VAT Holidays as Short-Term Economic Stimuli: Evidence from Colombia's "Días sin IVA" during COVID-19

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Abstract

Sales tax holidays (STH) are commonly used to spur short-term consumption, yet the evidence on their effectiveness in developing countries remains limited. This paper analyzes Colombia's Días sin IVA (DSI), a nationwide VAT holiday held eight times between 2020 to 2022. The policy temporarily cut the 19% VAT to 0% on selected goods, covering about 40% of formal household consumption. Using high-frequency transaction data and a repeated regression discontinuity design, we find that DSI increased average sales in formal businesses by 15%, after accounting for intertemporal substitution. Unlike previous studies, we show evidence of substantial spillover effects across sectors. While businesses selling goods subject to the VAT reduction experienced a 17% average increase in sales, those selling goods with non-reduced VAT increased their sales by 14%, with widespread heterogeneous effects across diverse product categories.

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I. Introduction

Temporary tax exemptions — often referred to as tax holidays — have been used as a fiscal policy tool to stimulate economic activity. Their appeal lies in their potential to boost demand without requiring structural reforms or imposing a sustained burden on public finances. Tax holidays typically target a limited number of sectors and apply to taxes on the sale of goods and services. In Europe, some countries have introduced partial reductions in the value-added tax (VAT) rate (or its equivalent general consumption tax) to incentivize demand for specific goods (Blundell, 2009; Fuest et al., 2025). In the United States, several states implement sales tax holidays (STH) during specific days, most commonly during the back-to-school season (Agarwal et al, 2017).

While the literature provides relatively comprehensive evidence on the effects of temporary tax cuts and STH experiences from high-income countries, the effectiveness of these policies in boosting economic activity in a developing country context remains contested. Two central debates are key to studying the impact of tax holidays. First, whether tax holidays boost aggregate consumption or merely induce intertemporal substitution, where consumers shift purchases to the holiday period but reduce expenditure before and after, leaving overall economic activity largely unchanged. Second, whether the benefits are narrowly concentrated, affecting only a limited number of sectors or firms—rather than generating broad-based economic effects beyond the targeted items — spillover effects. This study aims to shed light into these existing debates by evaluating the effectiveness of *Días sin IVA* (DSI), a nationwide VAT holiday implemented in Colombia between 2020 and 2022 to boost consumption during the COVID-19 pandemic. The policy temporarily reduced VAT from 19% to 0% on a broad range of goods—covering approximately 40% of formal household consumption—and was implemented across eight separate dates over three years. We assess whether DSI achieved one of its core objectives — stimulating economic activity — by measuring both its immediate and net effects, not only within the directly covered sectors but also through its spillover effects on non-covered sectors. First, we account for *anticipatory effects*—where consumers delay purchases in expectation of the tax holiday—and *reactive effects*—where post-holiday consumption falls after needs are fulfilled during the exempt period. Second, we examine how the policy impacted different parts of the economy: directly affected (covered) establishments, and spillover effects to indirectly affected (uncovered) establishments, and different sectors within the covered group.

Finally, we explore heterogeneous effects by analyzing differences in policy impact across establishment size and the income level of typical establishment consumers. In doing so, we provide new evidence on how effective consumption tax holidays can be as a tool for governments to stimulate short-term economic activity during crises, such as the COVID-19 pandemic.

Our findings show that the DSI policy led to a 16.7% in sales in establishments selling goods subject to the VAT reduction establishments—including clothing, electronics, household appliances, school supplies, and agricultural inputs—even after accounting for anticipatory and reactive effects. Importantly, we also observe a similarly sized increase on sales of around 13.6% in establishments selling goods not subject to the VAT reduction, indicating substantial spillover effects beyond the scope of the tax exemption. While sales gains varied somewhat across product categories—durable goods such as electronics saw larger effects—the policy's impact was consistently positive and statistically significant across all sectors and establishment types. This broad pattern suggests that DSI functioned not only as a targeted stimulus for selected goods, but also as a wider economic impulse.

Our findings contribute to a broader understanding of the economic effects of consumption tax holidays. While such policies—including sales tax holidays (STHs) in the United States and temporary VAT reductions in other countries—have been widely used to stimulate consumer spending, existing designs have generally focused on a narrow set of goods, limiting their potential to study economy-wide effects. For example, between 2015 and 2021, 16 to 18 U.S. states implemented at least one STH per year, typically exempting items like school supplies, clothing, or hurricane preparedness products. Internationally, VAT holidays have often been sector-specific and introduced in response to crises, such as the UK's VAT cut during the 2008 financial crisis (Blundell, 2009) or Germany's reduction during the COVID-19 pandemic (Montag et al., 2020; Baudisch & Neuenkirch, 2023; Fuest et al., 2025). Even though it is a widely used measure in the United States, STHs are not as common overseas. A first example of STHs outside the U.S. is the recently implemented GST/HST[1] break—a two-month tax holiday in Canada—exempting certain goods such as groceries, restaurant meals, drinks, snacks, children's clothing, and gifts during holidays season. However, to the best of our knowledge there is no

[1] In Canada, the Goods and Services Tax (GST) is collected at federal level, but some provinces combine the GST and Provincial Sales Tax (PST) into a single consumption tax called Harmonized Sales Tax (HST).

empirical evidence in this regard. Because these policies tend to be narrowly targeted, it has been difficult to assess their potential effectiveness as tools to increase broad economic activity.

In contrast to more limited-scope tax holidays, Colombia's *Días sin IVA* presents a rare opportunity to study the effects of a broad, multi-sector VAT exemption implemented at the national level. The policy was applied three times in 2020, three times in 2021, and two times in 2022, with announcements made at irregular intervals amid political uncertainty—introducing quasi-random variation in timing. Unlike U.S. sales tax holidays, which typically focus on a few categories and offer modest exemptions (e.g., 6% off school supplies), DSI applied a full 19% VAT waiver across a wide range of goods, ultimately covering about 40% of formal household consumption.

We use a novel and comprehensive dataset from Bancolombia, one of the largest financial institutions in Latin America and the leading commercial bank in Colombia. This dataset enables disaggregated, high-frequency analysis at the firm level, comprising approximately 1.3 billion transactions recorded between 2020 and 2022, covering 9.6 million cardholders and over 2 million establishments. Each transaction is documented with key details such as the transaction amount, timestamp, and anonymized identifiers for both establishments and customers. Additionally, the dataset provides valuable contextual information: for establishments, it specifies the city of operation and the Merchant Category Code (MCC), which allows us to classify businesses based on the goods or services they offer; for customers, it includes an estimated monthly income and demographic characteristics. Due to the nature of the policy—explained in detail in coming sections—our analysis focuses on the firm side, we aggregate the data and create a panel at the establishment-week level that includes total sales, the type of goods they offer, and aggregate anonymized client profiles for each week in our study period.

To evaluate the impact of VAT holidays in Colombia, we analyze establishment-level effects across all national DSI events. The randomized and varied event dates allow us to address seasonality-related challenges, while the high-frequency, establishment-level data provides a granular perspective on consumption trends. We begin by estimating the overall effect of DSI using a repeated regression discontinuity (RD) design at the establishment level for all businesses in our refined sample. Subsequently, we categorize establishments into covered and uncovered groups to assess spillover effects on establishments not directly impacted by the policy. Covered

establishments were defined as those providing goods subject to the VAT reduction, as identified by their *Merchant Category Code* (MCC). Finally, we incorporate firm-level characteristics, such as company size (based on sales), sector classification, and the median consumer's income, to explore the heterogeneous impacts of the policy across different types of businesses.

We find that a DSI event increased average weekly sales by 14.6 percent overall. Among covered establishments, the net effect was a 16.7 percent gain, driven by a 33.7 percent surge during DSI weeks and offset by an 8.5 weekly decline in the weeks following DSI announcements, suggesting anticipatory shifts in consumer behavior. Non-covered establishments saw an 8.7 percent increase during DSI weeks and a positive anticipatory weekly effect of 2.5 percent, resulting in a net sales gain of 13.6 percent due to a DSI event. We find no evidence of significant reactive effects at this level of aggregation[2]. Despite differences in the composition of responses, the total and net impacts are not statistically different between covered and non-covered sectors.

While both covered and non-covered establishments experienced on average significant sales increases from DSI events, the impact was heterogeneous. We examine this variation across several dimensions, including sector, establishment size, geographic location, and the typical income profile of each establishment's customers. Among covered sectors, the largest gains occurred in high-value, durable goods: electronics led with a 52.3% increase in sales, followed by department stores (42.6%) and agricultural supplies (23.6%). Meanwhile, categories associated with lower-ticket or more frequent purchases—such as school supplies (22.8%) and clothing (6.8%)—saw more moderate increases. These patterns suggest that consumers were more responsive when the tax savings were substantial.

Establishment characteristics also played a role. While the average effect of DSI did not vary significantly by establishment size across the full sample, among covered establishments, larger establishments experienced disproportionately higher sales increases[3]. In contrast, within non-covered sectors, establishment size had no statistically significant effect, though smaller establishments appeared to benefit slightly more—possibly due to spillover effects as consumers made additional purchases beyond the scope of the tax exemption. Finally, when categorizing

[2] Note that the figures should not be added directly, as there may be more than one anticipatory week. For a detailed explanation of anticipatory weeks, please refer to Appendix D.
[3] In this study, we assign the size of establishments based on observed sales before the pandemic by sector, i.e., the largest establishments are those whose sales rank in the top 25% in their sector.

establishments by the median income level of their typical shoppers, the policy had a stronger impact on establishments frequented by lower-income consumers, while effects were weakest in those frequented by an on-average higher-income clientele.

Our work contributes to two bodies of work. First, we contribute to the literature studying the effects of consumption tax holidays. Despite variations in policy design and objectives across states, the Sales Tax Holidays (STHs) are a well-known policy implemented in United States. In 2024, 19 states conducted at least one STH that year (i.e. 42% of U.S. states with sales tax), the most common are the back-to-school STH (15 states), but some states also implemented tax holidays on energy efficient products and severe weather preparedness items. Most STHs last between 2 and 7 days, but some states such as Florida and Tennessee have implemented it for longer periods[4]. The effects of STHs on total consumption appear to be positive and significant for the targeted items. Empirical evidence shows that in response to a STHs consumption increases for both semi-durable goods, such as computers (Cole, 2009a; Cole, 2009b), and essential goods, with the tax reduction often being almost fully passed on to consumers with lower prices. This is observed in studies from New York (NYS Department of Taxation and Finance, 2003), Tennessee (Ross & Lozano-Rojas, 2018), Florida (Harper et al., 2003), and Massachusetts (Aladangady et al., 2017). Similarly, Agarwal et al. (2017) report that STHs led to higher apparel consumption, despite some evidence of intertemporal substitution. We contribute to this literature by providing new evidence that consumption tax holidays can generate significant spillover effects in non-covered sectors when applied to a large set of goods—of roughly the same magnitude as those observed in covered categories. This suggests that tax holidays may have more diffuse and economy-wide impacts than previously documented. In addition, by leveraging high-frequency transaction data at the establishment level, we are able to disentangle policy effects within product categories, across establishment sizes, and between covered and uncovered sectors. Our results show that DSI increased sales for both covered and non-covered goods, and that the policy's impact was not confined to large retailers; in some cases, smaller establishments also experienced notable gains.

Second, we contribute to the broader literature on the role of indirect taxes—particularly VAT—as flexible instruments for achieving multiple policy objectives in developing countries. In

[4] See https://www.taxadmin.org/2024-sales-tax-holidays/

economies with large informal markets, VAT plays a central role in tax collection and is often viewed not only as a source of revenue but also as a tool to address inequality, promote formalization, and respond to economic shocks. In 2021, VAT accounted for 28.6% of total tax revenue in Latin American and Caribbean countries, compared to an average of 20.7% in OECD countries. VAT is an indirect tax applied to the sale of most goods and services, allowing firms to deduct the tax paid on their inputs. Among OECD countries, general VAT rates vary significantly—from as low as 5% to over 25%—and typically apply to a broad set of items, while exempting essentials like basic foodstuffs and healthcare (OECD, 2024). A growing body of work has explored how VAT design and enforcement can be leveraged to pursue redistributive and developmental goals. For instance, Bachas, Gadenne, and Jensen (2020) show that VAT and other consumption taxes can have progressive effects in high-informality settings; Pomeranz (2015) demonstrates how VAT enforcement can be effective even in informal economies by exploiting business-to-business transactions; and Naritomi (2019) highlights how VAT incentives can promote formalization and improve compliance. Keen (2008) also underscores VAT's central role in generating substantial revenue in low-capacity states. Building on this work, we show that VAT can also serve as a countercyclical instrument. Our findings indicate that VAT holidays can stimulate overall economic activity during downturns, as evidenced by Colombia's Días sin IVA. The impact was broad-based, extending beyond the directly exempted sectors, and was observed across stores of varying types and sales levels—suggesting that VAT holidays may offer tax administrations in developing countries a versatile tool to support demand during crises.

The study closer to ours is Arango et al. (2024) that also examines the effects on the DSI. They use data from retail trade indices published by the national statistical agency (DANE), which serve as proxies for household consumption across a range of merchandise categories. Their empirical strategy combines time series models with difference-in-differences and event study approaches to assess the effects of the policy on both consumption and prices. By aggregating consumption data at the product-line level and exploiting the timing of policy implementation, their setup assumes a clean separation between treated and control groups based on product eligibility for the VAT exemption. We complement their analysis by using a disaggregated panel of formal retail transactions at the establishment level, offering a more granular view of the

policy's effects on the formal sector. This approach allows us to examine spillover effects on non-covered products and sectors, capturing a broader range of behavioral responses.

The rest of the document is organized as follows: Section 2 describes the study's context and empirical setting, Section 3 details the data, Section 4 explains the empirical strategy and main assumptions, Section 5 presents the primary results, and Section 6 concludes.

II. Context and Empirical setting

The COVID-19 pandemic triggered a severe economic and social crisis in Colombia. Beginning in March 2020, the country implemented one of the strictest and longest lockdowns in Latin America, bringing much of the economy to a standstill (OECD, 2022). Mobility restrictions, business closures, and a sharp drop in domestic and global demand led to a historic 6.8% contraction in GDP that year (DANE, 2021) with particularly severe effects on employment and household income. Informal workers and small businesses—already vulnerable—were disproportionately affected (World Bank, 2021). In response, the government adopted a series of emergency measures, including cash transfers through the *Ingreso Solidario* program, credit guarantees, and temporary tax deferrals. However, limited fiscal space constrained the scope for large-scale stimulus. In this context, policies aimed at boosting consumption without generating long-term fiscal commitments became especially attractive.

The *DSI* policy emerged as one such instrument—designed to temporarily stimulate demand, support retailers, and ease the financial burden on households through targeted tax relief (Ministerio de Hacienda y Crédito Público, 2020). The DSI policy started in 2020 and exempted certain goods from the 19% VAT—the third largest rate in Latin America[5]— during one calendar day, across three separate and non-consecutive days. The exempted goods covered seven broad product categories: (1) clothing, (2) clothing accessories, (3) household appliances, computers, and communication devices, (4) sports equipment, (5) toys and games, (6) school supplies, and (7) agricultural inputs. To qualify for the exemption, purchases had to meet specific conditions: the transaction had to be paid with debit card, credit card or other electronic payment methods, cash was also allowed after the second year[6], the retailer was required to issue an electronic invoice, and consumers were limited to three items per category. Additionally, price

[5] Above of the regional average of 14.8% and slightly below the OECD average of 19.3% (OECD, 2020).
[6] The national government allowed cash payments from the fourth DSI, under Law 2155 of 2021.

caps applied by product type—for example, up to 20 UVT[7] for clothing, and up to 80 UVT for appliances, electronics, and agricultural goods. Although Decree 682 of 2020 also included tax exemptions for restaurants, bars, and rental services, this study focuses exclusively on the retail goods explicitly covered by the DSI designation. The specific categories of goods eligible for VAT exemption under the "Días sin IVA" policy, along with their respective price limits, are detailed in Appendix A.

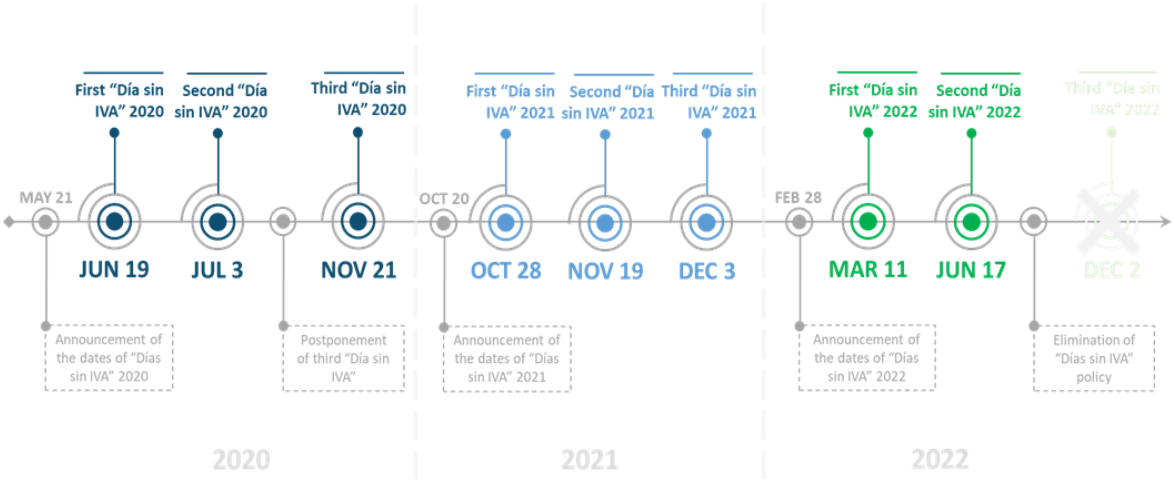
Subsequent decrees (1314 of 2021 and 290 of 2022) extended the policy by adding additional VAT-free days in the following years: 3 additional days in 2021 and 2 additional days in 2022, for a total of 8 different VAT holidays between 2020 and 2022, before elimination. The Colombian government announced the official DSI dates each year, typically releasing all three scheduled dates simultaneously. As shown in *Figure 1*, these announcements occurred at irregular intervals and often shortly before the first VAT-free day of the year. For example, in 2020, the three DSI dates were announced on May 21, less than a month before the first exemption day[8]; in 2021, the announcement was made one week before the next DSI; and, in 2022, the announcement came on February 28, just days ahead of the first implementation of the year in March. This lack of a consistent timing pattern—combined with ongoing uncertainty about the policy's continuation, including the cancellation of a planned date in late 2022—introduced quasi-random variation that we exploit for empirical identification. The implementation dates also varied considerably across years: in 2020, the VAT-free days occurred in June, July, and November; in 2021, they shifted to October, November, and December; and in 2022, they were held in March and June. DSI thus represents the first large-scale VAT holiday program implemented in Latin America and provides a unique opportunity to evaluate the effects of a broad, temporary consumption tax exemption. *Figure 1* summarizes the key policy milestones, including announcement and implementation dates, as well as any subsequent changes made throughout the program's three-year duration. Appendix B provides a detailed timeline of the announcements and implementation of the "Días sin IVA" policy from 2020 to 2022. It documents the specific dates for each DSI event, changes in purchasing conditions (such as restrictions on in-person sales for certain categories during the pandemic), and policy

[7] The unit of taxable value (UVT) is a measure used in Colombia to determine tax obligations, and its value increases annually based on Consumer Price Index (CPI) variation. The UVT was equivalent to COP 35,605 in 2020, COP 36,308 in 2021 and COP 38,004 in 2022 (~USD 9.4).

[8] Initially, the third DSI of 2020 was scheduled for July 19, however, given the increase in COVID-19 cases, the government postponed this event, which was later announced for November 21.

adjustments across administrations. We leverage this context and high frequency data to measure the effects of the policy.

Figure 1. Timeline of "Días sin IVA" policy



Source: Authors' elaboration based on Decrees 682 of 2020, 1044 of 2020, 1474 of 2020, 1314 of 2021 and 290 of 2022.

III. Data

We use a comprehensive database that captures a substantial share of transactions made via credit and debit cards in Colombia, with high-frequency data and detailed establishment-level identifiers. Our data partner, Bancolombia, is the largest commercial bank in Colombia, accounting for 26.5 percent of all credit and debit cards in circulation. Transactions made with these cards account for 44.5 percent of total financial transactions nationwide.[9] This extensive coverage provides a robust foundation for a detailed and representative analysis of consumer spending patterns across the country.

The transaction database offers a detailed snapshot of consumer and establishment activity in Colombia, capturing high-frequency data that spans the periods before, during, and after each DSI event. This data allows us to observe how spending patterns shift as consumers anticipate DSI dates, surge on VAT-free days, and adjust once the policy ends. The granularity of the data further uncovers sector-specific responses, as transactions are linked with a MCC, enabling us to classify spending across ten distinct commerce categories. Of these, five—appliances (including personal computers and electronics), clothing establishments, department

[9] Figure D2 (Appendix D) shows the distribution of cardholders and transactions by financial institution in Colombia, providing evidence that confirms Bancolombia is the country's largest commercial bank.

establishments, school supplies (including toys and sports items), and agricultural inputs—fall directly under the VAT exemption on DSI days.

While the transaction data offers a valuable view into consumer and business behavior, certain limitations must be acknowledged to clarify the study's focus and scope. First, we only observed sales paid with credit or debit cards issued by Bancolombia. As in many developing countries, financial inclusion in Colombia remains limited: only 22.5% of adults over 18 own a credit or debit card. Within the formal retail sector, an estimated 85% of establishments accept card payments (Arango-Arango et al., 2021). Notably, the DSI policy exclusively applies to formal businesses that can issue electronic invoices, which limits the policy's impact to businesses already integrated into formal financial networks. Given this scope, our analysis centers on the policy's effects on the sales activity of formal businesses. Furthermore, we aggregate sales data at the weekly level to smooth out short-term fluctuations and minimize the influence of outliers, ensuring more robust and reliable effect estimations[11].

A second concern relates to the sample of firms included in our study. During the period covered by our analysis many firms closed while others opened. The opening and closure of establishments during this time may introduce bias at the moment to study the impact of the DSI policy on the sales of an average business. To tackle this issue, we restrict our analysis to firms that we consistently observe in our study throughout the period. We include only establishments that recorded transactions in at least 147 of the 157 weeks from January 2020 to December 2022. This criterion ensures a stable sample given that a significant number of establishments had to close for at least 10 weeks (about 2 and a half months) due to the COVID-19 quarantine during the analysis period (refer to *Figure 2, Panel B*). After this filtering process, our final subsample comprises 3.5 million observations from 23,166 establishments. Our subsample is composed of 1% of the establishments in the original database, but their aggregate sales represent around 70% of the total transaction volume[12]. Given the structure of the data, we perform our analysis at the week-establishment level to tackle weekly periodicity.

Descriptive statistics in *Table 1* provide an overview of the distribution of establishments in our sample, distinguishing between establishments covered and not covered by the DSI policy. We

[11] One week is defined as a seven-day period that start each Monday and ends on Sunday.
[12] We also ran results using the total sample of establishments and the results are consistent, however, given the problems described above, we prefer the stable subsample of establishments.

considered as covered establishments those providing goods subject to the VAT reduction, as identified by their Merchant Category Code (MCC). Overall, 23.5% of establishments in the sample operate in sectors covered by the VAT exemption. Within this group, the largest share corresponds to clothing establishments (12.1%), followed by appliances and electronics (3.84%), department establishments (3.19%), school supply retailers (3.01%), and agricultural supply establishments (1.36%).

The remaining 76.5% of establishments fall outside the scope of the DSI policy. Among these non-covered sectors, grocery stores and restaurants make up the largest share (29.28%), followed by establishments selling household items (3.03%), business and household services (4.94%), and establishments in travel, entertainment, and transportation (3.0%). The remaining 36.25% of establishments are categorized as "other," a broad group that includes various businesses not directly aligned with the DSI-targeted categories

The second panel of Table 1 presents descriptive evidence of differences in average weekly sales between DSI and non-DSI weeks across covered and non-covered sectors. Even these raw descriptive statistics indicate notable differences between DSI and non-DSI periods. While not causal, these differences reveal a clear pattern in both covered and non-covered sectors, providing initial motivation for our spillover analysis. In covered sectors, average sales during DSI weeks were $12.26 thousand, compared to $7.81 thousand USD in non-DSI weeks—a difference of 57%. In non-covered sectors, average weekly sales reached $4.23 thousand USD during DSI weeks and $3.69 thousand USD during non-DSI weeks, reflecting a 15% difference.

The sectoral breakdown in Table 1 reveals important variation in weekly sales differences between DSI and non-DSI weeks. Among covered sectors, the largest differences are observed in durable, high-value categories. Department establishments and appliances/electronics show particularly strong contrasts, with differences of 61.6% and 91%, respectively. In contrast, clothing establishments exhibit a more moderate difference of 46%, despite also being covered by the policy. Among non-covered sectors, several categories, such as household items and business and household services, also display notable differences (37% and 56%, respectively), suggesting potential relevant indirect effects.

Table 1. Descriptive statistics

	Establishments		Weekly average sales		
	#	%	All weeks	DSI weeks	Non-DSI weeks
Total sample	23,166	100%	COP 18,379,511 [USD 4,715.2]	COP 23,875,890 [USD 6,125.3]	COP 18,077,720 [USD 4,637.8]
By covered sector					
Covered sectors	5,445	23.5%	$31,356,498 [$8,044.5]	$47,792,290 [$12,261.0]	$30,434,489 [$7,807.9]
Non-covered sectors	17,721	76.5%	$14,485,256 [$3,716.2]	$16,506,123 [$4,234.6]	$14,375,017 [$3,687.9]
By establishment sector					
Appliances, PC's & electronics (C)*	890	3.8%	$19,925,752 [$5,111.9]	$36,312,882 [$9,316.0]	$19,018,308 [$4,879.1]
Clothing establishments (C)	2,802	12.1%	$9,365,305 [$2,402.7]	$13,364,388 [$3,428.6]	$9,137,217 [$2,344.1]
Department stores (C)	740	3.2%	$153,367,430 [$39,346.1]	$240,117,110 [$61,601.6]	$148,637,070 [$38,132.6]
School supplies, toys & sports (C)	697	3.0%	$9,977,403 [$2,559.7]	$1,273,167 [$326.6]	$9,823,376 [$2,520.2]
Agricultural supplies (C)	316	1.4%	$10,235,392 [$2,625.9]	$12,143,515 [$3,115.4]	$10,131,981 [$2,599.3]
Household items	703	3.0%	$23,147,241 [$5,938.4]	$31,172,205 [$7,997.2]	$22,700,754 [$5,823.8]
Grocery stores & restaurants	6,783	29.3%	$12,628,327 [$3,239.8]	$14,627,503 [$3,752.7]	$12,519,813 [$3,211.9]
Business & household services	1,144	4.9%	$18,487,318 [$4,742.9]	$28,037,498 [$7,193.0]	$17,962,400 [$4,608.2]
Travel, entertainment & transportation services	694	3.0%	$39,112,654 [$10,034.3]	$38,997,484 [$10,004.7]	$39,118,947 [$10,035.9]
Others	8,397	36.2%	$12,722,408 [$3,263.9]	$13,382,390 [$3,433.2]	$12,686,361 [$3,254.7]
*By establishment size***					
Small	5,790	25%	$1,472,912 [$377.9]	$1,755,501 [$450.4]	$1,457,373 [$373.9]
Medium-small	5,786	25%	$3,734,417 [$958.1]	$4,519,455 [$1,159.5]	$3,691,293 [$947.0]
Medium-large	5,788	25%	$8,494,531 [$2,179.3]	$10,450,448 [$2,681.0]	$8,387,174 [$2,151.7]
Large	5,802	25%	$59,470,623 [$15,257.1]	$78,440,385 [$20,123.7]	$58,430,710 [$14,990.3]
By city type					
Metropolitan areas	13,672	59.0%	$22,898,606 [$5,874.6]	$29,491,689 [$7,566.0]	$22,536,593 [$5,781.7]
State capitals	5,391	23.3%	$12,158,912 [$3,119.3]	$15,672,709 [$4,020.8]	$11,965,251 [$3,069.7]
Other cities/towns	4,103	17.7%	$11,479,781 [$2,945.1]	$15,919,868 [$4,084.2]	$11,237,197 [$2,882.9]

Source: authors' elaboration based on transactional database.

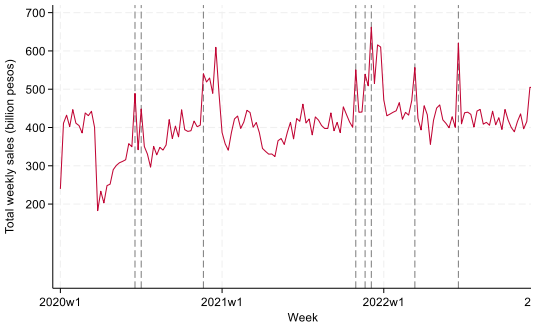
Notes: weekly sales at December 2022 constant prices. Amounts are in COP and USD (in brackets). *(C) means that the sector was covered by the DSI policy. ** Establishment size was defined based on the sectoral distribution of pre-covid sales on each establishment category: small (25th percentile or lower), medium-small (between the 25th and 50th percentile), medium-large (between the 50th and 75th percentile) and large (75th percentile or higher).

Figure 2 illustrates a noticeable increase in total sales across all establishments during DSI periods. This growth appears to be substantially larger in covered sectors compared to non-covered sectors. However, attributing these sales spikes solely to DSI is challenging, as the series also reflects seasonality. There are subtle peaks every two weeks, likely corresponding to paycheck

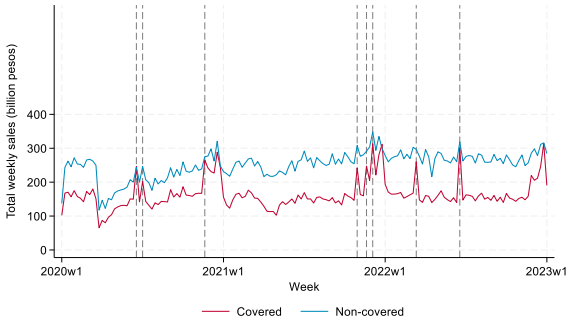
periods, as well as spikes around major consumption periods such as Christmas, New Year, Holy Week, Black Friday, and Cyber Monday. To account for these periodic fluctuations, our identification strategy will control for these events as explained in the next section.

Figure 2. Total sales by week and establishment type

a) All establishments



b) Covered vs non-covered



Source: authors' elaboration based on transactional database

Note: Each gray dashed line represents a week where a DSI was conducted. Sample includes all establishments with sales in at least 147 of 157 weeks.

IV. Empirical strategy

We aim to measure the net average effect of a DSI event occurring in a given week on establishment-level sales. In that sense, we aim to separate intertemporal substitution effects induced by DSI, where consumers alter the timing of their purchases, from a net increase in sales over the evaluation period. We leverage repeated DSI events and test the effect on sales of a DSI week. To estimate the impact of DSI on economic activity, we employ a repeated regression discontinuity (RD) on time, leveraging high-frequency bank data for all establishments in our sample. Events in this design are defined as periods when "Día sin IVA" (DSI) is active, while periods without DSI serve as controls, as all units are uniformly treated due to limited regional variability.

We considered several alternative identification strategies. The first natural candidate was a difference-in-differences (DiD) framework, which would involve a repeated DiD design using establishments in non-covered sectors as a control group. However, this approach presents several limitations. Anecdotally, we observe significant spillover effects from DSI into these would-be control groups. For instance, increased street activity on DSI days may have influenced sales in service-oriented sectors, such as restaurants and transportation, making it difficult to argue that these establishments were unaffected and breaking the Stable Unit Treatment Value

Assumption (SUTVA) that is required by the DiD methodology. Moreover, the classification of covered and non-covered sectors was not random, raising concerns about the comparability of sales trends across these groups. Given these challenges, we do not treat non-covered sectors as a strict control group. Instead, we use them to explore potential spillover effects.

Ultimately, we adopt a repeated regression discontinuity (RD) design. This approach has the advantage of comparing each establishment to itself across different periods, using control weeks that are neither affected by DSI events nor included in anticipatory or reactive windows. The high frequency of our transaction data provides a rich set of observations per establishment within these control periods, allowing for robust estimation. Importantly, this design enables us to analyze effects in uncovered sectors without imposing restrictive assumptions about their role as a control group. Finally, the large number of establishments in our sample, the availability of detailed establishment-level characteristics, and the repeated and relatively unanticipated nature of the DSI events together enhance the credibility and robustness of our empirical strategy.

To address potential intertemporal substitution effects, we define two control variables: an anticipatory variable and a reactive variable. The anticipatory variable captures the period during which consumers might delay purchases in anticipation of a DSI (i.e. when the DSI dates are known with certainty). We use each policy announcement as a reference point, the anticipatory period spans from the week of the announcement up to the week of the last DSI announced. In years with multiple closely spaced DSIs (like 2020 and 2021), this includes the weeks between events. In contrast, for 2022—where DSIs were spaced farther apart—we assume consumers would not anticipate a DSI more than four weeks in advance, so only the four weeks prior to the second DSI are considered anticipatory. The reactive variable is defined as the six weeks following the last DSI of each announcement period, capturing potential declines in consumption due to purchase reallocation. This approach allows us to isolate genuine increases in consumption from those driven by timing shifts, and robustness checks with alternative time windows (4 or 8 weeks) produce consistent results. Figure D1 in Appendix D summarizes the structure of our intertemporal substitution analysis. It visually distinguishes the anticipatory periods (between policy announcements and DSI dates), the event weeks (when DSI occurs), and the reactive periods (following the last DSI in each announcement cycle). Weeks outside these windows are treated as control periods, allowing for clean comparisons at the weekly level across the full 2020–2023 time frame.

We also include a vector of controls, X_t, which includes dummies for significant events impacting economic activity (e.g., Easter, Mother's Day, Black Friday, Cyber Monday, Christmas, and New Year) aligned with the time trends we observed in the previous section; payday dummies for weeks including the 1st and 15th, quarantine period dummies during COVID-19 lockdowns. We further control unobserved heterogeneity through establishment and month-year fixed effects, and we calculate standard errors clustered at the business category-department level. Specifically, we conduct regression analysis as outlined in equation (1)[13]

$$ln(y_{i,t}) = \alpha_i + \beta \times DSI_t + \delta \times A_t + \gamma \times R_t + \Theta \times X_t + \varepsilon_{i,t} \quad (1)$$

To better understand the effects of the DSI policy, it is important to distinguish between its direct and indirect impacts. The policy directly targeted a specific set of product categories by exempting them from VAT, but its broader influence may have extended beyond these categories. To capture this distinction, we divide our analysis into two groups: establishments that sell covered goods, which were explicitly included in the DSI exemption, and those that sell uncovered goods, which were not.[14] Covered products include appliances, PCs and electronics, clothing, department establishment items, school supplies, toys and sports equipment, and agricultural supplies, as outlined in previous sections. A establishment is classified as *covered* if it sells items from any of these categories. This distinction allows us to test whether the policy had spillover effects on sectors not directly targeted.[15]

V. Main results

This section begins by analyzing the overall effect of DSI events across the entire sample of establishments, capturing the aggregate short-term impact of the policy. Next, we disaggregate the analysis into covered and uncovered sectors to separate the direct effects on goods explicitly included in the VAT exemption and potential spillover effects on other sectors. We then further explore heterogeneity within covered sectors by examining how the policy's impact varies across

[13] We also test the effect including establishment level clusters as a robustness check. But leave the category-department level as our main specification.

[14] If we identify that an establishment sale both covered and uncovered goods, we include such establishment in the covered group. Such is the case with department establishments, which tend to include several categories of goods including clothing and electronics as well as offer services in uncovered sectors.

[15] To be cautious, control variables X_t include interactions between dummies for key events and the COVID-19 period with an indicator for firms in covered sectors. This accounts for the possibility that these events may have affected covered and non-covered businesses differently. Including or excluding these interactions does not alter the main results.

different product categories such as electronics, clothing, and school supplies. Finally, to better understand the policy's heterogeneous effects at the establishment level, we examine its impact across establishments of varying sizes and typical customer income levels, testing whether these characteristics influenced the policy's effectiveness.

5.1 Overall effect of DSI on economic activity

We find that DSI events have a significant impact on observed sales at the establishment level. Specifically, without accounting for anticipatory or reactive effects, weekly sales increase by 14.8% during DSI weeks. This corresponds to an average gain of approximately 2.7 million pesos (about 690 USD) per establishment. We refer to this as the gross effect throughout the paper—that is, the total observed increase in sales without adjusting for any intertemporal shifts in consumption. As shown in Column 1 of Table 2, this effect is statistically significant at the 1% level. This means that, after accounting for controls, fixed effects, and across all DSI periods, establishments in our sample experienced a gross increase in weekly sales of nearly 15% during weeks that included a DSI day.

As mentioned before, one of the main debates surrounding consumption tax holidays is whether they actually manage to incentivize economic activity, or whether, in contrast, they simply lead to an intertemporal substitution of consumption—where some consumers hold off on purchases until the DSI (anticipatory effects) and then reduce consumption afterward (reactive effects). To capture these timing shifts, we control for anticipatory and reactive effects, as explained in the identification section. We find that there are virtually no significant aggregate anticipatory or reactive effects of the policy, which means that—at the level of the full sample, including all types of goods and both covered and uncovered establishments—there is no evidence of systematic consumption shifting. Overall, the net effect remains between 14.6% and 14.9%, with a 1% confidence interval, confirming that the policy led to a meaningful increase in total economic activity. Thus, our finding is that the DSI events were an effective policy to boost short-term economic activity.[16]

[16] To validate our identification strategy, we test whether non-DSI weeks can serve as a reliable control group. Using ANOVA tests, we find no significant differences in average weekly sales across January–February of 2020, 2021, and 2022 for most establishment categories (analysis in detail is included in Annex E). This suggests that, despite the limited time window, non-DSI weeks provide a valid counterfactual for assessing DSI impacts.

Table 2. General effect DSI on short-term economic activity

	Dependent variable: Log. of weekly sales		
	(1)	(2)	(3)
DSI Effect	0.148***	0.148***	0.146***
	(0.01)	(0.01)	(0.01)
Anticipatory effect		0.002	0.000
		(0.01)	(0.01)
Reactive effect			-0.004
			(0.01)
Adjusted R^2	0.810	0.810	0.810
Observations	3,546,108	3,546,108	3,546,108
N. establishments	23,166	23,166	23,166
Avg. weekly sales (Thousand pesos)	$ 18,379.5	$ 18,379.5	$ 18,379.5
Establishment FE	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (1). In column 1 we incorporate neither anticipatory nor reactive effect, in column 2 we include anticipatory effect and in column 3 we incorporate both anticipatory and reactive effect. The dependent variable is the natural logarithm of weekly sales at constant prices of December 2022. DSI is a dummy that takes the value 1 for the weeks in which the "Días sin IVA" policy occurred. Anticipatory effect is a dummy that takes the value 1 for the weeks between announcement of implementation dates and the last DSI announced. Reactive effect is a dummy that takes the value 1 for the 6 weeks after the each last DSI announced. In total we have 8 DSI weeks, 16 anticipatory weeks and 24 reactive weeks. All regressions include Year-month FE, establishment FE and a weekly trend. Additionally, columns 2 and 3 include controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cyber Monday, Mother's Day and COVID-19 lockdown, all of them interacted with covered sectors dummy (except bimonthly payroll day). The standard errors, in parentheses, are clustered by Department × MCC. Significance levels are as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 DSI Effects on Covered and Uncovered Sectors

The overall increase in economic activity of approximately 14 percent, as presented in the previous section, masks important heterogeneities in how different sectors responded to the DSI policy. Most notably, we observe opposite anticipatory dynamics between covered and non-covered sectors, which ultimately balance each other out and result in a statistically similar net effect for both groups.

Specifically, establishments selling DSI-covered goods experienced a larger gross increase in sales (33.7%), paired with a negative anticipatory effect of 8.5%, as consumers delayed purchases to take advantage of the VAT exemption. In contrast, non-covered sectors saw a smaller gross increase (8.7%), but a positive anticipatory effect of 2.5% (Table 3). These opposing patterns in timing behavior mean that, after adjusting for anticipatory and reactive effects, both establishment types show similar net increases in sales—around 16.7% for covered sectors and

13.6% for non-covered sectors—with no statistically significant difference between them (Figure 3). This is a striking result, as it indicates that the policy's impact extended well beyond its formal scope, generating substantial spillover effects on sectors not directly targeted by the VAT exemption.

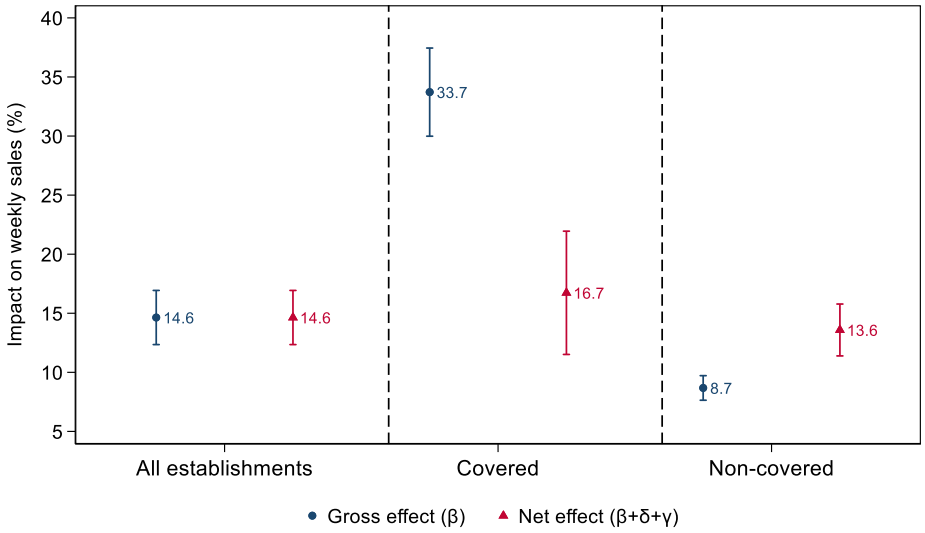
These contrasting anticipatory responses can be interpreted through the lens of income and substitution effects. In covered sectors, the tax exemption reduces the effective price of goods—as shown in Arango et al. (2024), encouraging consumers to delay purchases (a classic inter-temporal substitution effect). Meanwhile, consumers likely feel wealthier as they save money on covered items, leading to earlier or increased spending (an income effect). The presence of strong positive spillovers on non-covered sectors underscores the broad reach of the policy and highlights its capacity to stimulate consumption across the retail economy—not just in its intended categories. The detailed response is presented in Table 3 and summarized as follows.

Table 3. Covered sectors and double difference impact on establishments directly covered by the sales tax holiday policy

	(1) Overall effect	(2) Covered	(3) Non-covered
DSI Effect	0.146***	0.337***	0.087***
	(0.01)	(0.02)	(0.01)
Anticipatory effect	0.000	-0.085***	0.025***
	(0.01)	(0.01)	(0.00)
Reactive effect	-0.004	-0.018	0.000
	(0.01)	(0.02)	(0.01)
Adjusted R^2	0.810	0.825	0.803
Observations	3,546,108	818,520	2,727,588
N. establishments	23,166	5,445	17,721
Avg. weekly sales (Thousand pesos)	18,379.5	31,356.5	14,485.3
Establishment FE	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (1) for the type of sector indicated in the column header. The dependent variable is the natural logarithm of weekly sales at constant prices of December 2022. DSI is a dummy that takes the value 1 for the weeks in which the "Días sin IVA" policy occurred. Covered is a dummy that takes the value 1 for the five sectors that sell goods covered in the policy: Electronics, Clothing establishments, Department establishments, School supplies, toys & sports and Agricultural supplies. Anticipatory effect is a dummy that takes the value 1 for the weeks between announcement of implementation dates and the last DSI announced. Reactive effect is a dummy that takes the value 1 for the 6 weeks after the each last DSI announced. In total we have 8 DSI weeks, 16 anticipatory weeks and 24 reactive weeks. All regressions include Year-month FE, establishment FE, weekly trend and controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cyber Monday, Mother's Day and COVID-19 lockdown, all of them interacted with covered sectors dummy (except bimonthly payroll day). The standard errors, in parentheses, are clustered by Department × MCC. Significance levels are as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 3. Net effect



Note: this figure shows the gross and net effect of DSI on all, covered and non-covered establishments. β, δ and γ coefficients are weighted according to number of weeks (8 DSI, 16 anticipatory and 24 reactive weeks). Blue dot indicates the gross impact of DSI without considering either anticipatory or reactive effects, and red triangle indicates the net effect of DSI considering both anticipatory and reactive effects. It is important to note that only anticipatory or reactive effects are summed up when they are statistically different from zero. The bars represent the 95% confidence interval.

5.3 Results by product categories for covered goods

To analyze the effects of DSI in greater detail, we focus on establishment-level responses within each of the DSI-covered categories. We restrict our analysis to establishments selling goods in a particular covered sector, applying our main regression specification to these subsets. Disaggregating by category is important because different types of goods may respond differently to VAT exemptions due to variation in consumer behavior and demand elasticity. For example, high-value items such as electronics might show different purchasing patterns compared to essential items like school supplies. The DSI policy covered five key categories: electronics, clothing establishments, department establishments, school supplies (we also include in this category toys and sport equipment), and agricultural supplies. As mentioned before, of the 23,166 establishments in our sample, 3.8% are electronics establishments, 12.1% are clothing establishments, 3.2% are department establishments, 3.0% are school supply establishments, and 1.4% are agricultural supply establishments. Table 4 presents the results of these category-specific regressions, with each column corresponding to a different category: Column 1 for electronics, Column 2 for clothing, Column 3 for department establishments, Column 4 for school supplies, and Column 5 for agricultural supplies.

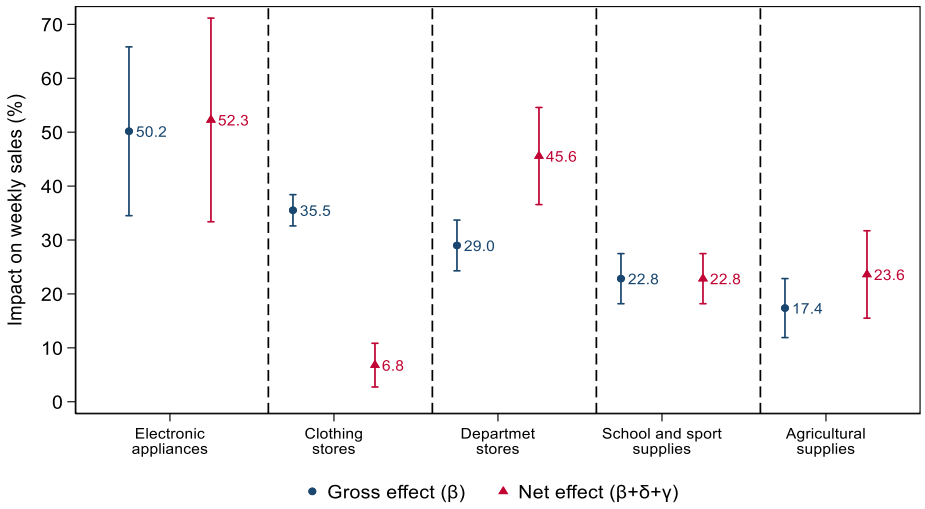
The dynamic responses to DSI vary markedly across sectors, revealing important patterns in consumer behavior. Electronics show the most dramatic reaction, with sales surging by nearly 50% during DSI weeks, despite a modest anticipatory dip of 1.9%—suggesting consumers delayed purchases to maximize savings. School supplies follow with a 23% increase, though without meaningful anticipatory or reactive shifts, indicating stable demand likely driven by necessity. Department establishments and agricultural supply outlets also experience robust gains of approximately 30% and 18%, respectively, each paired with small but positive anticipatory effects, reflecting some forward-looking consumer behavior. Clothing establishments exhibit a strong 36% jump in sales alongside a positive anticipatory response, suggesting both planned and impulse-driven purchases.

Table 4. *Heterogeneous effect by covered sector Impact by each covered sector*

	(1) Electronics	(2) Clothing establishments	(3) Department establishments	(4) School supplies, toys & sports	(5) Agricultural supplies
DSI Effect	0.502***	0.355***	0.290***	0.228***	0.174***
	(0.08)	(0.01)	(0.02)	(0.02)	(0.03)
Anticipatory effect	-0.019*	-0.144***	0.023***	-0.028	0.031**
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
Reactive effect	0.019**	-0.040	0.040***	-0.021	0.007
	(0.01)	(0.03)	(0.01)	(0.01)	(0.02)
Adjusted R^2	0.769	0.791	0.908	0.743	0.687
Observations	135,087	415,139	114,351	104,963	48,980
N. establishments	890	2,802	740	697	316
Avg. weekly sales (Thousand pesos)	19,925.8	9,365.3	153,367.4	9,977.4	10,235.4
Establishment FE	Yes	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (1) for the covered sector indicated in the column header. The dependent variable is the natural logarithm of weekly sales at constant prices of December 2022. DSI is a dummy that takes the value 1 for the weeks in which the "Días sin IVA" policy occurred. Anticipatory effect is a dummy that takes the value 1 for the weeks between announcement of implementation dates and the last DSI announced. Reactive effect is a dummy that takes the value 1 for the 6 weeks after the each last DSI announced. In total we have 8 DSI weeks, 16 anticipatory weeks and 24 reactive weeks. All regressions include Year-month FE, establishment FE, weekly trend and controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cyber Monday, Mother's Day and COVID-19 lockdown. The standard errors, in parentheses, are clustered by Department × MCC. Significance levels are as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure *4*. Anticipatory and reactive effects by covered sectors



Note: this figure shows the gross and net effect of DSI on covered establishments by category. . β, δ and γ coefficients are weighted according to number of weeks (8 DSI, 16 anticipatory and 24 reactive weeks). Blue dots indicate the gross impact of DSI without considering either anticipatory or reactive effects, and red triangle indicates the net effect of DSI considering both anticipatory and reactive effects. It is important to note that only anticipatory or reactive effects are summed up when they are statistically different from zero. The bars represent the 95% confidence interval.

When we focus solely on the net effects—accounting for both anticipatory and reactive dynamics, as shown in Figure 4—a clear ranking of sectoral impact emerges. Electronics lead with the highest net increase in sales at 52.3%, followed by department establishments at 45.6%. Agricultural supplies and school supplies register more moderate but still substantial gains of 23.6% and 22.8%, respectively. In contrast, clothing establishments show the smallest net effect among covered sectors, with an increase of just 6.8%. These results suggest that the DSI policy was particularly effective in boosting demand for higher-value, durable goods, while its impact on more essential or frequently purchased items like clothing was more limited once intertemporal shifts are considered.

5.4. The effects of DSI by establishment size

Another major debate around tax holiday policies is who actually benefits the most—especially when you consider the trade-off of losing tax revenue that could be used for public services. In other words, do some types of businesses gain more than others? A key part of this is whether establishment size plays a role in how much a firm benefit. Are larger establishments seeing bigger boosts in sales just because of their scale, or is the impact more homogenous? To analyze this in more detail, the next section looks at how the effects of DSI vary by establishment size.

To examine whether the impact of DSI varies by establishment size, we use pre-pandemic sales data to classify establishments into quartiles based on their total average sales from January to March 2020. This allows us to compare the effects of the policy across four size groups—from the smallest 25% of establishments to the largest 25%. The quartiles are calculated within categories, i.e. establishments of bottom 25% of department establishments could be larger than the bottom 25% of clothing establishments, however, both groups of establishments are classified as small businesses relative to their category. The goal is to assess whether firms with higher initial sales benefited disproportionately compared to smaller businesses. We use establishment-level sales as our primary measure of size to address a key concern raised in the public debate around DSI: that the policy might primarily favor already successful, larger companies, potentially reinforcing existing inequalities. To keep the analysis straightforward, we focus on quartile comparisons, though results hold across more detailed disaggregation as well.

In line with our broader analysis, we disaggregate our main results into four panels, accounting for both anticipatory and reactive effects. *Table 5* provides the results for each scenario using our main specification from equation (1). Within each panel, the first column shows results for establishments in the smallest sales quartile, the second for the second quartile, and so forth. Panel A presents results for all goods across both covered and non-covered sectors, Panel B includes results exclusively for covered sectors, and Panel C focuses on non-covered sectors. Overall, we do not find significant differences between gross and net effects across establishments of different sizes when considering all goods. If anything, there is a general pattern suggesting that larger establishments—those in the higher sales quartiles—experience slightly higher gross effects. However, this difference is only statistically significant between the smallest and largest quartiles and disappears entirely once we account for anticipatory and reactive effects.

When we break the analysis down by covered and non-covered sectors, this trend becomes more pronounced within the covered group: smaller establishments tend to see lower gross effects, while larger ones experience higher gross effects. Yet again, these differences vanish after incorporating anticipatory and reactive adjustments. For non-covered establishments, there are no significant differences in the DSI effect across establishment sizes, regardless of whether we consider gross or net impacts. These results are presented on Figure 5 and Table 5.

In summary, although we observe slightly different trends between covered and non-covered sectors, the net effects of DSI remain statistically insignificant across all establishment sizes. If anything, there is a mild—though not statistically significant—pattern suggesting that larger establishments may experience somewhat greater net effects. However, this trend is weak and does not support any conclusive difference in the policy's impact by establishment size.

Table 5. *Exploring the regressive nature of sales tax-holiday (1) - Impact by establishment size*

	(1) PC<25	(2) PC25-PC50	(3) PC50-PC75	(4) PC>75
Panel A. All establishments				
DSI Effect	0.110***	0.143***	0.161***	0.171***
	(0.01)	(0.01)	(0.01)	(0.02)
Anticipatory effect	-0.002	0.007	-0.001	-0.003
	(0.01)	(0.01)	(0.01)	(0.01)
Reactive effect	0.017**	0.002	-0.015**	-0.018**
	(0.01)	(0.01)	(0.01)	(0.01)
Adjusted R^2	0.542	0.530	0.564	0.766
Observations	881,241	885,343	887,826	891,698
N. establishments	5,790	5,786	5,788	5,802
Avg. weekly sales (Thousand pesos)	1,472.9	3,734.4	8,494.5	59,470.6
Panel B. Covered sectors				
DSI Effect	0.244***	0.338***	0.387***	0.373***
	(0.02)	(0.03)	(0.02)	(0.02)
Anticipatory effect	-0.082***	-0.091***	-0.084***	-0.082***
	(0.01)	(0.01)	(0.01)	(0.02)
Reactive effect	0.004	-0.022	-0.037**	-0.017
	(0.01)	(0.01)	(0.02)	(0.03)
Adjusted R^2	0.454	0.463	0.577	0.846
Observations	194,187	198,912	206,867	218,554
N. establishments	1,295	1,327	1,376	1,447
Avg. weekly sales (Thousand pesos)	1,953.7	4,623.6	11,639.5	100,474.1
Panel C. Non-covered sectors				
DSI Effect	0.071***	0.084***	0.089***	0.103***
	(0.01)	(0.01)	(0.01)	(0.01)
Anticipatory effect	0.021***	0.034***	0.023***	0.021***
	(0.01)	(0.01)	(0.01)	(0.01)
Reactive effect	0.020**	0.008	-0.008	-0.019***
	(0.01)	(0.01)	(0.01)	(0.01)
Adjusted R^2	0.548	0.541	0.556	0.724
Observations	687,054	686,431	680,959	673,144
N. establishments	4,495	4,459	4,412	4,355
Avg. weekly sales (Thousand pesos)	1,337.0	3,476.7	7,539.1	46,157.8

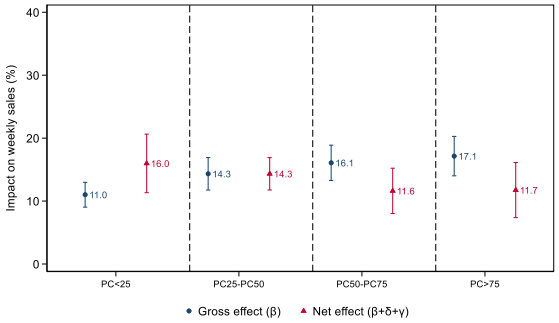
Establishment FE	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (1) for the establishment size indicated in the column header. Establishment size is defined by quartiles based on the distribution of sales before COVID-19 lockdown (January to March 2020). The dependent variable is the natural logarithm of weekly sales at constant prices of December 2022. DSI is a dummy that takes the value 1 for the weeks in which the "Días sin IVA" policy occurred. Anticipatory effect is a dummy that takes the value 1 for the weeks between announcement of implementation dates and the last DSI announced. Reactive effect is a dummy that takes the value 1 for the 6 weeks after the each last DSI announced. In total we have 8 DSI weeks, 16 anticipatory weeks and 24 reactive weeks. All regressions include Year-month FE, establishment FE, weekly trend and other controls listed in section IV. The standard errors, in parentheses, are clustered by Department × MCC. Significance levels are as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

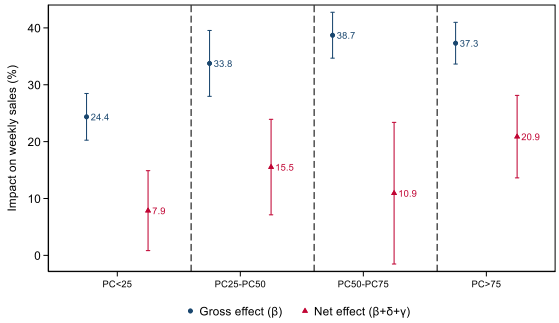
These results carry important implications for the design and evaluation of tax holiday policies like DSI. The absence of significant differences in net effects across establishment sizes suggests that the policy did not disproportionately benefit larger firms, alleviating some concerns about its potential to exacerbate existing market inequalities. While there is a slight tendency for larger establishments to see higher gross effects—particularly in covered sectors—these advantages diminish once we account for anticipatory and reactive behaviors. This indicates that, in practice, the temporary nature of the tax break and consumers' timing of purchases help balance outcomes across firms of different scales. For policymakers, this suggests that while DSI may generate short-term boosts in sales, its distributive impact across business sizes is limited, and the policy may not require additional targeting mechanisms to ensure equity in its application. That said, it is important to note that the establishments in our subsample are already relatively large compared to the full sample described earlier. This limits the external validity of these findings, particularly with respect to smaller firms that may respond differently to the policy.

Figure 5. Anticipatory and reactive effects by type establishment size

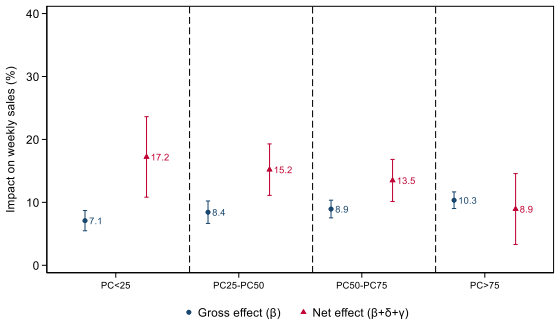
a) All establishments



b) Only covered establishments



c) Only non-covered establishments



Note: this figure shows the gross and net impact of DSI on all (panel a), covered (panel b) and non-covered (panel c) establishments by size. β, δ and γ coefficients are weighted according to number of weeks (8 DSI, 16 anticipatory and 24 reactive weeks). Blue dot indicates the gross impact of DSI without considering either anticipatory or reactive effects, and red triangle indicates the net effect of DSI considering both anticipatory and reactive effects. It is important to note that only anticipatory or reactive effects are summed up when they are statistically different from zero. The bars represent the 95% confidence interval.

5.5. The effects of DSI by income of establishment customers

To assess how the DSI policy affected establishments serving consumers of different income levels, we classified establishments by the median income of their customers. To address this question, we calculate the median income of customers for each establishment using transaction data from January to March 2020. This approach allows us to classify establishments by quartiles based on the median income of their customers: PC<25 represents establishments where the median customer income falls in the lowest 25% of the distribution, and PC>75 represents establishments where the median customer income is in the top 25%.

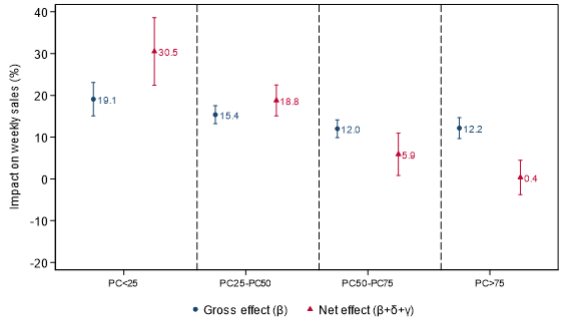
With these quartiles established, we apply our main regression specification to each income-based group, accounting for both anticipatory and reactive effects. We examine three panels: all establishments, establishments selling covered goods, and establishments selling non-covered goods. Table 6 presents the results of this analysis, providing insights into how DSI's effects vary across customer income groups. In this classification, establishments in the first quartile are frequented by lower-income consumers, while those in the fourth quartile serve higher-income customers based on pre-DSI income data.

Analyzing the full sample of firms, we find that DSI's impact varies by customer income quartile. For all goods, establishments frequented by lower-income consumers (first quartile) show a gross sales increase of 19.1%, with a net effect of 15.6%. In contrast, establishments serving higher-income consumers (fourth quartile) experience a 12.2% gross increase and a 10.1% net effect. This variation suggests that DSI had a stronger impact on establishments serving lower-

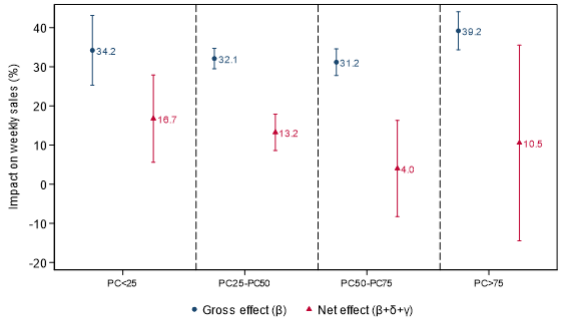
income customers, even after accounting for anticipatory and reactive effects. Notably, this pattern is observed only among non-covered establishments, as shown in Figure 6.

Figure 6. Gross and net effects by income of median customer

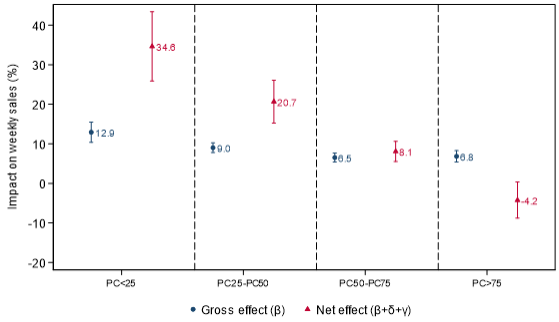
a) All establishments



b) Only covered establishments



c) Only non-covered establishments



Note: this figure shows the gross and net impact of DSI on all (panel a), covered (panel b) and non-covered (panel c) establishments by average median customer income, and coefficients are weighted according to number of weeks (8 DSI, 16 anticipatory and 24 reactive weeks). Blue dot indicates the gross impact of DSI without considering either anticipatory or reactive effects, and red triangle indicates the net effect of DSI considering both anticipatory and reactive effects. It is important to note that only anticipatory or reactive effects are summed up when they are statistically different from zero. The bars represent the 95% confidence interval.

Finally, we present additional results in Appendix E we explore the heterogeneous effects of the policy across regions and over time. First, we classify establishments into three regional categories—metropolitan areas, department capitals, and other municipalities—to reflect key differences in socioeconomic structure and market formality. We find that DSI had a more persistent stimulative effect in less urbanized areas, likely due to higher marginal consumption responses and lower substitution dynamics. Second, we disaggregate the effects by policy year (2020, 2021, and 2022), each marked by different economic conditions and levels of consumer anticipation. The results show a clear decline in effectiveness over time: net sales increased by 17.7% in 2020, 10.7% in 2021, and 6.8% in 2022. These findings suggest that DSI was most impactful in its first year, when novelty and consumer responsiveness were highest.

DSI Multiplier

We conducted a simple yet informative back-of-the-envelope calculation to evaluate its broader fiscal efficiency. Specifically, we estimate the DSI multiplier, defined as the ratio between the increase in economic activity and the revenue foregone due to the temporary VAT exemption. This exercise compares the estimated loss in government revenues—calculated as 19% of aggregate average sales during DSI weeks for covered sectors—with the additional sales generated by the policy, accounting for both reactive and anticipatory consumer responses. Our results suggest that for every peso of revenue not collected, covered sectors experienced a 0.56 peso increase in sales. When including non-covered sectors to capture potential spillover effects, the multiplier rises to 1.26 pesos, indicating that the policy may have led to a net positive stimulus to economic activity at the aggregate level.

Table 6. DSI multiplier: a back of the envelope calculation

	Covered sectors	**All establishments**
Loss of revenue (million COP)	$41,549.2	
Additional sales (million COP)	$23,255.9	$52,369.0
DSI multiplier	0.56	1.26

Note: The amounts presented in this table are estimates based on our sample and should not be interpreted as a measure of tax expenditures. Loss of revenue is calculated as the 19% of aggregate average sales during DSI weeks for covered sectors. Additional sales are calculated as the product of average sales during non-DSI week and the net impact of DSI presented in Figure 4 (16.7% for covered and 13.6% for non-overed sectors).

VI. Robustness Checks

To test the robustness of our findings, we conduct two complementary exercises. First, we implement a series of placebo tests by randomly assigning the DSI treatment to weeks in our sample and re-estimating the main regressions. This allows us to verify that the effects we observe are not the result of random fluctuations or spurious correlations. Second, we repeat the analysis after removing the weeks most affected by the COVID-19 lockdown, which could have introduced atypical sales dynamics unrelated to the policy. Our results are largely robust to both exercises and details in the next section.

Placebo tests

As a robustness check, we implement a placebo test to verify that the effects estimated in our main analysis are not driven by spurious correlations or random fluctuations in weekly sales. To

do so, we randomly select eight weeks out of the 157 weeks in our sample and assign to them a fictitious policy variable, referred to as *placebo DSI*. This artificial treatment replaces the actual DSI variable in our main regression specification (as shown in Table 3). We repeat this process 500 times, each time re-estimating the model and storing the resulting coefficient of the placebo DSI variable.[17]

The results of this placebo exercise provide strong support for the validity of our main findings. Across all specifications—including the full sample, covered sectors and non-covered sectors—the distribution of placebo estimates is centered around zero, as expected when treatment is assigned at random. In contrast, the actual DSI coefficient lies far in the upper tail of these distributions. This separation between the empirical effect and the simulated placebo effects indicates that the observed impact of DSI is not an artifact of the data or model structure, but rather a robust response to the policy intervention.

Removing Covid weeks

To further assess the robustness of our main results, we conduct an additional test by excluding the weeks most affected by the COVID-19 lockdown. The economic shock caused by the pandemic in early 2020 may have introduced structural breaks or unusual consumption patterns that could bias our estimates. To address this, we drop from our dataset the weeks corresponding to the strictest lockdown period in Colombia—weeks 12 to 22 of 2020—and re-estimate our core regressions using this restricted sample.

We apply our main specification to this adjusted sample, maintaining all fixed effects, trends, and control variables. The results shown in Table G6 of Appendix G confirm the stability of our findings. The estimated DSI effect remains highly significant and only marginally lower in magnitude compared to the full sample: 14.8% without anticipatory or reactive controls, and 13.7% after adjusting for both. Anticipatory and reactive effects remain small and consistent

[17] This procedure allows us to construct an empirical distribution of estimated treatment effects under the null hypothesis that DSI has no impact on sales. If the effects we observe in the actual data are truly driven by the policy and not by chance, the original DSI coefficient should lie in the tail of this placebo distribution. Figures F1 through F4 in Appendix F show the resulting distributions for different model specifications and subsamples. In each case, the red dashed line marks the value of the original estimated coefficient from our real DSI analysis.

with the baseline analysis, further supporting the idea that the original results are not driven by COVID-induced distortions.

VII. Conclusions and policy implications

This paper evaluates the impact of Colombia's Días sin IVA (DSI), a nationwide VAT holiday introduced during the COVID-19 pandemic to stimulate economic activity. Using high-frequency transaction data from over 23,000 establishments and more than 1.3 billion purchases, we estimate the policy's effects through a repeated regression discontinuity design that accounts for both anticipatory and post-event dynamics. Our findings provide new evidence on the effectiveness of consumer tax holidays in a developing country context, a topic for which empirical research remains limited.

Our findings show that DSI effectively stimulated economic activity across a wide range of sectors and business types. The policy led to a substantial increase in overall sales, even after accounting for timing shifts in consumer behavior, indicating that the surge in consumption was not merely a reshuffling of purchases but a genuine boost in demand. While the strongest effects were observed in high-value, durable goods sectors like electronics and department establishments, the impact extended beyond these categories. Non-covered sectors also saw meaningful increases, pointing to positive spillovers likely driven by increased foot traffic and complementary purchases. Contrary to concerns that the policy might favor only large or already successful firms, we find that the benefits were relatively evenly distributed across establishment sizes. Moreover, establishments serving lower-income consumers and consumers in smaller cities tended to experience greater gains. Taken together, these results suggest that, when well-targeted, sales tax holidays can serve as an effective and relatively equitable tool for short-term economic stimulus—particularly in times of crisis.

Our analysis shows that Colombia's *Días sin IVA* (DSI) policy produced a net increase in sales of 14% across the economy, even after accounting for anticipatory and reactive effects. Covered sectors saw stronger gains (16.7%) compared to non-covered sectors (13.6%), indicating both direct and spillover effects. Within covered categories, electronics and department stores experienced the largest net increases (52.3% and 45.6%, respectively), while clothing saw more modest gains (6.8%), likely due to timing effects.

We validate our findings with two key robustness exercises. First, a placebo test that randomly assigns DSI dates across the sample shows that the true policy effect lies far outside the distribution of placebo estimates—strengthening confidence that our results are not driven by chance. Second, we exclude the weeks most affected by the COVID-19 lockdown and find that the estimates remain robust and consistent in magnitude. These checks confirm that our identification strategy is sound and that the policy's effects are not artifacts of unusual timing or extreme shocks.

In short, DSI boosted short-term consumption across sectors and establishment types, with effects that were widespread rather than concentrated—supporting its role as an effective economic stimulus tool.

To our knowledge, this is the first study to thoroughly examine the spillover effects of consumption tax holidays across both covered and non-covered sectors. Our findings show that Colombia's DSI effectively stimulated economic activity not only in targeted sectors but also among non-covered firms, with impacts observed across businesses of varying sizes and consumer profiles. Rather than benefiting a narrow group, the policy influenced spending behavior more broadly, highlighting the potential of temporary tax breaks to shift demand across diverse economic actors. As policymakers consider similar measures in response to future shocks, understanding their distributional effects—not just aggregate outcomes—will be key to maximizing impact.

Policy Implications

This study provides strong evidence that temporary VAT holidays can generate meaningful and broad-based increases in economic activity. One of the clearest takeaways from the Días sin IVA (DSI) policy is the extent to which its impact extended well beyond the sectors explicitly covered by the VAT exemption. While the policy directly targeted goods such as electronics, clothing, and school supplies, we find that non-covered sectors—those not subject to the tax break—also experienced sizable and statistically significant increases in sales. These spillover effects suggest that VAT holidays can act as a general stimulus, influencing overall consumer behavior, drawing more people into commercial areas, and prompting additional purchases across a wide range of goods and services.

Beyond this broad reach, the policy's impact varied across product categories within the covered sectors. Durable, high-ticket items such as electronics and department stores experienced the largest increases in sales, while more frequent, lower-cost purchases like clothing showed more modest responses. This variation likely reflects both the greater perceived value of the tax exemption on expensive goods and the ability of consumers to time their purchases around the DSI calendar. These results indicate that policymakers can expect stronger demand responses in categories where the VAT discount translates into a more substantial reduction in out-of-pocket price.

The analysis also shows that the benefits of DSI were not concentrated among a particular type of establishment. Net effects were relatively consistent across establishments of different sizes, as measured by pre-policy sales. While larger establishments captured higher gross volumes, once anticipatory and reactive behavior was accounted for, the policy's impact was similarly distributed across small, medium, and large businesses. This suggests that VAT holidays, when broadly applied, can benefit a wide cross-section of the retail sector without necessarily favoring dominant firms.

Other patterns in the data—such as stronger effects in smaller municipalities and some variation by consumer profile—reinforce the idea that local context matters. However, these differences are secondary to the main conclusion: that a well-designed VAT holiday can meaningfully increase consumption in both targeted and untargeted sectors. The fact that spillovers were nearly as large as the direct effects challenges the notion that VAT holidays are too narrowly focused to generate widespread economic benefits.

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Appendix

Appendix A. *Goods and categories covered by "días sin IVA" policy.*

#	Category	Goods covered	Maximum price
1	Clothing	Clothing and footwear, regardless of the material used in their manufacture. Raw materials are excluded.	20 UVT[18] [188.5 USD]
2	Clothing accessories	Backpacks, briefcases, handbags, wallets, sunglasses, umbrellas, scarves, and costume jewelry.	20 UVT [188.5 USD]
3	Household appliances, computers, and communication devices	Televisions, home speakers, tablets, refrigerators, freezers, dishwashers, household washing and drying machines, vacuum cleaners, floor polishers, electric garbage disposals, electric food preparation and processing appliances, electric shavers, electric toothbrushes, electric water heaters, electric hair dryers, electric irons, space heaters and fans for domestic use, air conditioners, electric ovens, microwaves, cooking griddles, toasters, coffee makers or electric kettles, and electric heating elements and personal computers and communication devices. This category includes the goods described in this section that operate using natural gas.	80 UVT [753.8 USD]
4	Sports elements	Rubber balls, sport balls, rackets, bats, swimming goggles, wetsuits, fins, life vests, helmets, hand guards, elbow guards, shin guards, and specialized sports shoes. This category also includes bicycles and electric bicycles.	80 UVT [753.8 USD]
5	Toys and games	Dolls, action figures, toy animals, plush toys, rag dolls, toy musical instruments, playing cards, board games, electronic games and video games, electric trains, construction sets, wheeled toys designed to be used as vehicles, puzzles and marbles. This category does not include party supplies, carnival and recreational items, computer programs, or software. This category includes skateboards and electric scooters.	10 UVT [94.2 USD]
6	School supplies	Notebooks, educational software, pencils, pens, erasers, pencil sharpeners, correction fluid, modeling clay, glue and scissors.	5 UVT [47.1 USD]
7	Goods and supplies for the agricultural sector	Seeds and fruits for sowing, fertilizers of animal, vegetable, mineral and/or chemical origin, insecticides, rodenticides and other anti-rodents, fungicides, herbicides, germination inhibitors and plant growth regulators, irrigation systems, sprinklers and drippers for irrigation systems, brush cutters, harvesters, threshing machines, parts of harvesting or threshing machines and devices, animal feed and/or veterinary medicines, barbed wire and fences.	80 UVT [753.8 USD]

Notes: Average exchange rate from OECD indicators ($3,693.28 in 2020, $3,744.24 in 2021 and $4,256.19 in 2022).
Source: authors' elaboration based on legislation

[18] On average, one UVT was equivalent to $36,639.7 (approximately 9.42 USD) between 2020 and 2022.

Appendix B. *Details on the timeline for the announcements and implementation of Colombian "Días sin IVA"*

The DSI policy established that 3 days in a calendar year will be marked as DSI, and it was implemented for three years in a row, from 2020 to 2022. On May 21, 2020, the national government announced the dates of the first three DSI: June 19th, July 3rd, and July 19th. The first DSI was carried out with multiple crowds which led to the suspension of face-to-face purchases in the appliance and technology category for the following next two DSI, so these products could only be purchased in virtual establishments[19]. After the first two DSI, a considerable increase in COVID-19 infections was observed that led to the suspension of the third DSI without VAT,[20] which took place on November 21st of that year (4 months after the initially planned date), for this day the restriction on face-to-face purchases of household appliances and technology was maintained.

For 2021, the policy was ratified with the Social Investment Law,[21] defining by decree on October 20th the dates for the new days: October 28th, November 19th, and December 3rd.[22] The same categories and purchase restrictions were maintained, however, the face-to-face purchase of household appliances and technology was again admitted, additionally, it was authorized that purchases made in cash could also be subject to the same VAT exemptions.

Finally, in 2022, DSI dates were selected on February 28th. The dates announced were March 11th, June 17th and December 2nd.[23] Conditions of DSI were the same as in previous years. However, a new government took office in August 2022, and it decided to eliminate the DSI policy definitively. The study will be the first robust evaluation of the Colombian DSI over the economic activity. The publication of the study is timely given the ongoing policymakers' discussion on the reactivation of the *"Dias sin IVA"* policy in 2024.

[19] Additionally, in the first two days there were failures in the virtual establishments due to the high flow of customers, causing long virtual lines and even the impossibility of purchase for some customers.
[20] It should be considered that these days were carried out even with mobility restrictions such as the driving restriction policy *"pico y cédula"* in some cities, this only allowed entry to commercial establishments to people whose identification number was enabled on a certain day.
[21] Law 2155 of 2021 was one of the first post-pandemic tax reforms in LAC.
[22] Decree 1314 of 2021.
[23] Decree 290 of 2022.

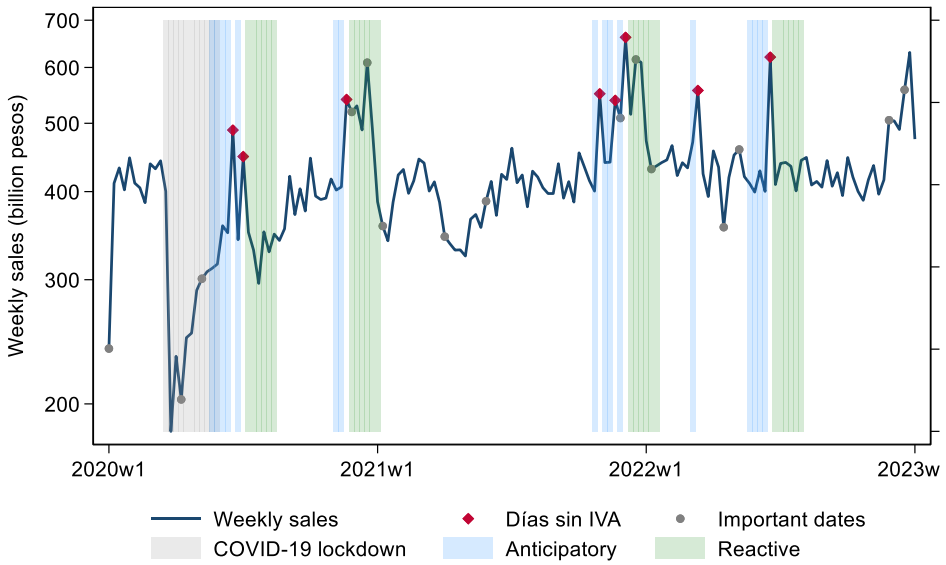
Appendix C. *MCC related sectors.*

Sector	MCC related
Appliances, PC's & electronics	4812, 4814, 5045, 5722, 5732, 5734, 5946, 5997
Clothing establishments	5611, 5621, 5631, 5641, 5651, 5655, 5661, 5681, 5691, 5697, 5699, 5948
Department stores	5311, 5499
School supplies toys & sports	5111, 5331, 5399, 5940, 5941, 5942, 5943, 5945
Agricultural supplies	0763
Household items	5712, 5713, 5714, 5718, 5719, 5733, 5735, 5815, 5816, 5817, 5818, 5931, 5932, 5937, 5944, 5947, 5949, 5950, 5970, 5973, 5998
Grocery stores & restaurants	5310, 5411, 5422, 5441, 5451, 5462, 5812, 5814
Business & household services	0742, 0780, 1520, 1711, 1731, 1740, 1750, 1761, 1771, 1799, 2741, 2791, 2842, 4813, 4816, 4821, 4899, 4900, 5137, 5139, 5192, 5960, 5963, 5964, 5965, 5966, 5967, 5968, 5969, 5994, 5995, 5996, 7210, 7211, 7217, 7221, 7230, 7261, 7296, 7297, 7311, 7333, 7338, 7339, 7342, 7349, 7361, 7372, 7379, 7392, 7393, 7394, 7395, 7399, 7512, 7513, 7519, 7523, 7531, 7534, 7535, 7538, 7542, 7549, 7622, 7623, 7629, 7631, 7641, 7692, 7699, 7841
Travel, entertainment & transportation services	3039, 3102, 3409, 3501, 3504, 3533, 3535, 3561, 3591, 3665, 3695, 4111, 4119, 4121, 4131, 4214, 4215, 4225, 4457, 4468, 4511, 4582, 4722, 4784, 4789, 5811, 5813, 5921, 5962, 5971, 5993, 7011, 7032, 7033, 7298, 7299, 7832, 7911, 7922, 7929, 7933, 7941, 7994, 7995, 7996, 7997, 7999
Others	5013, 5021, 5039, 5044, 5046, 5047, 5051, 5065, 5072, 5074, 5085, 5099, 5122, 5131, 5169, 5193, 5198, 5199, 5211, 5231, 5251, 5261, 5309, 5511, 5531, 5532, 5533, 5541, 5551, 5571, 5599, 5912, 5975, 5976, 5977, 5983, 5992, 5999, 6012, 6051, 6300, 6513, 7276, 8011, 8021, 8031, 8041, 8042, 8043, 8049, 8050, 8062, 8071, 8099, 8111, 8211, 8220, 8241, 8244, 8249, 8299, 8351, 8398, 8641, 8661, 8699, 8911, 8931, 8999, 9211, 9311, 9399, 9402, 9999

Source: authors' elaboration based on MCC industry classification

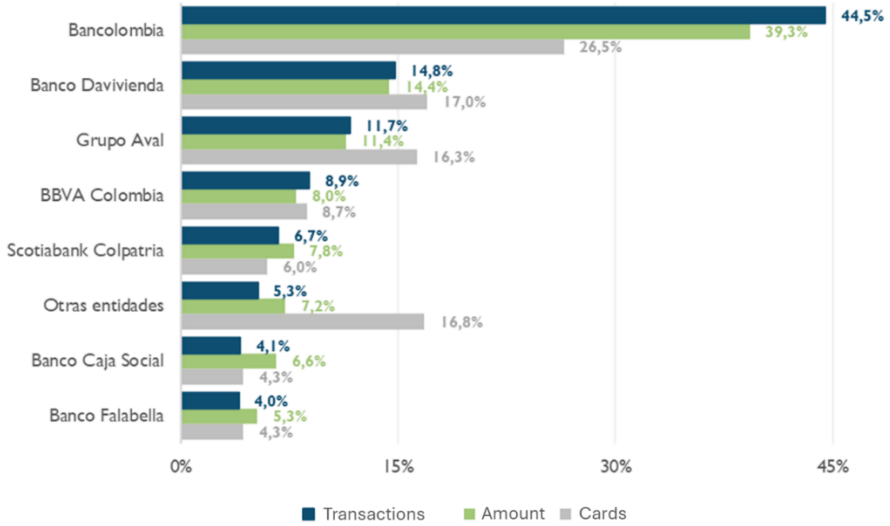
Appendix D. *Descriptive figures*

Figure D1. Time series of dependent variable



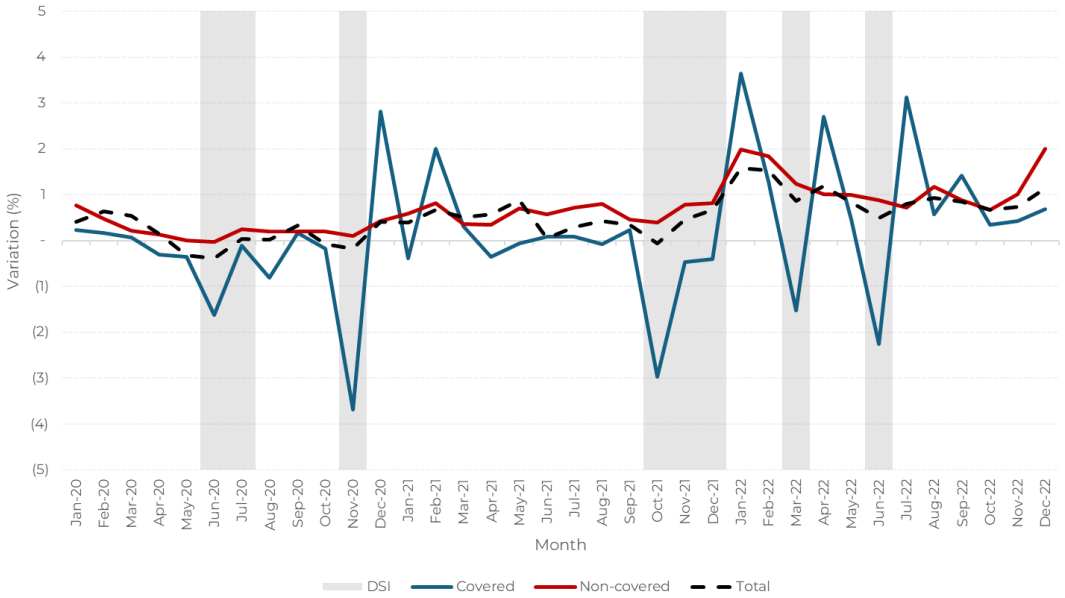
Note: This figure shows the average weekly sales (at December 2022 constant prices) for all establishments in our sample. Red diamonds indicate when a DSI occurred, the gray area corresponds to the COVID-19 lockdown, the blue areas to the weeks between announcement and last DSI announced, the green areas to the weeks between last DSI announced and next DSI occurred, and gray dots refers to important events.

Figure D2. Share of number of cards, number of transactions and amount of transactions by financial institution in Colombia, 2021



Source: Authors' elaboration based on Superintendencia Financiera de Colombia (2021)

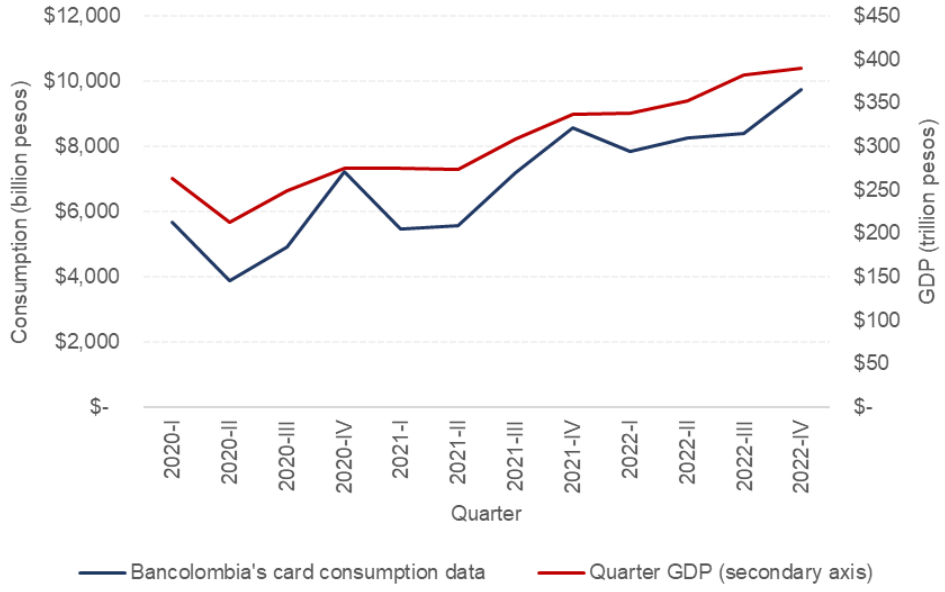
Figure D3. Prices variation for covered and non-covered products.



Source: own elaboration based on Consumer Price Index data from DANE.

Note: This figure shows the weighted average variation of the Consumer Price Index (CPI) in Colombia for covered, non-covered and all products in the economy. We consider as non-covered all products related to restaurants, entertainment, and household items, while covered are products related to clothing, electronics, toys, and school supplies. The total refers to the monthly variation of the total national CPI, which includes all products in the economy. The gray area reflects a month in which a DSI occurred. Covered and non-covered products weigh 5.3% and 12.4%, respectively, in the total CPI.

Figure D4. Card consumption data and Gross Domestic Product in Colombia, 2020-2022



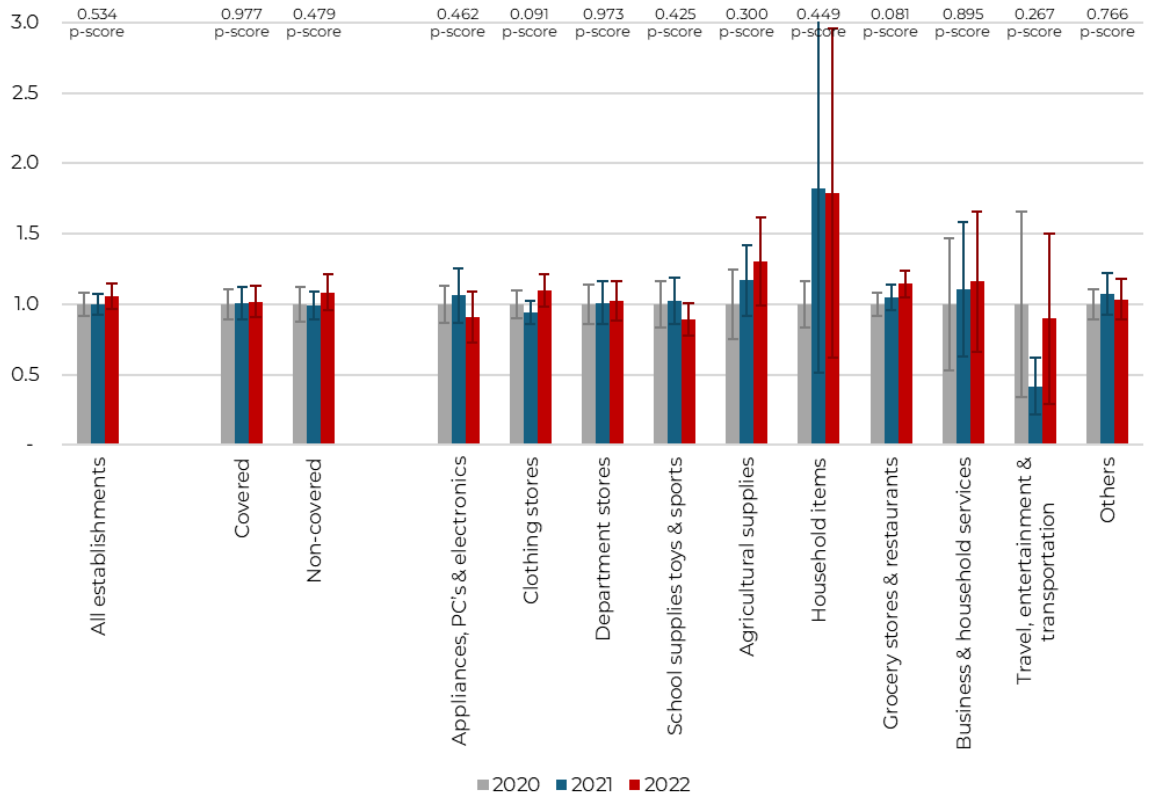
Source: authors' elaboration based on Bancolombia's data and national accounts from DANE.

Appendix E. Other Results

E1. Non-DSI weeks as a control group

Average sales for the establishments in our sample are not statistically different during the first weeks of each year, suggesting no long run impact of DSI. Since our database covers a restrictive period (2020-2022), in 2020 we only have the weeks between January and February as "pure controls" (i.e. without any major external event) because the Covid-19 quarantine started at the end of March and the first DSI was announced in May. In that sense, we compare the average weekly sales during the first two months each year and run an ANOVA test to determine if average sales are statistically different each year. Our results shows that average weekly sales during January and February are not statistically different in 2020, 2021 and 2022 for most of our establishment categories, suggesting that the weeks where no DSI occurred are good controls of those weeks with DSI.

Figure E1. Comparing average weekly sales per year



Source: authors' elaboration based on transactional data.

Note: This figure shows the comparison of average weekly sales during the first two months of each year for all the establishments in our sample. Bars represent the average weekly sales in January and February of each year, relative to 2020. Above each category, we report the p-score from an ANOVA test comparing yearly averages; values exceeding our confidence level indicate no statistically significant differences. The lines represent 95% confidence intervals.

E2. Main results by city type and geographical distribution

We explore the heterogeneous effects of DSI at the regional level, considering that local characteristics—such as informality rates, infrastructure quality, and financial inclusion—may influence the policy's effectiveness. In particular, areas with lower credit card penetration or higher levels of informal employment might be less able to benefit from a VAT holiday that requires electronic invoicing and formal retail channels. These differences could result in varying levels of responsiveness to DSI, especially in regions where access to formal retail is limited or consumer purchasing power is more constrained.

To capture this potential regional variation, we classify establishments into three categories based on their location: metropolitan areas, department capitals, and other municipalities. This segmentation reflects meaningful differences in socioeconomic structure and market formality. Metropolitan areas are typically wealthier, with higher levels of financial inclusion and formal consumption; department capitals are generally mid-sized urban centers with moderate levels of formality and income; and other municipalities represent smaller or rural areas with more limited infrastructure and greater prevalence of informal economic activity. We estimate both gross and net effects of DSI separately for these groups, using our standard regression framework that accounts for anticipatory and reactive behavior.

The results reveal substantial variation in the policy's net impact across regions. For all establishments, net effects are strongest in other municipalities (30.8%), moderate in department capitals (19.8%), and weakest in metropolitan areas (5.8%), despite relatively similar gross effects across all three. This pattern suggests that while the initial sales surge was broadly comparable, intertemporal substitution dampened net gains more substantially in urban areas. Among covered establishments only, we observe a similar gradient: gross effects are highest in other municipalities (38.8%) and lowest in metropolitan areas (32.7%), but net effects diverge more sharply—rising to 34.3% in other municipalities and falling to just 17.7% and 12.0% in metropolitan areas and department capitals, respectively. These findings indicate that DSI had a more persistent stimulative effect in less urbanized areas, potentially reflecting higher marginal consumption responses and lower substitution dynamics.

Table E1. Results by city type

	(1) Metropolitan areas	(2) Department capitals	(3) Other municipalities
Panel A. All sectors			
DSI Effect	0.140***	0.151***	0.161***
	(0.02)	(0.01)	(0.02)
Anticipatory effect	0.005	-0.008	-0.006
	(0.01)	(0.01)	(0.01)
Reactive effect	-0.027***	0.016**	0.049***
	(0.01)	(0.01)	(0.01)
Adjusted R^2	0.823	0.784	0.785
Observations	2,093,795	822,390	629,923
N. establishments	13,672	5,391	4,103
Avg. weekly sales (Thousand pesos)	22,898.6	12,158.9	11,479.8
Panel B. Covered sectors			
DSI Effect	0.327***	0.323***	0.388***
	(0.02)	(0.01)	(0.05)
Anticipatory effect	-0.075***	-0.102***	-0.086***
	(0.02)	(0.01)	(0.02)
Reactive effect	-0.044*	-0.014	0.042***
	(0.03)	(0.01)	(0.01)
Adjusted R^2	0.842	0.800	0.761
Observations	419,447	243,713	155,360
N. establishments	2,789	1,626	1,030
Avg. weekly sales (Thousand pesos)	43,481.2	21,020.3	14,836.3
Panel C. Non-covered sectors			
DSI Effect	0.092***	0.075***	0.084***
	(0.01)	(0.01)	(0.01)
Anticipatory effect	0.024***	0.029***	0.020***
	(0.01)	(0.01)	(0.01)
Reactive effect	-0.024***	0.027***	0.051***
	(0.01)	(0.01)	(0.01)
Adjusted R^2	0.814	0.773	0.795
Observations	1,674,348	578,677	474,563
N. establishments	10,883	3,765	3,073
Avg. weekly sales (Thousand pesos)	17,742.4	8,426.9	10,381.0
Establishment FE	Yes	Yes	Yes

Year-month FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (1) for the type of city indicated in the column header. Metropolitan areas include the metropolitan areas of the main five cities in Colombia (38 cities), department capital includes 27 cities not included in metropolitan areas, and other municipalities includes all other 857 municipalities. The dependent variable is the natural logarithm of weekly sales at constant prices of December 2022. DSI is a dummy that takes the value 1 for the weeks in which the "Días sin IVA" policy occurred. Anticipatory effect is a dummy that takes the value 1 for the weeks between announcement of implementation dates and the last DSI announced. Reactive effect is a dummy that takes the value 1 for the 6 weeks after the each last DSI announced. In total we have 8 DSI weeks, 16 anticipatory weeks and 24 reactive weeks. All regressions include Year-month FE, establishment FE, weekly trend and controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cyber Monday, Mother's Day and COVID-19 lockdown, all of them interacted with covered sectors dummy (except bimonthly payroll day). The standard errors, in parentheses, are clustered by Department × MCC. Significance levels are as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E3. Main Results for each DSI year

To examine how the effectiveness of DSI changed over time, we disaggregate the analysis by policy year and estimate separate effects for each implementation of the program—2020, 2021, and 2022. Each year brought different economic conditions, levels of consumer anticipation, and degrees of policy salience. The 2020 events followed a strict COVID-19 lockdown and were met with significant public attention, while the 2021 and 2022 editions occurred in a more normalized economic environment, with increasing familiarity and potentially reduced novelty. This temporal disaggregation allows us to assess whether the policy's impact diminished as it became more institutionalized.

To conduct this exercise, we restrict our dataset to construct separate samples for each DSI cycle. That is, we create three different databases—each including only the weeks around the DSI events of a given year—and re-estimate our main regression specification on each of them independently. This approach preserves consistency in the estimation strategy while allowing for a clean comparison across years, holding the identification strategy constant.

The results point to a clear decline in policy effectiveness over time. In 2020, DSI events led to a 19.3% increase in weekly sales. This effect dropped to 11.9% in 2021 and further to 7.0% in 2022. After adjusting for anticipatory and reactive dynamics, the net effects are slightly smaller: 17.7% for 2020, 10.7% for 2021, and 6.8% for 2022. These findings suggest that the policy was most impactful in its first implementation, when consumers were more responsive and DSI was perceived as a novel opportunity. Over time, the effects appear to taper off, likely due to declining surprise, saturation of demand, or shifting macroeconomic constraints.

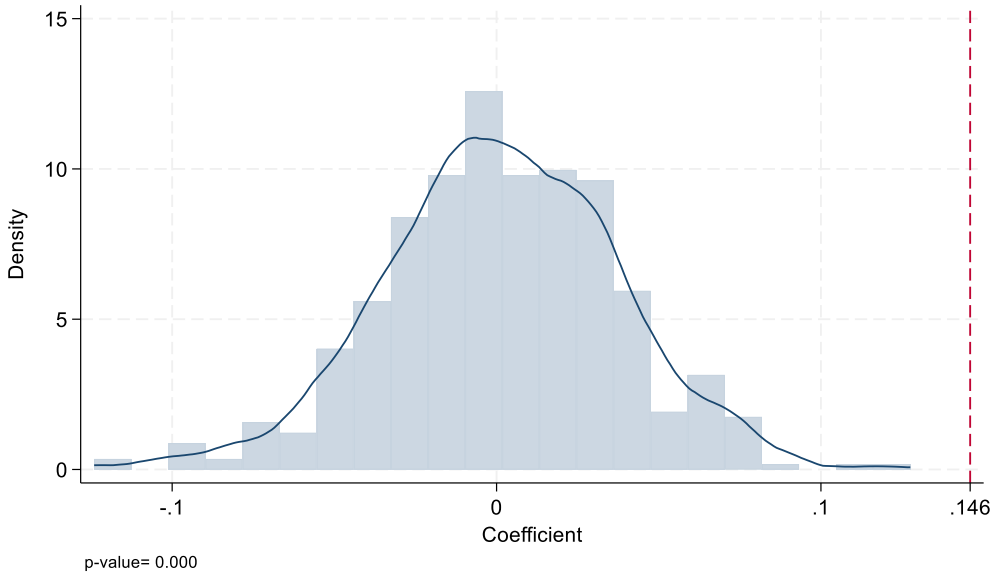
Table E2. By groups of DSI

	(1)	(2)	(3)
	Log weekly sales	Log weekly sales	Log weekly sales
DSI 2020	0.193***	0.189***	0.177***
	(0.03)	(0.02)	(0.02)
DSI 2021	0.119***	0.116***	0.107***
	(0.01)	(0.01)	(0.01)
DSI 2022	0.070***	0.069***	0.068***
	(0.01)	(0.01)	(0.01)
Anticipatory effect		-0.007	-0.013**
		(0.01)	(0.01)
Reactive effect			-0.018***
			(0.01)
Adjusted R^2	0.810	0.810	0.810
Observations	3,546,108	3,546,108	3,546,108
N. establishments	23,166	23,166	23,166
Avg. weekly sales (Thousand pesos)	18,379.5	18,379.5	18,379.5
Establishment FE	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes
Weekly trend	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (1). The dependent variable is the natural logarithm of weekly sales at constant prices of December 2022. DSI is a dummy that takes the value 1 for the weeks in which the "Días sin IVA" policy occurred. Anticipatory effect is a dummy that takes the value 1 for the weeks between announcement of implementation dates and the last DSI announced. Reactive effect is a dummy that takes the value 1 for the 6 weeks after the each last DSI announced. In total we have 8 DSI weeks, 16 anticipatory weeks and 24 reactive weeks. All regressions include Year-month FE, establishment FE and a weekly trend. Additionally, columns 2 and 3 include controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cyber Monday, Mother's Day and COVID-19 lockdown, all of them interacted with covered sectors dummy (except bimonthly payroll day). The standard errors, in parentheses, are clustered by Department × MCC. Significance levels are as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

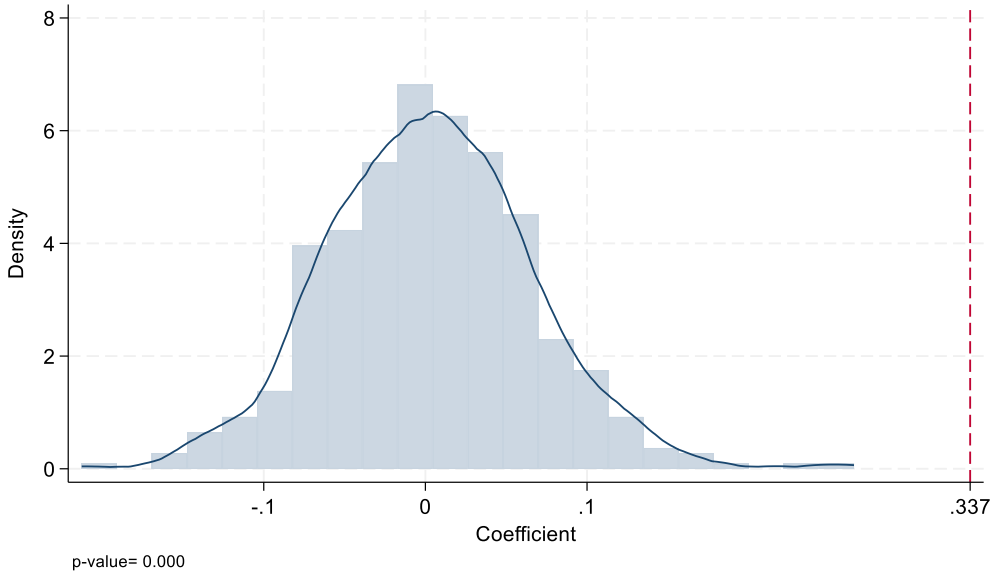
Appendix F. Placebo Test

Figure F1. Placebo check for main regression



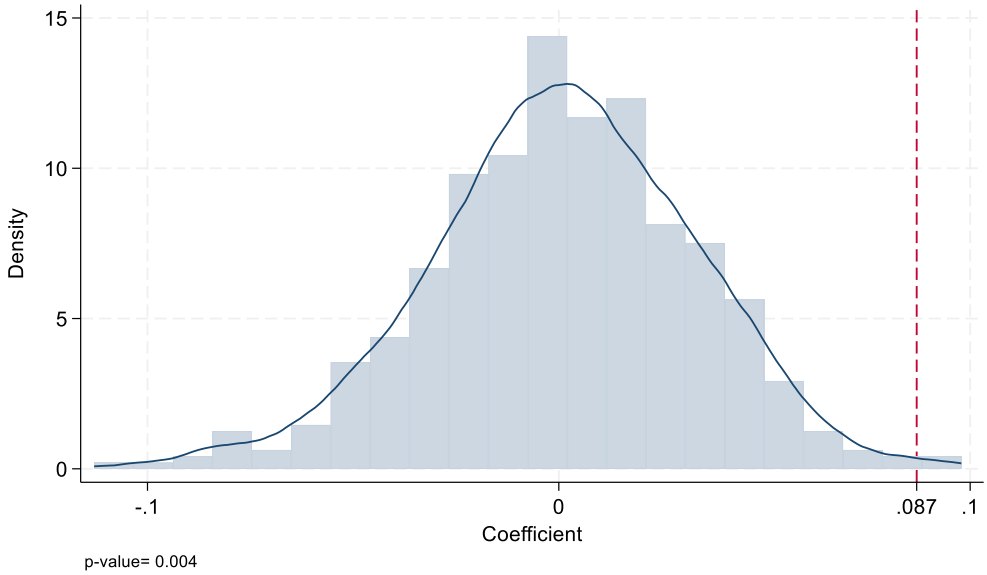
Notes: This figure presents the distribution of placebo treatments where we randomize eight weeks with *"Días sin IVA"*. We run 500 regressions for all sectors using the main specification and we show in a dashed red line the coefficient. The kernel function is Epanechnikov. All regressions include Year-month FE, establishment FE, weekly trend, anticipatory effect, reactive effect and controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cybermonday, Mother's Day and COVID-19 lockdown, all of them interacted with covered sectors dummy (except bimonthly payroll day).

Figure F2.Placebo check for covered sectors



Notes: This figure presents the distribution of placebo treatments where we randomize eight weeks with *"Días sin IVA"*. We run 500 regressions for covered sectors using the main specification and we show in a dashed red line the coefficient. The kernel function is Epanechnikov. All regressions include Year-month FE, establishment FE, weekly trend, anticipatory effect, reactive effect and controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cybermonday, Mother's Day and COVID-19 lockdown, all of them interacted with covered sectors dummy (except bimonthly payroll day).

Figure F3.Placebo check for non-covered sectors



Notes: This figure presents the distribution of placebo treatments where we randomize eight weeks with *"Días sin IVA"*. We run 500 regressions for non-covered sectors using the main specification and we show in a dashed red line the coefficient. The kernel function is Epanechnikov. All regressions include Year-month FE, establishment FE, weekly trend, anticipatory effect, reactive effect and controls for bimonthly payroll day, Christmas, new year, holy week, Black Friday, Cyber Monday, Mother's Day and COVID-19 lockdown, all of them interacted with covered sectors dummy (except bimonthly payroll day).