}$$

Here, Δc_g^{dom} denotes the expenditure-weighted average of domestic marginal cost changes in g, Δp_g^{imp} denotes the expenditure-weighted average of import price changes in g, and $ImpShare_g$ denotes the expenditure share on imported products in g.

While in equation (A4) and regression equation (6) the term in the right-hand-side multiplying the change in import retail prices, Δp_g^{imp}, is increasing in $ImpShare_g$, these two specifications are different so the estimated coefficients cannot be directly interpreted in terms of model structural parameters. Moreover, since changes in domestic marginal costs Δc_g^{dom} are unobservable to us, the error term in equation (6) could be correlated with Δp_g^{imp} if changes in import prices are correlated with changes in domestic costs. This motivates the use of an instrument discussed in the main text.

[A4] Due to its partial coverage of consumer expenditures, our homescan data is not well-suited to estimate the dependance of Γ_{ig}^{dom} on product characteristics such as market share, as in Amiti et al. (2019).

Figure D.5: *Swiss value added share in imports from France, Germany, and the euro area*



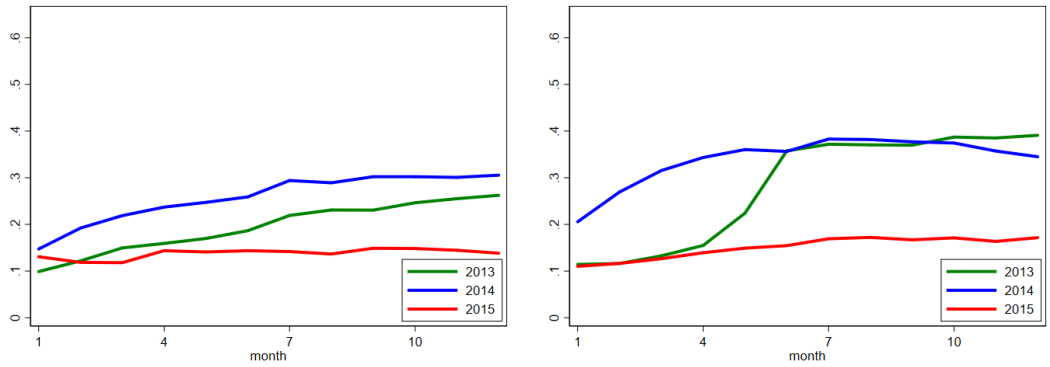
Notes: This figure displays the 2011 fraction of value added originating from Switzerland for French (red), German (green), or Euro area (blue) exports to Switzerland. This statistic is shown for either total exports (dark color bars, solid outline) or the food, beverage, and tobacco sector only (light color bars, dashed outline). For example, the number 0.006 in the left-most bar means that for every 100 CHF worth of French exports to Switzerland, 0.6 CHF worth of Swiss labor and other Swiss factors of production were ultimately used. Data is from the OECD's Trade in Value Added (TiVA) statistic, which only covers data until 2011 (origin of value added in gross imports; https://stats.oecd.org, accessed on 23.08.2018).

E Retail price stickiness: additional results

E.1 Aggregate statistics in subsection 4.4

We report additional results for subsection 4.4. We show the cumulative fraction of price increases, average frequency of monthly price changes (not cumulative as in the main text), and the average size of monthly price changes using different weighting schemes. We also compare the size of price changes in our data with other studies in the literature, and discuss additional robustness checks.

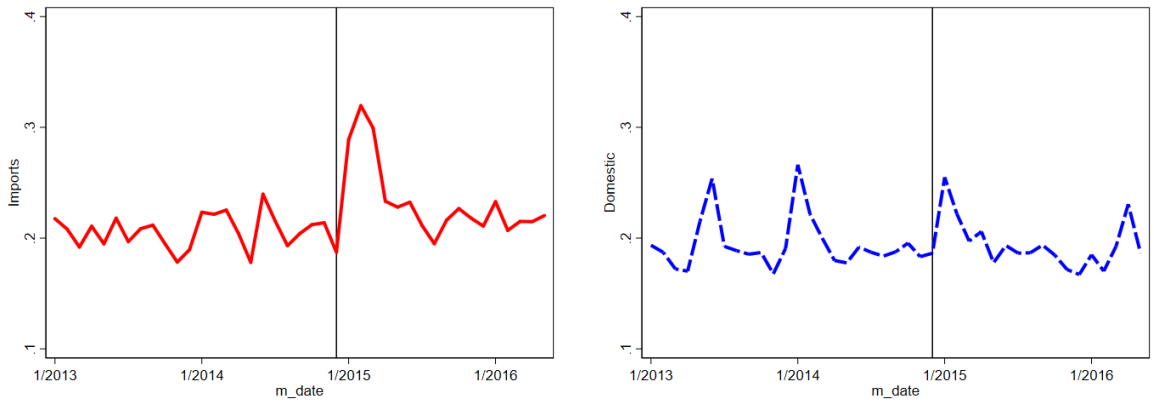
Figure E.1: *Fraction of price increases compared with December of previous year.*



(a) Increases imports (b) Increases domestic

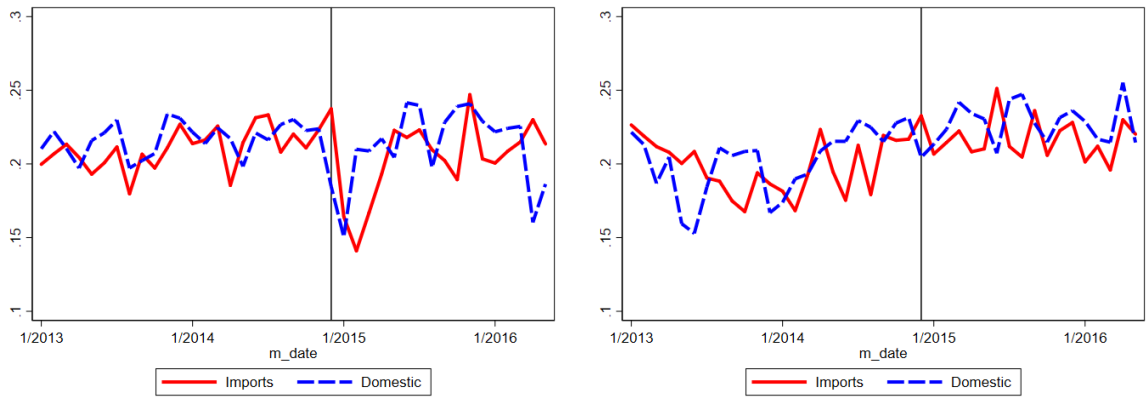
Notes: This figure presents a version of Figure 7 for price increases only. Panels (a) and (b) display the weighted average fraction of increases in modal prices relative to December of the previous year, f^{+}_{iyh}, for 1-12 month horizons of imported and Swiss-produced goods, respectively.

Figure E.2: *Average frequency of monthly price changes*



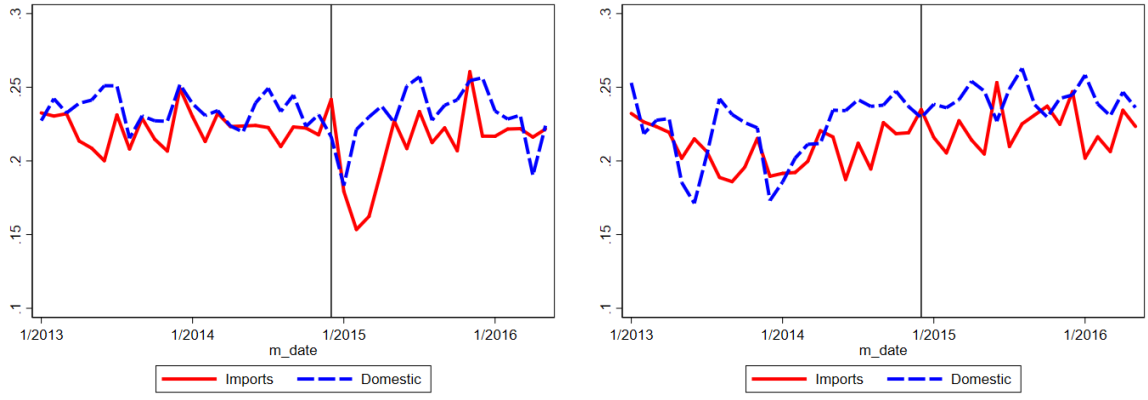
Notes: This figure displays the fraction of changes in the modal price from one month to the other between Jan 2013 and May 2016. Panel (a) considers imported goods and panel (b) considers Swiss-produced goods. Products are weighted by their 2014 expenditure share (as in the baseline retail regressions).

Figure E.3: *Average size of monthly price changes, weighted by expenditures per product*



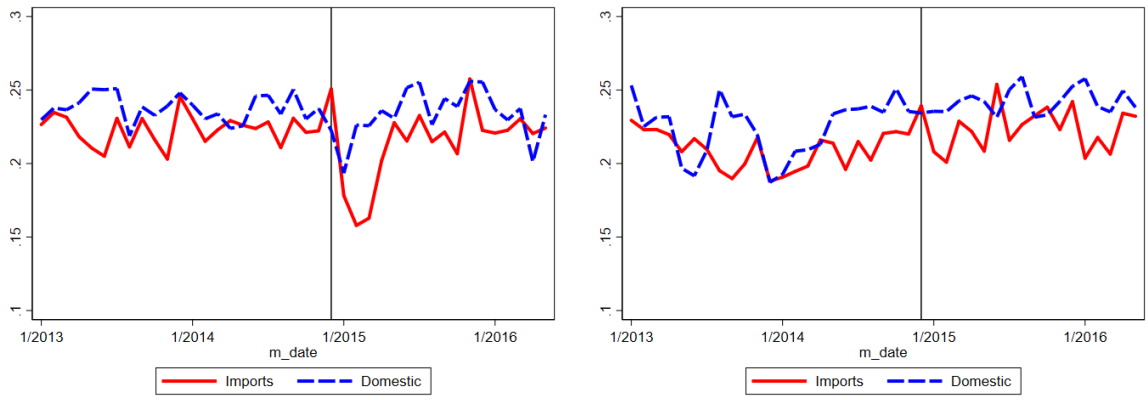
Notes: This figure displays the sizes of price changes in the modal price from one month to the other between Jan 2013 and May 2016. Panel (a) considers the size of price decreases and panel (b) considers the size of price increases. Weights are by individual product based on 2014 Nielsen expenditures.

Figure E.4: *Average size of monthly price changes, weighted by border category expenditures*



Notes: This figure repeats Figure E.3, but weighting by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category).

Figure E.5: *Average size of monthly price changes, unweighted*



Notes: This figure repeats Figure E.3, but weighting all observations equally.

Note to figure E.3-E.5 The average absolute size of price changes is larger than the average size of price changes for unprocessed food (around 15%) and processed food (around 8%) reported for Europe in Dhyne et al. (2006) or for the US in Nakamura and Steinsson (2008). However, the reported average size of price changes is in line with price-setting statistics in European homescan data reported in Beck and Lein (2019), who argue that using modal prices per product (as in Eichenbaum et al. (2014)) results in a higher size of price changes because many small price changes are erratic and the modal price is more robust to measurement error. Eichenbaum et al. (2014) show in their scanner level data that the median size of price adjustments increases from 10% to 30% after taking measurement error into consideration.

In an earlier draft, we reported that the central facts on the evolution of the fraction and size of retail price changes of imported goods are largely robust to a number of changes relative to our baseline procedure. First, we exclude temporary price changes due to temporary price reductions based on a simple v-shaped sales filter (i.e. price changes in month t that are exactly offset in month $t+1$).[A5] Second, we standardize price changes at the region and product-level to reduce the role of underlying heterogeneity across goods, as discussed in Alvarez et al. (2016). Third, we split goods into those with sticky prices prior to 2015 and those that changed prices frequently prior to 2015. Fourth, we separate firms with one or two goods from firms with more than two goods. Fifth, we split goods into those with high or low market share prior to 2015 within their respective product category. Finally, we include only the two largest retailers (Coop and Migros).

[A5]The frequency of temporary price reductions dropped slightly after January 2015 while the frequency of regular price reductions rose.

E.2 Regression (7) in subsection 4.4

We report additional results for the regressions in subsection 4.4. In particular, we consider additional estimation horizons, all price changes instead of only decreases, different weighting schemes, clustering, and border category samples.

Table E.1: *Invoicing currency and the extensive margin of retail price changes, horizons 4-6 months*

	(1) 4m-	(2) 5m-	(3) 6m-	(4) 4m+	(5) 5m+	(6) 6m+
Panel (a). Imports						
$EURShare \times \mathbb{I}13$	-0.297***	-0.116	-0.075	-0.275*	-0.165	-0.152
	[0.101]	[0.114]	[0.139]	[0.140]	[0.132]	[0.179]
$EURShare \times \mathbb{I}15$	0.386**	0.378**	0.571***	-0.380***	-0.340***	-0.474***
	[0.157]	[0.149]	[0.140]	[0.139]	[0.127]	[0.129]
Observations	2499	2497	2441	2499	2497	2441
Unique products	886	873	869	886	873	869
Adjusted R^2	0.26	0.28	0.27	0.22	0.17	0.16
Panel (b). Domestic						
$EURShare \times \mathbb{I}13$	-0.028	-0.052	-0.072	-0.193	-0.064	0.219
	[0.041]	[0.051]	[0.049]	[0.222]	[0.174]	[0.139]
$EURShare \times \mathbb{I}15$	0.247	0.319	0.197	-0.419	-0.449	-0.320
	[0.267]	[0.281]	[0.276]	[0.273]	[0.292]	[0.286]
Observations	6088	6126	5983	6088	6126	5983
Unique products	2104	2110	2083	2104	2110	2083
Adjusted R^2	0.15	0.16	0.15	0.19	0.21	0.25

Notes: This table repeats Table 8 for 4, 5 and 6 month horizons.

Table E.2: *Invoicing currency and the extensive margin of retail price changes, all changes*

	Imports			Domestic		
	(1)	(2)	(3)	(4)	(5)	(6)
	1m	2m	3m	1m	2m	3m
$EURShare \times \mathbb{I}13$	-0.136	-0.071	-0.294*	0.033	-0.177	-0.293
	[0.118]	[0.122]	[0.156]	[0.191]	[0.194]	[0.236]
$EURShare \times \mathbb{I}15$	0.018	0.372**	0.211	0.100	-0.024	-0.154
	[0.134]	[0.173]	[0.141]	[0.095]	[0.097]	[0.112]
Observations	2537	2508	2506	6223	6145	6121
Unique products	884	881	877	2138	2125	2113
Adjusted R^2	0.17	0.22	0.23	0.32	0.28	0.29

Notes: This table repeats Table 8, but for all price changes (that is, without separating price increases and decreases here).

Table E.3: *Invoicing currency and the extensive margin of retail price changes, unweighted*

Imported goods	(1)	(2)	(3)	(4)	(5)	(6)
	1m-	2m-	3m-	1m+	2m+	3m+
$EURShare \times \mathbb{I}13$	-0.089	0.033	-0.042	-0.083	-0.044	-0.182*
	[0.082]	[0.055]	[0.079]	[0.059]	[0.095]	[0.107]
$EURShare \times \mathbb{I}15$	0.281***	0.515***	0.394**	-0.263**	-0.233**	-0.257***
	[0.084]	[0.117]	[0.158]	[0.102]	[0.092]	[0.084]
Observations	2537	2508	2506	2537	2508	2506
Unique products	884	881	877	884	881	877
Adjusted R^2	0.10	0.18	0.22	0.14	0.15	0.17
Swiss-produced goods	(1)	(2)	(3)	(4)	(5)	(6)
	1m-	2m-	3m-	1m+	2m+	3m+
$EURShare \times \mathbb{I}13$	0.039	-0.005	-0.017	-0.176*	-0.222*	-0.307**
	[0.048]	[0.033]	[0.034]	[0.097]	[0.122]	[0.129]
$EURShare \times \mathbb{I}15$	0.184	0.128	0.158	-0.212*	-0.262*	-0.376**
	[0.121]	[0.116]	[0.142]	[0.114]	[0.140]	[0.153]
Observations	6223	6145	6121	6223	6145	6121
Unique products	2138	2125	2113	2138	2125	2113
Adjusted R^2	0.15	0.08	0.12	0.19	0.15	0.17

Notes: This table repeats Table 8, but weighting all observations equally.

Table E.4: *Invoicing currency and the extensive margin of retail price changes, border category weights*

Imported goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	-0.031	0.019	-0.031	-0.095	-0.086	-0.255**
	[0.069]	[0.058]	[0.074]	[0.064]	[0.093]	[0.098]
$EURShare \times \mathbb{I}15$	0.349***	0.596***	0.504***	-0.251***	-0.247***	-0.291***
	[0.087]	[0.122]	[0.157]	[0.088]	[0.093]	[0.084]
Observations	2537	2508	2506	2537	2508	2506
Unique products	884	881	877	884	881	877
Adjusted R^2	0.11	0.19	0.24	0.16	0.17	0.19
Swiss-produced goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	0.038	0.003	0.019	-0.172	-0.229	-0.326*
	[0.042]	[0.030]	[0.035]	[0.141]	[0.151]	[0.165]
$EURShare \times \mathbb{I}15$	0.160	0.094	0.119	-0.171	-0.232	-0.318*
	[0.148]	[0.145]	[0.166]	[0.147]	[0.170]	[0.186]
Observations	6223	6145	6121	6223	6145	6121
Unique products	2138	2125	2113	2138	2125	2113
Adjusted R^2	0.12	0.08	0.10	0.18	0.15	0.17

Notes: This table repeats Table 8, but weighting by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category).

Table E.5: *Invoicing currency and the extensive margin of retail price changes, cluster by border category*

Imported goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	-0.031	0.048	-0.004	-0.105	-0.119	-0.291
	[0.072]	[0.059]	[0.094]	[0.083]	[0.153]	[0.172]
$EURShare \times \mathbb{I}15$	0.284***	0.651***	0.574**	-0.267***	-0.279*	-0.363**
	[0.099]	[0.204]	[0.262]	[0.092]	[0.142]	[0.137]
Observations	2537	2508	2506	2537	2508	2506
Unique products	884	881	877	884	881	877
Adjusted R^2	0.11	0.19	0.24	0.19	0.18	0.21
Swiss-produced goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	0.063	-0.065**	-0.021	-0.031	-0.112	-0.272
	[0.060]	[0.029]	[0.035]	[0.190]	[0.194]	[0.206]
$EURShare \times \mathbb{I}15$	0.356	0.284	0.318	-0.255	-0.308	-0.472*
	[0.268]	[0.292]	[0.268]	[0.208]	[0.249]	[0.247]
Observations	6223	6145	6121	6223	6145	6121
Unique products	2138	2125	2113	2138	2125	2113
Adjusted R^2	0.12	0.12	0.14	0.17	0.15	0.20

Notes: This table repeats Table 8, but clustering standard errors by border product category.

Table E.6: *Invoicing currency and the extensive margin of retail price changes, Min 8+*

Imported goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	0.008	0.007	0.040	-0.105	-0.097	-0.230*
	[0.074]	[0.072]	[0.128]	[0.097]	[0.129]	[0.138]
$EURShare \times \mathbb{I}15$	0.294***	0.680***	0.631***	-0.179*	-0.165	-0.259**
	[0.110]	[0.201]	[0.186]	[0.103]	[0.144]	[0.111]
Observations	2095	2073	2085	2095	2073	2085
Unique products	726	724	726	726	724	726
Adjusted R^2	0.12	0.20	0.27	0.18	0.15	0.18
Swiss-produced goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	0.021	-0.085**	-0.015	0.005	-0.041	-0.209
	[0.044]	[0.033]	[0.041]	[0.219]	[0.257]	[0.285]
$EURShare \times \mathbb{I}15$	0.342	0.256	0.376	-0.235	-0.249	-0.439
	[0.324]	[0.342]	[0.348]	[0.255]	[0.321]	[0.356]
Observations	5312	5254	5238	5312	5254	5238
Unique products	1826	1816	1807	1826	1816	1807
Adjusted R^2	0.14	0.12	0.12	0.15	0.14	0.18

Notes: This table repeats Table 8, but including only product classes matched to border categories with more than 8 border observations.

Table E.7: *Invoicing currency and the extensive margin of retail price changes, Min 4+*

Imported goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	-0.040	0.030	0.006	-0.083	-0.092	-0.211*
	[0.063]	[0.055]	[0.092]	[0.071]	[0.101]	[0.120]
$EURShare \times \mathbb{I}15$	0.235**	0.554***	0.509***	-0.187*	-0.190	-0.289***
	[0.092]	[0.162]	[0.171]	[0.108]	[0.129]	[0.110]
Observations	2698	2658	2657	2698	2658	2657
Unique products	941	935	930	941	935	930
Adjusted R^2	0.13	0.17	0.23	0.18	0.18	0.22
Swiss-produced goods	(1) 1m-	(2) 2m-	(3) 3m-	(4) 1m+	(5) 2m+	(6) 3m+
$EURShare \times \mathbb{I}13$	0.064	-0.063**	-0.018	-0.026	-0.106	-0.263
	[0.056]	[0.029]	[0.035]	[0.177]	[0.200]	[0.225]
$EURShare \times \mathbb{I}15$	0.346	0.283	0.319	-0.239	-0.292	-0.455
	[0.274]	[0.287]	[0.292]	[0.216]	[0.257]	[0.286]
Observations	6366	6283	6263	6366	6283	6263
Unique products	2187	2173	2162	2187	2173	2162
Adjusted R^2	0.12	0.11	0.13	0.16	0.15	0.20

Notes: This table repeats Table 8, but including only product classes matched to border categories with more than 4 border observations.

E.3 Regression retail frequency on border prices in subsection 4.4

The extensive margin of price adjustment responds significantly to changes in border prices in the corresponding product category. To show this, we consider regressions relating changes between 2014 and 2015 in the fraction of price changes (either increases or decreases) across individual goods to changes in border prices at the category level. We estimate

$$\left(f^{+}_{i15h} - f^{+}_{i14h}\right) \text{ or } \left(f^{-}_{i15h} - f^{-}_{i14h}\right) = \alpha_h + \beta_h \times \left(p^{bor}_{g(i)15Q1} - p^{bor}_{g(i)14Q4}\right) + \varepsilon_{it}, \tag{A5}$$

over imported goods i for monthly horizons $h = 1, 2, 3$. We consider OLS estimates as well as 2SLS estimates in which we instrument average changes in border prices, $\left(p^{bor}_{g(i)15Q1} - p^{bor}_{g(i)14Q4}\right)$, by the fraction of EUR-invoiced products in border category $g(i)$ in 2014. This instrumentation addresses endogeneity concerns and is subject to similar exclusion restrictions as those discussed in the context of regression (4).

Table E.8: *Border prices and the extensive margin of retail price changes*

	1m		2m		3m	
Decreases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	-1.049*	-2.260***	-4.341***	-5.317***	-4.493***	-4.688***
	[0.607]	[0.782]	[1.001]	[1.335]	[1.166]	[1.210]
Observations	807	807	799	799	799	799
F first stage		87.6		85.3		84.1
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS
	1m		2m		3m	
Increases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	1.525***	2.163***	2.120***	2.213**	2.456***	3.022***
	[0.552]	[0.840]	[0.612]	[0.943]	[0.631]	[0.735]
Observations	807	807	799	799	799	799
F first stage		87.6		85.3		84.1
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table displays coefficient estimates of β_h in Equation A5. Panel (a) reports estimates for the fraction of price decreases, and panel (b) for the fraction of price increases.

Table E.8 displays estimates of β_t for price decreases (upper panel) and price increases (lower panel). The increase in the fraction of price reductions is more pronounced for imported goods with larger border price reductions. According to our 2SLS estimates, the increase in the fraction of retail price reductions in the first quarter of 2015 (relative to that fraction of price reductions in the first quarter of 2014) is 0.47 larger for goods in product categories with a 10 percentage point larger decline in border prices. Similarly, the decline in the fraction

of price increases is more pronounced for goods with larger border price reductions. The reduction in the fraction of retail price increases in the first quarter of 2015 (relative to the fraction of price increases in the first quarter of 2014) is roughly 0.3 larger for imported goods in product categories with a 10 percentage point larger decline in border prices. Almost all 2SLS estimates (as well as OLS estimates at 2- and 3-month horizons) are significant at the 1% level.

Table E.9: *Border prices and the extensive margin of retail price changes, unweighted*

	1m		2m		3m	
Decreases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	-1.222***	-2.321***	-3.315***	-4.448***	-3.640***	-3.512***
	[0.445]	[0.711]	[0.724]	[0.974]	[0.924]	[1.173]
Observations	807	807	799	799	799	799
F first stage		98.9		91.2		93.3
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS
	1m		2m		3m	
Increases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$order price	1.213***	2.209**	1.462***	1.868**	2.026***	2.338***
	[0.427]	[0.916]	[0.438]	[0.785]	[0.457]	[0.647]
Observations	807	807	799	799	799	799
F first stage		98.9		91.2		93.3
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table E.8, but weighting all observations equally.

Table E.10: *Border prices and the extensive margin of retail price changes, border category weights*

	1m		2m		3m	
Decreases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	-1.242**	-2.770***	-3.885***	-4.840***	-3.799***	-4.177***
	[0.492]	[0.747]	[0.708]	[0.954]	[0.964]	[1.078]
Observations	807	807	799	799	799	799
F first stage		105.9		99.6		101.5
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS
	1m		2m		3m	
Increases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	1.375***	2.032***	1.628***	1.860**	2.163***	2.486***
	[0.414]	[0.716]	[0.457]	[0.731]	[0.496]	[0.560]
Observations	807	807	799	799	799	799
F first stage		105.9		99.6		101.5
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table E.8, but weighting by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category).

Table E.11: *Border prices and the extensive margin of retail price changes, cluster by border category*

	1m		2m		3m	
Decreases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	-1.049	-2.260***	-4.341***	-5.317***	-4.493***	-4.688***
	[0.707]	[0.775]	[1.139]	[1.401]	[1.506]	[1.697]
Observations	807	807	799	799	799	799
F first stage		38.8		37.9		38.3
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS
	1m		2m		3m	
Increases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	1.525***	2.163***	2.120***	2.213**	2.456***	3.022***
	[0.490]	[0.734]	[0.607]	[1.010]	[0.769]	[0.852]
Observations	807	807	799	799	799	799
F first stage		38.8		37.9		38.3
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table E.8, but clustering standard errors by border product category.

Table E.12: *Border prices and the extensive margin of retail price changes, Min 8+*

	1m		2m		3m	
Decreases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	-0.927	-2.592**	-4.881***	-6.031***	-4.963***	-5.575***
	[0.739]	[1.058]	[1.219]	[1.784]	[1.405]	[1.385]
Observations	669	669	660	660	666	666
F first stage		53.9		53.5		52.2
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS
	1m		2m		3m	
Increases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	1.131*	1.624*	1.663**	1.395	1.871***	2.340***
	[0.574]	[0.931]	[0.696]	[1.227]	[0.667]	[0.855]
Observations	669	669	660	660	666	666
F first stage		53.9		53.5		52.2
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table E.8, but including only product classes matched to border categories with more than 8 border observations.

Table E.13: *Border prices and the extensive margin of retail price changes, Min 4+*

	1m		2m		3m	
Decreases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	-1.012*	-1.932**	-3.937***	-4.659***	-4.291***	-4.332***
	[0.591]	[0.763]	[0.998]	[1.310]	[1.150]	[1.187]
Observations	858	858	845	845	846	846
F first stage		91.4		88.3		86.9
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS
	1m		2m		3m	
Increases	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta p^{bor}_{g(i)t}$	1.318**	1.560*	1.753***	1.508	2.241***	2.473***
	[0.556]	[0.869]	[0.648]	[1.035]	[0.639]	[0.796]
Observations	858	858	845	845	846	846
F first stage		91.4		88.3		86.9
Estimation	OLS	2SLS	OLS	2SLS	OLS	2SLS

Notes: This table repeats Table E.8, but including only product classes matched to border categories with more than 4 border observations.

E.4 Explaining the decline in the size of price reductions

In subsection E.1 we showed that in early 2015, accompanying the increase in the fraction of price reductions of imported goods there was a significant decline in the absolute size of retail price reductions for imported goods. We now show that a simple Ss pricing can generate this seemingly puzzling negative co-movement between the change in the frequency of price adjustment and the change in the absolute size of price changes of imported goods. Specifically, in response to a decline in the CHF-denominated cost of imported goods, the absolute size of price reductions falls if new price changes (i.e. those that would not have occurred in the absence of the shock) are sufficiently small relative to the size of typical price reductions. This is the case under the form of selection in Ss pricing models with idiosyncratic shocks that give rise to a fat-tailed distribution of price changes, as in Gertler and Leahy (2008) and Midrigan (2011).

Consider the following pricing rule for goods produced abroad and imported into Switzerland. Firm i's desired or reset price denominated in CHF is denoted (in logs) by p_{it}^*. We assume that $p_{it}^* = c + w_t + z_{it}$, where c is a constant, w_t is the aggregate component of marginal costs (production and local costs) measured in CHF, and z_{it} is the idiosyncratic component of marginal costs. An appreciation of the CHF reduces w_t for imported goods.

Following Gertler and Leahy (2008) and Midrigan (2011), we allow for the possibility that changes in the idiosyncratic component of marginal costs arrive infrequently according to a Poisson process. Specifically, $z_{it} - z_{it-1} = \varepsilon_{it}$ where

$$\varepsilon_{it} = \begin{cases} 0 & \text{with prob } 1-\lambda \\ N(0,\sigma) & \text{with prob } \lambda. \end{cases}$$

We assume that single-product firms change their price to p_{it}^* if the price gap (i.e. the difference between the actual log price, p_{it}, and the desired log price, p_{it}^*) exceeds y.[A6] This implies that the actual log price evolves according to

$$p_{it} = \begin{cases} p_{it-1} & \text{if } |p_{it-1} - p_{it}^*| < y \\ p_{it}^* & \text{if } |p_{it-1} - p_{it}^*| \geq y. \end{cases}$$

This policy function allows us to provide a simple characterization of how the average absolute size of price changes responds to an aggregate cost shock. Consider first the pre-shock steady-state, in which the aggregate component of costs w_t is constant over time. Every period a fraction f of firms reduce their price by an average size of $s \geq y$, a fraction f raise

[A6] Alvarez and Lippi (2014) derive this Ss pricing rule in a menu cost model under the assumption that marginal cost shocks follow a random walk process and desired markups are constant.

their price by the same average size s, while the remaining fraction of firms $1-2f$ leave their price unchanged. Consider now the response of prices after a one-time permanent decline in w_t of size $\Delta > 0$. The fraction of firms reducing their prices increases from f to f'. Of these f' firms reducing their price after the shock, f would have reduced their price even if $\Delta = 0$ and they will do so by an average size equal to $s + \Delta$. Hence, for this subset of firms, the average price reduction grows by Δ relative to the pre-shock equilibrium.[A7] A fraction $f' - f$ of firms, which would have either increased or left their price unchanged if $\Delta = 0$, now reduce their price by $\tilde{s}$. Putting these two pieces together, the change in the average size of price reductions is

$$s' - s = \frac{f}{f'}\Delta + \frac{f' - f}{f'}(\tilde{s} - s). \tag{A6}$$

The first term in equation (A6) contributes to increasing the average size of price reductions. The second term in equation (A6) contributes to decreasing the average size of price reductions if new price changes are on average small relative to pre-shock price changes ($\tilde{s} < s$). The average size of price reductions falls if the second term in equation (A6) is large and negative because there is a large increase in the fraction of price reductions and these new price reductions are small compared with pre-shock price reductions.[A8] We next illustrate in a calibrated version of this simple pricing model that if shocks arrive frequently ($\lambda = 1$), the first term in the right-hand side of equation (A6) dominates, and the average size of prices reductions rises. We then show that this result can be overturned if λ is sufficiently small, in which case $\tilde{s}$ is low relative to s and the second term in the right-hand side of equation (A6) dominates.

To calibrate the model, we set the time period to a month. For any given value of λ, we choose σ and y to target the following pre-shock equilibrium moments: (i) fraction of prices changing (increasing or decreasing) every month = 0.21, and (ii) average absolute size of price changes = 0.22. We consider two alternative values for the shock arrival probability λ: 1 (which we refer to as Gaussian) and 0.3 (which we refer to as Poisson). In order to match our two calibration targets, the Poisson specification requires thinner Ss bands y and more volatile cost shocks σ.[A9] As discussed in Midrigan (2011), the Poisson specification gives rise

[A7] In the presence of expected CHF overshooting (as observed in Figure 1) or strategic complementarities, the desired price may fall by less than Δ. Our qualitative results below are unchanged when we consider a smaller decline in desired prices, parameterized as a smaller value of Δ.

[A8] If we make the length of the time interval sufficiently short (reducing σ correspondingly) then price reductions before the shock are of size y (so that $s = y$) and new price changes after the shock are no smaller than y (so that $\tilde{s} \geq s$), implying $s' > s$. Therefore, a necessary condition for $s' < s$ is that the time interval is sufficiently long such that there is a non-degenerate distribution of price changes greater than y.

[A9] With $\lambda = 1$, we set $\sigma = 0.105$ and $y = 0.16$. With $\lambda = 0.3$, we set $\sigma = 0.21$ and $y = 0.08$. To assess the role of λ, we considered two alternative parameterizations. First, if we fix y and σ at their Gaussian-calibration levels and set $\lambda = 0.3$, the average size of price reductions falls after the CHF appreciation. Second, if we fix y and σ at their Poisson-calibration levels and set $\lambda = 1$, then the average size of price reductions rises after the CHF appreciation.

to a more Leptokurtic distribution of cost changes (the kurtosis of price changes is 2.2 with $\lambda = 0.3$ and 1.3 with $\lambda = 1$).

Starting in the pre-shock steady state distribution of price gaps in which $w_t = 0$, we consider a one-time 3.2% permanent reduction in the aggregate component of marginal cost for imported goods at the retail level, that is, $w_t = \Delta = -0.032$ for $t \geq 0$. This choice of Δ corresponds to the average decline of border prices three months after the CHF appreciation (6.4% averaging CHF and EUR-invoiced border price changes in Table 3) times 0.5 (which assumes a distribution share of 50%).

Both model specifications imply a reduction in the fraction of price increases, a rise in the fraction of prices decreases, and a small reduction in the size of price increases, as observed in the data on retail prices of imported goods reviewed above. However, while the model with Gaussian shocks implies an increase in the size of price reductions (from 0.22 to 0.23), the model with Poisson shocks implies a drop in the size of price reductions (from 0.22 to 0.20).

We can understand these results using equation (A6). Both specifications of the model are calibrated to the same pre-shock frequency and absolute size of price adjustment, f and s. Both specifications produce roughly the same increase in the frequency of price reductions, f'. The key difference between the two specifications is in terms of the absolute size of new price reductions: $\tilde{s} = 0.17$ with Gaussian shocks and $\tilde{s} = 0.09$ with Poisson shocks. With Poisson shocks, more firms are subject to small cost shocks, which only reduce their price in response to the aggregate cost reduction. This shift in the composition of price changes toward small values reduces the average size of price reductions. With Poisson shocks, the average size of large price reductions (those larger than 15%) increases after the shock, as well as the fraction of firms with small price reductions (those smaller than 15%).

If we consider a larger reduction in border prices (i.e. a larger value of Δ), the increase in the frequency of price reductions and the reduction in the average size of price reductions are both larger. This is consistent with the empirical results reported in subsection 4.4: larger reductions in border prices (or foreign-currency invoiced border prices) lead to more frequent but smaller price reductions.[A10]

Finally, we discuss the implications of the model for average (zero and non-zero) price changes. Denoting the average price change after k months by p_k, $p_1 = -0.022$, $p_3 = -0.031$, and $p_6 = -0.032$ with Gaussian shocks ($\lambda = 1$), and $p_1 = -0.013$, $p_3 = -0.023$, and $p_6 = -0.029$ with Poisson shocks ($\lambda = 0.3$). As discussed in detail in Midrigan (2011), the model with

[A10] We considered two alternative model specifications which can produce a more Leptokurtic distribution of price changes: one with multi-product firms, as in Midrigan (2011), and one in which every period the Ss band y is zero (i.e. zero menu costs) with a certain probability, as in the Calvoplus model of Nakamura and Steinsson (2010). When parameterized with Gaussian shocks ($\lambda = 1$), the average size of price reductions implied by these alternative model specifications increases in response to a decline in aggregate costs, as in the single-product model with Gaussian shocks.

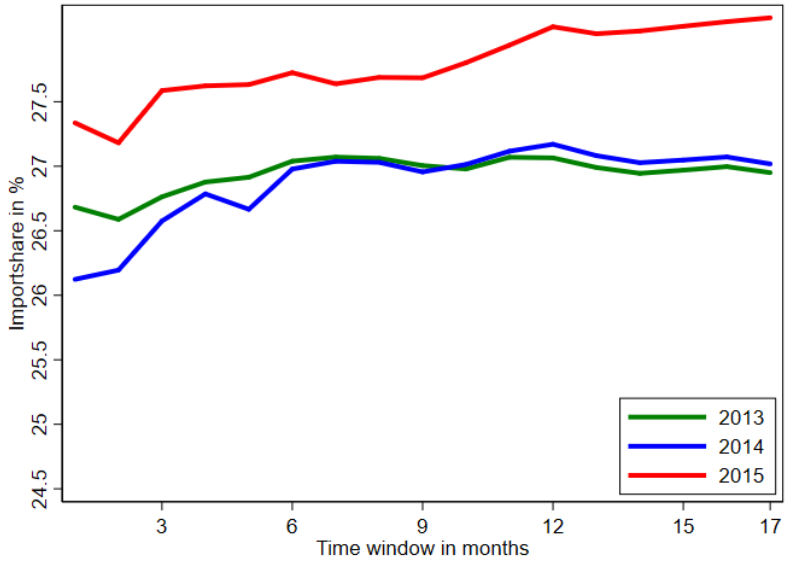
Poisson shocks implies a smaller reduction in prices, on average, because of a weaker "selection effect" in the set of firms changing price. What we showed is that this selection effect also has very different implications for the direction of the intensive margin of price changes in response to an aggregate cost shock.

F Expenditure switching: additional results

F.1 Aggregate import shares in subsection 5.1

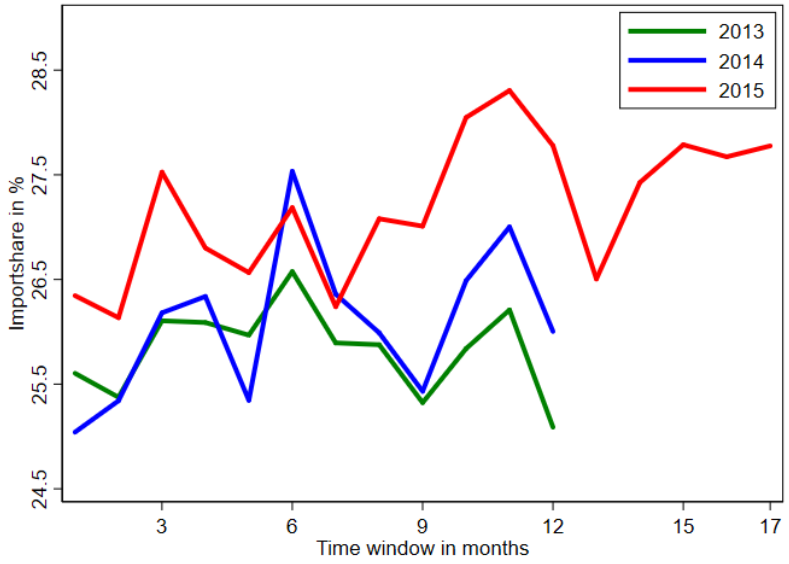
We provide additional graphs for aggregate import shares. We consider the full set of product classes (sample Min0+) rather than dropping product categories with 7 or less border prices per quarter in 2014), monthly shares (not cumulative by horizon), and using only EU imports.

Figure F.1: *Aggregate import share in total expenditures*



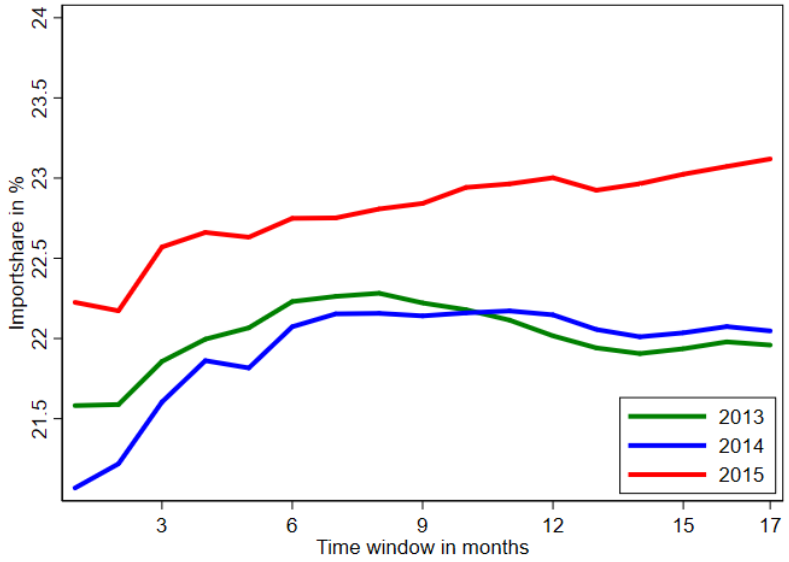
Notes: This figure repeats Figure 8, but in the sample Min0+ that includes all product categories (rather than dropping product categories with 7 or less border prices per quarter in 2014).

Figure F.2: *Aggregate import share in total expenditures not accumulated*



Notes: This figure repeats Figure 8, but does not accumulate expenditures over time for each horizon.

Figure F.3: *Aggregate EU import share in total expenditures*



Notes: This figure repeats Figure 8, but including only EU imports in the numerator.

F.2 Regression (8) in subsection 5.2

We consider sensitivity analysis to using different weighting schemes, clustering, trimming, balanced sample, EU imports, and border category samples. Note that, in contrast to our results on prices and invoicing, as we include more border categories, estimates become stronger. Moreover, results are not very sensitive to including EU imports only.

Table F.1: *Expenditure switching and invoicing, unweighted*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	-0.117	0.005	-0.029	0.067	0.082	0.092
	[0.082]	[0.075]	[0.075]	[0.073]	[0.073]	[0.070]
$EURShare \times \mathbb{I}15$	0.051	0.220***	0.155**	0.223***	0.197**	0.143
	[0.071]	[0.065]	[0.071]	[0.076]	[0.082]	[0.092]
Adjusted R^2	0.90	0.91	0.91	0.91	0.90	0.90
Panel (b). Interaction of import share with invoicing						
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	-0.062	-0.001	-0.060	0.036	0.084	0.105
	[0.092]	[0.096]	[0.092]	[0.093]	[0.090]	[0.086]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.191**	0.372***	0.278***	0.321***	0.301***	0.296**
	[0.089]	[0.085]	[0.093]	[0.091]	[0.104]	[0.119]
Adjusted R^2	0.90	0.91	0.91	0.91	0.90	0.90
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.093	-0.020	0.018	-0.024	-0.029	-0.042
	[0.071]	[0.069]	[0.091]	[0.090]	[0.089]	[0.091]
$(1 - ImpShare) \times \mathbb{I}15$	0.104	0.008	0.106	0.036	0.081	0.128
	[0.064]	[0.067]	[0.069]	[0.097]	[0.104]	[0.117]
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	-0.154	0.020	-0.078	0.060	0.113	0.148
	[0.130]	[0.127]	[0.147]	[0.147]	[0.145]	[0.143]
$EURShare \times (1 - ImpShare)\mathbb{I}15$	0.087	0.364***	0.170	0.284*	0.219	0.165
	[0.112]	[0.115]	[0.125]	[0.156]	[0.165]	[0.190]
Adjusted R^2	0.90	0.91	0.91	0.91	0.90	0.90
Observations	6279	7068	7563	8046	8118	8160
Unique products	2093	2356	2521	2682	2706	2720

Notes: This table repeats Table 10, but weighting all observations equally.

Table F.2: *Expenditure switching and invoicing, border category weights*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	-0.123	-0.021	-0.012	0.089	0.100	0.117*
	[0.079]	[0.072]	[0.073]	[0.076]	[0.072]	[0.070]
$EURShare \times \mathbb{I}15$	0.074	0.214***	0.178**	0.244***	0.215**	0.173*
	[0.072]	[0.072]	[0.085]	[0.084]	[0.088]	[0.098]
Adjusted R^2	0.90	0.91	0.91	0.91	0.90	0.90
Panel (b). Interaction of import share with invoicing						
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	-0.048	-0.019	-0.059	0.033	0.082	0.096
	[0.087]	[0.094]	[0.088]	[0.093]	[0.084]	[0.080]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.228***	0.368***	0.305***	0.343***	0.330***	0.307**
	[0.086]	[0.097]	[0.113]	[0.102]	[0.115]	[0.138]
Adjusted R^2	0.90	0.91	0.91	0.91	0.90	0.90
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.107	-0.007	-0.019	-0.069	-0.066	-0.083
	[0.071]	[0.070]	[0.087]	[0.090]	[0.087]	[0.090]
$(1 - ImpShare) \times \mathbb{I}15$	0.078	0.022	0.126*	0.061	0.108	0.135
	[0.061]	[0.068]	[0.075]	[0.094]	[0.099]	[0.109]
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	-0.159	-0.012	-0.039	0.104	0.150	0.181
	[0.128]	[0.117]	[0.135]	[0.143]	[0.134]	[0.131]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.147	0.345***	0.175	0.280*	0.219	0.167
	[0.108]	[0.125]	[0.147]	[0.156]	[0.165]	[0.191]
Adjusted R^2	0.90	0.91	0.91	0.91	0.90	0.90
Observations	6279	7065	7560	8043	8115	8157
Unique products	2093	2355	2520	2681	2705	2719

Notes: This table repeats Table 10, but weighting by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category).

Table F.3: *Expenditure switching and invoicing, standard errors clustered by border category*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	0.033	0.090**	-0.008	0.024	0.036	0.037
	[0.064]	[0.043]	[0.053]	[0.042]	[0.047]	[0.048]
$EURShare \times \mathbb{I}15$	0.119***	0.127***	0.080**	0.111**	0.115**	0.096**
	[0.041]	[0.035]	[0.038]	[0.042]	[0.045]	[0.047]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (b). Interaction of import share with invoicing						
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	0.077	0.096*	0.006	0.007	0.035	0.040
	[0.071]	[0.052]	[0.066]	[0.060]	[0.064]	[0.063]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.207***	0.179***	0.143***	0.179***	0.191***	0.175***
	[0.051]	[0.041]	[0.049]	[0.054]	[0.058]	[0.056]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.063	-0.003	0.048	0.000	-0.001	0.000
	[0.063]	[0.055]	[0.063]	[0.038]	[0.038]	[0.040]
$(1 - ImpShare) \times \mathbb{I}15$	-0.033	-0.038	0.017	0.007	0.003	0.014
	[0.036]	[0.039]	[0.034]	[0.038]	[0.039]	[0.044]
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	0.007	0.099	-0.046	0.006	0.036	0.040
	[0.116]	[0.088]	[0.107]	[0.072]	[0.077]	[0.077]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.244***	0.221***	0.124**	0.172***	0.188***	0.159**
	[0.066]	[0.056]	[0.058]	[0.063]	[0.062]	[0.067]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Observations	6279	7068	7563	8046	8118	8160
Unique products	2093	2356	2521	2682	2706	2720

Notes: This table repeats Table 10, but clustering standard errors by border product category.

Table F.4: *Expenditure switching and invoicing, Min 8+*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	0.047	0.057	-0.016	0.035	0.049	0.046
	[0.067]	[0.054]	[0.071]	[0.052]	[0.056]	[0.058]
$EURShare \times \mathbb{I}15$	0.145**	0.115**	0.054	0.082*	0.088*	0.070
	[0.057]	[0.047]	[0.046]	[0.047]	[0.052]	[0.054]
Adjusted R^2	0.94	0.95	0.95	0.94	0.94	0.94
Panel (b). Interaction of import share with invoicing						
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	0.091	0.060	0.001	0.012	0.044	0.046
	[0.075]	[0.060]	[0.071]	[0.058]	[0.060]	[0.061]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.230***	0.163***	0.119**	0.151***	0.166***	0.151**
	[0.073]	[0.057]	[0.055]	[0.057]	[0.061]	[0.063]
Adjusted R^2	0.94	0.95	0.95	0.94	0.94	0.94
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.044	0.009	0.059	-0.005	-0.007	-0.003
	[0.068]	[0.054]	[0.067]	[0.040]	[0.044]	[0.046]
$(1 - ImpShare) \times \mathbb{I}15$	-0.042	-0.025	0.031	0.018	0.007	0.017
	[0.044]	[0.043]	[0.038]	[0.042]	[0.047]	[0.053]
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	0.042	0.049	-0.065	0.018	0.052	0.050
	[0.119]	[0.094]	[0.119]	[0.080]	[0.085]	[0.087]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.277***	0.192**	0.085	0.131*	0.158*	0.132
	[0.091]	[0.077]	[0.072]	[0.074]	[0.081]	[0.088]
Adjusted R^2	0.94	0.95	0.95	0.94	0.94	0.94
Observations	5394	6075	6504	6912	6975	7011
Unique products	1798	2025	2168	2304	2325	2337

Notes: This table repeats Table 10, but including only product classes matched to border categories with more than 8 border observations per quarter in 2014.

Table F.5: *Expenditure switching and invoicing, Min 4+*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	0.022	0.081*	-0.007	0.013	0.024	0.026
	[0.052]	[0.048]	[0.055]	[0.043]	[0.046]	[0.048]
$EURShare \times \mathbb{I}15$	0.117**	0.123***	0.078*	0.101**	0.102**	0.088*
	[0.054]	[0.043]	[0.042]	[0.043]	[0.049]	[0.052]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (b). Interaction of import share with invoicing						
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	0.087	0.113*	0.024	0.012	0.041	0.047
	[0.067]	[0.059]	[0.065]	[0.053]	[0.056]	[0.057]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.206***	0.175***	0.142***	0.178***	0.185***	0.171***
	[0.072]	[0.055]	[0.054]	[0.055]	[0.062]	[0.065]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.092	0.033	0.069	0.017	0.016	0.018
	[0.057]	[0.055]	[0.059]	[0.037]	[0.040]	[0.042]
$(1 - ImpShare) \times \mathbb{I}15$	-0.024	-0.042	0.012	0.010	0.002	0.012
	[0.046]	[0.039]	[0.037]	[0.040]	[0.043]	[0.048]
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	-0.013	0.077	-0.051	-0.006	0.024	0.027
	[0.098]	[0.092]	[0.104]	[0.073]	[0.078]	[0.080]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.232**	0.221***	0.129*	0.167**	0.183**	0.158*
	[0.091]	[0.075]	[0.073]	[0.073]	[0.082]	[0.089]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Observations	6777	7647	8178	8691	8769	8820
Unique products	2259	2549	2726	2897	2923	2940

Notes: This table repeats Table 10, but including only product classes matched to border categories with more than 4 border observations per quarter in 2014.

Table F.6: *Expenditure switching and invoicing, Min 0+*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	0.002	0.062	-0.023	-0.001	0.008	0.007
	[0.048]	[0.044]	[0.052]	[0.040]	[0.044]	[0.046]
$EURShare \times \mathbb{I}15$	0.114**	0.125***	0.090**	0.104***	0.103**	0.092*
	[0.050]	[0.039]	[0.039]	[0.039]	[0.045]	[0.047]
Adjusted R^2	0.93	0.94	0.94	0.94	0.94	0.93
Panel (b). Interaction of import share with invoicing						
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	0.057	0.095*	0.006	-0.001	0.023	0.028
	[0.065]	[0.056]	[0.062]	[0.050]	[0.054]	[0.055]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.202***	0.182***	0.156***	0.184***	0.189***	0.178***
	[0.068]	[0.052]	[0.051]	[0.051]	[0.057]	[0.060]
Adjusted R^2	0.93	0.94	0.94	0.94	0.94	0.93
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.091*	0.036	0.072	0.019	0.019	0.023
	[0.054]	[0.051]	[0.055]	[0.035]	[0.039]	[0.041]
$(1 - ImpShare) \times \mathbb{I}15$	-0.031	-0.048	-0.002	-0.001	-0.007	0.002
	[0.045]	[0.038]	[0.036]	[0.039]	[0.042]	[0.047]
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	-0.037	0.057	-0.068	-0.021	0.003	0.004
	[0.089]	[0.082]	[0.095]	[0.068]	[0.074]	[0.076]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.234***	0.232***	0.158**	0.185***	0.196**	0.176**
	[0.085]	[0.070]	[0.068]	[0.067]	[0.076]	[0.081]
Adjusted R^2	0.93	0.94	0.94	0.94	0.94	0.93
Observations	7041	7962	8508	9030	9114	9171
Unique products	2347	2654	2836	3010	3038	3057

Notes: This table repeats Table 10, but including all product categories (rather than dropping product categories with 7 or less border prices per quarter in 2014).

Table F.7: *Expenditure switching and invoicing, trimming largest expenditure changes*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	0.023	0.094*	-0.010	0.025	0.034	0.034
	[0.055]	[0.052]	[0.063]	[0.046]	[0.051]	[0.053]
$EURShare \times \mathbb{I}15$	0.114**	0.127***	0.080*	0.110**	0.114**	0.096
	[0.056]	[0.047]	[0.048]	[0.048]	[0.056]	[0.059]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (b). Interaction of import share with invoicing						
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	0.061	0.102*	0.006	0.014	0.036	0.041
	[0.068]	[0.060]	[0.068]	[0.055]	[0.057]	[0.058]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.200***	0.179***	0.145**	0.183***	0.196***	0.179***
	[0.072]	[0.059]	[0.058]	[0.059]	[0.066]	[0.068]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.068	-0.003	0.052	0.006	0.004	0.005
	[0.060]	[0.057]	[0.063]	[0.038]	[0.042]	[0.044]
$(1 - ImpShare) \times \mathbb{I}15$	-0.029	-0.037	0.018	0.011	0.007	0.019
	[0.043]	[0.041]	[0.038]	[0.041]	[0.046]	[0.051]
$EURShare \times (1 - ImpShare) \times \mathbb{I}13$	-0.013	0.105	-0.050	0.008	0.032	0.035
	[0.102]	[0.097]	[0.112]	[0.075]	[0.080]	[0.082]
$EURShare \times (1 - ImpShare) \times \mathbb{I}15$	0.231**	0.219***	0.125	0.171**	0.188**	0.158*
	[0.092]	[0.079]	[0.077]	[0.078]	[0.088]	[0.095]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Observations	6209	6985	7472	7955	8021	8068
Unique products	2080	2337	2502	2667	2688	2708

Notes: This table repeats Table 10, but trimming the dependent variable by excluding the 1% largest changes in absolute values from the regression.

Table F.8: *Expenditure switching and invoicing, 2014-2015 balanced sample*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	0.034	0.072	-0.014	0.014	0.024	0.024
	[0.061]	[0.051]	[0.062]	[0.046]	[0.051]	[0.054]
$EURShare \times \mathbb{I}15$	0.122**	0.092*	0.068	0.090**	0.092*	0.072
	[0.058]	[0.047]	[0.044]	[0.044]	[0.050]	[0.054]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (b). Interaction of import share with invoicing						
$(1 - CHFShare)(1 - ImpShare) \times \mathbb{I}13$	0.079	0.096	0.006	0.000	0.028	0.031
	[0.074]	[0.060]	[0.066]	[0.054]	[0.057]	[0.058]
$(1 - CHFShare)(1 - ImpShare) \times \mathbb{I}15$	0.212***	0.180***	0.142***	0.167***	0.176***	0.156**
	[0.076]	[0.057]	[0.054]	[0.053]	[0.059]	[0.065]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.060	0.012	0.052	0.011	0.010	0.010
	[0.060]	[0.054]	[0.060]	[0.037]	[0.042]	[0.044]
$(1 - ImpShare) \times \mathbb{I}15$	-0.039	-0.010	0.025	0.028	0.024	0.035
	[0.051]	[0.044]	[0.039]	[0.041]	[0.046]	[0.051]
$(1 - CHFShare)(1 - ImpShare) \times \mathbb{I}13$	0.013	0.084	-0.051	-0.012	0.017	0.019
	[0.107]	[0.095]	[0.109]	[0.076]	[0.082]	[0.084]
$(1 - CHFShare)(1 - ImpShare)\mathbb{I}15$	0.255***	0.191**	0.115	0.136*	0.150*	0.117
	[0.097]	[0.081]	[0.074]	[0.073]	[0.082]	[0.092]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Observations	6803	7702	8329	8844	8928	8994
Unique products	2355	2673	2904	3081	3111	3137

Notes: This table repeats Table 10, but based on balanced samples that, for any given monthly horizon, only include goods observed in both 2014 and 2015.

Table F.9: *Expenditure switching and invoicing, EU imports*

	(1) 3m	(2) 6m	(3) 9m	(4) 12m	(5) 15m	(6) 17m
Panel (a). EUR-invoicing share						
$EURShare \times \mathbb{I}13$	0.060	0.114**	0.005	0.051	0.067	0.066
	[0.061]	[0.054]	[0.066]	[0.052]	[0.056]	[0.058]
$EURShare \times \mathbb{I}15$	0.128**	0.134**	0.089*	0.132**	0.142**	0.123*
	[0.062]	[0.052]	[0.052]	[0.053]	[0.060]	[0.063]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (b). Interaction of import share with invoicing						
$(1 - CHFShare)(1 - ImpShare) \times \mathbb{I}13$	0.124*	0.111*	0.007	0.022	0.061	0.062
	[0.073]	[0.066]	[0.072]	[0.061]	[0.063]	[0.064]
$(1 - CHFShare)(1 - ImpShare) \times \mathbb{I}15$	0.239***	0.191***	0.154**	0.211***	0.235***	0.217***
	[0.078]	[0.063]	[0.061]	[0.063]	[0.070]	[0.073]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Panel (c). Import share and interaction of import share with invoicing						
$(1 - ImpShare) \times \mathbb{I}13$	0.075	-0.006	0.035	-0.030	-0.025	-0.023
	[0.059]	[0.052]	[0.058]	[0.049]	[0.053]	[0.055]
$(1 - ImpShare) \times \mathbb{I}15$	-0.011	-0.022	0.011	-0.015	-0.008	0.009
	[0.045]	[0.043]	[0.042]	[0.049]	[0.051]	[0.054]
$(1 - CHFShare)(1 - ImpShare) \times \mathbb{I}13$	0.050	0.117	-0.027	0.052	0.086	0.085
	[0.098]	[0.090]	[0.103]	[0.087]	[0.091]	[0.093]
$(1 - CHFShare)(1 - ImpShare)\mathbb{I}15$	0.251***	0.213***	0.143*	0.226**	0.243**	0.208**
	[0.094]	[0.081]	[0.082]	[0.088]	[0.095]	[0.099]
Adjusted R^2	0.93	0.94	0.94	0.94	0.93	0.93
Observations	5448	6168	6627	7086	7158	7200
Unique products	1816	2056	2209	2362	2386	2400

Notes: This table repeats Table 10, considering only EU imports (shares are calculated including non-EU imports in the denominator).

F.3 Regression (9) in subsection 5.3

We first report the results of Table 11 also for the 15-month and the 17-month horizon. We then report OLS estimates, as well as sensitivity analysis to using different weighting schemes, clustering, trimming, price aggregations, balanced sample, converting EUR-invoiced prices into CHF using the quarterly EUR/CHF exchange rate, and using EU imports only. We report all these robustness tests for horizons up to 17 months.

Table F.10: *Sensitivity of import shares to relative prices, incl. 15 months and 17 months horizon*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.21***	-1.12***	-1.02***	-0.98***	-0.95**	-0.87**	-1.43***	-1.27***	-1.65***	-1.46***	-1.58**	-1.39**
	[0.45]	[0.41]	[0.34]	[0.33]	[0.39]	[0.35]	[0.47]	[0.42]	[0.57]	[0.51]	[0.63]	[0.57]
F first stage	126.7	237.6	123.7	243.2	85.4	183.9	59.6	142.6	48.2	117.6	42.8	106.3
Rel. bor.+distr. imp. price	-2.27**	-1.97***	-1.89***	-1.75***	-1.87**	-1.59**	-2.90***	-2.31***	-3.41**	-2.68***	-3.33**	-2.58**
	[0.89]	[0.73]	[0.66]	[0.60]	[0.81]	[0.64]	[1.07]	[0.77]	[1.34]	[0.95]	[1.48]	[1.06]
F first stage	48.1	231.1	41.8	230.5	27.8	167.5	18.3	129.8	14.2	105.1	12.1	93.1
Rel. retail imp. price	-5.10*	-3.81**	-4.23**	-3.60**	-3.81*	-2.79**	-5.84	-3.85**	-5.26*	-3.69**	-4.77*	-3.36*
	[2.68]	[1.61]	[2.09]	[1.59]	[2.30]	[1.41]	[3.63]	[1.84]	[2.98]	[1.79]	[2.84]	[1.77]
F first stage	6.1	16.9	6.5	13.3	5.2	12.8	3.6	10.8	4.9	11.9	4.7	11.7
Observations	2092	2092	2352	2352	2517	2517	2677	2677	2701	2701	2714	2714
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11 including the 15 months and the 17 months horizon.

Table F.11: *Sensitivity of import shares to relative prices, OLS estimates*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-0.24	-0.40	-0.24	-0.38	-0.28	-0.51	-0.39	-0.61	-0.29	-0.44	-0.25	-0.32
	[0.36]	[0.33]	[0.29]	[0.28]	[0.29]	[0.32]	[0.33]	[0.39]	[0.39]	[0.45]	[0.41]	[0.48]
Rel. bor.+distr. imp. price	-0.17	-0.69	-0.21	-0.67	-0.20	-0.88	-0.33	-1.05	-0.23	-0.73	-0.23	-0.48
	[0.57]	[0.58]	[0.42]	[0.50]	[0.39]	[0.58]	[0.41]	[0.71]	[0.47]	[0.83]	[0.50]	[0.88]
Rel. retail imp. price	0.40**	0.37*	0.38*	0.37	0.36	0.34	0.09	0.08	0.15	0.15	0.18	0.19
	[0.20]	[0.19]	[0.23]	[0.22]	[0.23]	[0.23]	[0.26]	[0.25]	[0.27]	[0.26]	[0.28]	[0.27]
Observations	2092	2092	2352	2352	2517	2517	2677	2677	2701	2701	2714	2714
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table shows the OLS specifications corresponding to each of the 2SLS estimations of Table 11. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.12: *Sensitivity of import shares to relative prices, unweighted*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.11**	-1.11**	-2.13***	-2.23***	-1.88***	-1.91***	-2.65***	-2.65***	-2.77**	-2.74***	-2.84**	-2.81**
	[0.52]	[0.52]	[0.56]	[0.55]	[0.69]	[0.66]	[0.92]	[0.81]	[1.12]	[0.97]	[1.36]	[1.20]
F first stage	166.7	248.4	122.9	226.6	83.3	142.4	59.9	102.4	46.7	84.6	41.0	74.9
Rel. bor.+distr. imp. price	-1.96**	-1.96**	-3.68***	-4.00***	-3.39**	-3.49***	-4.84**	-4.85***	-5.18**	-5.10***	-5.40*	-5.29**
	[0.94]	[0.92]	[1.07]	[0.99]	[1.37]	[1.21]	[1.93]	[1.49]	[2.41]	[1.82]	[2.95]	[2.28]
F first stage	74.8	239.9	46.9	211.9	35.7	126.8	25.7	90.8	19.0	73.5	16.2	63.3
Rel. retail imp. price	-3.46*	-3.45*	-5.46***	-6.19***	-4.52**	-4.70**	-6.92*	-6.94**	-6.47*	-6.35**	-5.61	-5.48*
	[1.85]	[1.81]	[1.99]	[2.11]	[2.19]	[1.99]	[3.63]	[2.92]	[3.70]	[2.92]	[3.70]	[3.13]
F first stage	10.5	11.8	13.2	14.5	11.3	16.1	6.7	9.5	6.3	9.2	7.0	9.8
Observations	2092	2092	2352	2352	2517	2517	2677	2677	2701	2701	2714	2714
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but weighting all observations equally. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.13: *Sensitivity of import shares to relative prices, border category weights*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.27**	-1.22***	-2.03***	-2.02***	-1.94**	-1.88***	-2.60***	-2.48***	-2.73**	-2.60***	-2.62*	-2.49**
	[0.50]	[0.47]	[0.58]	[0.56]	[0.77]	[0.70]	[0.90]	[0.77]	[1.08]	[0.93]	[1.35]	[1.18]
F first stage	183.8	298.4	156.5	282.3	107.0	195.7	77.3	145.1	61.7	120.5	54.9	109.6
Rel. bor.+distr. imp. price	-2.32**	-2.15***	-3.64***	-3.60***	-3.59**	-3.41***	-4.89**	-4.50***	-5.25**	-4.76***	-5.10*	-4.61**
	[0.93]	[0.82]	[1.13]	[0.99]	[1.55]	[1.27]	[1.93]	[1.40]	[2.34]	[1.71]	[2.91]	[2.20]
F first stage	81.6	288.0	61.2	264.5	44.0	176.7	31.3	131.0	24.1	106.8	20.9	95.0
Rel. retail imp. price	-4.05**	-3.58**	-5.16**	-5.09***	-4.73*	-4.41**	-7.02*	-6.23**	-6.59*	-5.84**	-5.04	-4.57*
	[1.96]	[1.54]	[2.00]	[1.80]	[2.42]	[1.97]	[3.74]	[2.62]	[3.66]	[2.61]	[3.49]	[2.76]
F first stage	8.2	12.4	14.5	18.7	12.4	18.5	6.6	10.8	6.4	10.6	7.7	12.2
Observations	2092	2092	2351	2351	2516	2516	2676	2676	2700	2700	2713	2713
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but weighting by border product categories based on 2014 Nielsen expenditures (observations are equally weighted within border category). Also the results for the 15 months and the 17 months horizon are displayed.

Table F.14: *Sensitivity of import shares to relative prices, cluster border categories*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.21***	-1.12***	-1.02***	-0.98***	-0.95***	-0.87***	-1.43***	-1.27***	-1.65***	-1.46***	-1.58***	-1.39***
	[0.36]	[0.33]	[0.28]	[0.28]	[0.33]	[0.29]	[0.44]	[0.37]	[0.53]	[0.44]	[0.56]	[0.48]
F first stage	79.9	94.3	88.3	89.5	51.8	59.1	34.5	44.9	28.7	38.3	26.2	35.0
Rel. bor.+distr. imp. price	-2.27***	-1.97***	-1.89***	-1.75***	-1.87***	-1.59***	-2.90***	-2.31***	-3.41***	-2.68***	-3.33**	-2.58***
	[0.71]	[0.57]	[0.56]	[0.50]	[0.71]	[0.51]	[1.06]	[0.66]	[1.31]	[0.82]	[1.39]	[0.90]
F first stage	41.4	90.2	39.6	81.9	23.3	51.3	14.4	39.0	11.4	32.6	10.1	29.1
Rel. retail imp. price	-5.10**	-3.81***	-4.23**	-3.60***	-3.81*	-2.79**	-5.84	-3.85**	-5.26*	-3.69**	-4.77*	-3.36**
	[2.49]	[1.37]	[1.75]	[1.25]	[2.21]	[1.23]	[3.61]	[1.74]	[2.87]	[1.62]	[2.49]	[1.48]
F first stage	6.3	19.4	7.6	15.3	6.3	15.3	4.7	12.5	6.4	14.0	6.5	13.6
Observations	2092	2092	2352	2352	2517	2517	2677	2677	2701	2701	2714	2714
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but clustering standard errors by border product categories. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.15: *Sensitivity of import shares to relative prices, Min 8+*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.25***	-1.24***	-0.86***	-0.89***	-0.73**	-0.74**	-1.10***	-1.09***	-1.29**	-1.27**	-1.22**	-1.21**
	[0.42]	[0.42]	[0.31]	[0.33]	[0.34]	[0.34]	[0.42]	[0.42]	[0.50]	[0.49]	[0.54]	[0.54]
F first stage	177.1	177.6	203.5	185.3	134.7	145.6	92.4	114.0	76.0	94.4	68.4	85.9
Rel. bor.+distr. imp. price	-2.24***	-2.20***	-1.50***	-1.61***	-1.34**	-1.35**	-2.05**	-1.99***	-2.42**	-2.36**	-2.32**	-2.28**
	[0.77]	[0.75]	[0.54]	[0.60]	[0.63]	[0.63]	[0.80]	[0.77]	[0.96]	[0.92]	[1.06]	[1.02]
F first stage	108.2	173.9	103.5	177.6	77.2	134.0	50.6	104.4	41.0	84.9	35.7	75.8
Rel. retail imp. price	-4.92**	-4.71**	-3.17**	-3.72**	-2.56	-2.59*	-3.93*	-3.73*	-3.76*	-3.63**	-3.42*	-3.33*
	[2.33]	[1.93]	[1.48]	[1.80]	[1.56]	[1.47]	[2.36]	[1.98]	[2.12]	[1.83]	[2.06]	[1.80]
F first stage	7.4	14.2	9.5	11.0	7.6	12.3	5.3	10.1	6.5	12.0	6.2	11.5
Observations	1797	1797	2021	2021	2164	2164	2299	2299	2320	2320	2332	2332
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but including only product classes matched to border categories with more than 8 border observations. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.16: *Sensitivity of import shares to relative prices, Min 4+*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.20***	-1.12***	-1.00***	-0.97***	-0.96**	-0.88**	-1.44***	-1.28***	-1.63***	-1.45***	-1.58**	-1.40**
	[0.44]	[0.41]	[0.33]	[0.32]	[0.38]	[0.34]	[0.46]	[0.41]	[0.56]	[0.51]	[0.62]	[0.56]
F first stage	135.6	250.3	130.2	248.8	88.6	187.5	60.6	140.2	48.6	113.9	42.6	101.6
Rel. bor.+distr. imp. price	-2.25***	-1.97***	-1.86***	-1.74***	-1.87**	-1.60**	-2.90***	-2.33***	-3.35***	-2.66***	-3.33**	-2.61**
	[0.86]	[0.72]	[0.64]	[0.58]	[0.78]	[0.62]	[1.04]	[0.75]	[1.30]	[0.94]	[1.45]	[1.05]
F first stage	52.0	244.5	44.7	237.2	29.5	172.0	19.2	128.2	14.8	102.2	12.4	89.2
Rel. retail imp. price	-5.29*	-3.97**	-4.34**	-3.74**	-4.06*	-2.97**	-6.18	-4.08**	-5.41*	-3.82**	-5.00*	-3.52*
	[2.73]	[1.66]	[2.12]	[1.64]	[2.43]	[1.47]	[3.86]	[1.94]	[3.07]	[1.85]	[2.98]	[1.85]
F first stage	6.2	16.7	6.5	12.8	5.0	12.1	3.5	10.2	4.7	11.3	4.5	11.0
Observations	2258	2258	2545	2545	2722	2722	2892	2892	2918	2918	2934	2934
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but including only product classes matched to border categories with more than 4 border observations. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.17: *Sensitivity of import shares to relative prices, alternative aggregations of transaction-level prices to price series*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. retail imp. price	-4.92**	-3.71**	-4.07**	-3.51**	-3.61*	-2.68**	-5.83	-3.76**	-5.30*	-3.62**	-4.73*	-3.28*
	[2.47]	[1.55]	[1.94]	[1.55]	[2.10]	[1.34]	[3.56]	[1.78]	[2.97]	[1.74]	[2.78]	[1.72]
F first stage	7.3	19.5	7.8	14.7	6.2	14.7	3.9	12.0	5.0	12.9	5.0	12.6
Observations	2092	2092	2352	2352	2517	2517	2677	2677	2701	2701	2714	2714
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11 with an alternative aggregation of retail prices, taking the mode (instead of the mean as in the baseline) across households, weeks, and stores in triplet rst and then average P^{ret}_{irst} across regions and retailers in month t to obtain a measure of the retail price of product i in month t, P^{ret}_{it}. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.18: *Sensitivity of import shares to relative prices, official exchange rate*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.18***	-1.09***	-0.98***	-0.94***	-0.93**	-0.85**	-1.40***	-1.24***	-1.62***	-1.43***	-1.55**	-1.36**
	[0.44]	[0.40]	[0.33]	[0.32]	[0.38]	[0.34]	[0.46]	[0.41]	[0.56]	[0.50]	[0.62]	[0.56]
F first stage	133.7	261.8	135.2	273.6	90.5	196.6	62.6	150.0	50.3	122.5	44.6	110.6
Rel. bor.+distr. imp. price	-2.21**	-1.93***	-1.81***	-1.68***	-1.81**	-1.54**	-2.82***	-2.26***	-3.33**	-2.62***	-3.25**	-2.53**
	[0.86]	[0.71]	[0.63]	[0.57]	[0.78]	[0.63]	[1.03]	[0.75]	[1.29]	[0.93]	[1.43]	[1.04]
F first stage	50.5	255.8	45.6	261.0	29.6	179.8	19.3	136.9	14.9	109.9	12.7	97.3
Rel. retail imp. price	-5.10*	-3.81**	-4.23**	-3.60**	-3.81*	-2.80**	-5.84	-3.85**	-5.26*	-3.69**	-4.77*	-3.36*
	[2.67]	[1.61]	[2.09]	[1.59]	[2.30]	[1.41]	[3.63]	[1.84]	[2.98]	[1.79]	[2.84]	[1.77]
F first stage	6.1	16.9	6.5	13.3	5.2	12.8	3.6	10.8	4.9	11.9	4.7	11.7
Observations	2092	2092	2352	2352	2517	2517	2677	2677	2701	2701	2714	2714
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but converting EUR-invoiced prices into CHF prices based on the official quarterly EUR/CHF rate rather than using CHF prices provided by the SFSO. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.19: *Sensitivity of import shares to relative prices, trimming largest expenditure changes*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-0.95**	-0.88**	-0.85***	-0.82***	-0.78**	-0.71**	-1.15***	-1.02***	-1.32***	-1.16***	-1.32**	-1.16**
	[0.43]	[0.40]	[0.31]	[0.31]	[0.34]	[0.31]	[0.41]	[0.37]	[0.50]	[0.44]	[0.55]	[0.49]
F first stage	126.5	234.9	124.0	241.2	85.4	182.4	59.7	141.4	48.3	116.5	42.8	105.1
Rel. bor.+distr. imp. price	-1.78**	-1.55**	-1.58***	-1.47***	-1.52**	-1.29**	-2.34**	-1.86***	-2.73**	-2.14***	-2.79**	-2.15**
	[0.83]	[0.70]	[0.59]	[0.55]	[0.70]	[0.57]	[0.93]	[0.67]	[1.15]	[0.82]	[1.28]	[0.93]
F first stage	48.2	228.6	42.0	228.6	27.9	166.1	18.4	128.6	14.3	104.1	12.1	92.0
Rel. retail imp. price	-4.23*	-3.12**	-3.75*	-3.16**	-3.30	-2.39*	-5.15	-3.29*	-4.51	-3.10*	-4.28	-2.95*
	[2.54]	[1.56]	[1.98]	[1.53]	[2.13]	[1.32]	[3.61]	[1.73]	[2.86]	[1.65]	[2.77]	[1.67]
F first stage	5.4	16.2	5.8	12.3	4.7	12.0	3.1	9.9	4.3	11.1	4.2	10.5
Observations	2073	2073	2329	2329	2492	2492	2651	2651	2674	2674	2687	2687
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but trimming the dependent variable by excluding the 1% largest changes in absolute values from the regression. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.20: *Sensitivity of import shares to relative prices, 2014-2015 balanced sample*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.23***	-1.14***	-1.02***	-0.98***	-0.94**	-0.86**	-1.31***	-1.17***	-1.49***	-1.33***	-1.38**	-1.23**
	[0.47]	[0.43]	[0.34]	[0.34]	[0.38]	[0.34]	[0.44]	[0.39]	[0.53]	[0.47]	[0.61]	[0.55]
F first stage	130.1	237.3	126.3	242.8	86.4	183.6	61.6	145.9	50.2	120.5	44.6	109.1
Rel. bor.+distr. imp. price	-2.30**	-2.01***	-1.88***	-1.76***	-1.82**	-1.57**	-2.62***	-2.13***	-3.05**	-2.45***	-2.88**	-2.28**
	[0.91]	[0.77]	[0.66]	[0.60]	[0.78]	[0.62]	[0.98]	[0.72]	[1.21]	[0.88]	[1.39]	[1.03]
F first stage	50.8	231.2	44.0	230.7	29.3	167.5	19.6	132.7	15.3	107.6	13.1	95.5
Rel. retail imp. price	-5.72*	-4.22**	-4.12**	-3.57**	-3.73*	-2.81**	-5.29*	-3.61**	-4.72*	-3.41**	-4.10*	-2.98*
	[2.99]	[1.80]	[1.91]	[1.48]	[2.13]	[1.34]	[3.16]	[1.68]	[2.56]	[1.59]	[2.46]	[1.61]
F first stage	5.6	16.0	7.3	15.3	5.7	13.7	4.0	11.6	5.4	13.0	5.3	12.9
Observations	2353	2353	2666	2666	2900	2900	3076	3076	3106	3106	3131	3131
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but based on balanced samples that, for any given monthly horizon, only include goods observed in both 2014 and 2015. Also the results for the 15 months and the 17 months horizon are displayed.

Table F.21: *Sensitivity of import shares to relative prices, EU imports only*

	3m		6m		9m		12m		15m		17m	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Rel. border imp. price	-1.44***	-1.35***	-1.11***	-1.09***	-1.02**	-0.96**	-1.66***	-1.54***	-2.00***	-1.85***	-1.94***	-1.79***
	[0.49]	[0.46]	[0.36]	[0.37]	[0.41]	[0.38]	[0.52]	[0.48]	[0.64]	[0.58]	[0.70]	[0.64]
F first stage	157.3	204.8	170.8	207.7	120.5	159.3	81.8	121.7	64.2	99.6	56.4	89.5
Rel. bor.+distr. imp. price	-2.64***	-2.35***	-1.98***	-1.94***	-1.91**	-1.73**	-3.17***	-2.75***	-3.88***	-3.35***	-3.81**	-3.27***
	[0.92]	[0.80]	[0.66]	[0.65]	[0.79]	[0.69]	[1.05]	[0.85]	[1.34]	[1.06]	[1.49]	[1.18]
F first stage	74.6	202.8	70.2	201.5	55.1	149.2	36.3	113.5	27.5	91.5	23.3	80.8
Rel. retail imp. price	-6.62*	-5.05**	-4.97**	-4.68**	-4.43	-3.56**	-7.52	-5.53**	-7.15*	-5.53**	-6.74	-5.22**
	[3.54]	[2.14]	[2.53]	[2.23]	[2.71]	[1.82]	[4.99]	[2.75]	[4.28]	[2.60]	[4.26]	[2.58]
F first stage	4.9	12.3	5.7	8.8	4.4	8.6	2.8	6.7	3.7	7.9	3.3	7.6
Observations	1811	1811	2049	2049	2205	2205	2358	2358	2382	2382	2395	2395
Aggreg. dom. price	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Notes: This table repeats Table 11, but includes only EU imports. Also the results for the 15 months and the 17 months horizon are displayed.

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