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Policy Brief

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How Far Will Trump Protectionism Push Up Inflation?

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Summary

The tariff duties already enforced or threatened by the Trump administration are likely to increase costs and prices in the US economy, but by how much? To address this question, we identify and quantify three channels: direct taxation, cost increase linked to taxes on intermediate inputs, and altered pricing strategy resulting from strategic complementarities across firms. Evidence from three recent episodes of additional tariff protection show that our framework provides sensible assessments of ensuing price increases, which usually materialize gradually and do not reach their maximum level for at least four months.

We reckon that the additional duties enforced up to December 2018 should increase inflation in the US by 0.25% to 0.38%. Should all US imports from China be hit with a 25% tariff, the total inflationary impact would range between 0.66% and 0.99%. Levying 25% additional duties on imports of autos and auto parts would more or less double down this effect, by adding 0.67% to 1.03% to inflation if all providers are targeted, and 0.47% to 0.73% if Canada and Mexico are excluded.

These estimates show that the additional duties considered by the Trump administration, if applied extensively, might push up consumer prices by more than one percentage point. This is far from negligible from the point of view of both consumers' purchasing power and financial stability, thus potentially seriously limiting the administration's room for maneuver. The contrast with China is stark; there, the inflationary impact of retaliatory measures is small, and more than counterbalanced by the wide-ranging tariff cuts enforced over the last year.

The trade protection measures recently announced or contemplated by Donald Trump are likely to increase costs and prices in the US economy. There is wide agreement on this general statement, but little is known about the magnitude of the potential impact. This open question is important, especially at a time when uncertainty surrounds the inflation trend. Past episodes, such as Obama's safeguards on Chinese tires imports or Bush's safeguards on steel imports, showed the reality of these effects. In the latter case, for instance, USITC (2003, Vol. III, Figures 2-4, 2-5, 2-6) found very strong price increases for important categories, with spot prices of steel sheets increasing by 40% or more in the four months following the safeguard, while steel producer price indices increased by 20% to 30%, even though this initial impact was somewhat tempered later on.

As regards tariffs recently enforced by the United States against imports of steel and aluminum, price tensions have already surfaced. In the national summary of its April Beige Book, the Fed reported that "there were widespread reports that steel prices rose, sometimes dramatically, due to the new tariff", and that "businesses generally anticipate further price increases in the months ahead, particularly for steel and building materials". The price increase of steel products was in some cases dubbed to be "at double-digit rates" (Fed, 2018a, p. D-1). Similar allusions abound in the May Beige book, reporting for example "a sharp rise in the cost of steel and aluminum" (Fed, 2018b, p. K-1), as well as in the September one. And most categories of steel products saw their spot prices increased by 10% to 25% within three months of duties enforcement.

These impacts are not well described in standard economic models. On the one hand, trade models tend to focus on long-run impacts (generally expressed in real terms), with little attention devoted to short-run mechanisms of transmission on prices. This is of little help in devising the potential impact on inflation in the months following tariff enforcement. On the other hand, short-term models explicitly dealing with inflation usually adopt a macroeconomic approach where sectors are not disaggregated beyond crude distinctions like the one between intermediate and final goods (*e.g.* Anderson, 2013). This Policy Brief aims at bridging this gap, by proposing a detailed assessment of the short-run consequences of protection measures on prices and costs. To do this, we disentangle the main channels through which tariffs affect prices at the sector level in the short term, and propose a quantitative assessment of the corresponding effects.

Tariffs alter selling prices through three channels: direct taxation, cost increase Altered pricing strategy,

1. How do tariffs affect costs and prices?

Tariffs may alter selling prices through three channels:

- Direct taxation, *i.e.* the direct increase of the (tax-inclusive) price of targeted imports;
- Cost increase, associated with the increased price of intermediate inputs used in production;
- Altered pricing strategy, when the pricing strategy of untargeted producers is modified.

Let us consider each of them in turn, and summarize how we take each into account in our assessment (see the Box 1 for details on our methodology and its empirical implementation).

1.1. Direct taxation

The direct impact on tax-inclusive prices may seem obvious since taxes are expressed as a percentage. In practice, though, its magnitude depends on the extent to which foreign providers adapt their net selling price to this new environment. The theory of tax incidence shows how the burden is shared in practice between buyers and suppliers, because the latter need to lower their price to clear the market. Accordingly, Zoller-Rydzek and Felbermayr (2018) calculate that, for products affected up to September 2018, 75% of the burden would be borne by Chinese producers. However, such results directly depend on the value of hypothesized price elasticities of demand and supply by product. While estimates are available, it is not clear whether they are reliable enough to serve as a robust basis on which to estimate the corresponding price impacts.

We prefer to rely on studies dealing specifically with the transmission of importing conditions. In particular, an extensive literature has estimated how exchange-rate variations pass through into import prices. The transmission of exchange-rate fluctuation has also been shown to vary significantly across firms, large and efficient firms exhibiting a far smaller pass-through than smaller ones (Berman *et al.*, 2012). Regarding average levels, the wide-ranging estimates by Campa and Goldberg (2005) suggest a pass-through in the order of 0.8 to 0.9 for most countries, with the US standing as a noteworthy exception, with a pass-through close to 0.7. The international role of the dollar as an invoicing currency may explain this singularity, but this is not relevant regarding the transmission of additional duties.[1] More recently, Amiti *et al.* (2018) find a pass-through of firm-specific costs equal to 0.65. This lower level is not

(1) Indeed, exchange-rate fluctuations influence not only prices, but also the cost of imported intermediate inputs, which are held unchanged in their invoicing currency. Since a significant share of exporters' production cost is usually invoiced in dollars, a depreciation of their own currency against the dollar is not fully reflected in their production cost and therefore in their selling price, meaning that the pass-through of exchange-rate variations is lower against the dollar than against other currencies (Boz *et al.,* 2017; Casas *et al.*, 2017). The same is not true of tariffs, to the extent that they are unlikely to affect the production costs of targeted foreign providers.

Box 1 – Assessing the short-run price impacts of additional duties: methodological framework

To characterize the short-term price impacts of imposing additional tariff duties on a subset of products and countries of origin, we consider an economy where K products, indexed by *k*, are sold by three groups of producers: home producers (type *h*), untargeted importers (type *u*) and targeted importers (type *m*). Only targeted importers are facing the additional tariff t_k. For any variable with initial level *x*, its final level is written *x'* and we note $\hat{x} = x'/x$ the ratio between its final and initial level. For any given product *k*, tariffs may alter selling prices through the three different channels mentioned in the text, assumed to be separable so that the price charged by type-*g* producers' changes according to:

$$(1) \quad \hat{p}_{k,g} = \hat{\tau}_{k,g} \times \hat{\iota}_{k,g} \times \hat{\mu}_{k,g}$$

Where *g* is an index for producer type (*g* =*h,u,m*). The direct impact is simply characterized as

$$(2) \quad \hat{\tau}_{k,u} = \hat{\tau}_{k,h} = 1 \; ; \; \hat{\tau}_{k,m} = 1 + \alpha \, t_k,$$

Where α is a parameter reflecting the extent of the pass-through of tariff shocks, set here equal to 0.65. The consequences of intermediate input price increases can be written as follows:

$$(3) \quad \hat{\iota}_{k,u} = \hat{\iota}_{k,m} = 1 \; ; \; \hat{\iota}_{k,h} - 1 = \Sigma_{i,g} a_{i,g,k} (\hat{p}_{i,g} - 1)$$

Where $a_{i,g,k}$ is a technical coefficient, assumed constant, corresponding to the cost share of intermediate products *i* in the production cost of product *k* by type-*g* producers. This cost impact is zero for imports.

The third impact results from the fact that tariffs will suddenly and exogenously change the terms of competition. For untargeted producers (untargeted importers and domestic producers), the consequence is an exogenous increase in the demand they are facing, for a given price. In the short run, such a shock leads to an increase in prices, due to potential additional costs associated with the need to suddenly beef up supply, as well as with the opportunity given to sheltered producers to increase their mark-up, *i.e. strategic complementarities*. Following Amiti *et al.* (2018), we assume that untargeted producers react by adjusting their price in response to the changing price of their competitors, with an elasticity γ = 0.48.

$$(4) \quad \hat{\mu}_{k.u} = \hat{\mu}_{k.h} = \gamma \, \beta_{k.m} \, \hat{\tau}_{k.m}$$

Where $\beta_{k,m}$ is the initial share of producers *m*, *i.e.* targeted importers, in total sales of product *k* in the country.

Practically, equations (2) and (4) can be applied straightforwardly, but equations (1) and (3) must be jointly solved (here, using a recursive algorithm), because they are interdependent. This makes it possible to evaluate $\hat{p}_{k,g}$, the price change for any group of producers. Aggregates indices of production and consumption prices are then computing using Fisher indices.

Empirical implementation

The empirical implementation relies upon 6-digit level data on import and export flows, sourced from BACI (CEPII), combined with data on output, demand and intermediate inputs from the WIOD database. The latest year available for the latter database, 2014, is used as the year of reference throughout. We complement BACI trade data with tariff-line level data on US imports, sourced from the USITC, to measure the share of trade targeted within each 6-digit item.

While trade information is available at the product level, other variables are only observed here at the sector level (56 ISIC 2-digit sectors in WIOD, of which 19 are producing goods). To implement empirically our methodology, our general approach is to assume the distribution of output and demand across products within each sector to be proportional to imports. In addition, since technical coefficients are not available at the product level but only at the sector level, we implement equation (3) at the sector level (i.e., using sector-level technical coefficients and indices of intermediate input prices).

In presenting the results, we compute aggregate indices for "Commodities" (ISIC 10 to 33) and "Services" (all other ISIC codes). The BEC classification is used to disentangle intermediate from final consumption products, and only the latter are accounted for in computing consumption price indices. Finally, we ensure that the relative weights of the two groups match their weights in the US Bureau of Labor Statistics' CPI* in order to derive the overall inflation induced by the protectionist measure under scrutiny.

* See BLS (2017), "Relative importance of components in the Consumer Price Indexes: U.S. city average, December 2017", https://www.bls.gov/cpi/tables/relative-importance/home.htm. The weight is 0.373 for commodities and 0.627 for services.

surprising, to the extent that when a cost increase is specific to one firm, it is less likely to pass it fully in selling prices, for fear of losing market shares to its competitors.

A specific feature of exchange-rate variations is that, being market-driven, their durability is unknown *a priori*. Tariffs tend to be far more persistent, even when they are presumed temporary, as is the case in the episodes considered here. An illustration of this persistence is US tariffs on trucks, which were originally enforced in response to the unification of European tariffs on chicken, in the 1960s, and are still in force. The consequence of this higher persistence of tariffs is that they are likely to exhibit a larger pass-through, *i.e.* to be more widely transmitted into price increases.

Based on these arguments, we use in our simulations two values for the pass-through of tariffs into prices, which can be understood as lower and upper bounds: a conservative value of 0.65 in our baseline (meaning that 65% of the tariff increase is passed through to the tax-inclusive consumption price), and a unitary pass-through.

1.2. Cost increase

When intermediate consumption products are targeted, production costs increase for manufacturers using them. The price of intermediate consumption products may also increase, either because their own production cost is increased, or because pricing strategies are altered (more on this below). Such cost increases may be significant in the era of global value chains (GVCs). Of course, imports account for only a limited part of consumption. For instance, Hale and Hobijn (2011) emphasize that "goods and services from China accounted for only 2.7% of U.S. personal consumption expenditures in 2010". Still, beyond the fact that this share is likely to have increased somewhat since the

beginning of the decade, it is likely to be far more substantial for some specific products, or when all source countries are hit, as is currently the case for steel and aluminum additional tariffs. A shortcut to assess this indirect effect is to use the share of a product content originating in foreign countries. Taking advantage of legal information requirements, Lovely *et al.* (2018) use this information at the product level, separately for each car model, to evaluate what would be the impact of additional duties on car prices. They find that it matters a lot, with estimated price increases ranging from 8.4% to 19.9%. Such detailed information is not available for the whole economy, making it impossible to generalize this approach. We use instead WIOD (Timmer *et al.*, 2015), a multiregional input-output table, to assess at the sector level where intermediate consumption comes from, and take this indirect impact into account at least at the sector level. In doing so, we assume that the corresponding cost shocks are fully transmitted to prices.[2]

1.3. Altered pricing strategy

This is not all, though: protection also affects the price of untargeted producers, by mitigating the competitive pressure they are facing. This is even partly the objective, to the extent that protection measures often aim at restoring or improving the profitability of domestic producers. This indirect effect will notably depend upon the competitive positions of targeted imports, market structure, the number and importance of exempted exporters, the price-responsiveness of demand, the utilization rate of production capacity, and producers' responsiveness. Practically, this reflects firms' strategic complementarity in pricing strategies, and it can be assessed as the elasticity of a firm's price with respect to the prices of its competitors. Relying on detailed firm-level data for Belgium, Amiti *et al.* (2018) estimate this elasticity at 0.48, meaning that a firm increases its price by 4.8% on average when the average price of its competitors is increased by 10%. They also show that this responsiveness is higher for large firms, and lower, if not zero, for small firms. We cannot account for this heterogeneity across firms in our product-level calculations and use instead the average estimated elasticity of 0.48 in what follows.

protection also affects the price of untargeted producers, by mitigating the competitive pressure they are facing

An additional impact is that producers negatively affected by foreign retaliation may also have to lower their price. This is common for commodities, where producers are usually price takers, as recently illustrated by US-grown soya bean prices, which fell by more than 20% between early June and mid-July 2018, when Chinese retaliations were enforced. For manufacturing products, though, downward price rigidity is widespread, and there is no convincing empirical evidence of such a price-decreasing impact of protection. We thus consider that this effect is bound to remain very small at the aggregate level, and we disregard it.

2. Evidence from recent episodes

While technicalities may be discussed, the objective is to provide a consistent framework to assess the short-run cost and price consequences of a protection upsurge. To check to what extent this is the case, we apply it to three recent episodes, and compare our assessment to observed trends. The first episode is the global safeguard measure decided in March 2002 by US President George W Bush, whereby additional tariffs ranging from 8% to 30% were imposed on a wide range of steel products, initially for a three-year period starting on 20 March 2002 (in practice, they were withdrawn in December 2003). These tariffs, based on Section 201 of the US Trade Act of 1974, excluded imports from preferential trading partners, as well as from a list of 100 developing countries.

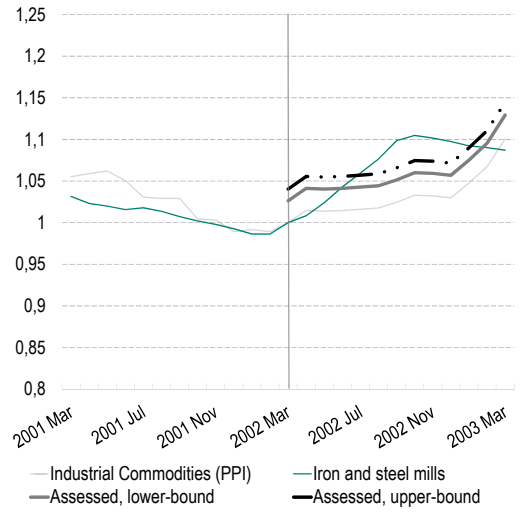
The motivation behind this measure was allegations that unfair trade practices in the EU, China and Japan, among others, were hurting the domestic steel industry. In fact, the US steel sector was sharply declining long before this; 35 companies, representing about one-third of all US steel capacity, fell into bankruptcy between 1997 and 2001, and it is difficult to establish that imports played an important role in this state of affairs (see, *e.g.* Jean and Reshef, 2017). As already mentioned, the detailed analysis carried out by the USITC reported significant price increases.

Since targeted products are exclusively intermediate products, we focus on production prices, which are bound to be the most directly affected in such a case. To figure out how well our assessment framework performs, we compare three series: (i) the production price index (PPI) for iron and steel mills (the most detailed category for which this price index is available), as published by the Bureau of Labor Statistics (BLS), which represents observed outcomes; (ii) the sum of this average PPI for industrial commodities, supposedly incorporating underlying, cross-cutting trends, and of our lower-bound price increase assessment (2.6% in this case, based on product-level calculations);[3] (iii) the same, using instead our upper-bound assessment (4.0%). Despite the series' significant variability over time, the enforcement of duties is visibly

(2) Amiti *et al.* (2018) show that firm-specific cost shocks are only partially passed through to prices, but in the present case, we are measuring the average shock in the industry, *i.e.* a shock that can be thought of as common to all firms. This is why we are assuming it to be fully passed through, even though the reality of this transmission may be slightly overstated.

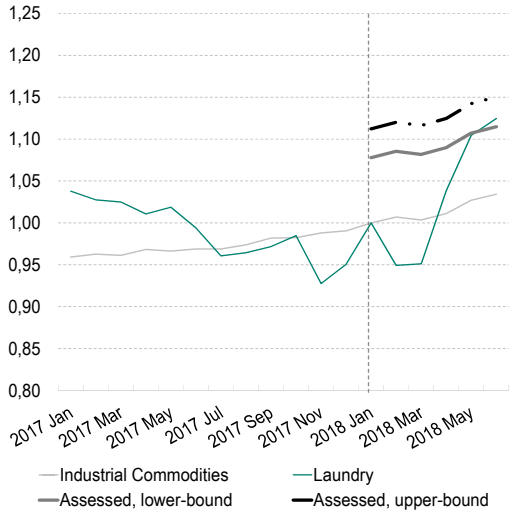
(3) Note that 41.9% of the commodities (8-digit HS tariff lines) belonging to the NAICS code for iron and streel mills were affected by the 2002 safeguard measures.

Figure 1 – Observed and predicted producer price changes following March 2002 US safeguard measures



Source: Own calculations using WIOD data (2016 update) and BACI (CEPII) product-level import data. Price indexes are from the US Bureau of Labor Statistics. "Iron and steel mills" refers to NAICS code 331111. A total of 41.9% of traded commodities (HS 8) in the industry were directly affected by the safeguard measures. "Assessed, lower-bound" is computed as the sum of the price index of industrial commodities and of the simulated price-increasing impact of protection measures, assuming a pass-through coefficient of 0.65. "Assessed, upper-bound" is based on a unitary pass-through coefficient.

Figure 2 – Observed and predicted producer price changes following January 2018 US tariffs on washing machines



Source: Own calculations using WIOD data (2016 update) and BACI (CEPII) product-level import data. Price indexes are from the US Bureau of Labor Statistics. "Laundry" refers to the consumer price index in US city average, all urban consumers, not seasonally adjusted, series CUUR0000SS30021. "Major appliances" refers to the CUUR0000SEHK01 series. "Industrial commodities" reports the series WPU03THRU15. "Assessed, lower-bound" is computed as the sum of the price index of industrial commodities and of the simulated price-increasing impact of protection measures, assuming a pass-through coefficient of 0.65. "Assessed, upper-bound" is based on a unitary pass-through coefficient.

followed by a pronounced difference in trends between steel and the remaining industrial products for seven months, culminating in an 8.3% increase in steel prices relative to the rest (Figure 1). This impact is significantly larger than our predictions, but it may partly reflect overshooting (possibly due to the fairly large degree of concentration among the sector's producers), judging by the reduction of this difference in the following months. The bottom line is that the average price differential over the period of four to 12 months following enforcement was 4.7%, larger than but not inconsistent with our model's assessment.

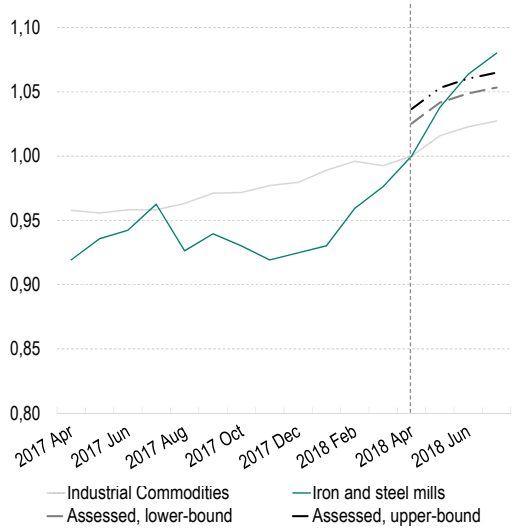
The second episode we use to test this methodology is the imposition of safeguard tariffs on large residential washing machines, announced on January 22, 2018, pursuant to Section 201 of the US Trade Act of 1974.[4] While a reduced rate was applied within a quota of 1.2 million units during the first year of application, the additional duty was set to 50% beyond this quota for the first year. We use this rate in our calculations, since, in a situation where the quota is filled, as will be the case here in all likelihood, the out-of-quota tariff rate determines the economic impact, beyond the rent accruing to in-quota sales. This remedy applies to all providers, except Canada and countries benefiting from the US Generalized System of Preferences, other than Thailand. For these consumption goods, we focus on consumer prices and take industrial commodities as a reference, even though we also report for information the price index for major appliances. Here again, plotting the series of price indices does not leave any doubt about the reality of the impact over prices: it is delayed and only materializes as of April 2018, but it results on average over the following months in a 7.9% increase in the price of washing machines, compared to other industrial commodities, a figure coherent with our model's assessment (+ 7.8% to +11.2%, see Figure 2).

The third episode we analyze is the imposition of a 25% additional duty on steel imports, announced on March 8, 2018 and applicable as of March 23, 2018, pursuant to Section 232 of the Trade Expansion Act of 1962.[5] With the exception of Australia and with a delay until June 1 for the EU, Canada and Mexico, all partners were concerned about these additional duties, except in a few cases where they accepted complying with quotas. As previously, given the intermediate nature of the targeted products, we focus on production prices. The result is more difficult to interpret in this case, since the price index for iron and steel products trends significantly upward in comparison to other industrial products as of January 2018 (Figure 3). It cannot be excluded that this reflects the anticipated impact of protection measures, since their enforcement was expected by most observers, given the enquiry launched and a number of related public declarations. In any case, whether this anticipated effect is taken into account or not, the price differential (+8.7% on average after four months or more)

(4) Similar measures were announced at the same time for solar cells and modules, but no detailed price index is available concerning this product category.

(5) A 10% additional duty was announced concomitantly on aluminum imports, but a specific producer price index is not published for this product category.

Figure 3 – Observed and predicted producer price changes following April 2018 US safeguard measures



Source: Own calculations using WIOD data (2016 update) and BACI (CEPII) product-level import data. Price indexes are from the US Bureau of Labor Statistics, iron and streel mills refer to NAICS code 331111; "Industrial commodities" reports the series WPU03THRU15. "Assessed, lower-bound" is computed as the sum of the price index of industrial commodities and of the simulated price-increasing impact of protection measures, assuming a pass-through coefficient of 0.65. "Assessed, upper-bound", is based upon a unitary pass-through coefficient.

significantly overreaches our methodology's prediction of 2.5% to 3.7%. Again, the concentrated production structure of the sector may be part of the explanation. As a matter of fact, Commerce Secretary Wilbur Ross announced to the US Senate on June 20, 2018, that the US Commerce Department was investigating whether some market participants were "illegitimately profiteering", invoking "speculative activity", and noting that hot-rolled steel coil futures prices were up 53% from a year before.[6]

These three cases illustrate that the price impacts are likely to vary significantly over time and depend on market structure. Nevertheless, they also show that our model assessments are qualitatively consistent with observed outcomes in the three cases. If anything, they are an understatement of the price impact observed over the period following tariff enforcement by approximately four to 12 months, in particular for steel products (Table 1). In this sense, our assessment can be considered as a cautious one.

3. The assessed cost and price impacts of Trump protectionist measures

We now apply our methodological framework to assess what might be the price impacts of protection measures recently enforced by the Trump administration, or presented as potentially forthcoming. The following measures are considered:

Table 1 – Price impact of restrictive trade policies, predictions v. observations
(%)

	Observed, av. 4-12 months after enforcement	Assessed, lower-bound	Assessed, upper-bound
Steel, March 2002	4.7	2.6	4.0
Washers, January 2018	7.9	7.8	11.2
Steel, April 2018	8.7	2.5	3.7

Source: Own calculations using WIOD data (2016 update) and BACI (CEPII) product-level import data. Price indexes are from the US Bureau of Labor Statistics.

Note: The price index used for Steel is the Producer Price Index for Iron and Steel mills (PCU331110331110); "*Washers, January 2018*" refers to the Consumer Price Index for Laundry Equipment (CUUR0000SS30021). The observed price impact is computed as the change in the price of targeted products in comparison to the industry average, measured using the series for Industrial Commodities (WPU03THRU15); the impact is averaged over the observations available at the time of writing on the period from four to twelve months after enforcement (the latest available is six months after for washers, and five months after for 2018 measures on steel). "Assessed, lower-bound" is computed as the sum of the price index of industrial commodities and of the simulated price-increasing impact of protection measures, assuming a pass-through coefficient of 0.65. "Assessed, upper-bound", is based upon a unitary pass-through coefficient.

- "Steel & Alu": Additional duties on steel and aluminum imports under Section 232 (25% additional duties on imports of steel products, worth approximately $29 Bn in 2017, and 10% on aluminum imports, worth $19 Bn in 2017), applied from March, 23, 2018, assumed here to apply to all partners.[7]
- "China, $50 Bn": 25% additional duties on imports from China, applied as of July 6 for a first part, as of August 23 for the second part, targeting products worth a little less than $50 Bn of total import value in 2017.
- "China, $200 Bn, 10%": 10% additional duties on imports from China, applied as of September 24, targeting products worth close to $200 Bn of total import value in 2017.
- "China, $200 Bn, 25%": additional duties on imports from China, referred to in the previous item, increased to 25%. Initially announced as applying on January 1, 2019, if no agreement is found with China by then, this threat has been postponed at least until March 1, 2019 after the Trump-Xi meeting during the Buenos-Aires G-20 Summit.
- "China, all products, 25%": 25% additional duties on all imports from China. Threat formulated on several occasions, with no specific time horizon.
- "Cars (EU28)": 25% additional duties on imports of automobiles and auto parts from the EU. The Section 232 national security investigation on US imports of automobiles and auto parts was initiated on May 23, 2018, and the US Department of Commerce has until February 17, 2019, to submit its report, after which the president has 90 days to decide whether to act or not. For the time being, both the outcome and the

(6) See, for instance, the reporting in https://www.reuters.com/article/us-usa-trade-steel/u-s-commerce-department-investigating-steel-price-hikes-after-tariffs-ross-idUSKBN1JG22W.

(7) Those accepting a quota are constrained as well, *de facto*, so that assuming the duties to apply in this case is probably a better proxy of the actual price impact than assuming no impact.

timing remain unknown, so the rate hypothesized here is chosen arbitrarily.

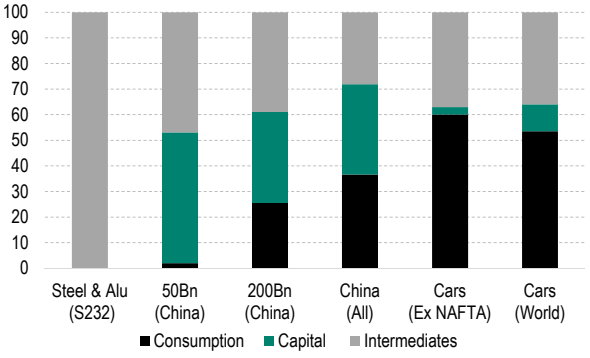
- "Cars (All, excl. NAFTA)": 25% additional duties on imports of automobiles and auto parts from all countries, except Canada and Mexico. Given the recent signature of the USMCA agreement, such exception seems likely but it cannot be taken for granted.
- "Cars (All)": 25% additional duties on all US imports of automobiles and auto parts.

In each case, we rely on legal information to determine the list of targeted products, as reported in official communiqués (and listed in Bown and Kolb, 2018). We consider these measures sequentially, assuming those on steel and aluminum to be applied first, followed by those targeting China, and finally those targeting the car industry.[8] In each case, we assess the impact in the US on goods production costs, goods consumption prices, and finally the consumption price index (CPI), which covers goods and services.

inflationary impact of the measures: 0.63% to 0.94% if all imports from China are taxed

The relative levels of these impacts depend upon the product mix: targeting intermediate products has a more direct impact on production costs, while taxing final consumption goods weighs more on consumption prices. In this respect, the measures applied or considered vary significantly (Figure 4): additional duties on steel and aluminum target only intermediate products, while those on automobiles and auto parts mainly aim at consumption products (two-thirds of the total for imports from the EU). As regards China, the first measures targeted almost exclusively capital and intermediate products, in comparable proportions. As the product scope is extended, though, it includes an increasing proportion of consumption products: 26% for the additional measures on $200 Bn enforced in September 2018, and 37% on average if all Chinese imports are involved, meaning that the last batch would be mainly composed of consumption products. As a result, the impact is larger on production costs than on consumption prices for the steel and aluminum tariffs, but this is an exception (Table 2). The impact on consumption prices is twice as large as that on production costs for the first measures on Chinese imports, and three times or more when all Chinese imports are targeted, or for measures on automobiles.

Figure 4 – Categories of products targeted



Source: Authors' calculations based on official information and BACI-CEPII database, in combination with the BEC classification.

Since services are only indirectly affected but significantly contribute to the CPI, the resulting impact on the CPI is lower. It is actually very small for duties on steel and aluminum (0.03% to 0.05%) and for the first set of additional duties on Chinese imports (0.09% to 0.13%). This is not surprising given that these measures do not strike consumption products directly, and that each of these measures concerns an import value approximately equal to 0.3% of US total consumption. As the amount of targeted imports grows larger, so does the inflationary impact of the measures: 0.22% to 0.33% when the 10% additional duties on $200 Bn of Chinese imports, enforced since September 24, 2018, are taken into account, 0.35% to 0.53% if these duties are increased to 25%, and 0.63% to 0.94% if all imports from China are taxed at this level. Focusing on goods only, this corresponds to an increase in average consumption prices by more than 1.5%, and up to 2.3% in the latter case.

additional duties on automobiles and parts have a larger inflationary impact: 0.67% to 1.03% if all suppliers are involved

According to the Bureau of Economic Analysis, US imports in motor vehicles and parts totaled $361 Bn in 2017. While this is less than the total of imports from China, additional duties on automobiles and parts have a larger inflationary impact: 0.67% to 1.03% if all suppliers are involved, and 0.47% to 0.73% if NAFTA partner countries are excluded.

In each case, we also calculate the contribution of each of the three influence channels to the total effect. Logically, direct taxation matter more when consumption products are a larger part of the target. Hence its zero influence for steel and aluminum duties, and its contribution to more than half the total impact for duties on autos and auto parts. Beyond this, and putting aside the case of duties on steel and aluminum products, this decomposition shows that the orders of magnitude are in most cases that direct taxation contributes for about a half of the total, cost increase for about one third, and altered pricing strategy about one sixth.

To figure out how the impacts add up, Figure 5 represents the estimated cumulative impacts of the measures, in relation

(8) When a given product is affected by different measures, only the maximum across applicable additional duties is applied, not the sum. Hence, even for imports of auto parts from China, the additional duty will never exceed 25%.

Table 2 – Assessed (non-cumulative) impact on costs and prices in the U.S.

		Duties on imports from China				Duties on autos and auto parts	
	Pass-Through coefficient	$50 Bn (25%)	$50 Bn (25%) + $200 Bn (10%)	$50 Bn (25%) + $200 Bn (25%)	All imports (25%)	All. excl. NAFTA	All
Production cost (manuf. goods)	0.65	0.07	0.18	0.31	0.38	0.23	0.40
	1	0.11	0.28	0.48	0.60	0.34	0.61
Consumption price (manuf. goods)	0.65	0.19	0.50	0.82	1.53	1.01	1.71
	1	0.29	0.76	1.25	2.29	1.56	2.65
CPI (all goods and services)	***0.65***	***0.09***	***0.22***	***0.35***	***0.63***	***0.39***	***0.67***
	1	***0.13***	***0.33***	***0.53***	***0.94***	***0.61***	***1.03***
of which (% of total CPI impact):							
Direct taxation		45	48	44	52	60	58
Cost increase		32	33	35	24	27	28
Altered pricing strategy		23	20	20	24	13	14

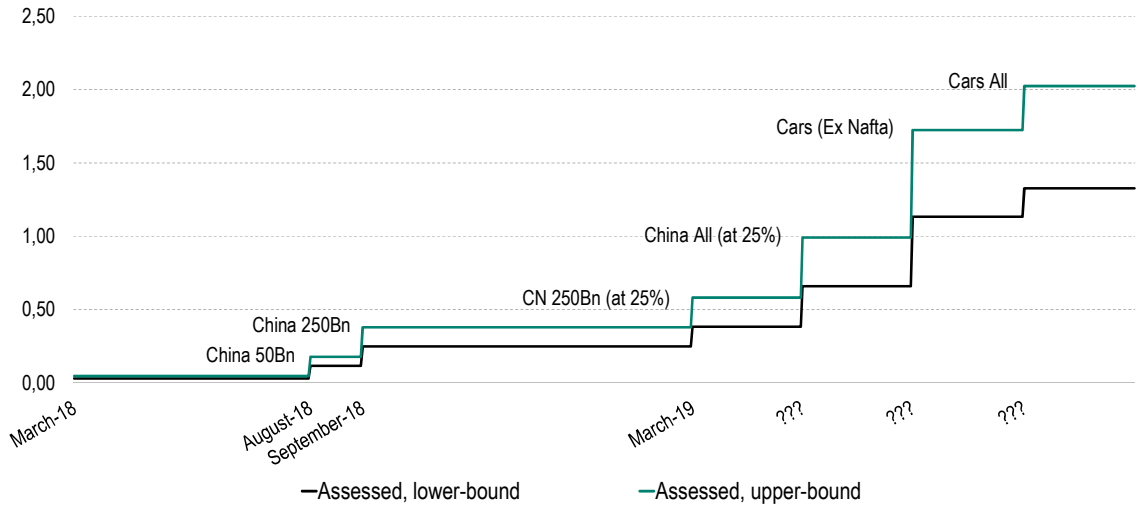
Source: Authors' calculations using WIOD data (2016 update) and BACI (CEPII) product-level import data, together with the product definition of Section 301 trade sanctions communicated by the USTR (updated list, September 2018).

Note: The figures refer to the separate impact of each set tariff measures, taking into account the sequence, *i.e.* assuming that the measures on steel and aluminum are applied first, then those on imports from China, and finally those on autos and auto parts. For a product potentially concerned by two measures, only the maximum additional duty is taken into account (put differently, the additional duty applied on one product never exceeds 25%).

to their date of enforcement. For all measures enforced up to December 2018, the cumulative impact on inflation is 0.25% to 0.38%. This figure would rise to 0.38% to 0.58% if the duties on $200 Bn of Chinese imports rise to 25%, and up to 0.66% to 0.99% if all Chinese imports are taxed. Taxing cars in addition would lead to the inflationary impact overreaching one percentage point, even excluding Canada and Mexico (1.13% to 1.72%). If all suppliers are affected, it ranges from 1.33% to 2.02%. These figures suggest that the measures taken so far have little impact (which is probably not even completely felt yet for the measures applied since end-September) compared to the ones being considered. This would be the case in particular if all imports from China are targeted, and even more if cars are targeted.

What about impacts on China? After all, it has also announced retaliation measures that are far from negligible. To address this question, we apply the same methodology to the two batches of retaliations announced by China in response to the US measures. The first, enforced in July and August, applies 25% additional duties on approximately $50 Bn of US imports. The second, enforced at end-September, applies 5% to 10% additional duties to $60 Bn of US imports. Our calculations show that the inflationary impact would amount to 0.09% to 0.14% for the first set of measures, and 0.04%

Figure 5 – Assessed, cumulative impact of protection measures upon U.S. consumer price index, by date of enforcement
(%)



Source: Authors' calculations based on official information and BACI-CEPII database. "Assessed, lower-bound" is computed as the sum of the price index of industrial commodities and of the simulated price-increasing impact of protection measures, assuming a pass-through coefficient of 0.65. "Assessed, upper-bound", is based upon a unitary pass-through coefficient.

to 0.05% for the second. These impacts are not negligible, but they remain small, given that no further measures have been announced or even considered. They are actually more than counterbalanced by liberalization measures: since December 2017, China has been cutting its most-favored nation (MFN) duties applied on imports of many products, including automobiles. According to the Chinese Ministry of Finance, the overall tariff level applied by China was cut from 9.8% in November 2017 to 7.5% in December 2018[9], as a result of four successive announcements of tariff cuts. As a result, the inflationary impacts of retaliatory measures should not be a concern for China.

the inflationary impacts of retaliatory measures should not be a concern for China

4. Conclusion

These estimated impacts of protection measures on inflation in the US may sound limited, given their wide-ranging scope. This is not surprising, given that even goods imports from China total less than 4% of US total consumption. However, the orders of magnitude we are pointing out are far from negligible, even ignoring the fact that, in some cases, like recently for the steel sector, the impact proved to be two to three times higher than expected based on our assessment – presumably at least partly the result of the concentrated production structure of this sector.

Given the current relatively low level of inflation (slightly above the FED target of 2% for core inflation in recent months), such an exogenous, more than a hundred-basis-point shock may make a significant difference. In theory, this is a one-off shock and its impact is bound to fade quickly over time. If identified as such, it would not call for any specific monetary policy reaction, at least if the Fed assumes that the shock will not be transmitted to other prices (no second round). This is far from straightforward, though, especially given the uncertainty surrounding inflation trends and the conditions underlying the normalization of monetary policy. In his Jackson Hole symposium speech in August 2018, Jerome Powell warned against "overemphasizing imprecise estimates of the stars", by which he was referring to the "fundamental structural features of the economy" (Powell, 2018). Implicitly, this is a way to recognize that visibility of the real state of the economy is limited, and that evidence on inflation level and expectations may be a better guide for policymaking than estimation of its underlying structural determinants. Against this background, how the interference linked to additional duties will be factored in remains a question. At a time when the IMF's latest Global Financial Stability Report (IMF, 2018, p. 8) emphasizes that "financial markets remain vulnerable to an inflation surprise", this is a legitimate source of concern.

An additional reason why these impacts may be problematic is, of course, their consequences for households' purchasing power. Inflation materializes the fact that additional duties are actually a consumption tax – a disturbing reality from a political viewpoint. These concerns may impose serious limitations on the bullying strategy that the Trump administration frequently seems tempted to follow with regard to its partners. This is particularly true considering that measures applied so far are likely to have had a limited impact compared to the ones announced as potentially coming soon. In this sense, the first measures can be seen as the easy part, the cost of which remains limited. This will not necessarily be the case for the ones coming next.

(9) See http://en.businesstimes.cn/articles/103658/20181003/china-slashes-import-tariffs-third-time-year.htm.

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