Industry-specific cost indices to monitor pressures on inflation

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Abstract

Measuring cost pressures is important to inform policy decisions. We propose a method to construct industry-specific cost indices using I-O tables and estimate these for the most disaggregated level of the industrial classification in Mexico. By linking cost indices at the industry level with each item in the CPI basket in Mexico, we show that these are a powerful tool to illustrate how cost pressures have evolved over time, to analyze the sources of cost pressures on consumer prices in Mexico at different points in time, and particularly for understanding the inflationary surge in the aftermath of the COVID-19 pandemic. Finally, we show that cost indices have predictive power over inflation, despite pass-through being incomplete and lagged. This illustrates their usefulness to monitor the risks to inflation.

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1 Introduction

Understanding the causes of inflation is important from a policy perspective because it enables informed, and therefore better, policy decisions. Measuring cost pressures may allow policy makers to distinguish if inflationary pressures are being driven by higher wages or higher input prices (cost-push inflation, see Machlup (1960)), and to understand if pressures are generalized or specific to certain goods or services.

In this paper, we propose a method to approximate the evolution of production costs by industry. The intuition is simple: We argue that the evolution of production costs in each industry corresponds to changes in the prices of the inputs used, weighted by the importance of each input in total costs. This implicitly assumes a constant technology and that the changes in relative prices do not change the composition of inputs. While this is a strong assumption that would generally not hold, this simplification allows us to construct a time-varying measure of costs with information that is publicly available. Moreover, we show that our measures are useful to understand the sources and severity of cost pressures at different points in time.

The cost structure (or the importance of each input in total costs) is obtained from the 2018 Input-Output tables (I-O tables). In order to approximate the change in the price of each input, we propose to distinguish four types of inputs: commodities (whose prices respond to international references so their evolution would ideally be captured with data of these references), inputs that are bought domestically (whose price evolution would ideally be captured by domestic prices of each input, for example, Producer Price Indices (PPI)), imported inputs (whose price evolution would ideally be captured by the import price of each input), and labor (whose price evolution would ideally be captured with average wage of each specific industry). We use this methodology to estimate cost indices (CIs) for industries in Mexico at the 6-digit level of the North American Industry Classification System (NAICS), which is the narrowest industry classification in the country.

To illustrate the usefulness of CIs, we link each item in Mexico's consumer price index (CPI) basket with the 6-digit industry that produces it using a correspondence of our own elaboration. We then perform some descriptive exercises. First, we show the evolution and composition of estimated production costs of the core consumer price index basket in Mexico between January 2006 and July 2024. This exercise reveals that, despite the pandemic being the period when the estimated annual increase in cost reached its peak for the core basket as a whole, Mexico has undergone several episodes of inflation characterized by significant cost increases. The decomposition of costs into different types of inputs illustrates how the drivers of cost pressures have changed over time, and the heterogeneity in the sources of pressures for different types of goods or services.

To exemplify how CIs may contribute to policy analysis, we perform a second descriptive exercise that shows that CIs were particularly useful for understanding the inflation surge during 2021-2023. The accumulated increases in estimated costs since the beginning of the pandemic captured the generalized increases in production costs across industries induced by the shocks associated with the health emergency and the war in Ukraine. The composition of these cost changes illustrates the specific sources of pressure at different points in time. In particular, while a depreciated exchange rate seems to have influenced costs at the onset of the pandemic, cost increases became generalized across goods and services during 2021. We also document that the impact of different inputs was heterogeneous across different baskets: while food items were particularly affected by commodity prices and domestic inputs, non-food merchandise was pressured by the cost of imported inputs, and services inflation was more exposed to labor costs. We also illustrate that the response of consumer prices to the surge in costs was slower than the rise in costs for all baskets. We argue that this is a consequence of demand weakness during the early stages of the pandemic or of severe cost increases that made it very difficult for businesses to fully and immediately pass them on to consumer prices. However, the pass-through seems to have been heterogeneous for different baskets. For instance, by 2023, the cumulative increase in consumer prices was higher than the increase in costs for merchandise, in contrast to services. An explanation that may rationalize this observation is that businesses in the services sector had less scope to pass through the severe increases in costs to selling prices relative to merchandise since the recovery of demand took longer. The lagged pass-through for services may help explain the persistence of this component's inflation during 2023 and 2024.

More generally, we argue that CIs may be advanced indicators of inflation. To formally show this, we analyze whether they have predictive power over inflation through Granger causality tests. Our results indicate that for most baskets considered, CIs Granger-cause consumer prices, but consumer prices do not Granger-cause CIs. This implies that monthly variations in the cost indices provide useful information to predict monthly changes in consumer prices. This underscores the validity of CIs as relevant determinants of inflation and their usefulness as an instrument for monitoring inflationary risks.

These findings raise the question of the extent to which higher costs, as measured by CIs, are passed through to consumer prices in Mexico, including both the magnitude and the lag with which this happens. Although higher costs may be expected to translate, eventually, into higher consumer prices, the degree to which this happens will intuitively depend on different factors, including the strength of demand and thus the scope to raise prices, the demand elasticity (since a stronger sensitivity of demand to price increases may force firms to absorb a larger proportion of cost changes), the supply elasticity (that determines if the firm has increasing or diminishing returns to scale), whether cost changes are generalized or idiosyncratic to particular firms, and whether inflation expectations are high or low (since, in a context of high inflation expectations, firms may be more willing to pass on cost increases at a larger magnitude). In terms of the speed of this pass-through, there could be a delay if businesses do not want their selling prices to respond immediately to increasing costs, if implementing cost changes is costly, if price rigidities do not allow implementing price changes as regularly as desired, or because there may be a time lag before higher costs at the factory level materialize in higher prices at retail stores. Using regression analysis, we find a lagged and incomplete pass-through of estimated costs to consumer prices.

Our paper contributes to the existing literature by proposing a method to estimate cost indices using I-O tables, estimating them for the case of Mexico at the most narrow industry classification, and linking these with the items of the CPI basket, which allows us to evaluate and monitor cost pressures for each item.[1] CIs consider that there are different types of input, so the cost pressures arising from each of these can be analyzed separately. We also document that the CIs we propose are useful for understanding the evolution of cost pressures on inflation in Mexico and that they have predictive power over consumer price inflation. By publishing these indices, we hope to provide a new tool that may enhance economic analysis and the discussion of the extent to which cost pressures affect inflation in Mexico.

The rest of this paper is organized as follows. The following section briefly summarizes the economics literature on the topic. In section 3, we describe how we construct CIs. In section 4, we link the items of the CPI basket in Mexico with cost indices and provide a descriptive analysis of the evolution of cost pressures as captured by the CIs we construct since 2006. Section 5 delves into more details regarding the sources of cost pressures during the Covid-19 pandemic and its aftermath. Section 6 evaluates the validity of CIs as advanced indicators of inflation and estimates the degree of pass-through of cost pressures into consumer price inflation. We conclude in section 7.

2 Literature

Our paper is related to the literature that explores cost-related pressures on inflation, particularly the question of the importance of cost-push factors in the inflationary episode in the aftermath of the pandemic (see, for example, Chen and Semmler (2024); Shapiro (2022)). However, understanding the drivers of inflation and whether these stem from demand or supply (cost) factors has interested the economics literature for a long time (see, for example, Machlup (1960)).

Due to this interest, some statistical agencies construct indices to monitor the cost pressures of specific industries. Different versions of cost indices are available for the US (e.g. United States Census Bureau (2024); U.S. Bureau of Labor Statistics (2024)). Similarly, the Eurostat (2024) publishes a quarterly cost indicator for new residential buildings. Another example of a cost indicator is the Farm Input Price Index calculated by Statistics Canada (2024), which tracks the price variation of goods and services used by Canadian farmers. The Official Statistics of Finland (2024) calculates a cost index of civil engineering works, which follows changes in input costs relative to a base year. The BLS Satellite Series of Net Inputs to Industry Price Indices proposed by Pollock and Weinhagen (2020) is, to our knowledge, the only indicator that tracks cost pressures across a broader range of industries, and, therefore, the most similar existing instrument to the one presented in this paper.

There are, however, important differences between CIs and those published by the BLS. First, the latter consider domestically produced and imported input prices, but they do not take into account labor costs. Second, the Mexican Input-Output table used for the CIs provides information about the participation of imports in domestic costs, whereas the BLS satellite series uses an approximation, assigning weights to domestically

[1] To our knowledge, the most similar existing instrument to the CIs presented in this work is the Bureau of Labor Statistics (BLS) Satellite Series of Net Inputs to Industry Price Indices (Pollock and Weinhagen 2020), but there are several differences between these two, outlined in section 2.

produced or imported commodities according to the value of domestic production of each commodity relative to its imported value. Finally, while the CIs are available at the 6-digit level disaggregation of the NAICS, the BLS satellite series are available at a more aggregated level (3-digit NAICS). Nonetheless, the BLS data is plausibly more precise in terms of the approximated cost of imported inputs, as they directly use the import price index of the US, while to construct CIs we use US international trade price indices as a proxy of Mexican import price indices.[2]

In terms of the magnitude of the pass-through of cost to prices, several attempts have also been made using the different tools available to monitor cost pressures. Empirical studies have primarily focused on the effects of specific cost shocks on prices (e.g., exchange rate, tax incidence, energy prices, imported input prices, minimum wages), often restricting their analyses to particular industries or goods. Consequently, it is difficult to compare the wide range of available evidence due to the different empirical strategies employed and the varying types of pass-through measures estimated, such as absolute pass-through or elasticities (Durand et al. 2014). Additionally, the price transmission between intermediate goods price indices and indices for final demand has also been explored (Weinhagen 2016).[3]

Within this strand of literature, a particular set of papers exploits price microdata to estimate cost pass-through. Gopinath and Itskhoki (2010) study the relation between price adjustment frequency and the magnitude of exchange rate pass-through (conditional on price adjustments) for US imported manufacturing goods. They find that firms above the median of the price adjustment distribution pass through 44% of the cost shock, while for those below the median, the estimated pass-through is only 21%. Similarly, Kochen and Sámano (2016) estimate the exchange rate pass-through to consumer prices for a subset of goods and services in the Mexican CPI basket. Their results indicate that a 1% increase in the nominal exchange rate leads to a 0.073 percentage points pass-through when firms adjust their prices. This, in turn, results in a 0.043% increase in aggregate inflation. Lafrogne-Joussier et al. (2023) estimate the pass-through of energy and imported input cost shocks into the French manufacturing PPI, finding a pass-through rate of 32.2% for import shocks and a full pass-through for energy shocks. In addition, they find asymmetries between positive and negative shocks, with positive shocks leading to larger pass-through rates. Their estimates suggest that during 2021-2022, imported cost shocks increased the PPI by 1.9% while energy shocks raised it by 1.62%. For Denmark, Dedola et al. (2021) estimate the pass-through of import and energy cost shocks to producer prices. Their findings suggest that the price adjustment to an import cost shock is gradual over the first 12 months, reaching a medium-run elasticity of approximately 0.2. For energy shocks, the estimates indicate a medium-run elasticity between 0.8 and 0.9. The magnitude and dynamics of these price adjustments are primarily driven by substantial

[2] This is arguably a good proxy of import prices for Mexico, given that the US is a large economy and Mexico a small one. However, the implicit assumptions that support this choice could not hold for all industries, meaning that US international trade prices could be a poor proxy for these cases.

[3] Using a VAR model, Weinhagen (2016) finds that price changes for less processed goods, intermediate goods, or goods that are found in a higher stage of the production process are passed forward to more processed commodities, final goods, or goods and services that are found at the latter stages of the production chain, respectively, but not the other way around.

heterogeneity in pass-through rates across firm sizes and sectors.

An additional strand of the literature that highlights the importance of understanding the relationship between production costs and price-setting behavior is the trade and industrial organization literature on markup estimation. In this context, researchers typically exploit firm-level data on production and total input expenditures and rely on the optimality conditions of the cost minimization problem (Hall et al. 1986; Olley and Pakes 1996; Levinsohn and Petrin 2003; De Loecker and Warzynski 2012). Although our paper proposes a method to empirically approximate the cost pressures faced by producers within a specific industry, we do not adopt a structural approach nor attempt to estimate the underlying production function governing firms' behavior.

Finally, it is important to note the limitations of our work regarding the propagation and aggregation of cost shocks throughout the economy. As Baqaee and Rubbo (2023) show, the transmission of shocks in production networks is shaped not only by input–output interactions but also by wedges, substitution patterns, and complementarities across sectors. A framework that models the full general-equilibrium environment provides a richer understanding of how micro-level shocks propagate and aggregate, but such an approach lies beyond the scope of this paper. Instead, our proposed cost indicators rely on input–output data and are aggregated using CPI expenditure weights. Although this approach does not incorporate the full set of mechanisms that influence how cost shocks affect the economy, it offers an intuitive, tractable, and policy-relevant measure of cost pressures.

3 Construction of item-specific cost indices

3.1 Conceptual framework

The method proposed to construct CIs will allow for doing so at the highest level of disaggregation of the industrial classification available in the I-O tables in each specific country or case of study. In order to use this framework, the structure of the I-O table should enable the researcher to separately identify the value of imported inputs, the value of inputs sourced domestically, and labor consumption in each industry. Separating domestic and imported inputs is important, as will become clear below.

We consider that there are four types of inputs: commodities, goods or services that are imported, goods or services sourced domestically, and labor. This distinction is relevant because we assume that the prices of commodities respond to their international references and are given in dollars; the prices of imported inputs are determined by foreign companies (and may be proxied by import price indices) and are referenced in foreign currency; the prices of domestic inputs are determined domestically (and may be proxied by domestic PPI at the industrial level); and the cost of labor may be proxied by industry-specific wages. Each input in the I-O table (each row) is assigned to its type as follows:[4] if it consists of a raw material whose price will respond to international references, it is classified as a commodity (regardless of whether, according to the I-O table, the input is

[4] We consider an I–O table structure where each entry corresponds to the intermediate demand of the column industry for the goods or services produced by the row industry.

sourced domestically or internationally).[5] For the rest of the inputs (rows in the I-O table), the fraction classified as an imported or domestic input is defined depending on the value sourced from each origin according to the I-O table. Labor corresponds to the row in the I-O table that reports the total payments to labor.

The cost index for each month t is constructed as the weighted sum of the imputed price indices of each input k used in the production of industry i at t, weighted by the share of k in the total costs of i. The total cost of i is the sum of all rows in the I-O table, excluding the profit (i.e., the value of the intermediate use from all industries plus the payments to labor according to the I-O table).

The imputed price index for each input corresponds to the best approximation feasible given the available data that each researcher has at hand.[6] We assume that both commodities and imported goods and services are referenced in US dollars, so the price index in dollars is transformed to the local currency by multiplying its value by the exchange rate of the period (domestic currency per US dollar). All indices and the exchange rate should be normalized so that they have the same base. This homogenizes the units of all inputs so that they are given in local currency and so that the index is equal to 100 at a chosen base period.

3.2 Construction of cost indices

Using the expenditure structure provided by the I-O table for each industrial class i, let $x^M_{i,k}$ be the value in basic prices of the imported intermediate consumption of input k for the production of i, let $x^D_{i,k}$ represent the analogous value for domestic intermediate consumption, and L_i denote total labor payments.[7] For each input, $x^O_{i,k}$, $O \in \{D, M\}$ corresponds to the total value, so it considers both prices and quantities used. We define the total expenditure of the industrial class i as the sum of all inputs and labor consumed in the production process:

$$\text{TE}_i = \sum_{k \in \mathcal{K}} (x^D_{i,k} + x^M_{i,k}) + L_i \,. \tag{1}$$

From the definition in Equation (1), we derive weights θ by origin that reflect the participation of input k in the total expenditure of i:

$$\theta^D_{i,k} = \frac{x^D_{i,k}}{\text{TE}_i}, \quad \theta^M_{i,k} = \frac{x^M_{i,k}}{\text{TE}_i}, \quad \theta^L_i = \frac{L_i}{\text{TE}_i} \,.$$

Because of the assumption that prices of commodities correspond to their international reference, regardless of origin, it is necessary to identify the inputs classified as commodities ($k \in \mathcal{C}$), and define their weight as the sum of the domestic plus the imported weights:

$$\forall k \in \mathcal{C}, \quad \theta^C_{i,k} = \theta^D_{i,k} + \theta^M_{i,k} \,.$$

[5] See section 3.3 for details of how we define this classification for our application to Mexico.

[6] Below we detail the series used for the construction of indices for the case of Mexico.

[7] In the Mexican I-O table, this corresponds to the entry of row k, column i.

In order to approximate the evolution of production costs by industry, we set the base year of the index to the base year of the I-O table and normalize the prices of all inputs to 1. This is important because it allows us to interpret weights as the quantity share of each input in the total quantity of inputs used.[8]

Under the assumption of a Leontief production function, where inputs are perfect complements so that a constant ratio between inputs is guaranteed regardless of scale or input prices, the cost function is given by the sum of the price of each input, weighted by the θ's defined above.[9] Then, estimated weights and price data are used to construct the CI for each industrial class i in month t following Equation (2):

$$\mathrm{CI}_{i,t} = \sum_{k \in \mathcal{I}} \left(\theta^{D}_{i,k} p^{D}_{k,t} + \theta^{M}_{i,k} (p^{M}_{k,t} \cdot e_t) \right) + \sum_{k \in \mathcal{C}} \theta^{C}_{i,k} (p^{C}_{k,t} \cdot e_t) + \theta_{i,L} p^{L}_{i,t} \,, \tag{2}$$

where $\mathcal{I}$ is the set of inputs not classified as commodities, $\mathcal{C}$ is the set of inputs classified as commodities, $p^{O}_{k,t}$ denotes the price index imputed to input k according to consumption origin/input type O, e_t corresponds to the index of the exchange rate at time t, and p^{L}_{it} is the index of the wage paid by industry i at t. Notice that in equation 2, the exchange enters mechanically, so that the prices of imported inputs and commodities, which are assumed to be invoiced in dollars, mechanically respond to the exchange rate.

3.3 Data and specifics for the construction of CIs in Mexico

We construct CIs for the narrowest industry classification in Mexico (6-digit NAICS) for the period January 2005- July 2024. We use the 2018 I-O table published by Mexico's Instituto Nacional de Estadística y Geografía (INEGI), which contains data on domestic and imported inputs, as well as labor consumption, in basic prices across 834 industrial classes considered by INEGI. We use the FIX exchange rate of the period (Mexican pesos per US dollar) published by Banco de México to convert the price indices of commodities

[8] To see this, consider the weights θ defined above. If $\theta_{\bar{k}} = q_{\bar{k}} w_{\bar{k}} / \sum_{k=1}^{K} q_k w_k$, where q_k is the quantity of input and w_k its price. If we assume that $w_k = 1 \; \forall \; k$, then $\theta_{\bar{k}} = q_{\bar{k}} / \sum_{k=1}^{K} q_k$. Thus, for any two $\bar{k}, k'$, $\theta_{\bar{k}} / \theta_{k'} = q_{\bar{k}} / q_{k'}$

[9] Consider the cost minimization problem of the following Leontief production function:

$$\begin{aligned} \min_{q_1,\ldots,q_K} \quad & \sum_{k=1}^{K} w_k q_k \qquad \text{s.t.} \;\; \min\left\{ \frac{1}{\theta_1} q_1, \, \frac{1}{\theta_2} q_2, \, \ldots, \, \frac{1}{\theta_K} q_K \right\} \geq \bar{q} \\ & \Rightarrow q^*_k = \theta_k \bar{q} \quad \forall \;\; k = 1, \ldots K \\ & \Rightarrow C(w_k, \bar{q}) = \sum_{k=1}^{K} w_k q^*_k = \sum_{k=1}^{K} w_k \theta_k \bar{q} = \bar{q} \left[\sum_{k=1}^{K} w_k \theta_k \right] \end{aligned}$$

Thus, since the production function assumes that θ is constant, the change in the cost of producing one unit between t and $t+i$, if Δw_k is the change in the price of input k over this period, is given by:

$$\sum_{k=1}^{K} \theta_k \Delta w_k$$

and imported inputs (that are referenced in dollars) to pesos. Our choice is to normalize indices to 2018 = 100. The normalization to this period is arbitrary and is done because it is the base year for the I-O table, so it makes the interpretation convenient. In particular, they can be interpreted as the cost of producing one unit of each good or service relative to 2018, considering that the production structure is fixed to that in 2018.[10]

The proxy used for labor costs should be an approximation of the evolution of average wages in each industry. For the case of Mexico, the best approximation we have is the index of the average daily taxable income in the formal sector at the 3-digit level of the NAICS industry code that corresponds to each 6-digit industry. This is obtained from the Mexican Institute of Social Security (IMSS).[11] This proxy has two caveats. The first is that it is restricted to the formal sector, although we think that this is still a good proxy for the rate of growth of labor costs in each industry.[12] The other caveat is that average wages are given for very aggregated sectors (3-digit). This is because IMSS data does not use the NAICS classification system, and the correspondence could not be done at higher levels of disaggregation.

We consider an input a commodity if it is available in the Commodity Price Series published by the International Monetary Fund (IMF). We manually build a correspondence of NAICS industrial classes and the primary products included in said database. Since the assumption is that their prices respond to their international references, the imputed price index for each commodity corresponds to the price index in the IMF commodity prices database, multiplied by the average exchange rate during the month (as index 2018=100).

For the remaining goods and services used as inputs in the production of i (ie, all rows excluding those defined as commodities and the row corresponding to labor payments), we distinguish whether they are sourced domestically or imported using the information provided by the I-O table. For those sourced domestically, we proxy the evolution of their cost using the Mexican PPI of each industry at the 6-digit disaggregation level, available from INEGI.[13] For imported inputs, we use the US international trade price indices as a proxy, since data on Mexican import price indices is not available at the disaggregated industry level.[14] In particular, we impute the US's import price index for k at the 6-digit

[10] The use of the 2018 I-O table for all the period studied may raise some concern about whether 2018 is a good proxy for costs in the earliest period. An alternative would be to change the I-O table used every 5 years (which is the periodicity in which these are published). This would add another challenge of defining whether these changes should be discrete (each 5 years would use a new I-O table), or if there should be some kind of interpolation between years. This, in turn, would raise the concern of having fixed weights for 2018 onwards, until the most recent I-O table becomes available. Appendix A presents a robustness exercise that compares the evolution of cost indices using the 2008, 2013, and 2018 I-O tables, and the series are very similar, suggesting that the production structure has not changed significantly in this period.

[11] The daily taxable income includes various forms of compensation other than salary (e.g., paid vacations and bonuses) while excluding additional non-taxable payments.

[12] We do not use data on the quarterly labor survey in Mexico, Encuesta Nacional de Ocupación y Empleo (ENOE), because that data is not representative at the industrial sector. In contrast, IMSS data corresponds to administrative records, so it encompasses nearly the entire universe of formal workers.

[13] In particular, we use the total goods PPI in the domestic market for each industry.

[14] Using import price indices at a highly disaggregated level is desirable because the construction of industry-specific cost indices relies on the ability to find a price for each specific input. We leverage the fact that the US publishes import and export price indices at a highly disaggregated level of the NAICS classification. While we recognize that these are just proxies, we argue that these may be good (albeit

NAICS level if the US is a net importer of that industry, and the US export price index if the US is a net exporter. The reasoning behind choosing these price indices as proxies of the cost of inputs in Mexico is that if the US is a net exporter of a good, it is plausible that Mexico is importing said good from the US, so the evolution of its export price index is a good indicator of the evolution of prices of Mexican imports. On the other hand, if both Mexico and the US are importers of said goods, it is possible that they are importing the goods from the same country, so the evolution of US import price indices is a good proxy for the evolution of importing prices of Mexican businesses. Another argument that could support the decision to use US international trade price indices as proxies for imported input costs in Mexico is that the US is a big economy, so the prices of its exports and imports can serve as an appropriate reference for the evolution of the international prices of manufactured goods.

Import and export price indices for the US are available at the BLS. We use the import price index if, on average, the US was a net importer of said industry during the 12 months prior to the reference period, as measured by the ratio of imports to exports according to data on US trade flows from the Census Bureau. Otherwise, if the US was a net exporter, we use the export price indices. These price indices are multiplied by the average exchange rate during the reference month (as index 2018=100).[15]

Cost indices for each industry at the 6-digit code for Mexico over the period January 2005-July 2024, constructed using the methodology outlined above, are available here [SE INCLUIRÁ LA SERIE DE DATOS POR SCIAN A 6 DÍGITOS COMO DATA TABLE].

3.4 Discussion

We believe the cost indices we constructed are a useful tool for the analysis that illustrates how production costs evolve. However, it is important to bear in mind some of their drawbacks. First, the construction of the indices implicitly assumes that the input composition (in quantities) is constant in time and equal to the one captured by the 2018 I-O table. Therefore, the share of inputs in total costs in the CIs will change as input prices vary

approximate) indicators.

[15] The PPI and the import and export price indices are not available for all industries at the 6-digit disaggregation level. For those inputs sourced domestically whose PPI is not available at the 6-digit industry, we impute the evolution of PPI at the highest disaggregation level possible (extrapolating series with monthly variations in case the index for the 6-digit industry is available for more recent dates). For example, if there is no price index for the 6-digit industry, but there is one for the corresponding 5-digit industry, the latter is imputed. If this is not available either, then we impute the figure for the 4-digit industry. For the cases when data for the corresponding 4-digit industry is not available, we construct an average 4-digit industry monthly variation price index with the 6-digit industries available within that category. If no 6-digit industry category is available within it, then we impute the value for the corresponding 3-digit industry classification. If no price index for any of the categories described above is available, then we impute the corresponding import (or export) price index of the US for the most disaggregated level available (up to 3-digits), depending on whether the US was a net importer or exporter of said good on average over the 12 months prior to the reference period. In the last instance, if we cannot find a reference for the price of a certain input neither for the PPI in Mexico nor the US international trade price indices at the 3-digit disaggregation level, then we impute the PPI of the 2- digit industrial sector, or if that is not available, the average of all 6-digit industries within the corresponding 2-digit industry. The procedure for the prices of imported inputs that are not available at the 6-digit level is analogous.

at different rates and their relative prices change, but the weight of each input in total costs is fixed and equal to that given in the 2018 I-O table. This is the assumption of a Leontief production function and no technological change. But in reality, firms may substitute inputs as their relative prices change or modify the composition of inputs for other reasons, such as the adoption of new technologies, or the availability (or affordability) of new or different inputs. The CIs will not capture these changes. This means that they may misestimate cost pressures arising from current economic conditions, or overestimate costs if technological changes lead to more efficient production processes.[16]

Second, the CIs assume that changes in input prices and the nominal exchange rate are immediately reflected in the cost pressures faced by firms. Nevertheless, these pressures might affect firms with a certain level of delay. This is particularly true for the changes in costs associated with exchange rate fluctuations, as cost indices incorporate these changes mechanically. However, in reality, firms may have mechanisms that shield them from exchange rate volatility, such as contracts with their providers or financial instruments to hedge the risk.

Third, the indices approximate changes in costs that are generalized across industries. However, each firm may have different costs. For example, some businesses may be importing a larger fraction than others, or some may have a larger scope to adjust the composition of inputs when one of them becomes more expensive, or could even have different bargaining power with providers (or longer-term contracts) that mean that unit costs are heterogeneous across firms.

Fourth, like any empirical measurement, they are subject to measurement errors. One source of these discrepancies is the use of the IMF Commodity Price Series as a proxy for the price of inputs classified as commodities, which may not accurately reflect the prices paid by Mexican firms and do not account for transportation costs. In addition, we use export or import prices of the US as a proxy for Mexican import prices, rather than directly estimating the latter. Moreover, we use the wages imputed to the industrial classes that correspond to the average wage observed at a more aggregated level. Measurement errors may be more severe during the early periods of our series, when there is more missing information that we need to impute with second-best alternatives. For example, if we go back in time, industrial classifications have slight modifications, and the PPIs for several industry classifications at the greatest level of disaggregation are unavailable. Given the way these indices are constructed, this means that the evolution of the costs of these inputs is approximated by the evolution of price indices of more aggregated industries or, in some cases, by the evolution of US import or export price indices of these industries.

Despite these drawbacks and the possibility that the further back in time, the less precise our measurements are, the indices constructed are informative about the evolution of cost pressures. Having long time series that allow for an analysis of how cost pressures have stemmed from different sources at different inflationary episodes is valuable, regardless of these being imprecise estimates.

[16] While these indices may not provide a precise estimate of the change in production costs, they are still informative of evolving cost pressures. Indeed, even if companies respond to changes in relative input prices by modifying the share of inputs used (if they are substitutes), total costs are weakly increasing in a rise in input prices.

4 Evolution of cost pressures on the core CPI basket in Mexico between 2006 and 2024

4.1 Cost indices of the items in the CPI basket

To illustrate the usefulness of CIs, in this section, we perform some descriptive exercises to show how cost pressures have evolved for the goods and services that form the CPI basket in Mexico. To do so, we first define a cost index that is specific for each item by linking each item g of the CPI basket with the industry or industries i (6-digit NAICS code) that produce it. We use a correspondence of our own elaboration.[17] If an item is matched with more than one class, we define I_g as the set of all 6-digit industries that are matched with the item, and the CI of the item is estimated by averaging the CIs of all $i \in I_g$:[18]

$$\mathrm{CI}_{g,t} = \frac{1}{N_g} \sum_{i \in I_g} \mathrm{CI}_{i,t} \,.$$

The descriptive analysis presented in the following sections covers the period from January 2005 to July 2024.[19] In order to visualize the results, it is convenient to present them for some baskets that are more specific than the official subindices published by INEGI. These *special baskets* aggregate sets of related items within the CPI basket.[20] CIs for these baskets correspond to the weighted average of the CIs of all the items that comprise each group, using the items' weights in the headline CPI basket, re-weighted to sum up to one for each aggregation. Therefore, if ω_g is item g's weight in the CPI, the cost index for each basket B is given by:

$$\mathrm{CI}_{B,t} = \sum_{g \in B} \left(\frac{\omega_g}{\sum_{g \in B} \omega_g} \right) \mathrm{CI}_{g,t} \,.$$

[17] In particular, we manually identify the 6-digit industry or industries that produce each item using the description of each NAICS code available at INEGI, which provides an explanation of the activities of each industry, including the particular goods or services it produces.

[18] This is the case for some items that include several products, such as "other fruits" or "parts, accessories, and other repair items for vehicles".

[19] The analysis finishes in July 2024 because in that period there was a change in the CPI basket, which implies a different composition of the baskets' cost index.

[20] The classification into baskets is done according to a definition used internally in Banco de México that groups the different items of the core basket sub-indices into sub-groups according to the types of goods or services. Food merchandise is categorized into alcohol and tobacco, dairy, processed meat, sugar derivatives, corn derivatives, soybean derivatives, wheat derivatives, and other products. Non-food merchandise is split into household cleaning items, medicines, personal care items, household items, recreational items, and others. Services are split into education, food services, healthcare services, recreation services, residential building construction, telecommunications, tourism, transportation services, and other services.

4.2 Evolution of cost pressures on the core CPI basket between 2006 and 2024

The evolution of the annual growth rate of the estimated cost indices for the core CPI basket and its components is plotted in Figure 1.[21] The figures show the contribution of each component (commodities, imported inputs, domestic inputs, and wages) to the annual growth of the indices, and we also plot the annual variation of the CPI of each basket. In the bottom-left panel, we show the Pearson correlation between the CI and CPI annual variation.

Several messages can be drawn from Figure 1. First, the annual variation of the estimated cost indices is very volatile, much more so than that of the consumer price index. Part of this volatility can be attributed to the mechanical impact of the exchange rate (see appendix B).[22]

The figure also illustrates that consumer price inflation of food merchandise is correlated with the annual variations of CIs. In contrast, there is no positive correlation between these series for the case of services. A plausible explanation is that services inflation is much less volatile than food inflation.

Figure 1 also reflects how high wage growth in the last six years has translated into cost pressures over the period. In fact, this component was relatively small before 2018 but has evidently gained importance in explaining the increase in costs in recent years.

It is clear that, while the pandemic has been the period in which the annual increase of estimated aggregate costs reached its highest peak for the core basket as a whole, Mexico has gone through several episodes of inflation that have been accompanied by significant increases in costs. For example, costs also rose sharply during the Global Financial Crisis, particularly for the inputs used to produce non-food merchandise, especially those imported. Moreover, during the period 2014-2017, there was also a sustained increase in estimated costs that may be associated with the steady depreciation of the exchange rate. What is remarkable during the pandemic is the duration of the elevated growth rates, and also how every component contributed to that increase, reflecting how broad-based and generalized cost pressures were during the period. Indeed, between 2020 and 2022, costs increased due to sharp rises in commodity prices (which had a particularly adverse impact on food costs), imported inputs (which mainly affected non-food merchandise), domestic inputs (which affected all items), and wages (which were particularly pernicious for services). The other distinctive feature of the evolution of cost indices during the pandemic is the decline in these observed during 2023 and 2024, which may be associated with the exchange rate appreciation during this period, which exerted downward pressures on the costs of commodities and imported inputs.

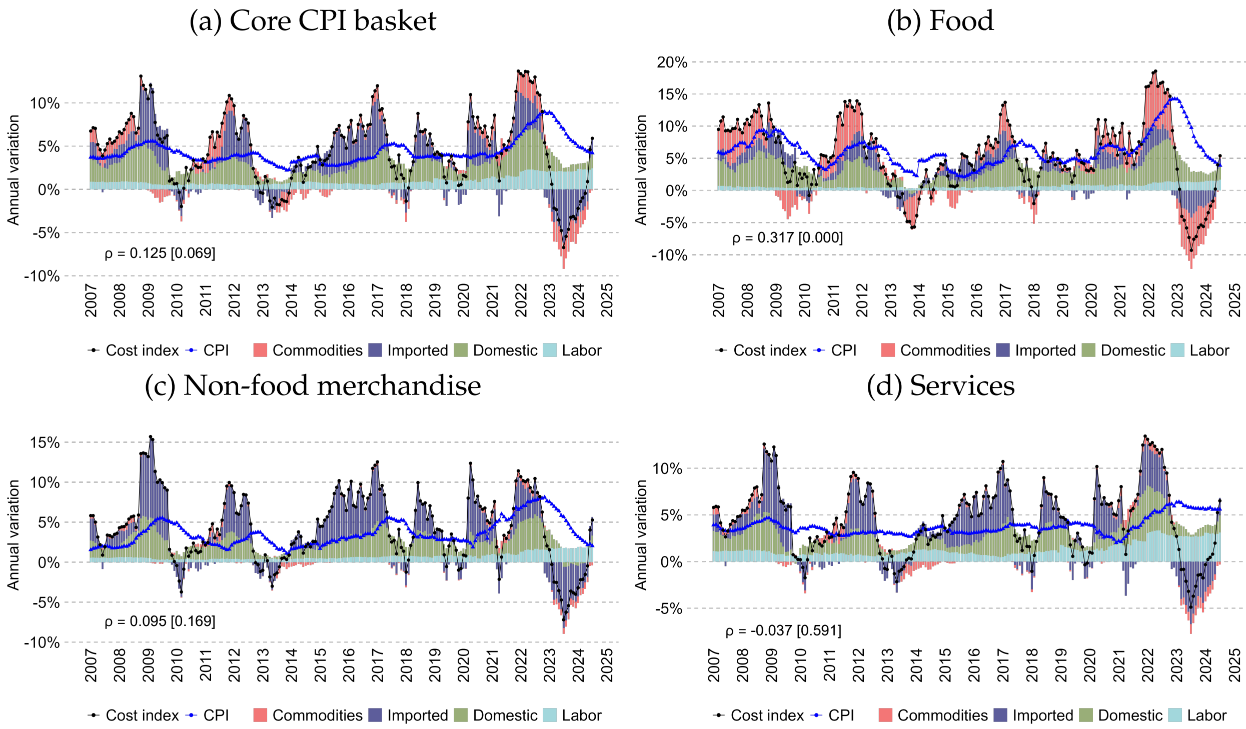
All in all, Figure 1 illustrates how cost indices may contribute to policymakers' analysis. In particular, they are a useful tool for identifying episodes in which cost-push factors

[21] We focus exclusively on the core basket because the prices of the items in the non-core basket are less responsive to cost-push factors. In particular, the prices of fruits, vegetables, livestock products, and energy could respond to supply shocks or their international references.

[22] We refer to it as mechanical impact as the estimations incorporate the exchange rate directly by multiplying commodity prices and imported input prices by the exchange rate, so the monthly movements of this reference are directly reflected in our estimation.

have influenced consumer price inflation.

Figure 1: Annual variation of Cost Indices and CPI (%)



Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. The figure shows the annual variation in the estimated cost index and the CPI for the core, food, merchandise, and services baskets. Each panel displays the Pearson correlation between the estimated cost index and the CPI, with the corresponding p-value in brackets. Cost indices are decomposed into different types of inputs to illustrate their contributions to the annual variation of the index.

5 Cost-push pressures on inflation during the Covid-19 pandemic

In this section, we carry out a simple descriptive exercise that illustrates the usefulness of the cost indices we constructed for a specific inflationary episode. In particular, to assess how cost pressures evolved since the beginning of the pandemic, Figure 2 illustrates the accumulated increase of each component of the cost index since February 2020 and up to July 2024 for the core basket and its components (food, non-food merchandise, and services). To compare the estimated accumulated increase in costs with that of consumer prices over the period, we also plot the accumulated increase in the CPI for each component.

Figure 2 illustrates a substantial and widespread increase in the production costs of items within the core CPI basket since the beginning of the pandemic. In particular, as of the end of July 2024, the CIs of food, non-food merchandise, and services registered a cumulative growth rate of 29.2%, 19.6%, and 27.1%, respectively, implying a 25.8% increase in the overall core basket in those four years and a half.

For food, the rapid and sustained growth observed between early 2021 and 2022 was mainly driven by higher commodity prices, which were exacerbated in early 2022 with Russia's invasion of Ukraine. Rising pressures from domestic inputs were also observed from the beginning of 2021 until mid-2024, and this counteracted commodity and imported input price reductions since 2023. On the other hand, the increase in costs for non-food merchandise was mainly influenced by imported inputs, especially during 2020, probably influenced by the exchange rate depreciation observed at the onset of the pandemic. The cost pressures arising from domestic inputs and labor started playing a more significant role in early 2022. Services exhibit a very similar trend, with a decline in pressures originating from imported inputs since mid-2022 and a persistent increase in the contribution of domestic inputs and wages to the cumulative growth rate.

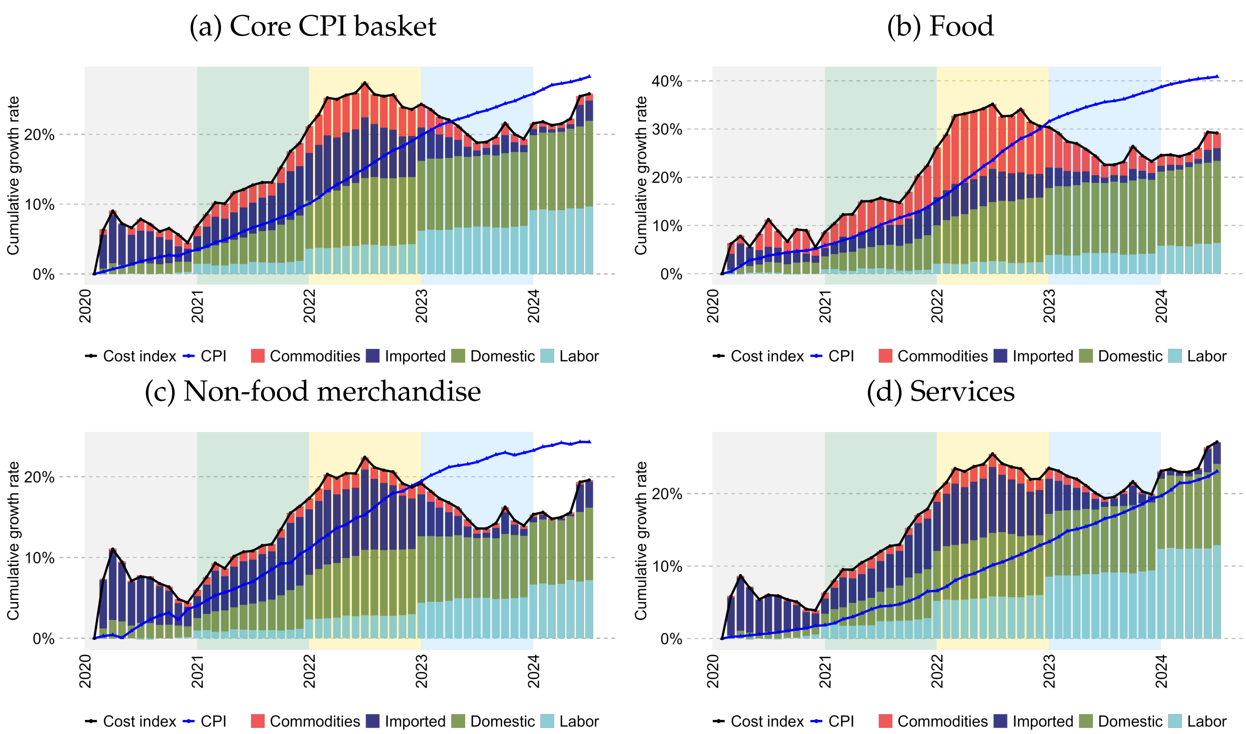
The analysis of the differential evolution of cost and consumer price indices has helped rationalize the differences in the evolution of consumer price inflation of different components. A negative difference between the accumulated increase of consumer prices and the cost indices can be interpreted as evidence that businesses are absorbing a proportion of cost increases or that firms have been unable to fully pass through cost increases to consumer prices. In contrast, a positive difference would indicate that the changes in CPI have exceeded estimated cost increases.[23]

The results suggest that the increase in consumer prices occurred at a slower rate than that of the cost indices for all baskets. This could have been a consequence of a weakness in demand during the early stages of the health emergency (from February 2020 to late 2022), or of the severity of cost increases that made it difficult for businesses to fully transfer higher costs to consumers. Since 2023, however, the gap has reversed for merchandise, so that accumulated increases in consumer prices exceed those estimated for costs for both food and the rest of goods. A decline in cost pressures has contributed to this behavior. However, it is possible that the resilience of demand for goods, which may have provided space for firms to continue increasing prices, also contributed to this trend. The analysis for services contrasts with that of merchandise. For services, the estimated increase in costs exceeded the one observed in prices throughout the period of analysis. Two factors may have contributed to this evolution. First, the pass-through of costs to consumer prices plausibly happened at a slower pace for services since businesses in this sector may have had less scope to translate higher costs into higher selling prices, given that the demand took longer to recover. Second, elevated wage growth during the period has continued to pressure costs, particularly services, due to the high weight they carry in the cost structure of these activities. These two factors have ultimately meant that the pass-through for services has lagged behind, and may help rationalize why the inflation of services has been particularly persistent (as businesses still have not fully passed through their higher costs to consumers).

Figure 3 shows the difference between the cumulative change in the CPI and the cumulative change in the CI since February 2020, each month for the *special baskets* of items that integrate the core consumer price index. A positive value in a given month indicates that the accumulated increase in consumer prices in said month was larger than

[23] Despite these differences being informative, they cannot be interpreted as precise measures of the pass-through or as evidence of changes in profit margins.

Figure 2: Cumulative change in cost indices and CPI of different baskets since February 2020 (%)



Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. The figure shows the cumulative growth rate since February 2020 in the estimated cost index and the CPI for the core, food, merchandise, and services baskets. Cost indices are decomposed into types of inputs to show the contributions of wages, domestic and imported inputs, and commodity prices to the cumulative growth.

the estimated accumulated increase in costs, and vice versa. The graph shows that the evolution of this gap has been heterogeneous across different groups, illustrating that both the velocity and the extent to which higher costs have been passed through to consumer prices have differed across types of products. During 2020 and 2021, in general, the estimated CI displayed larger increases than consumer prices, resulting in a negative gap. However, since 2022, consumer prices have recovered to different degrees. In general, the latest observations for food and non-food products suggest that the cumulative change in CPI since 2022 was larger than the estimated cumulative change in costs. For services, the graph shows more heterogeneity: by July 20204, it was positive for transportation services; it was close to zero for healthcare, recreation, telecommunications, and food services; and it was still clearly negative for education services, residential building construction, and other services. These gaps are consistent with the heterogeneity of demand recovery in different industries, which may have given different scope for businesses to raise their selling prices.

In sum, the analysis of the inflationary period during the pandemic and its aftermath illustrates that the cost indices developed in this work are an informative tool. They show how the different shocks that affected business operations since the onset of the health emergency reflected in generalized rises in production costs and heterogeneous rhythms and levels of pass-through across products.

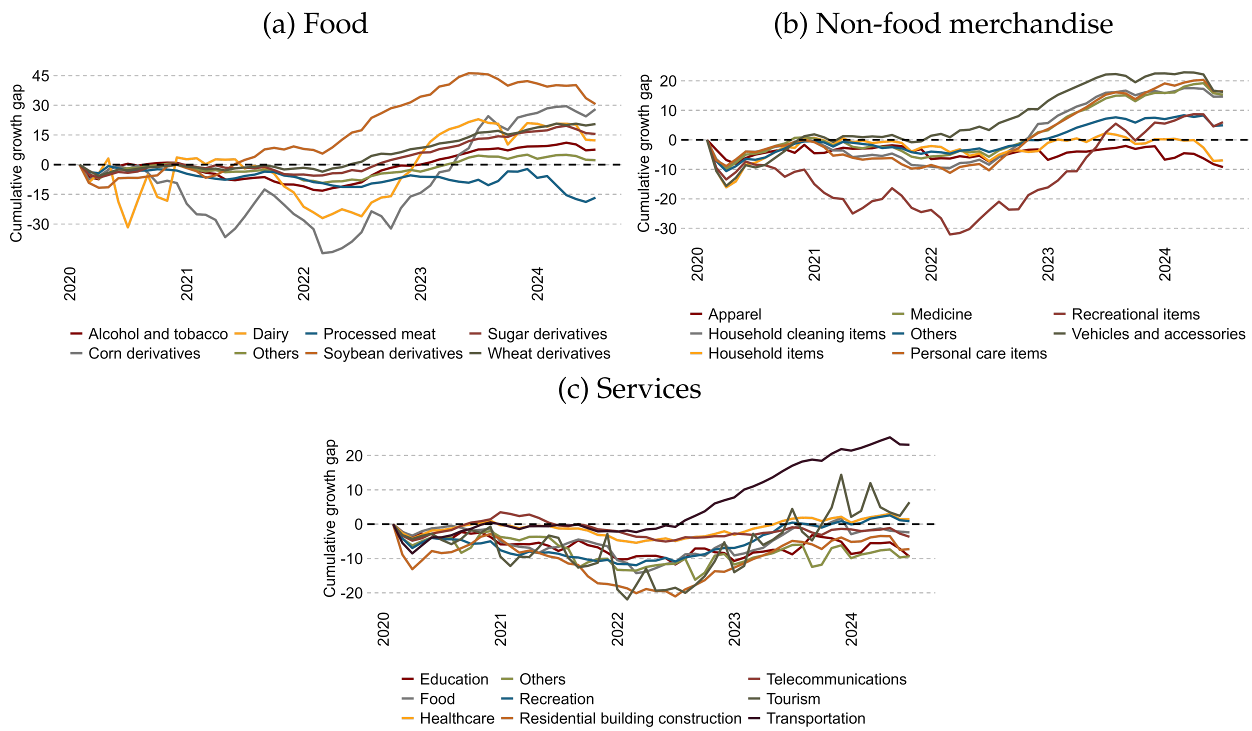
6 Predictive power of cost indices over consumer price inflation and estimation of the pass-through

This section explores the relationship between cost indices and consumer price indices more formally. We first test the existence of Granger causality between monthly variations of the CI and CPI for the special baskets of items and some aggregates. In Table 1, we present the results of the Granger tests along with the order of the VAR employed to test the hypothesis for each case (which was chosen using the BIC criterion). We do not test for Granger causality in baskets where there is autocorrelation in the residuals of the VAR specification at some lags.

For the aggregate core CPI basket, we find evidence of Granger causality from the cost index to consumer prices at the 5% significance level. The same result applies to the aggregated basket of food merchandise and all special baskets within this category, except for sugar derivatives. For the case of merchandise, we find evidence of Granger causality of CIs to CPI for the aggregated basket and for each special basket, except for medicine. Regarding services, the results suggest Granger causality for the two baskets that satisfied the conditions for the test to be valid. According to the Granger causality definition (Granger 1969; Lütkepohl and Krätzig 2004), these findings suggest that past values of the cost indices provide useful information to predict the evolution of monthly core CPI inflation. In this sense, they are a valuable tool for monitoring cost pressures that may eventually pass through into consumer prices. However, the results do not provide information on the magnitude or timing of such pass-through effects.

We also perform a simple exercise to evaluate whether inflation forecasts can be improved

Figure 3: Cumulative gap between the CPI and cost indices by basket since February 2020 (Percentage points)



Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. The figure shows the cumulative growth gap since February 2020 between the CPI and the estimated cost index for specific groups of goods or services within the core, food, merchandise, and services baskets. The cumulative growth gap corresponds to the difference between the cumulative growth rates of the CPI and the cost index.

Table 1: Results of Granger causality tests

	VAR order	Wald test statistic	
		CI $\rightarrow$ CPI	CPI $\rightarrow$ CI
Core CPI basket	4	21.756	2.341
		[0.000]	[0.673]
Food	4	28.954	4.508
		[0.000]	[0.342]
Alcohol and tobacco	9	31.954	28.346
		[0.000]	[0.001]
Dairy	4	27.350	3.950
		[0.000]	[0.413]
Sugar derivatives	1	1.593	1.004
		[0.207]	[0.316]
Soybean derivatives	1	6.636	1.580
		[0.010]	[0.209]
Wheat derivatives	5	16.966	2.305
		[0.005]	[0.805]
Others	6	29.200	10.606
		[0.000]	[0.101]
Merchandise	6	58.625	4.088
		[0.000]	[0.665]
Apparel	6	36.572	3.761
		[0.000]	[0.709]
Household cleaning items	8	70.376	18.952
		[0.000]	[0.015]
Household items	9	36.803	4.994
		[0.000]	[0.835]
Medicine	5	7.593	8.713
		[0.180]	[0.121]
Personal care items	6	17.014	8.090
		[0.009]	[0.232]
Vehicles and accessories	7	27.741	10.736
		[0.000]	[0.151]
Services	16	68.574	17.574
		[0.000]	[0.349]
Healthcare	6	18.623	3.443
		[0.005]	[0.752]
Residential building construction	8	27.504	7.070
		[0.001]	[0.529]

Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. This table reports the results of Granger causality tests between monthly variations of the estimated cost index and the CPI for aggregated and special baskets. The cost index and CPI series were seasonally adjusted. The VAR order was selected based on the Bayesian Information Criterion. The symbol $\rightarrow$ indicates the direction of the Granger causality. The p-values are shown in brackets. Numbers in green indicate the rejection of the null hypothesis that x does not Granger-causes y at the 5% significance level; red numbers indicate that the null hypothesis cannot be rejected at the 5% significance level.

through the use of CIs (see Appendix C). While CIs improve forecasting performance for certain baskets of goods relative to simple benchmark models, they do not systematically outperform models augmented with the exchange rate. However, forecasting accuracy appears to improve relative to exchange-rate-augmented models for more disaggregated baskets, particularly in the case of services and food items.

We now turn to a regression analysis to study the degree to which changes in cost indices translate into consumer price inflation. We use the seasonally adjusted monthly variations in CI and CPI at the item level between February 2006 and July 2024. Our sample consists of a panel dataset with 44,600 observations restricted to items in the core CPI basket.[24] Using these data, we estimate the regression specified in Equation 3.

$$\widetilde{\mathrm{CPI}}_{g,t} = \sum_{k \in C} \beta_k \, \widetilde{\mathrm{CI}}_{g,t-k} + \sum_{k \in P} \delta_k \, \widetilde{\mathrm{CPI}}_{g,t-k} + \theta \, X_{s,t} + \alpha_g + \gamma_t + \varepsilon_{g,t} \tag{3}$$

In this equation, $\widetilde{\mathrm{CI}}_{g,t}$ and $\widetilde{\mathrm{CPI}}_{g,t}$ represent the monthly variations in the CI and CPI for item g in month t, respectively. The term $X_{s,t}$ refers to the cyclical components of the sales revenue at the industry level, which serves as proxy for demand. This controls for demand factors or time-varying shocks that affect related goods similarly.[25] We include item and time fixed effects (α_g and γ_t, respectively) to account for time-invariant unobservable factors specific to each item, as well as common trends across time. Lagged variables for the monthly changes in CI and CPI, denoted by sets C and P were selected through a stepwise procedure.[26] In addition, we estimate Equation 3 separately for items classified as merchandise and services. The estimation results are shown in Appendix D (Table D.4), and reflect that changes in cost indices have a lagged impact in the changes of consumer prices for the three baskets analyzed. The table presents the coefficient for the specific lags that are found to have a statistically significant correlation.

To understand the magnitude of the estimated effect, we perform two exercises. First, we compute the long-run coefficients for each specification of the core, merchandise, and service baskets. Table 2 presents the results. For the core CPI basket, the results indicate that a one percentage point (pp) increase in the CI's monthly variation is associated with an increase of 0.226 pp in monthly inflation (that is, the estimated pass-through in the long run is 22.6%). Results are of similar magnitude for merchandise, where monthly inflation increases by 0.202 pp. Regarding services, the estimated long-run coefficient is slightly lower, suggesting a rise of 0.187 pp in monthly inflation.

[24] The sample contains information on only 200 items. In this subset of items, 81% are classified as merchandise; the rest correspond to services.

[25] For the services sector we use the sales revenue index by sector level (2-digit code in the NAICS), obtained from the Monthly Services Survey. For merchandise, we use the sales volume index at the subsector level (3-digit code), obtained from the Monthly Manufacturing Industries Survey. Both surveys are published by INEGI. We calculate their cyclical components using the Hodrick–Prescott filter (λ=129,600). The industry level is chosen due to data availability. Data for the NAICS sector 81 "Other services excluding government activities" is unavailable for the period before 2018, so we use the average of the sales revenue index of sectors 71 and 72.

[26] First, we regressed the monthly variation of the CPI on 24 lags of the monthly variation of both the CPI and the CI, the contemporaneous value of the CI, and the previously described set of fixed effects. Then, we performed a backward stepwise regression, which selects variables significant at the 10% level.

Table 2: Estimated long-run monthly pass-through

	Monthly CPI variation		
	Core CPI basket	**Merchandise**	**Services**
	(1)	(2)	(3)
Monthly cost index variation	0.226	0.202	0.187
	(0.035)	(0.0360)	(0.058)
	[0.159, 0.294]	[0.131, 0.273]	[0.074, 0.301]

Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. This table reports the results of the estimation of the long-run pass-through of the monthly cost index variation to the monthly core consumer price inflation. Table D.4 in the Appendix shows the results of the respective OLS regressions used to estimate the long-run coefficients. Column (1) presents the estimation results using all the items included in the core CPI basket. Columns (2) and (3) restrict the sample to items classified as merchandise and services, respectively. Cost index and CPI series were seasonally adjusted. Standard errors estimated by the delta method are reported in parentheses. Confidence intervals at the 95% level are reported in brackets.

The pass-through seems to be relatively low if we consider that prices should reflect changes in marginal costs that should be captured by cost indices. However, the magnitude of our estimate is in line with what has been found for Denmark (Dedola et al. 2021).[27]

Our second attempt to help understand the magnitude of our estimations is to calculate the contribution of cost pressures and CPI persistence in CPI inflation for each month from February 2006 to July 2024. We define the contribution of cost pressures as the sum of all the CI terms included in the estimation of Equation 3. The persistence factor is defined analogously for lagged inflation. We include a residual term, which reflects the contribution of factors that are not explained by the model at each point in time. This exercise is illustrated in Figure 4. The figure presents the results for the core, merchandise, and services CPI baskets. We observe that the contribution of the cost and persistence factor to explain monthly inflation is relatively low.

For instance, in the first half of 2009, the average monthly core inflation was 0.51%, with cost pressures contributing 0.15 pp according to our estimations. Similarly, during the inflationary episode in the first quarter of 2017, the average monthly core inflation rose to 0.75%, with estimated cost pressures accounting for 0.20 pp. In the aftermath of the pandemic, core inflation rose significantly, with an average rate of 0.63% between 2021 and 2022, and our calculations suggest that CI contributed on average with about 0.13 pp. A similar pattern is observed in monthly merchandise inflation during these inflationary episodes.

Several factors could explain a relatively low pass-through. For example, for some industries, fixed costs could be relatively significant, so changes in cost indices could be

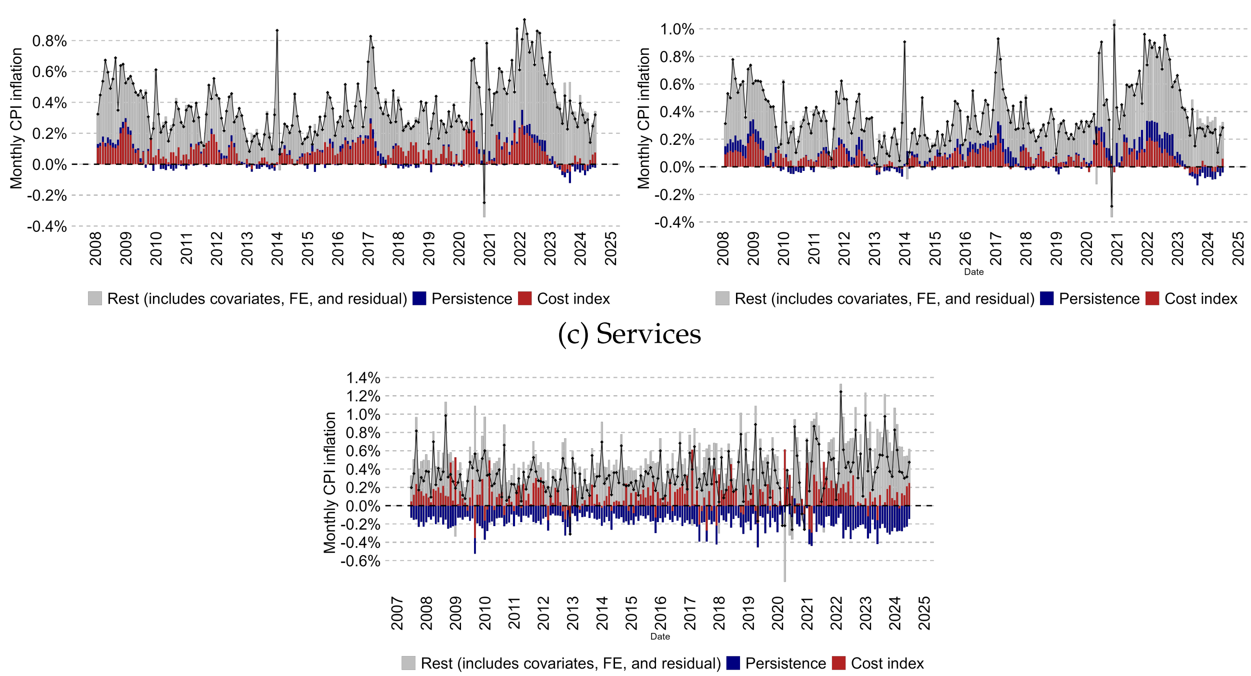
[27] Our estimate is not directly comparable to that in Dedola et al. (2021) because of the different methodology and the fact that they focus on import and energy cost shocks to producer prices, but it may give an idea of how our estimate compares with the literature.

Figure 4: Estimated contribution of different factors to monthly core CPI inflation (%)

(a) Core CPI basket

(b) Merchandise

(c) Services



Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. The figures depict the contribution of cost pressures (defined as the sum of all the CI terms included in the estimation of Equation (3) and CPI persistence (the sum of all lagged inflation terms included in Equation (3) in CPI inflation for each month. The rest term includes the contribution of fixed-effects, the demand proxy, and the residual term in Equation 3. Panel (a) presents the estimation results using all items in the core CPI basket. Panels (b) and (c) restrict the sample to items classified as merchandise and services, respectively. CI and CPI series were seasonally adjusted. The monthly CPI inflation and the contribution of each factor were calculated by averaging across items.

economically insignificant for businesses. Additionally, pricing could be more responsive to factors other than costs. For example, pricing could be more responsive to demand-pull factors or may respond to the marketing strategies of the firms, so that in the face of a change in costs, businesses adjust the markup rather than the selling price. It is also possible that firms respond differently to different types of cost shocks that could affect CIs in a similar magnitude, but that arise from different factors. For instance, wage fluctuations tend to be more permanent than commodity price fluctuations, and businesses could be less responsive to shocks that they perceive as temporary. Similarly, pass-through could be asymmetric depending on whether the costs rise or fall. Price rigidities could also imply an incomplete pass-through. An additional factor is methodological: the cyclical component of sales revenue may help control for demand trends, it may also be absorbing a large fraction of the variance in the cost indices and common cost pressures to similar items. Naturally, measurement errors in the cost indices that make this tool an imprecise estimate of costs could also be part of the explanation.

7 Conclusion

In this work, we propose a method to construct industry-specific cost indices using I-O tables. We then do so for industries in Mexico at the 6-digit disaggregation level and use them to measure cost pressures for each item of the CPI basket in Mexico. We argue that CIs are useful to illustrate how cost pressures have evolved over time, and to analyze the nuances of how these stem from different factors at different points in time. We also emphasize how these were useful to understand the inflationary surge in the aftermath of the COVID-19 pandemic. Finally, we show that cost indices have predictive power over inflation, making a strong argument for using these as an additional instrument to monitor the risks to inflation.

We hope this work stimulates a debate about how cost pressures on inflation can be best measured. Moreover, we have confidence that by making this instrument publicly available, we contribute to a more nuanced understanding of cost-push determinants of inflation. We also hope that this instrument is used to address a wider set of questions that are relevant both from an academic and public policy perspective.

References

Baqaee, D. and Rubbo, E. (2023). Micro propagation and macro aggregation. *Annual Review of Economics*, 15(Volume 15, 2023):91–123.

Chen, P. and Semmler, W. (2024). Inflation: Demand pull or cost push? A Markov switching approach. Working paper, Available at SSRN: https://ssrn.com/abstract=4692473.

De Loecker, J. and Warzynski, F. (2012). Markups and firm-level export status. *American Economic Review*, 102(6):2437–71.

Dedola, L., Kristoffersen, M. S., and Züllig, G. (2021). The extensive and intensive margin of price adjustment to cost shocks: Evidence from Danish multiproduct firms.

Durand, B., Majumdar, A., and Williams, I. (2014). Cost pass-through: Theory, measurement, and potential policy implications. Technical report, RBB Economics.

Eurostat (2024). Construction producer price and construction cost indices overview. `https://ec.europa.eu/eurostat/statistics-explained/index.php?`

Gopinath, G. and Itskhoki, O. (2010). Frequency of price adjustment and pass-through. *The Quarterly Journal of Economics*, 125(2):675–727.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37(3):424–438.

Hall, R. E., Blanchard, O. J., and Hubbard, R. G. (1986). Market structure and macroeconomic fluctuations. *Brookings Papers on Economic Activity*, 1986(2):285–338.

Kochen, F. and Sámano, D. (2016). Price-setting and exchange rate pass-through in the Mexican economy: Evidence from CPI micro data. Working Papers 2016-13, Banco de México.

Lafrogne-Joussier, R., Martin, J., and Mejean, I. (2023). Cost pass-through and the rise of inflation. Documents de Travail de l'Insee - INSEE Working Papers 2023-13, Institut National de la Statistique et des Etudes Economiques.

Levinsohn, J. and Petrin, A. (2003). Estimating production functions using inputs to control for unobservables. *The Review of Economic Studies*, 70(2):317–341.

Lütkepohl, H. and Krätzig, M., editors (2004). *Applied Time Series Econometrics*. Themes in Modern Econometrics. Cambridge University Press, Cambridge.

Machlup, F. (1960). Another view of cost-push and demand-pull inflation. *The Review of Economics and Statistics*, 42(2):125–139.

Official Statistics of Finland (2024). Cost index of civil engineering works. `https://stat.fi/en/statistics/maku`.

Olley, G. S. and Pakes, A. (1996). The dynamics of productivity in the telecommunications equipment industry. *Econometrica*, 64(6):1263–1297.

Pollock, J. and Weinhagen, J. (2020). A new BLS satellite series of net inputs to industry price indexes: Methodology and uses. *Monthly Labor Review*.

Shapiro, A. H. (2022). How much do supply and demand drive inflation? *FRBSF Economic Letter*, 2022(15):1–06.

Statistics Canada (2024). Farm input price index. `https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=2305`.

United States Census Bureau (2024). Current series (base year 2005). `https://www.census.gov/construction/cpi/current.html`.

U.S. Bureau of Labor Statistics (2024). PPI commodity data for inputs to construction industries, excluding capital investment, labor, and imports, not seasonally adjusted. `https://data.bls.gov/dataViewer/view/timeseries/WPUIP230000`.

Weinhagen, J. (2016). Price transmission within the producer price index final demand–intermediate demand aggregation system. *Monthly Labor Review*, 2016.

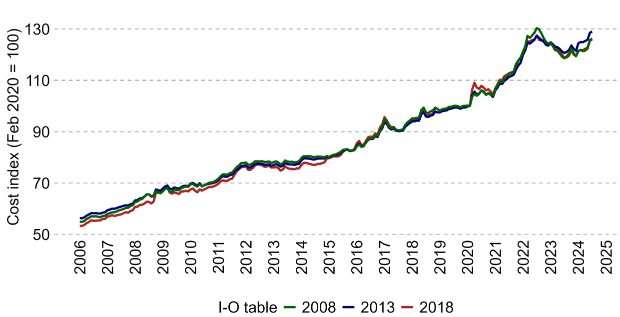
Appendix

A Comparison of the evolution of estimated cost indices using input–output tables for different years

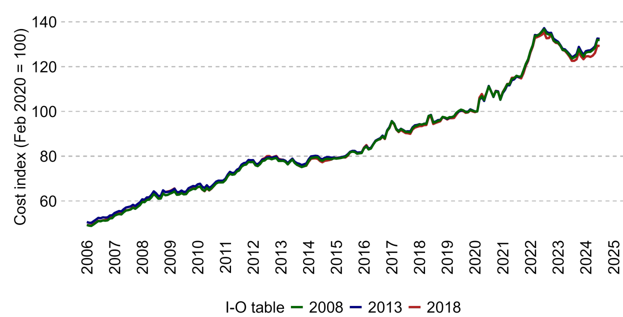
There is a question of whether using the I-O table for 2018 is appropriate to construct cost indices for the whole period of study. Figure A.1 shows the evolution of cost indices if different I-O tables are used to obtain the weight of each input in total costs (we have I-O tables for 2008, 2013, and 2018). The figures confirm that the evolution of cost indices is similar regardless of which is used, suggesting that, even if the composition of inputs has changed over time, our results are not driven by the choice of table. We choose to keep the indices constructed using the most recent table so that our indicators capture the evolution of costs for the most updated production structure.

Figure A.1: Comparison of cost indices constructed with different I-O tables.

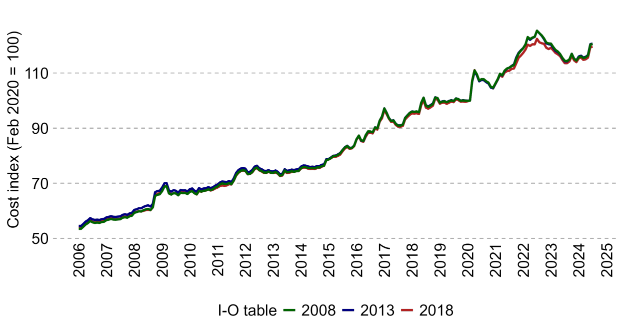
(a) Core CPI basket



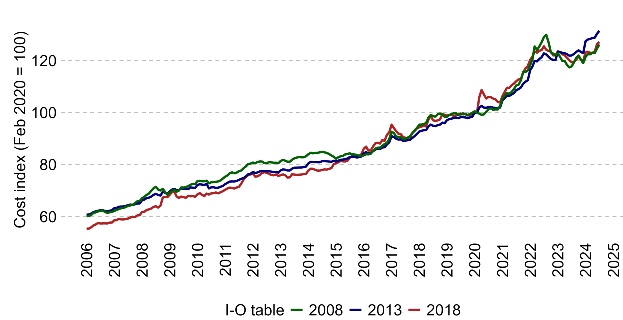
(b) Food



(c) Non-food merchandise



(d) Services

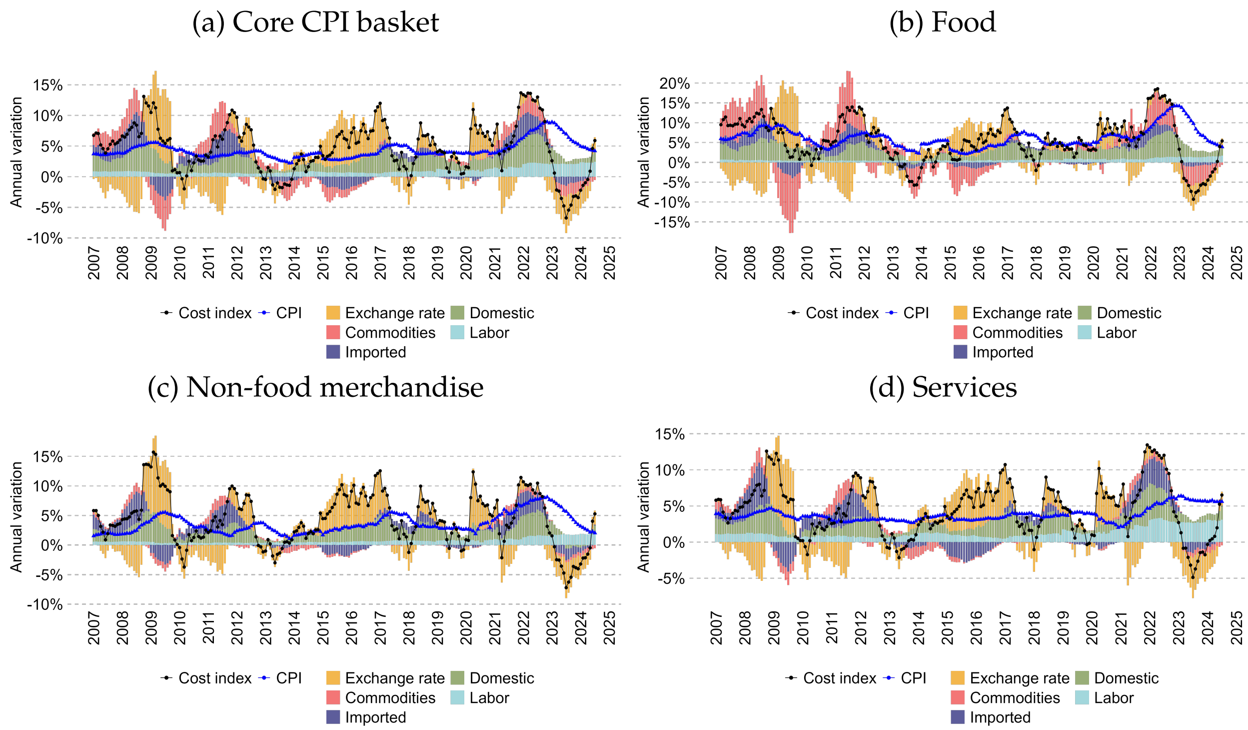


Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. The figure shows the cost indices for the core, food, non-merchandise, and services baskets. Data from the I-O tables are used to compute the share of each input in an industry's total expenditure (see Section 3.2). Each panel displays the cost index constructed using the 2008, 2013, and 2018 Mexican I-O tables.

B Decomposition of the cost index isolating the exchange rate impact

To assess the explicit contribution of the exchange rate to the estimated cost indices, we complement the decompositions presented in the paper with an additional exercise incorporating a mechanical exchange rate component. Specifically, we recalculate the cost index without multiplying the price indices of imported inputs and commodities with the index of the exchange rate. We then compute the difference between the original cost index and this adjusted version. We refer to this difference as the *mechanical effect of the exchange rate*.

Figure B.2: Annual variation of Cost Indices and CPI including the mechanical effect of the exchange rate.



Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. The figure shows the annual variation in the estimated cost index and the CPI for the core, food, non-merchandise, and services baskets. We decompose cost indices by the contribution of domestic and imported inputs, commodities, labor, and the mechanical effect of the exchange rate.

C Forecasting performance of models that incorporate CIs

To formally assess the usefulness of the estimated cost indices as indicators of cost pressures, we conduct a recursive forecasting exercise for each horizon h from 1 to 24 months and each basket. For each basket, we set January 2007 to December 2019 as the initial estimation window (training period), and using data for this period we compare the root mean squared error (RMSE) of a SARIMA model augmented with the cost index when forecasting inflation at December 2019 $+h$ with that of two alternative benchmark models: an ARIMA model and a SARIMA model augmented with the exchange rate. For each horizon and estimation window, model orders are selected according to the AIC. The exercise is implemented in an expanding-window framework, with recursive estimations carried out at each step from January 2020 to July 2024 $-h$ (at each step, the training window is extended by one month, and the model is re-estimated to generate a forecast h months ahead). Finally, we compute the success rate, defined as the proportion of cases in which the augmented model achieves a lower RMSE than the benchmark models. For each h, the success rate is calculated over the number of windows between January 2020 and July 2024 minus h. The results are shown in the tables below.

Table C.1: Success rate of SARIMA model augmented with cost index in forecasting annual inflation for different baskets of the CPI

Panel A: Forecast horizons 1–12

		Forecast horizon (months)											
	Basket	1	2	3	4	5	6	7	8	9	10	11	12
Relative to ARIMA	Headline	57.4%	58.5%	57.7%	58.8%	60.0%	59.2%	58.3%	59.6%	60.9%	62.2%	63.6%	65.1%
	Core	74.1%	73.6%	75.0%	74.5%	74.0%	73.5%	72.9%	72.3%	71.7%	73.3%	72.7%	72.1%
	Food merchandise	59.3%	60.4%	59.6%	58.8%	58.0%	57.1%	58.3%	57.4%	58.7%	60.0%	61.4%	60.5%
	Rest of merchandise	57.4%	56.6%	57.7%	56.9%	56.0%	55.1%	54.2%	53.2%	52.2%	53.3%	52.3%	51.2%
	Services	24.1%	22.6%	23.1%	23.5%	24.0%	24.5%	22.9%	23.4%	23.9%	24.4%	25.0%	25.6%
Relative to SARIMA using exchange rate as control	Headline	22.2%	22.6%	21.2%	21.6%	22.0%	20.4%	18.8%	19.1%	19.6%	20.0%	20.5%	20.9%
	Core	40.7%	41.5%	40.4%	41.2%	42.0%	42.9%	43.8%	44.7%	43.5%	42.2%	40.9%	41.9%
	Food merchandise	55.6%	54.7%	55.8%	54.9%	56.0%	55.1%	56.3%	55.3%	54.3%	53.3%	52.3%	51.2%
	Rest of merchandise	14.8%	13.2%	11.5%	11.8%	12.0%	12.2%	12.5%	12.8%	13.0%	11.1%	11.4%	11.6%
	Services	61.1%	60.4%	61.5%	62.7%	62.0%	61.2%	60.4%	59.6%	58.7%	57.8%	56.8%	58.1%

Panel B: Forecast horizons 13–24

		Forecast horizon (months)											
	Basket	13	14	15	16	17	18	19	20	21	22	23	24
Relative to ARIMA	Headline	64.3%	63.4%	62.5%	61.5%	60.5%	62.2%	63.9%	65.7%	67.6%	69.7%	71.9%	74.2%
	Core	71.4%	70.7%	70.0%	69.2%	68.4%	67.6%	66.7%	65.7%	64.7%	63.6%	62.5%	61.3%
	Food merchandise	59.5%	58.5%	57.5%	56.4%	55.3%	54.1%	52.8%	51.4%	50.0%	48.5%	46.9%	45.2%
	Rest of merchandise	50.0%	48.8%	47.5%	46.2%	44.7%	45.9%	47.2%	48.6%	50.0%	51.5%	53.1%	54.8%
	Services	26.2%	26.8%	25.0%	23.1%	23.7%	21.6%	22.2%	22.9%	23.5%	24.2%	25.0%	25.8%
Relative to SARIMA using exchange rate as control	Headline	19.0%	17.1%	15.0%	12.8%	10.5%	10.8%	11.1%	11.4%	11.8%	12.1%	9.4%	9.7%
	Core	42.9%	43.9%	42.5%	41.0%	42.1%	40.5%	38.9%	37.1%	35.3%	33.3%	31.3%	29.0%
	Food merchandise	50.0%	48.8%	47.5%	46.2%	47.4%	45.9%	44.4%	42.9%	44.1%	42.4%	40.6%	38.7%
	Rest of merchandise	11.9%	12.2%	12.5%	10.3%	10.5%	10.8%	11.1%	11.4%	11.8%	12.1%	12.5%	12.9%
	Services	57.1%	58.5%	57.5%	56.4%	57.9%	56.8%	58.3%	60.0%	61.8%	63.6%	65.6%	67.7%

Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census.

Table C.2: Success rate of SARIMA model augmented with cost index in forecasting annual inflation for different baskets of the CPI. Relative to ARIMA

Panel A: Forecast horizons 1–12

Group	Basket	Forecast horizon (months) 1	2	3	4	5	6	7	8	9	10	11	12
Food	Alcoholic beverages	70.4%	71.7%	71.2%	70.6%	70.0%	69.4%	68.8%	70.2%	71.7%	73.3%	75.0%	76.7%
	Derived from sugar	11.1%	9.4%	9.6%	9.8%	10.0%	10.2%	10.4%	8.5%	6.5%	4.4%	4.5%	2.3%
	Sausages	81.5%	81.1%	80.8%	82.4%	84.0%	83.7%	85.4%	87.2%	87.0%	88.9%	90.9%	93.0%
	Dairy products	64.8%	66.0%	65.4%	66.7%	66.0%	67.3%	68.8%	68.1%	67.4%	66.7%	65.9%	65.1%
	Derived from corn	57.4%	58.5%	59.6%	60.8%	62.0%	61.2%	62.5%	61.7%	60.9%	60.0%	59.1%	58.1%
	Other food	37.0%	37.7%	36.5%	37.3%	36.0%	34.7%	33.3%	34.0%	32.6%	31.1%	29.5%	27.9%
	Derived from soy	55.6%	54.7%	55.8%	54.9%	56.0%	55.1%	56.3%	55.3%	56.5%	57.8%	56.8%	58.1%
	Derived from wheat	66.7%	67.9%	69.2%	70.6%	72.0%	73.5%	75.0%	76.6%	78.3%	80.0%	81.8%	83.7%
Non-food	Hygiene & personal care	59.3%	60.4%	59.6%	58.8%	58.0%	57.1%	56.3%	55.3%	54.3%	55.6%	56.8%	58.1%
	Household cleaning	27.8%	26.4%	25.0%	23.5%	24.0%	24.5%	25.0%	25.5%	26.1%	26.7%	27.3%	27.9%
	Entertainment material	27.8%	28.3%	26.9%	25.5%	24.0%	24.5%	25.0%	25.5%	26.1%	26.7%	27.3%	27.9%
	Medicines	13.0%	11.3%	11.5%	11.8%	10.0%	10.2%	10.4%	8.5%	6.5%	6.7%	4.5%	4.7%
	Furniture	46.3%	45.3%	46.2%	45.1%	46.0%	44.9%	43.8%	44.7%	43.5%	44.4%	43.2%	41.9%
	Other non-food prods	22.2%	20.8%	19.2%	17.6%	18.0%	18.4%	18.8%	17.0%	17.4%	17.8%	18.2%	16.3%
	Apparel and footwear	33.3%	32.1%	32.7%	31.4%	30.0%	28.6%	27.1%	25.5%	23.9%	22.2%	20.5%	18.6%
	Vehicles	42.6%	43.4%	42.3%	41.2%	40.0%	38.8%	37.5%	36.2%	34.8%	35.6%	34.1%	32.6%
Services	Food outside from home	25.9%	24.5%	23.1%	23.5%	24.0%	24.5%	25.0%	23.4%	21.7%	22.2%	22.7%	23.3%
	Entertainment	46.3%	45.3%	44.2%	43.1%	44.0%	44.9%	45.8%	44.7%	43.5%	42.2%	40.9%	41.9%
	Other services	50.0%	49.1%	48.1%	47.1%	46.0%	44.9%	45.8%	46.8%	47.8%	48.9%	50.0%	51.2%
	Health	35.2%	34.0%	32.7%	31.4%	32.0%	32.7%	33.3%	31.9%	30.4%	31.1%	31.8%	30.2%
	Telecommunications	44.4%	45.3%	46.2%	45.1%	46.0%	44.9%	43.8%	42.6%	41.3%	42.2%	43.2%	41.9%
	Transport	40.7%	41.5%	40.4%	39.2%	38.0%	38.8%	37.5%	36.2%	34.8%	33.3%	34.1%	34.9%
	Tourism	55.6%	54.7%	55.8%	56.9%	56.0%	55.1%	56.3%	57.4%	58.7%	60.0%	61.4%	62.8%
	Education	18.5%	17.0%	17.3%	17.6%	18.0%	16.3%	14.6%	12.8%	10.9%	8.9%	9.1%	7.0%
	Shelter	33.3%	34.0%	34.6%	33.3%	32.0%	30.6%	31.3%	31.9%	32.6%	31.1%	31.8%	32.6%
Non-core	Fruits and vegetables	61.1%	62.3%	61.5%	60.8%	62.0%	63.3%	64.6%	66.0%	67.4%	68.9%	70.5%	72.1%
	Livestock products	88.9%	90.6%	92.3%	92.2%	94.0%	93.9%	93.8%	95.7%	97.8%	100%	100%	100%
	Energy	70.4%	71.7%	73.1%	74.5%	76.0%	77.6%	79.2%	78.7%	78.3%	77.8%	77.3%	79.1%
	Govt.-authorized prices	63.0%	64.2%	65.4%	66.7%	68.0%	67.3%	66.7%	68.1%	69.6%	71.1%	72.7%	74.4%

Panel B: Forecast horizons 13–24

Group	Basket	Forecast horizon (months) 13	14	15	16	17	18	19	20	21	22	23	24
Food	Alcoholic beverages	76.2%	75.6%	75.0%	76.9%	78.9%	81.1%	83.3%	85.7%	85.3%	84.8%	84.4%	83.9%
	Derived from sugar	2.4%	2.4%	2.5%	2.6%	2.6%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Sausages	92.9%	92.7%	92.5%	92.3%	92.1%	91.9%	94.4%	94.3%	94.1%	93.9%	93.8%	93.5%
	Dairy products	64.3%	63.4%	62.5%	61.5%	60.5%	59.5%	58.3%	60.0%	58.8%	57.6%	56.3%	54.8%
	Derived from corn	57.1%	58.5%	57.5%	56.4%	57.9%	56.8%	55.6%	54.3%	52.9%	54.5%	56.3%	54.8%
	Other food	26.2%	24.4%	25.0%	25.6%	26.3%	27.0%	27.8%	28.6%	29.4%	30.3%	31.3%	32.3%
	Derived from soy	59.5%	61.0%	60.0%	59.0%	57.9%	56.8%	55.6%	54.3%	55.9%	57.6%	56.3%	58.1%
	Derived from wheat	83.3%	82.9%	82.5%	82.1%	81.6%	81.1%	80.6%	82.9%	82.4%	81.8%	81.3%	80.6%
Non-food	Hygiene & personal care	59.5%	61.0%	62.5%	64.1%	65.8%	67.6%	69.4%	71.4%	73.5%	75.8%	75.0%	74.2%
	Household cleaning	28.6%	29.3%	30.0%	28.2%	26.3%	24.3%	25.0%	22.9%	23.5%	21.2%	21.9%	19.4%
	Entertainment material	28.6%	29.3%	30.0%	30.8%	31.6%	32.4%	33.3%	34.3%	35.3%	36.4%	37.5%	38.7%
	Medicines	4.8%	4.9%	5.0%	5.1%	5.3%	2.7%	2.8%	2.9%	0.0%	0.0%	0.0%	0.0%
	Furniture	40.5%	39.0%	37.5%	35.9%	34.2%	35.1%	36.1%	37.1%	38.2%	39.4%	40.6%	41.9%
	Other non-food prods	16.7%	14.6%	12.5%	12.8%	13.2%	13.5%	13.9%	14.3%	14.7%	15.2%	12.5%	12.9%
	Apparel and footwear	16.7%	15.0%	15.4%	15.8%	16.2%	16.7%	17.1%	17.6%	18.2%	18.8%	19.4%	19.4%
	Vehicles	31.0%	29.3%	27.5%	25.6%	23.7%	21.6%	19.4%	17.1%	14.7%	12.1%	12.5%	12.9%
Services	Food outside from home	23.8%	24.4%	22.5%	20.5%	18.4%	18.9%	16.7%	17.1%	17.6%	18.2%	18.8%	19.4%
	Entertainment	42.9%	43.9%	45.0%	46.2%	44.7%	45.9%	44.4%	45.7%	47.1%	48.5%	46.9%	45.2%
	Other services	52.4%	53.7%	55.0%	53.8%	52.6%	51.4%	50.0%	48.6%	47.1%	48.5%	50.0%	51.6%
	Health	28.6%	26.8%	27.5%	28.2%	28.9%	29.7%	30.6%	31.4%	32.4%	33.3%	34.4%	35.5%
	Telecommunications	40.5%	39.0%	40.0%	41.0%	42.1%	43.2%	44.4%	45.7%	47.1%	48.5%	50.0%	48.4%
	Transport	35.7%	36.6%	37.5%	35.9%	34.2%	32.4%	30.6%	31.4%	32.4%	33.3%	34.4%	35.5%
	Tourism	64.3%	63.4%	65.0%	66.7%	68.4%	70.3%	72.2%	74.3%	76.5%	78.8%	81.3%	83.9%
	Education	4.8%	2.4%	2.5%	2.6%	2.6%	2.7%	2.8%	2.9%	2.9%	3.0%	3.1%	3.2%
	Shelter	31.0%	29.3%	27.5%	25.6%	23.7%	21.6%	19.4%	17.1%	14.7%	12.1%	9.4%	6.5%
Non-core	Fruits and vegetables	73.8%	73.2%	72.5%	71.8%	71.1%	70.3%	69.4%	68.6%	67.6%	66.7%	65.6%	64.5%
	Livestock products	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Energy	81.0%	82.9%	85.0%	87.2%	86.8%	86.5%	86.1%	85.7%	85.3%	84.8%	84.4%	83.9%
	Govt.-authorized prices	73.8%	75.6%	77.5%	79.5%	81.6%	81.1%	80.6%	80.0%	79.4%	78.8%	78.1%	77.4%

Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census.

Table C.3: Success rate of SARIMA model augmented with cost index in forecasting annual inflation for different baskets of the CPI. Relative to SARIMA using the exchange rate as control

Panel A: Forecast horizons 1–12

		Forecast horizon (months)											
Group	Basket	1	2	3	4	5	6	7	8	9	10	11	12
Food	Alcoholic beverages	68.5%	67.9%	69.2%	70.6%	70.0%	69.4%	70.8%	72.3%	73.9%	75.6%	77.3%	79.1%
	Derived from sugar	59.3%	58.5%	59.6%	60.8%	62.0%	63.3%	62.5%	61.7%	60.9%	60.0%	61.4%	60.5%
	Sausages	72.2%	71.7%	73.1%	74.5%	76.0%	77.6%	79.2%	80.9%	82.6%	84.4%	86.4%	86.0%
	Dairy products	55.6%	54.7%	55.8%	54.9%	54.0%	55.1%	56.3%	55.3%	54.3%	53.3%	52.3%	51.2%
	Derived from corn	46.3%	45.3%	46.2%	47.1%	48.0%	49.0%	50.0%	48.9%	47.8%	46.7%	45.5%	44.2%
	Other food	27.8%	26.4%	26.9%	27.5%	26.0%	24.5%	22.9%	23.4%	23.9%	24.4%	25.0%	25.6%
	Derived from soy	33.3%	32.1%	32.7%	31.4%	32.0%	32.7%	33.3%	34.0%	34.8%	35.6%	34.1%	34.9%
	Derived from wheat	53.7%	54.7%	55.8%	56.9%	58.0%	59.2%	60.4%	61.7%	63.0%	64.4%	65.9%	67.4%
Non-food	Hygiene & personal care	25.9%	24.5%	23.1%	21.6%	22.0%	22.4%	22.9%	23.4%	23.9%	24.4%	25.0%	25.6%
	Household cleaning	44.4%	43.4%	42.3%	41.2%	42.0%	42.9%	43.8%	44.7%	45.7%	46.7%	47.7%	48.8%
	Entertainment material	14.8%	15.1%	13.5%	13.7%	14.0%	14.3%	14.6%	14.9%	15.2%	15.6%	15.9%	16.3%
	Medicines	20.4%	20.8%	19.2%	19.6%	20.0%	20.4%	20.8%	21.3%	19.6%	20.0%	18.2%	18.6%
	Furniture	14.8%	15.1%	13.5%	13.7%	12.0%	12.2%	10.4%	10.6%	10.9%	8.9%	9.1%	9.3%
	Other non-food prods	16.7%	15.1%	15.4%	15.7%	16.0%	16.3%	16.7%	17.0%	17.4%	15.6%	13.6%	14.0%
	Appareal and footware	14.8%	15.1%	13.5%	13.7%	14.0%	14.3%	14.6%	14.9%	15.2%	13.3%	11.4%	11.6%
	Vehicles	11.1%	9.4%	9.6%	7.8%	8.0%	6.1%	6.3%	6.4%	6.5%	4.4%	4.5%	4.7%
Services	Food outside home	33.3%	34.0%	32.7%	33.3%	34.0%	34.7%	35.4%	34.0%	32.6%	33.3%	34.1%	32.6%
	Entertainment	63.0%	62.3%	61.5%	60.8%	62.0%	63.3%	62.5%	61.7%	60.9%	60.0%	59.1%	60.5%
	Other services	64.8%	64.2%	63.5%	62.7%	62.0%	61.2%	62.5%	63.8%	65.2%	66.7%	68.2%	69.8%
	Health	33.3%	32.1%	30.8%	29.4%	30.0%	30.6%	31.3%	29.8%	28.3%	28.9%	29.5%	27.9%
	Telecommunications	38.9%	39.6%	40.4%	41.2%	42.0%	40.8%	41.7%	40.4%	39.1%	40.0%	40.9%	41.9%
	Transport	61.1%	62.3%	61.5%	60.8%	62.0%	61.2%	60.4%	59.6%	58.7%	57.8%	56.8%	55.8%
	Tourism	50.0%	49.1%	50.0%	51.0%	52.0%	53.1%	54.2%	55.3%	56.5%	57.8%	59.1%	60.5%
	Education	64.8%	64.2%	65.4%	66.7%	68.0%	67.3%	66.7%	66.0%	65.2%	64.4%	65.9%	65.1%
	Shelter	37.0%	37.7%	36.5%	35.3%	34.0%	32.7%	33.3%	31.9%	32.6%	31.1%	29.5%	27.9%
Non-core	Fruits and vegetables	40.7%	41.5%	42.3%	43.1%	44.0%	44.9%	45.8%	46.8%	47.8%	48.9%	50.0%	51.2%
	Livestock products	87.0%	88.7%	90.4%	90.2%	92.0%	91.8%	91.7%	93.6%	95.7%	97.8%	100%	100%
	Energy	81.5%	83.0%	84.6%	86.3%	88.0%	89.8%	91.7%	91.5%	91.3%	91.1%	90.9%	90.7%
	Govt.-authorized prices	50.0%	50.9%	51.9%	52.9%	54.0%	55.1%	56.3%	57.4%	58.7%	60.0%	61.4%	62.8%

Panel B: Forecast horizons 13–24

		Forecast horizon (months)											
Group	Basket	13	14	15	16	17	18	19	20	21	22	23	24
Food	Alcoholic beverages	78.6%	78.0%	77.5%	79.5%	81.6%	83.8%	86.1%	85.7%	88.2%	87.9%	87.5%	87.1%
	Derived from sugar	61.9%	63.4%	65.0%	66.7%	68.4%	70.3%	69.4%	68.6%	70.6%	72.7%	75.0%	74.2%
	Sausages	86.0%	85.7%	85.4%	87.5%	89.7%	89.5%	89.2%	88.9%	88.6%	88.2%	87.9%	90.3%
	Dairy products	51.2%	50.0%	48.8%	47.5%	46.2%	44.7%	43.2%	41.7%	40.0%	38.2%	36.4%	32.3%
	Derived from corn	44.2%	42.9%	43.9%	42.5%	41.0%	42.1%	40.5%	38.9%	37.1%	35.3%	36.4%	35.5%
	Other food	25.6%	23.8%	22.0%	22.5%	23.1%	21.1%	21.6%	22.2%	20.0%	20.6%	21.2%	22.6%
	Derived from soy	34.9%	35.7%	36.6%	35.0%	35.9%	36.8%	37.8%	38.9%	40.0%	41.2%	39.4%	38.7%
	Derived from wheat	66.7%	65.9%	65.0%	64.1%	63.2%	62.2%	61.1%	62.9%	61.8%	63.6%	65.6%	67.7%
Non-food	Hygiene & personal care	26.2%	26.8%	27.5%	28.2%	28.9%	29.7%	30.6%	31.4%	32.4%	33.3%	34.4%	32.3%
	Household cleaning	50.0%	51.2%	52.5%	51.3%	50.0%	48.6%	47.2%	45.7%	44.1%	42.4%	40.6%	38.7%
	Entertainment material	16.7%	17.1%	17.5%	17.9%	18.4%	18.9%	19.4%	20.0%	20.6%	21.2%	21.9%	22.6%
	Medicines	19.0%	19.5%	20.0%	17.9%	18.4%	18.9%	19.4%	17.1%	17.6%	18.2%	18.8%	19.4%
	Furniture	9.5%	9.8%	10.0%	10.3%	10.5%	10.8%	11.1%	11.4%	11.8%	12.1%	12.5%	12.9%
	Other non-food prods	14.3%	14.6%	15.0%	15.4%	15.8%	16.2%	13.9%	11.4%	11.8%	12.1%	9.4%	9.7%
	Apparel and footware	11.9%	12.2%	12.5%	12.8%	13.2%	13.5%	13.9%	11.4%	11.8%	9.1%	9.4%	9.7%
	Vehicles	4.8%	4.9%	2.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Services	Food outside from home	32.6%	33.3%	34.1%	32.6%	33.3%	34.1%	32.5%	30.8%	28.9%	29.7%	27.8%	28.6%
	Entertainment	61.9%	63.4%	65.0%	66.7%	65.8%	67.6%	66.7%	68.6%	70.6%	72.7%	71.9%	71.0%
	Other services	71.4%	73.2%	75.0%	74.4%	73.7%	73.0%	72.2%	71.4%	70.6%	72.7%	75.0%	77.4%
	Health	27.9%	26.2%	26.8%	27.5%	28.2%	28.9%	29.7%	30.6%	31.4%	32.4%	33.3%	32.3%
	Telecommunications	40.5%	39.0%	40.0%	41.0%	42.1%	43.2%	44.4%	45.7%	47.1%	48.5%	50.0%	48.4%
	Transport	54.8%	53.7%	52.5%	51.3%	50.0%	51.4%	52.8%	54.3%	55.9%	57.6%	59.4%	61.3%
	Tourism	61.9%	63.4%	65.0%	66.7%	68.4%	70.3%	72.2%	74.3%	76.5%	78.8%	81.3%	83.9%
	Education	66.7%	68.3%	70.0%	69.2%	71.1%	73.0%	75.0%	74.3%	76.5%	75.8%	75.0%	77.4%
	Shelter	26.2%	24.4%	22.5%	20.5%	18.4%	16.2%	13.9%	11.4%	8.8%	6.1%	3.1%	0.0%
Non-core	Fruits and vegetables	52.4%	53.7%	52.5%	51.3%	52.6%	54.1%	55.6%	57.1%	58.8%	60.6%	62.5%	61.3%
	Livestock products	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Energy	90.5%	90.2%	90.0%	89.7%	89.5%	89.2%	88.9%	88.6%	88.2%	87.9%	87.5%	87.1%
	Govt.-authorized prices	61.9%	61.0%	62.5%	64.1%	65.8%	64.9%	63.9%	62.9%	61.8%	60.6%	59.4%	58.1%

Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census.

D Estimation results

Table D.4: Estimation results of monthly cost index variation pass-through to monthly core consumer price inflation

	Monthly variation of CPI											
	Core CPI basket (1)				**Merchandise** (2)				**Services** (3)			
	$\widetilde{\mathrm{CI}}_t$	0.0099**	$\widetilde{\mathrm{CPI}}_{t-1}$	0.0592**	$\widetilde{\mathrm{CI}}_t$	0.0076*	$\widetilde{\mathrm{CPI}}_{t-1}$	0.1299***	$\widetilde{\mathrm{CI}}_{t-1}$	0.1227***	$\widetilde{\mathrm{CPI}}_{t-1}$	-0.1369*
		(0.0043)		(0.0277)		(0.0039)		(0.0238)		(0.0435)		(0.0703)
	$\widetilde{\mathrm{CI}}_{t-1}$	0.0252***	$\widetilde{\mathrm{CPI}}_{t-3}$	0.0416*	$\widetilde{\mathrm{CI}}_{t-1}$	0.0210**	$\widetilde{\mathrm{CPI}}_{t-3}$	0.0457***	$\widetilde{\mathrm{CI}}_{t-3}$	0.1187***	$\widetilde{\mathrm{CPI}}_{t-2}$	-0.1262**
		(0.0092)		(0.0231)		(0.0097)		(0.0124)		(0.0451)		(0.0635)
	$\widetilde{\mathrm{CI}}_{t-2}$	0.0300***	$\widetilde{\mathrm{CPI}}_{t-5}$	0.0556**	$\widetilde{\mathrm{CI}}_{t-2}$	0.0294***	$\widetilde{\mathrm{CPI}}_{t-4}$	0.0358***	$\widetilde{\mathrm{CI}}_{t-10}$	0.1041**	$\widetilde{\mathrm{CPI}}_{t-4}$	-0.1192**
		(0.0086)		(0.0249)		(0.0086)		(0.0115)		(0.0456)		(0.0498)
	$\widetilde{\mathrm{CI}}_{t-3}$	0.0365***	$\widetilde{\mathrm{CPI}}_{t-12}$	-0.0632***	$\widetilde{\mathrm{CI}}_{t-4}$	0.0206***	$\widetilde{\mathrm{CPI}}_{t-5}$	0.0332***	$\widetilde{\mathrm{CI}}_{t-11}$	-0.1472***	$\widetilde{\mathrm{CPI}}_{t-15}$	-0.1150*
		(0.0072)		(0.0162)		(0.0042)		(0.0100)		(0.0427)		(0.0615)
	$\widetilde{\mathrm{CI}}_{t-4}$	0.0197***	$\widetilde{\mathrm{CPI}}_{t-13}$	-0.0309*	$\widetilde{\mathrm{CI}}_{t-5}$	0.0128***	$\widetilde{\mathrm{CPI}}_{t-6}$	0.0427***	$\widetilde{\mathrm{CI}}_{t-17}$	0.0825**		
		(0.0047)		(0.0161)		(0.0033)		(0.0108)		(0.0372)		
	$\widetilde{\mathrm{CI}}_{t-5}$	0.0156***	$\widetilde{\mathrm{CPI}}_{t-14}$	0.0501**	$\widetilde{\mathrm{CI}}_{t-7}$	0.0079*	$\widetilde{\mathrm{CPI}}_{t-11}$	-0.0323***				
		(0.0036)		(0.0240)		(0.0040)		(0.0113)				
	$\widetilde{\mathrm{CI}}_{t-8}$	0.0135***	$\widetilde{\mathrm{CPI}}_{t-15}$	-0.0519**	$\widetilde{\mathrm{CI}}_{t-10}$	0.0106***	$\widetilde{\mathrm{CPI}}_{t-12}$	-0.0832***				
		(0.0041)		(0.0227)		(0.0031)		(0.0121)				
	$\widetilde{\mathrm{CI}}_{t-10}$	0.0162***	$\widetilde{\mathrm{CPI}}_{t-22}$	0.0263*	$\widetilde{\mathrm{CI}}_{t-12}$	0.0077**	$\widetilde{\mathrm{CPI}}_{t-23}$	-0.0254**				
		(0.0038)		(0.0154)		(0.0032)		(0.0103)				
	$\widetilde{\mathrm{CI}}_{t-13}$	0.0172***	$\widetilde{\mathrm{CPI}}_{t-23}$	-0.0321**	$\widetilde{\mathrm{CI}}_{t-13}$	0.0141***	$\widetilde{\mathrm{CPI}}_{t-24}$	-0.0701***				
		(0.0036)		(0.0149)		(0.0030)		(0.0137)				
	$\widetilde{\mathrm{CI}}_{t-16}$	0.0119***	$\widetilde{\mathrm{CPI}}_{t-24}$	-0.0389*	$\widetilde{\mathrm{CI}}_{t-14}$	0.0073*						
		(0.0041)		(0.0233)		(0.0038)						
	$\widetilde{\mathrm{CI}}_{t-19}$	0.0066*			$\widetilde{\mathrm{CI}}_{t-16}$	0.0071*						
		(0.0035)				(0.0038)						
	$\widetilde{\mathrm{CI}}_{t-22}$	0.0087**			$\widetilde{\mathrm{CI}}_{t-19}$	0.0068**						
		(0.0035)				(0.0031)						
					$\widetilde{\mathrm{CI}}_{t-22}$	0.0059**						
						(0.0029)						
Controls												
Demand proxy			Yes				Yes				Yes	
Fixed-effects												
Item			Yes				Yes				Yes	
Time			Yes				Yes				Yes	
Observations		39,600					32,076				7,562	
AIC		-265,638.7					-221,116.5				-47,427.1	
BIC		-262,032.3					-217,908.5				-45,722.1	
R^2		0.1031					0.1530				0.1241	

Source: Authors' calculations using data from Banco de México, INEGI, IMSS, IMF, Bureau of Labor Statistics, and US Census. Panel (1) presents the estimation results using all items in the core CPI basket. Panels (2) and (3) restrict the sample to items classified as merchandise and services, respectively. CI and CPI series were seasonally adjusted. Newey-West standard errors in parentheses. Significance level ***: 1%, **: 5%, *: 10%.