Federal Reserve Bank of Chicago

Spending Responses to State Sales Tax Holidays

Sumit Agarwal and Leslie McGranahan

WP 2012-10

Spending Responses to State Sales Tax Holidays

Sumit Agarwal

National University of Singapore, ushakri@yahoo.com

Leslie McGranahan

Federal Reserve Bank of Chicago, leslie.mcgranahan@chi.frb.org

November 2012

Abstract

Every year over 20 states offer sales tax holidays (STHs) on specific items like clothes, shoes and other items to encourage consumption, effecting over 100 million consumers. We use a unique dataset of credit cards transaction to study the spending response to these holidays. Using a diff-in-diff methodology, we find that STHs increase overall daily spending by 8%, with large percentage increases in spending on children's clothes and shoes of 193% and 98% respectively. Consumers with children increase spending more during STHs. Our estimates of price elasticities range from 6 for big box merchants to 30 for kids clothing merchants (in absolute terms). There is no evidence of inter-temporal substitution either before or after the STH or cross-product substitution away from non-treated goods. Finally, we show that consumers from across state borders also take advantage of these tax holidays and shop in states offering holidays. Our falsification tests rule out concerns that our results are driven by spurious correlations.

Keywords: Consumption, State Sales Tax Holidays, Back to School, Credit Cards, Household Finance, Banks, Loans, Shopping, Spending.

JEL Classification: D12, G21, H20, H71, L81

---

[*]We benefited from the comments of Gene Amromin, Zahi Ben-David, Eric French, Erik Hurst, David Laibson, Nathan Marwell, Rich Rosen, Amit Seru, Nick Souleles, seminar participants at the Federal Reserve Bank of Chicago and Federal Reserve Systems Regional Economics Meetings. The views in this paper are those of the authors and may not reflect those of the Federal Reserve System, the Federal Reserve Bank of Chicago.

1. Introduction

This paper uses a unique transaction level panel dataset of thousands of credit card accounts to analyze how consumer spending responds to state sales tax holidays (STHs). We test whether spending on goods temporarily exempt from taxes during the STH increases significantly during the STH period and compare that to spending on goods not covered under the STH.

Sales tax holidays – the suspension of sales taxes levied on targeted retail goods for a set period of time - have grown in the last 20 years. In 2012 18 states offered STHs impacting the over 120 million people living in these states. Hence, they can have potentially a large impact on household spending, retail sales, and state budgets during the brief window in which they are in effect. There are three stated objectives of STHs. First, by eliminating the state-level sales tax, the STH lowers the final sales price of retail goods to consumers. Second, lowering sales tax rates helps retailers lower prices without reducing profits. Third, by targeting specific items for tax exemption, the STH encourages consumption of specific goods that policy makers believe have inherent social benefits. In this study we primarily test whether STHs increase consumption since they reduce prices of goods without impacting the profitability of the merchant. While our objective is not to test any specific theoretical model, our results can also be interpreted as a test of the Life-Cycle/Permanent Income (LCPI) model. If the LCPI holds, we should not find significant increase in spending over a broad window due to a temporary and expected change in income (reduction in taxes).[1] However, we would expend to see temporarily spending responses during a temporary price drop.

To study the consumption response to the STH, this paper looks at STHs in 2003. We have credit card *transaction* data from a large financial institution from February 8 - October 20. The sample covers over 75,000 consumers representing all states. Specifically, we know the exact date, amount and type of every *transaction* (i.e. $83 at Hyatt Hotel, $489 purchase at Best Buy, and $218 purchase from US Airways, etc.), of the cardholder over the sample period. We know the merchant category code (MCC) allowing us to separate cardholder purchases into categories that can help us assess the differential response to the STH program.

We use credit card data because this dataset has a number of advantages. Relative to traditional household data sets like the Diary portion of the U.S. Bureau of Labor Statistics' (BLS) *Consumer Expenditure Survey* (CEX), the sample is quite large with little measurement error. This data should provide much more power than others to identify the effects of the STH because it is easier to pick up consumption effects for specific items during small window using a well measured high frequency data set. Also, because we have a panel dataset, we observe

[1] As the article from the Smart money website documents, "consumers can shave up to $48 off the average spending of $689 on kids in grade school; and up to $63 on college-bound teens' average $907 tab." http://www.smartmoney.com/spend/deal-of-the-day/making-the-most-of-salestax-holidays-1343336950640/

consumers before, during, and after the STH. So, it is possible to study high frequency dynamics. Specifically, we are interested in inter-temporal substitution and cross-product substitution effects due to the STH which our data set allows us to investigate. While credit cards are only one payment method, survey evidence shows that consumers typically use credit cards to make purchases for clothes, shoes, computers, and home furnishings. On the other hand, using credit card data does entail a number of limitations. The main unit of analysis is an account, not an individual. Also, we do not observe the card holders total spending (*i.e.*, spending via cash and checks). Additionally, we do not know the specific items purchased, but just the merchant where the transaction took place and the MCC.

As discussed by Gross and Souleles (2003), credit cards play an important role in consumer finances, so they can be quite useful for studying consumer behavior. About 20 percent of aggregate personal consumption is already being purchased using credit cards. Moreover, for most households credit cards represent the leading source of unsecured credit and about two-thirds of households have at least one bankcard.[2]

Previewing the results, we find consumer spending increases during STHs to be statistically significant and large that are concentrated in the merchant categories where there are exempt goods. For example, we find $1.20 increase in total spending in states with STH relative to spending on the same date in a state without a STH. This is an increase of 8% to total spending. We also see significant increases in spending for both non-apparel and apparel, and within these categories for kids clothing, shoes, other apparel and at big box retailers. In percentage terms, the largest increase is for kids clothing (193%) followed by shoes (98%). In dollar terms, the largest increase is in clothing ($0.43), followed by big box spending ($0.23). Next we test for heterogeneity across individuals and STH policy parameters. We find that consumers with children increase their expenditures more than other consumers. These results are consistent with the stated objective of the STH programs. We also find that the duration of the STH matters in the spending response -- longer duration (5 days versus 2 days) dampens the effect of the STH on daily spending. We find no evidence on spending response to the tax subsidy due to the STH. Essentially, consumers respond equally if the STH results in a 4% reduction in taxes versus a 7% reduction in taxes. We also study the effect of a state's STH on the spending behavior of individuals living along across the border in the neighboring state. We find that consumers living in zip codes bordering a STH do spend more as compared to consumers not along the border. Finally, we test for inter-temporal and cross-product substitution due to the STH. There is no evidence of cross-product substitution i.e., consumers do not shift their spending patterns away from goods that are not covered under the STH. We find that spending does not drop either before or after the STH. In fact spending changes are positive before and after the STH, but statistically insignificant. We choose a window of 2 weeks before and after, but our results are robust to alternative window durations.

[2] Moreover, Japelli, Pischke, and Souleles (1998) found that people with bankcards were better able to smooth their consumption past income fluctuations than were people without bankcards.

To put our results in the broader prospective, we calculate price elasticities for the apparel subcategories and for books and school supplies. We want to know how quantities change in response to changes in the after tax price. We do these calculations assuming that the pre-tax price of goods is unchanged and as a result the price change arises solely from the removal of the sales tax. We measure spending in the absence of the sales tax holiday as average spending in non-STH states on the STH dates. These elasticities are quite large and range (in absolute value) from 6 for big box merchants to 30 for kids clothing merchants. These elasticities are far larger than other estimates in the literature. For example, Seale et. al. (2003) estimates that the price elasticity of demand for clothing and footwear in the United States is 0.7 and for education is 0.9.

The pattern of positive coefficients in the periods around sales tax holiday concerns us that we are picking up seasonal demand patterns. In particular, we worry that the sales tax holidays are deliberately placed during periods of state-specific peak seasonal demand. If this is the case, we are picking up the correlation between seasonal demand and spending rather that the effects of the STH itself. This concern is somewhat allayed by the fact that the effects during the brief sales tax holiday window are substantially larger than the effects before or after. However, this general seasonal demand pattern may be biasing our coefficients up. If there are seasonal demand peaks, then our control group is not the right one. Shoppers in a sales tax holiday state should be compared with shoppers in other states on the same date who are subject to the same demand patterns. To account for the potential inappropriateness of our control group, we develop three alternative control groups. We compare consumers in sales tax holidays to others in states without a sales tax holiday in the same region, to others living in zip codes with the same average August temperature, and to others in states which start school in the same general window. Our results are unchanged with these alternative control groups. This gives us confidence that we are picking up the causal effect of the STH on consumer spending.

We conduct a series of falsification tests to make sure that our results are not simply driven by spurious correlations. Since our point estimates in dollar terms are small but measured very precisely, it is possible that we are just picking up noise, despite the fact that we control for account fixed effects, time fixed effects, other controls, and our standard errors are clustered at the state level. To convince ourselves that we are actually picking up a causal effect, we randomly assign STHs over states and time. Our point estimates in that specifications are zero. Overall, these results suggest that there are important spending responses to the STH.

Our paper contributes to several strands of the literature. Our work directly contributes to the growing literature that evaluates the effectiveness of the STH. Cole (2009) analyzes the fiscal impact of these tax holidays, and finds that there is about a 4 percent reduction in states' sales and use tax collection in the months with an STH. Marwell and McGranahan (2011) also studies the effect of the STH on consumption, but cannot precisely determine whether inter-temporal shifting is occurring. These studies do not study the dynamic consumption response to the STH holiday, our study fills that void.

We also contribute to the vast literature on studying consumption response to various fiscal stimulus programs. Some recent studies include Shapiro and Slemrod (1995), Souleles (1999, 2000, 2002), Parker (1999), Browning and Collado (2001), Hsieh (2003), Stephens (2003), and Johnson, Parker, and Souleles (2006). The literature finds mixed evidence, some studies find that consumption response is essentially zero, while other find that liquidity constrained consumers respond positively to the fiscal stimulus programs. Our work is more directly related to the work by Agarwal, Liu, and Souleles (2007) on the 2001 tax rebates. They exploit the random timing of the 2001 tax rebates to identify the dynamic response of credit card payments, spending, and debt to the rebates. They find that consumers initially saved much of the rebates, on average, by increasing their credit card payments and thereby paying down debt. But spending did subsequently increase, offsetting the initial extra payments, so that eventually debt rose back near its original level.

Our work is also related to the general literature on cross-border and online shopping behavior of consumers in response to state and county sales taxes. Goolsbee (2000) finds that consumers in high tax areas are more likely to make online purchases. Einav, Knoepfle, Levin, and Sundaresan (2012) study the price elasticities with respect to the effective sales taxes using the sales purchase decisions of eBay customers. Our price elasticity measures are line with the above two studies.

Finally, we also contribute to the broad literature that exploits the program design features of various fiscal programs and studies the effectiveness of these programs. Aaronson, Agarwal, and French (2012) and Agarwal et. al. (2012) study the changes in minimum wage polices and the HAMP programs respectively. They find positive consumption response to the changes in the minimum wage policies and a higher modification rate due to the HAMP policy.

The rest of the paper is organized as follows. The next section provides a brief background about the STH policies. Section three discusses the data. Section four discusses the results, and section five provides concluding remarks.

2. Background information about Sales Taxes, the STH, and Policy Objectives of STH

Sales taxes are levied on almost every tangible good and a number of services—the exceptions being a few necessity goods such as food and prescription drugs. The tax applies at the retail level, is ad valorem, and is remitted by vendors. Sales taxes are levied by different levels of government; 45 states have some type of state-level sales tax, with counties, cities, and other local governments levying additional sales taxes. In 2010, the average state-level sales tax was 5.6 percent and the median was 6.0 percent, with a range of 2.9 percent in Colorado to 8.25 percent in California. Just under a quarter of state own-source revenues are derived from the general sales tax. Sales taxes affect the vast majority of Americans almost every day of the year.

Cole (2008) presents a historical synopsis of the STH. Briefly, the first STH occurred in 1997 in New York and was enacted to help the city's retailers compete with their tax-free competitors in neighboring New Jersey. Lasting seven days, the holiday exempted general use clothing and footwear priced under $500 from the state-wide 4% sales tax. The STH then spread to Florida in 1998 and Texas in 1999. By 2011, 23 states and the District of Columbia had instituted at least one STH. In 2012, 18 states have authorized sales tax holidays offering the 130 Million residents of those states a brief respite from the sales tax. STHs are state level policies although in a number of cases, localities have also suspended their sales tax during the state holiday. The duration of the STH, the type of exempted items, the ceiling below which these items could be purchased tax-free, and even the number of STH offered each year are all parameters set by the state legislative bodies; in a given year, no two STH have been identical.

While the stated purposes for state tax holidays are varied, they are generally justified to accomplish three goals. First, by eliminating the state-level sales tax, the STH lowers the final sales price of retail goods to consumers. Further, the dates for STHs are often chosen to coincide with periods of high seasonal demand, such as back-to-school shopping periods, with the intention of providing relief to lower-income, liquidity-constrained households or those otherwise deemed worthy of tax relief by policymakers. In justifying Illinois's 2010 holiday, the lead sponsor said, "[w]orking families with kids going back to school, we want to give them a break." (Associate Press, 2010) Second, lowering sales tax rates helps retailers lower prices without reducing profits. And relatedly, STHs can help retailers compete better against their counterparts in bordering states with lower sales tax rates. Third, by targeting specific items for tax exemption, policymakers can encourage the consumption of specific goods that they believe have inherent social benefits. Despite the growing popularity of the STH, little formal evaluation has been conducted to determine whether they actually accomplish policymakers' stated goals. There are a number of reasons why instituting an STH may be ineffective, or why doing so may be considered bad public policy. First, while the sales tax is eliminated for a brief period of time, consumers would not see any benefit if retailers increased the pre-tax price of items; the degree by which prices may be lowered depends on the incidence of taxation. Second, even if after-tax prices do drop consumers may not purchase any more of the targeted item—the degree of change in consumer response depends on the elasticity of demand for the eligible targets. Third, the temporal nature of the STH may cause consumers to shift planned consumption over time. Fourth, because the STH is available to all consumers, unintended recipients, such as wealthy households or those without children, may also take advantage of the holiday or may even have the means to take better advantage of the STH than the intended beneficiaries. In particular, this may be too blunt a policy instrument for subsidizing the consumption of targeted groups. Fifth, there have been complaints of onerous compliance costs for retailers who are forced to participate in an STH.

3. Data

We use a unique, proprietary dataset from a large financial institution that issues credit cards nationally. The bulk of the data consists of the main billing information listed on each account's monthly statement, including total payments and spending, balances, and debt, as well as the credit limit. The dataset is essentially the same as used by Agarwal, Liu, and Souleles (2007) but with one *key* difference. In addition to the aggregate monthly billing information we have access to individual transaction information listed on each account's monthly statement. Specifically, we know the exact date, amount and type of every transaction of the cardholder over a given month. We also know the merchant category code (MCC) allowing us to separate cardholder purchases into categories that can help us measure the differential response to the STH program. The data appendix discusses the MCC is greater detail.

We aggregate the transactions for each account holder in a day to create daily spending. As a result, in our data set, an observation is a spending-day. We only have an observation for a household if some type of transaction occurred on a given date. In the event that the household did not use their credit card on a particular date, it would not be included in the underlying data set. This is problematic because we would like to include households even if they choose not to engage in any credit card spending on a day. One way the sales tax holiday may influence spending is by inducing households that would not have otherwise gone shopping to do so. In order to capture this effect, we expand the sample to include households on every day between when we first and last observed them in the sample. On these added days the household has no spending. Rather than being transactions based, we now have a sample that includes all open accounts. The transaction sample had 1.6 million observations; the open account sample has 10.3 million observations. This indicates that on most days when the account is open, no transactions occur.

We categorize spending based on the type of merchant where the item was purchased. We do not know which items were purchased in a transaction, but we do know the type if merchant where the transaction occurred. We create a series of spending categories based on these merchant categories. We measure total spending and create ten spending subcategories that we think are particularly relevant for investigating sales tax holidays. We first break total spending into apparel and non-apparel spending. Apparel is further broken into four categories, clothing, kids clothing, shoes, and other. Clothing includes department store purchases because approximately 60% of items purchased at department stores are clothing (see Nordstrom 2001). Kids clothing includes only those retailers that specifically concentrate on items for children. Other apparel is primarily apparel accessories, but many of these merchant also carry some clothing items. Non-apparel spending is further divided into Big Box retailers, books and school supplies, appliances, and other. Big box retailers include that set of merchants that sell a

wide range of products often including groceries.[3] We break out books and school supplies, and appliances because a number of the sales tax holidays specifically target these items.

In addition to information on transactions by merchant category, we also have account identifiers, and limited measures of the socio-demographics of the account holder including FICO score, age, income, zip code and state of residence, and a dummy for whether there is a co-applicant on the account. We begin using data for 2003 covering February 8 - October 20. We chose this period because it represents the heart of our data series where we have at least 1000 observations each day.

During our sample period, there were nine STHs. Details are in Table 1. We note that clothing and footwear is exempt eight of the sales tax holidays, school supplies in four, computers in five, and some home furnishings in one. When clothing and footwear are exempt, most clothing accessories are still subject to tax. We also note that these sales tax holidays vary in duration from two days to one week. All occur during the back to school shopping season. The first begins on July 31 and the last ends on September 1, with the majority covering over the weekend of Friday, August 1-Sunday, August 3.

We link this information on sales tax holidays to our data on spending by the state of residence of the account holder and the date when the transaction occurred. In the first three columns of Table 2, we display variable means for the open account sample. On the average day, an account holder spends about $15. There is substantial variation in this sum across observations. Most of this spending is in the "Other" category of non-apparel spending. The average amount of apparel spending is $1.43, most of this in clothing. An additional $0.98 is spent at big box retailers and $0.55 on appliances. Spending in the remainder of the categories is below $0.50 on the average day. The average account holder in our sample is 46 years old, earns $62K per year and has a FICO score of 741 (sample median is 750). Just over a third of the sample has a co-applicant. These means underscore that this is a relatively well to do sample. Average income is above average household income in the US of $59k in 2003 and the median FICO in the sample is above the U.S. median of 723. In the final row of the table, we show the mean of a dummy variable equal to one if the observation is during a sales tax holiday in the state where the account holder lives. Only 0.6% of our observations occur when there is a sales tax holiday in the state where the household lives which due to our large sample size equals over 60,000 observations.

It is important that we show that the consumers in states that have a sales tax holiday are similar to those in states that do not have any sales tax holiday. Instead of showing the first and second moments, we plot the entire kernel density of the key observable variables. These patterns are in Figures 1, 2, and 3. We plot the kernel densities of age, FICO credit score, and

[3] According to Target's 2011 annual report, 19% of their sales were in the apparel and accessories category. The largest category was household essentials with 25%. Wal-Mart's sales mix was 7% apparel in 2011. The largest category was grocery at 55%. (Wal-mart Stores, Inc, 2012)

income of the consumers. The consumers who receive the STH and those that do not receive the STH look remarkably similar on all these dimensions.

4. Results

Before we show formal analysis showing conditional means of spending as a function of STHs, we present basic difference-in-difference tabulations demonstrating that spending was higher during STHs. In particular, in tables 3A and 3B, we compare spending for individuals in sales tax holiday states and non-sales tax holiday states on sales tax holiday dates and non-sales tax holiday dates between May 1 and September 30. In the first panel of the Table 3A, we show average total spending among four groups of consumers: individuals in states that never have a sales tax holiday on dates where no state has a sales tax holiday, individuals in states that have a sales tax holiday during the sales tax holiday in that state, individuals in states that never have a sales tax holiday on dates where another state has a sales tax holiday and individuals in states that have a sales tax holiday on dates when no state has a sales tax holiday[4]. In the first row we show that average spending in a state with a sales tax holiday during this sales tax holiday ($15.72) was higher than average spending in a sales tax holiday state on non-sales tax holiday dates ($14.19). In the second row, we show that spending on STH dates was also higher in non-sales tax holiday states ($15.51 versus $14.57). This second tabulation highlights the placement of STHs during dates where there is more shopping. We calculate the difference between these two differences as $0.58 indicating that the increase in spending in STH states on STH dates is $0.58 larger than the difference in spending on these same dates in other states.

The next two panels of Table 3A, breaks this increase in total spending into the intensive and extensive margin. In particular, we tabulate the percent of account holders making any purchase and the amount of the purchase conditional on purchasing. When we calculate difference-in-differences, we find that the majority of the effect is on the extensive margin.

In Table 3B, we narrow our tabulations to only look at spending on apparel because most sales tax holidays exempt apparel. In this case, we find that the average household in a sales tax holiday state spends $0.88 more on clothing on sales tax holiday dates than non sales tax holiday dates while the average household outside a sales tax holiday state spends an addition $0.18 yielding a difference between the two differences of $0.71. We see increases in STH states relative to non-STH states on both the intensive and extensive margins indicating that individuals are both more likely to buy apparel and also to spend more conditional on shopping.

4.1 Baseline specifications

We now turn to investigating whether an increase in spending occurs for individuals who reside in an STH state during a sales tax holiday as compared to individuals residing in states

[4] Individuals in states that have a sales tax holiday on dates when a different state has a sales tax holiday are not captured in any of the tabulations.

without a sales tax holiday on the same date while controlling for additional covariates. Our baseline specification is:

$$y_{ist} = \beta_0 + \beta_1 \times STH_{ist} + \gamma \times X_i + \theta_t + \varepsilon_{ist} \qquad (1)$$

Where y_{ist} is an outcome measuring the purchases by household *i* in state *s* on day *t*. STH_{ist} is an indicator variable equal to 1 if there is a sales tax holiday on date *t* in the state *s* where household *i* lives. X_i is a vector of the household-level controls of age, age squared, income, income squared, FICO score, a co-applicant dummy and state of residence. θ_t are time fixed effects, and ε_{ist} is an error term. Our time fixed effects are calendar dates (for example, August 10, 2003).

We control for the calendar date of the observation because STHs are deliberately placed during times of high demand. As we showed in Table 3, there is higher spending in non-STH states on dates when another state has an STH than on dates when no other state has an STH. STHs frequently occur on weekends and more shopping for covered items, such as clothing, occurs on Fridays, Saturdays and Sundays than during the remainder of the week. In addition, sales tax holidays tend to be placed during the back to school shopping season from late July-early September when spending on the covered items tends to be high.

We begin by labelling a state as having sales tax holiday if taxes were suspended on any good. In our first specification, we include covariates measuring age, age squared, income, income squared, FICO score, a co-applicant dummy, a set of state dummies, and calendar date fixed effects. Results are presented in Table 4.

We see statistically significant and large increases in expenditure in the merchant categories where we would anticipate finding exempt goods. The number $1.173 in the first row and column of Table 4 means that on the average sales tax holiday day, we see an increase of $1.173 in total spending relative to spending on the same date in a state without a sales tax holiday. In the final row of the Table, we divide the sales tax holiday effect by average daily spending in that category. The number 0.0775 in the first column of the table indicates that this increase of $1.173 represents an 8% increase in overall spending.

In the remainder of the columns in the Table we look at spending in other categories. We see significant increases in spending for both non-apparel and apparel, and within these categories for clothing, kids clothing, shoes, other apparel and big box retailers. In percentage terms, the largest increase is for kids clothing (193%) followed by shoes (98%). In dollar terms, the largest increase is in clothing ($0.43), followed by big box spending ($0.23). Note that in the absence of any consumption response by consumers (and assuming retailers don't hike prices), we would expect these estimates to be negative because the charge for these items would be lower due to the tax savings. We do not see offsetting declines in spending in the "other" category where we would expect to find few exempt goods. The coefficients on the other

covariates are as anticipated with those with higher incomes, FICO scores, and co-applicants spending more.

We next narrow our analysis to investigate only the period surrounding the sales tax holiday. In particular we restrict the sample to May 1 – September 30. We present means for this shortened sample in the last three columns of table 2. Estimates of sales tax effects for this smaller seasonal window are presented in Table 5A. The pattern of results here is very similar to those in Table 4, indicating that using this shorter window doesn't substantively alter our conclusions.

In our next specification, we maintain the shorter window and replace the covariates with account fixed effects. The account fixed effects allow us to control for the propensity of different card holders to consume different items and spend different amounts. We are controlling for all attributes of the household, including composition. This sample is slightly larger than in the covariates example as we no longer need to exclude those households where we lack demographic information. In our sample, we have an average of 96 observations per account. Results are presented in Table 5B. We see a similar pattern to those presented in tables 4 and 5A. In particular we see increase in total spending, and for apparel and all of its subcategories. Outside of apparel, we find increases in spending at big box retailers. In the bottom row of this column, we tabulate the increase in spending relative to the mean and continue to see an 8 percent increase in total spending relative to an average day, and more substantial increases in the other categories, with the largest increase of 183% for children's clothing. Spending in the "other" category is essentially unchanged.

One issue with these specifications is that the spending categories and the STH don't necessarily match. We are asking whether the average STH leads to increased spending in a category, but most STHs may not exempt spending in that merchant category. We next investigate increases in spending for specific types of sales tax holidays and match the STH to the spending category. For STHs that exempt clothing, we look at spending on apparel, clothing, kids clothing, other apparel, and at big box merchants. For sales tax holidays that exempt appliances or computers, we look at spending on appliances and computers, and at big box merchants. For sales tax holidays that exempt school supplies, we look at spending at book and school supply stores and at big box merchants. For STHs that exempt home furnishings, we look at spending at home operations, furnishings merchants (a part of non-apparel, other) and at big box retailers. Most sales tax holidays exempt clothing, but only a few exempt each of the other items. We show results for these more narrowly defined STHs controlling for covariates in Table 6A and with account fixed effects in Table 6B.

The results are consistent across the two specifications. The results for the sales tax holidays on clothing, kids clothing, and shoes are very similar to the results for all sales tax holidays because with the exception of Vermont, all of the states with an STH during our period exempt clothing. The effects for STHs on computers and appliances are imprecisely estimated.

This may be because among the numerous items in these categories, only computers were exempt from taxes in the five 2003 STHs that exempted any appliances. In addition, many purchases of computers were made online (32% in 2002, Wagner 2003) allowing individuals an alternative means of avoiding taxes. If this is the case, the sales tax holiday on computers may serve to affect the outlet from which a computer is purchased rather than the decision to purchase a computer. We cannot capture this change in outlet using our data because we don't know merchant location. For the sales tax holidays that include books and school supplies, we find large increases in spending at book and school supply merchants. We did not find similar results when we looked at all sales tax holidays. For sales tax holidays exempting home goods, we find large and negative results for furnishing stores and large and positive results for big box retailers. Only one of our sales tax holidays (in SC) covers home goods and only a small set of goods in this category are exempt – sheets and towels – which would explain an effect close to zero. We may be finding a negative effect because consumers may be choosing to shop at big box retailers where they can also purchase the other items that are exempt during the SC holiday. Going forward, we are going to focus on the sales tax holidays on clothing and school supplies and books as that is where we find the cleanest results.

Based on the account fixed effects estimates in Table 6B and using the back to school shopping season data, we calculate price elasticities for the apparel subcategories and for books and school supplies. We want to know how quantities change in response to changes in the after tax price. We do these calculations assuming that the pre-tax price of goods is unchanged and as a result the price change arises solely from the removal of the sales tax. For the tax rate in these calculations, we use the average tax rate in STH observations of 4.9%. We measure spending in the absence of the sales tax holiday as average spending in non-STH states on the STH dates. Our estimated increase in spending is relative to this average. We present estimates of elasticities in Table 7. These elasticities are quite large and range (in absolute value) from 6 for big box merchants to 30 for kids clothing merchants. These estimates likely underestimate the true effects because they are assuming a change in price equal to the percentage change arising from removing the sales tax. However, many items in some of these merchant categories are not covered by the sales tax holiday. As a result the fall in prices is smaller and the elasticites correspondingly larger. We next estimate the percent of in the merchant category exempt from the sales tax and show adjusted elasticities.[5] These elasticities are far larger than other estimates in the literature. For example, Seale et. al. (2003) estimates that the price elasticity of demand for clothing and footwear in the United States is 0.7 and for education is 0.9.

We could be underestimating the fall in prices because merchants may lower prices even further through sales during sales tax holidays to further attract consumers to stores. In the final column of the table, we report what the fall in price during the holiday would have needed to be to match the elasticities in the literature given our estimated change in quantities.

[5] The estimates of coverage come from the Annual Reports of Nordstrom Inc. (2001), Target (2011) and Wal-mart Stores, Inc (2012)

While our estimates are price elasticities, we can alternately view them as intertemporal price elasticities if we assume that the increase in quantities that we observe are offset by declines in other periods. We investigate intertemporal patterns in detail in section 4.4.

4.2 Heterogeneity Across Households

We find evidence that sales tax holidays lead to increases in spending on clothing and apparel items and at big box merchants, and at school supply retailers during the subset of holidays that exempt school supplies. We next ask whether there is heterogeneity across individuals in the sample. In particular we are interested in whether the sales tax holiday increases the consumption of well to do or less well to do households or of households with or without children. We only show results for overall spending, the apparel, and its subcategories, and big box retailers for the clothing STHs and for books and school supplies for the school supply STHs.

For income, we divide households into income quartiles based on the income data. We then replace the sales tax holiday dummy with four variables measuring the interaction between the sales tax holiday dummy and the income quartile dummy. Our equation becomes:

$$y_{ist} = \beta_0 + \sum_{g=1}^{G} \beta_g \times D_{ig} \times STH_{ist} + \gamma \times X_i + \theta_t + \varepsilon_{ist} \quad (2)$$

Where D_{ig} is a dummy variable indicating membership of household *i* in income group *g* and β_g the coefficient indicating how the STH effects spending among members in the group g.

The results for are presented in Table 8A for our specification including covariates, and in Table 8B for our account fixed effects. We are asking how much spending increases during an STH for individuals in that income grouping. In the bottom four rows of the table, we calculate the estimated increase in spending in that merchant category as a fraction of average daily spending in that merchant category among households in that income category. For overall spending and the covariates specification we see spending effects that increase monotonically with our income quartiles. With the exception of the highest income category, these effects are imprecisely estimated. For apparel spending, we find similar and statistically significant increases for all income groups for both of our specifications. The percentage increases are slightly larger for account holders in the lower two income quartiles. For the STHs on school supplies, in both specifications, we see higher school supply spending that is statistically significant only for the top quartile, but percentage-wise, we see substantial increases in our bottom income group. We suspect that many of the individuals in the lowest income quintile are students which may explain some of this finding.

We next are interested in whether the effects differ based on whether the household has children living in the household because much of the discussion surrounding STHs is focused on

back to school purchases. We investigate this in two ways to compensate for the fact that we do not have data on whether the household contains children. First, we divide the sample by age group and investigate whether the effects differ by age. We do this because card holders in the middle ages are more likely to have children at home than older and younger households. According to the Census Bureau, in 2003, 56% of householders aged 24 or below had own children in the household, 76% of those 25-34, 86% of those 35-44, 68% of those 45-54, 34% of those 55-64, and 23% of those 65 plus. (U.S. Census Bureau, 2004). Results are presented in Table 9A and Table 9B. For both specifications and across spending categories, we tend to find the largest effects for individuals ages 35-44. These are the individuals most likely to have school aged children. For both specifications, the only group where apparel spending does not increase is that with individuals 65 and over. For the school supply holidays, we find large increases for the under 25 group, which likely contains many college students.

As our second method of investigating the effect of the presence of children, we replace the age groups by the probability that households in that age group have children (according to Census data) and investigate whether households that are more likely to have kids have larger effects. The equation we estimate is:

$$y_{ist} = \beta_0 + \beta_1 \times STH_{ist} + \varphi \times STH_{ist} \times \Pr(kids) + \gamma \times X_i + \theta_t + \varepsilon_{ist} \quad (3)$$

In particular, we add an interaction between the sales tax holiday dummy variable and the measure of the probability that the household has kids. For the covariate specification, we also add the measure of the probability of having kids to our vector of covariates. We are investigating whether households that are more likely to have kids have larger expenditure effects during tax holidays. These results are presented in 10A and 10B. For apparel, clothing, kids clothes and shoes, we find significantly larger spending increases among those more likely to have kids. In the bottom three rows of the Table, we display the percentage increase in spending based on different percentiles of the distribution of the probability of having kids. In keeping with the strong effects on the interaction between the probability of having kids and the sales tax holiday, we see monotonic increases in spending as the probability increases.

These regressions show how much more households spend due to the STH. However, the policy subsidizes purchases of households even if they do not purchase additional items by reducing the after tax price of the items they would have purchased anyway. In Table 11, we display household tax savings by income (Table 11A) and age group (Table 11B). These calculations are based on average spending of households on covered items. These tabulations highlight that the largest tax savings accrue to the wealthiest households because they spend the most on apparel on average. When we investigate spending by age group, we find that spending on apparel is highest among those households most likely to have kids. The correlation between tax savings and the probability of having kids is over 0.9. These demographic comparisons show that spending increases most dramatically and savings are largest among those most likely to have children. This is consistent with the policy goal of helping families with kids at back to

school time. The results for the income comparison groups are more mixed. High income individuals benefit from the sales tax holiday to a similar extent or slightly more than low income individuals.

4.3 Heterogeneity Across Holidays

We next turn to the question of whether there are different effects corresponding to different attributes of the sales tax holidays themselves. We look at two aspects of holidays – the duration of the sales tax holiday and the rate of the state level tax that is suspended.[6] Sales tax holidays in our sample range from 2 days (Iowa) to 7 days (Connecticut). The suspended tax ranges from 4 percent (Georgia and New York) to 6.25 percent (Texas). To investigate the effect of duration and rate, we add an interaction between the STH dummy and the rate or duration of the tax holiday to our regression.

$$y_{ist} = \beta_0 + \beta_1 \times STH_{ist} + \varphi \times STH_{ist} \times duration/rate + \gamma \times X_i + \theta_t + \varepsilon_{ist} \quad (4)$$

The results for the duration are presented in Tables 12A and 12B. Most of the point estimates on the effects of duration are statistically insignificant. However, we do find that each additional day of the holiday reduces spending by approximately $0.07 for clothing and $0.03 for shoes. At the bottom of the table, we show the sales tax effects as a percent of average daily spending for a three day and a seven day holiday to demonstrate the magnitude of smaller effects for each day of a longer holiday. However, within the length of holidays we observe in the data, we find that individuals do increase their total spending (by summing across all the days of the holiday) more during the longer holidays than the shorter ones.

The results for tax rates are presented in Tables 13A and 13B. We might anticipate finding positive coefficients on the interaction with the rate because higher rates mean greater savings. On the other hand, we might anticipate negative coefficients, because the drop in the after tax price is greater in higher tax states, so absent any change in consumption there would be a larger drop in cost. With the exception of kids clothing, where we find a positive coefficient on the rate, we find no effect of the value of the tax that is suspended. This may be because there is not a substantial amount of variation across the holidays. This also may be because we are not measuring the reduction in taxes correctly because local sales taxes are also suspended in most jurisdictions during tax holidays and we have not incorporated this added variation in our measure of the level of suspended taxes. At the bottom of the table, we show the percentage change in expenditure for a state with a 4% and a 6% holiday

4.4 Spending Across Time

[6] Holidays also differ in the ceiling up to which items are exempt. There is very little variation in this measure for the 2003 holidays with clothing exempt up to $100 per item in most states.

We have found evidence that individuals increase spending on covered goods during sales tax holidays. We next are interested in whether this increase in spending during sales tax holidays is offset by declines in spending before and after the sales tax holidays. We are interested in whether households increase their consumption or merely alter the timing of planned consumption to take advantage of the holidays. One of the frequent concerns about sales tax holidays is that they primarily alter the timing of consumption rather than its level. If this is the case, the holidays do not lead to increase consumption of covered goods.

To investigate timing, we measure consumption in the days before and after the sales tax holiday. In particular, we estimate the following equation:

$$y_{ist} = \beta_0 + \beta_1 \times STH_{ist} + \sum_r \beta_r \times STH\_Pre_{istr} + \sum_l \beta_l \times STH\_Post_{istl} + \gamma * X_i + \theta_t + \varepsilon_{ist} \quad (5)$$

Where we add variables denoting dates either preceding (STH_Pre) or following (STH_Post) an STH. If shifting is taking place we would expect negative coefficients prior to and/or after the STH to offset the increases during the sales tax holiday. We investigate timing in three ways – we look at the periods 7 days before and 7 days after the sales tax holiday, two weeks before and after, and four weeks before and after.[7] We only present the results for the period two weeks before and two weeks after the sales tax holiday because the results across the three time frames are very similar. We present the results in Table 14A and 14B. The coefficient presented for "two weeks before the STH" represents the average increase in *daily* spending for days that are within the two weeks prior to the start of the STH.

There are two calculated statistics at the end of each table. First, we present the average change in daily spending in the days before and after the STH (and the associated P-value) labeled "average day before and after". This is a test for whether the STH alters consumption in the period before or after the STH. Second, we present the "Sum of STH effects" which measures the average change in spending before, during and after the STH. This asks whether consumption as a whole changes in response to the sales tax holiday. To calculate this, we add the change in consumption before and after to the change during the STH. To estimate the change during the STH, we multiply the STH effect by the average duration of the STH.

Based on this table, there is very little evidence of individuals shifting consumption from the periods before or after the sales tax holiday into the sales tax holiday period. Most of the coefficients for the weeks before and after the sales tax holiday are positive. For clothing and school supplies in the covariates estimate and for apparel, kids clothing, and school supplies in the account fixed effects specification, this increase is statistically significant. When we combine the period before, during and after the holiday, we see net positive and significant

[7] If we look at data from Google Trends, we see discussion of STHs in 2012 starting on July 24th, approximately 1.5 weeks before the first of the back to school holidays began on August 3. We observe a similar pattern for 2011.

coefficients for most of the spending categories. These findings indicate that sales tax holidays lead to an overall increase in spending in states with tax holidays in the window we investigate.

Our specifications do not allow STH to lead to an overall increase in spending during the entire sample period because we are including state fixed effects in the covariates specification, and account fixed effects in the other specifications. These fixed effects account for the overall level of spending among households treated with STHs. Because we control for the level of spending, the increased spending must dissipate at some point. In Table 15, we investigate dissipation by looking at spending in the period up to eight weeks before and after the sales tax holiday. At the bottom of the Table, we include the sum of the STH effects as we did in Tables 14A and 14B. We see that sales tax holidays lead to a statistically significant increase in consumption through the period 5 weeks before and after the holiday. Once we include 6 weeks in either direction, the effects are no longer significantly different from zero although the point estimates are still positive. In Table 16, we investigate the 8 week window using three specifications; account fixed effects, covariates with state fixed effects and covariates without fixed effects. When we exclude the state fixed effects, we are allowing the STH to increase overall spending in states with a STH over the entire sample. In Figure 4, we graph the point estimates from Table 16. All three specifications show a jump in spending during the sales tax holiday and effects that are modestly positive or close to zero throughout the remainder of the window. In Figure 5, we present a similar figure for households ages 25-54 as they had the largest effects in Tables 9A and 9B and observe a similar pattern.

4.5 Alternative Control Groups

The large number of positive coefficients before and after the STH is somewhat concerning. Negative numbers before and after the holiday would be consistent with shifting behavior. Zero before the holiday and positive numbers after would be consistent with momentum shopping, where shopping begets more shopping. However, it is hard to develop a theory as to why individuals would increase their shopping of covered goods in anticipation of a sales tax holiday.

The pattern of positive (albeit predominately insignificant) coefficients in the periods around sales tax holiday raises the concern that we are picking up seasonal demand patterns. In particular, we worry that the sales tax holidays are deliberately placed during periods of peak seasonal demand. If this is the case, we are picking up the correlation between seasonal demand and spending rather that the effects of the STH itself. This concern is somewhat allayed by the fact that the effects during the brief sales tax holiday window are substantially larger than the effects before or after. However, this general seasonal demand pattern may be biasing our coefficients up.

Sales tax holidays tend to take place in August during the back to school shopping season. At this time in the year, seasonal demand patterns would likely be related either to the

timing of the start of school or to weather patterns and the need to switch into a warmer wardrobe at different times in different states. If there are seasonal demand peaks, then our control group is not the right one. Shoppers in a sales tax holiday state should be compared with shoppers in other states without a sales tax holiday on the same date who are subject to the same demand patterns. To account for the potential inappropriateness of our control group, we develop three alternative control groups. We compare consumers in sales tax holiday states to others in states without a sales tax holiday in the same region, to others living in zip codes with the same average August temperature, and to others in states which start school in the same general time frame.

To compare states with holidays to other in the same region, we divide states into the four major census regions and compare spending among individuals in states with STHs to those in other states without STHs in the same region on the same date. In short, instead of date fixed effects, we now have region-date fixed effects. Results looking at spending in a 2 week window, controlling for covariates are presented in Table 17. For the spending categories including the covered goods: apparel and school supplies, we continue to primarily see increases before and after the holidays. For the most part, the sum of STH effects are positive, but are more imprecisely estimated.

As a second method of developing a more appropriate control group, we compare individuals in states with sales tax holidays with individuals in states without sales tax holidays who live in zip codes with August temperatures in a similar range. Here we are taking advantage of the fact that we have information about card holder zip code, which we link to national weather service data for the nearest weather station. We divide zip codes into three groups, those with average August temperature above 71.2, between 71.2 and 75.2, and above 75.2. Results are presented in Table 18. The results are very similar to what we observed when we looked at regional control groups in Table 17.

For our final alternative control group, we divide states based on the typical start date of schools in the state. We determine the typical start of the 2003 school year based on data from the Council of Chief State School Officers (CCSSO 2004). The CCSSO report provides a range of dates for most states. We divide states based on the midpoint of the range provided by the CCSSO. In most states, school start dates are determined at the district rather than the state level. Some states restrict the choice of the district by mandating that schools must start after a certain date, other states leave start dates completely at the discretion of the district. Data is only provided for 43 of the 50 states, and for DC. We do not include data for the states where start dates were not available. In the deleting these states, we lose one of our sales tax holiday states, New York, and also lose California. (See Appendix A for a discussion of the start of school by state). Results for this control group and the two week window are presented in Table 19. Most of our estimates continue to be positive and insignificant in the periods before and after the holidays.

Across these three different alternative control groups, we don't see any evidence of consumers shifting spending from the period before and after the sales tax holiday into the sales tax holiday window. The STH appears to lead to higher spending during the sales tax holiday period without an offsetting decline in spending in the two week window before or after the tax holiday.

4.6. Border Spillovers

When states temporarily exempt items from the sales tax, they are hoping to reduce the expenses faced by their residents. However, the benefits are not restricted to individuals living in the state. Residents of other states who choose to shop across the border benefit from the lower taxes as well. Because we know the zip code of the account holder, we can investigate whether individuals who live in a zip code near a state with a sales tax holiday also increase their spending during sales tax holidays. We investigate whether STHs lead to increased spending among individuals who live in a state without a sales tax holiday, but in a zip code within 17 miles of a state with a sales tax holiday. We choose 17 miles because the average passenger car in the US travelled 34 miles in the average day in 2003. (U.S. Department of Transportation 2003).

Results estimating the increased consumption of households living just over tax holiday state borders are presented in Table 20A for the covariates estimates, and Table 20B for the account fixed effects specification. Focusing on the account fixed effects estimates, we find increased total spending and clothing spending among households just over the border during tax holidays. These increases in spending are slightly smaller than the increases within the tax holiday states. For example, based on the account fixed effects specification, the average consumer in a tax holiday state increases apparel spending by $0.68, while the average consumer living across the border increases spending by $0.45. We can't be sure whether this increase in spending is occurring in the holiday state because we do not have information on merchant location. However, these findings are consistent with the conjecture that the tax holiday policy increases spending in holiday states by out of state individuals.

We would also see increases in spending within sales tax holiday states and in adjacent zip codes if there was a seasonal demand pattern that influenced the timing of holidays. These seasonal demand patterns, if driven by weather or similar forces, would increase spending on both sides of state borders. To investigate this further, we test whether we see increases in spending in zip codes within 17 and 50 miles of the border, within 50 and 150 miles of the border and between 150 and 250 miles of the border as compared in individuals living more than 250 miles from a sales tax holiday on sales tax holiday dates. Results are shown in Tables 21A and 21B. It is unlikely that many families would travel over 50 miles to save a couple percentage points on purchases. The results of this experiment are mixed. Relying on the account fixed effects specification, we do see increases in apparel spending among households

between 50 and 150 miles of the border, but these effects are smaller than the effects for those in a sales tax holiday state are within 17 miles of the border.

4.7. Falsification Tests

One concern with our findings is that the small increase in spending is not due to the sales tax holiday, but the likely result of looking at spending in a small group of states on a random set of dates in a very large sample. This is concerning because our findings point to increases in spending that, while a substantial amount of daily spending, are small in dollar terms. To test this further, we investigate whether we would find similar effects on spending if we were to pick random sales tax holiday dates in random states. In particular, we randomize across the states and dates in our sample and assign 9 randomly chosen state-date pairs the duration and coverage of the 9 STHs in our sample. We then investigate the magnitude of increases in total spending, clothing spending, and kids clothing spending on these simulated STH dates for our baseline back to school specification (Tables 5A and 5B). We perform this randomization 100 times. In Table 22 we show some statistics concerning the results of these randomizations and compare them to our findings for the actual sales tax holidays – Table 22A provides results for the covariate based specification and Table 22B for the fixed effects specification.

We find that it is unlikely that the results we observe arise randomly. The mean estimated coefficients on the effects of the random STHs are close to zero for both specifications. In addition, the estimated coefficients for the actual holidays are outside the 95% confidence interval for the random coefficients for clothing and kids clothing spending and outside the 90% confidence interval for total spending. In addition, for clothing and kids clothing not a single one of the 100 estimated coefficients using the random holidays is as high as the observed coefficients on the actual holidays for either specification.

5. Conclusion

This paper used a unique new panel dataset of credit card transactions and associated credit bureau data to analyze how consumers responded to the STH. We find that overall spending rises by 8% but spending rises by 98% and 193% for shoes and children's clothes respectively. We also find that the spending response is higher for account holders likely to have children. Furthermore we do not find any evidence of inter-temporal or cross-product substitution. Finally, we also find some effects that consumers from neighboring states also increase spending if they live closer to the border of the states with the STH. We also calculate price elasticities for the apparel subcategories and for books and school supplies, these elasticities are quite large and range (in absolute value) from 6 for big box merchants to 30 for kids clothing merchants.

One criticism of our approach may be that since states intentionally place STH during periods of increased seasonal demand, our estimation strategy my fail to account for heterogeneity of demand cycles that vary by state. Shoppers in a sales tax holiday state should be compared with shoppers in other states on the same date who are subject to the same demand patterns. To account for the potential inappropriateness of our control group, we develop three alternative control groups. We compare consumers in sales tax holidays to others in states without a sales tax holiday in the same region, to others living in zip codes with the same average August temperature, and to others in states which start school in the same general window. Our results are unchanged with these alternative control groups. This gives us confidence that we are picking up the causal effect of the STH on consumer spending.

These results suggest that the STH policy is effective is fulfilling the main objective – increase consumer spending by giving the consumers incentives that reduce the prices of these goods through reduced tax burden on specific items like clothes and shoes without impacting the profitability of the merchants.

Appendix A: Transaction Data Appendix

Any user initiated credit card activity is referred to as a transaction. Transaction data is transmitted from the point of purchase to a central clearinghouse. There are several clearinghouses throughout the US. The major clearinghouse is First Data Resources or FDR. FDR provides monthly summaries of transaction data to the credit card issuers.

The transaction data file includes many fields (such as exact time of transaction) but the ones used for this study are transaction amount, card account number, and Merchant Classification Code or MCC. Merchant Category Codes (MCCs) are codes established by the bankcard associations or banks to identify different types of businesses. The MCC is a 4-digit code selected by the merchant. The merchant selects the code that best describes their business. The MCC identifies the merchant by type of processing, authorization and settlement.

Appendix B: School Start Date Appendix

One issue related to the timing of sales tax holidays and consumption relates to the start of school in US. One way sales tax holidays could be correlated with higher consumption in a state is if states timed sales tax holidays to correspond to high demand in the state that resulted from the timing of the start of school. To address this we briefly investigate the question of when school starts in the United States and how this corresponds to the timing of sales tax holidays. Data on school start dates is not collected at the national level by the Department of Education. This is partly because there are 13,000 school districts in the United States and in most states districts determine when to start school, often subject to required parameters. In the paper, we use data on the general timing of the start of school in 2003 based on a data from the Council of Chief State School Officers. In this appendix we investigate the timing of school start dates in 2011 for the 500 largest school districts in the United States. We collected basic data on these districts from the National Center for Education Statistics and used district websites to determine when school started. We found the following to be true: larger districts start later as do districts that are further north. Controlling for longitude and latitude of the district, we find that districts with hotter temperatures start earlier. We also find a high correlation (0.6) between the district start date in 2011 and the average state start date in 2003, indicating that state patterns are fairly persistent. We find very weak relationships between school start dates and whether and when a state has a sales tax holiday.

References

Aaronson, D., S. Agarwal, E. French, 2012, "Consumption and Debt Response to Minimum Wage Increases," forthcoming, *American Economic Review*

Agarwal, S., G. Amromin, I. Ben-David, S. Chomsisengphet, A. Seru, and T. Piskorski, 2012, "Policy Intervention in Debt Renegotiation: Evidence from Home Affordability Modification Program", Working Paper Columbia University

Agarwal, S., C. Liu, and N. Souleles, 2007, "Reaction of Consumer Spending and Debt to Tax Rebates - Evidence from Consumer Credit Data" *Journal of Political Economy,* 115, 986-1019

Blinder, A.S., 1981, "Temporary Income Taxes and Consumer Spending," *Journal of Political Economy*, 89, pp. 26-53.

Blinder, A.S., and Deaton, A., 1985, "The Time Series Consumption Function Revisited," *Brookings Papers on Economic Activity*, 2, 465-511.

Bodkin, R., 1959, "Windfall Income and Consumption," *American Economic Review*, 49, 602-614.

Browning, M., and Lusardi, A., 1996, "Household Saving: Micro Theories and Micro Facts," *Journal of Economic Literature*, 34, 1797-1855.

Browning, M., and Collado, M.D., 2003, "The Response of Expenditures to Anticipated Income Changes: Panel Data Estimates," *American Economic Review*, 91, 681-92.

Carroll, C, 1992, "The Buffer-Stock Theory of Saving: Some Macroeconomic Evidence," *Brookings Papers on Economic Activity*, 2, 61-156.

Einav Liran, Dan Knoepfle, Jonathan Levin, and Neel Sundaresan, 2012, "Sales Taxes and Internet Commerce," NBER Working Paper No. 18018

Goolsbee, Austan, 2000, "In a World without Borders: the Impact of Taxes on Internet Commerce," *Quarterly Journal of Economics*, 115(2), 561-576.

Gross, D., and Souleles, N., 2002, "Do Liquidity Constraints and Interest Rates Matter for Consumer Behavior? Evidence from Credit Card Data," *Quarterly Journal of Economics*, 149-185.

Hsieh, C., 2003, "Do Consumers React to Anticipated Income Changes? Evidence from the Alaska Permanent Fund," *American Economic Review*, 93, 397-405.

Jappelli, T., Pischke, S., and Souleles, N.S., 1998, "Testing for Liquidity Constraints in Euler Equations with Complementary Data Sources," *The Review of Economics and Statistics*, 80, 251-262.

Johnson, D.S., Parker, J.A., and Souleles, N.S., 2006, "Consumption and Tax Cuts: Evidence from the randomized income tax rebates of 2001," *American Economic Review*, 96, 1589-1610.

Nordstrom, W., 2001, "Percentage of 2000 Sales by Merchandise Category," 2001 Annual Report.

U.S. Census Bureau, Population Division, Current Population Survey, 2003 Annual Social and Economic Supplement. Internet Release Date: September 15, 2004.

Parker, J., 1999, "The Reaction of Household Consumption to Predictable Changes in Social Security Taxes," *American Economic Review*, 89, 959-973.

Poterba, J.M., 1988, "Are Consumers Forward Looking? Evidence from Fiscal Experiments," *American Economic Review*, 78, 413-418.

Seale. James Jr., Anita Regmi and Jason Bernstein, 2003. "International Evidence on Food Consumption Patterns," *United States Department of Agricuture: Technical Bulletin, No.* 1904, October.

Shapiro, M.D., and Slemrod, J., 1995, "Consumer Response to the Timing of Income: Evidence from a Change in Tax Withholding," *American Economic Review*, 85, 274-283.

Shapiro, M.D., and Slemrod, J., 2002, "Did the 2001 Tax Rebate Stimulate Spending? Evidence from Taxpayer Surveys," NBER working paper 9308, October.

Shapiro, M.D., and Slemrod, J., 2003, "Consumer Response to Tax Rebates," *American Economic Review*, 93, 381-396.

Shea, J., 1995, "Union Contracts and the Life-Cycle/Permanent-Income Hypothesis," *American Economic Review*, 85, 186-200.

Souleles, N.S., 1999, "The Response of Household Consumption to Income Tax Refunds," *American Economic Review*, 89, 947-958.

Souleles, N.S., 2000, "College Tuition and Household Savings and Consumption," *Journal of Public Economics*, 77(2), 185-207.

Souleles, N.S., 2002, "Consumer Response to the Reagan Tax Cuts," *Journal of Public Economics*, 85, 99-120.

Stephens, M., 2003, "3rd of tha Month: Do Social Security Recipients Smooth Consumption Between Checks?" *American Economic Review*, 93, 406-422.

Target. "Target 2011 Annual Report"vhttp://corporate.target.com/annual-reports/2011/images/company/annual_report_2011/documents/Target_2011_Annual_Rep

ort.pdf

The Council of Chief State School Officers (CCSSO), "Key State Education Policies on PK-12 Education: 2004." 2004.

US Department of Transportation, 2003, Bureau of Transportation Statistics, *Omnibus Household Survey*, OmniStats *Volume 3, Issue 4 October 2003. http://www.bts.gov/publications/omnistats/volume_03_issue_04/html/figure_02.html*

Wagner, Mary, "Online Sales Jumped 48% in 2002, Shop.org/Forrester study reports" Internet Retailer, May 15, 2003. On the internet at http://www.internetretailer.com/2003/05/15/online-sales-jumped-48-in-2002-shop-org-forrester-study-report.

Wal-mart Stores, Inc "Form 10-K for the Fiscal Year Ended January 31, 2012" United States Security and Exchange Commission file number 1-6991. Available on the internet at http://www.sec.gov/Archives/edgar/data/104169/000119312512134679/d270972d10k.htm.

Wilcox, D.W., 1989, "Social Security Benefits, Consumption Expenditure, and the Life Cycle Hypothesis," *Journal of Political Economy*, 97, 288-304.

Wilcox, D.W., 1990, "Income Tax Refunds and the Timing of Consumption Expenditure," Federal Reserve Board of Governors working paper, April.

Tables

Table 1: Sales Tax Holidays in 2003

State	Dates	Description	Local Participation	Relevant Spending Sub-Categories	State Tax Rate
Connecticut	8/17/2003-8/23/2003	Clothing and footwear priced $300 or less. (Normally no tax on clothing under $75)	No local sales tax	Clothing, Kids Clothing, Shoes, Big Box	6
Georgia	7/31/2003-8/3/2003	Clothing and footwear priced under $100, school supplies and children's books under $20, computers and computer accessories under $1500	Local sales taxes also repealed	Clothing, Kids Clothing, Shoes, Big Box, Books, Computers & Appliances	4
Iowa	8/1/2003-8/2/2003	Clothing and footwear priced $100 or less	Local sales taxes also repealed	Clothing, Kids Clothing, Shoes, Big Box	5
New York	8/26/2003-9/1/2003	Clothing, footwear and clothing repair items priced less than $110	Localities choose whether local sales taxes are repealed	Clothing, Kids Clothing, Shoes, Big Box	4
North Carolina	8/1/2003-8/3/2003	Clothing, footwear, and school supplies priced $100 or less, sports equiptment $50 or less, computers priced $3500 or less	Local sales taxes also repealed	Clothing, Kids Clothing, Shoes, Big Box, Books, Computers & Appliances	4.5
South Carolina	8/1/2003-8/3/2003	Clothing, footwear and school supplies, computers, bedding and bath items	Local sales taxes also repealed	Clothing, Kids Clothing, Shoes, Big Box, Books, Computers & Appliances, Home Furnishings	5
Texas	8/1/2003-8/3/2003	Clothing and footwear priced $100 or less	Localities choose whether local sales taxes are repealed	Clothing, Kids Clothing, Shoes, Big Box	6.25
Vermont	8/9/2003-8/11/2003	Computers and associated accessories up to $4000	Local sales taxes also repealed	Computers & Appliances, Big Box	5
West Virginia	8/1/2003-8/3/2003	Clothing, footwear, and school supplies priced $100 or less. Computers and accessories less than $750.	No local sales tax	Clothing, Kids Clothing, Shoes, Big Box, Books, Computers & Appliances	6
Data from Adam J. Cole, 2008					

Table 2: Variable Means

	Full Sample				Back to School Sample		
	Observations	Mean	Standard Deviation		Observations	Mean	Standard Deviation
Total Spending	10303961	$ 15.13	112.38		7076458	$ 14.59	110.38
Apparel	10303961	$ 1.43	28.09		7076458	$ 1.37	27.27
Clothing	10303961	$ 1.06	19.76		7076458	$ 1.01	18.92
Kids Clothing	10303961	$ 0.05	3.05		7076458	$ 0.05	3.01
Shoes	10303961	$ 0.11	5.30		7076458	$ 0.10	5.39
Other Apparel	10303961	$ 0.21	18.59		7076458	$ 0.21	18.21
Non-Apparel	10303961	$ 13.70	108.42		7076458	$ 13.22	106.54
Big Box	10303961	$ 0.98	15.23		7076458	$ 0.95	13.83
Books	10303961	$ 0.23	8.38		7076458	$ 0.23	8.38
Appliances	10303961	$ 0.55	25.85		7076458	$ 0.54	25.40
Other	10303961	$ 11.94	103.38		7076458	$ 11.49	101.67
Age	10125588	46.33	14.66		6955338	46.33	14.68
Income (Thousands)	8089414	62.20	111.35		5576384	61.87	110.02
FICO Score	10147903	740.50	67.34		6954746	739.23	70.11
Co-Applicant Flag	8089414	0.35	0.48		5576384	0.34	0.48
Dummy=1 if Sales Tax Holiday	10303961	0.01	0.08		7076458	0.01	0.09
Observations During STH	63365				63365		

Notes: Summary statistics represent the sample means, standard deviations and number of observations for the main dependent and independent variables used in the empirical analysis. The full sample covers the time period from February 8 - October 20, 2003. The back to school sample covers May 1-September 30, 2003.

Table 3A: Difference in Difference of Means: Total Spending

Total Spending				
Average Spending				
	Sales Tax Holiday Date	Non-Sales Tax Holiday Date	Difference	Diff-in-Diff
Sales Tax Holiday State	$ 15.72	$ 14.19	$ 1.52	
Non Sales Tax Holiday State	$ 15.51	$ 14.57	$ 0.94	
Difference	$ 0.21	$ (0.37)		
Diff-in-Diff				$ 0.58
% Positive Spending				
	Sales Tax Holiday Date	Non-Sales Tax Holiday Date	Difference	Diff-in-Diff
Sales Tax Holiday State	14.4%	14.1%	0.4%	
Non Sales Tax Holiday State	14.3%	13.8%	0.5%	
Difference	0.1%	0.2%		
Diff-in-Diff				-0.1%
Average Spending Conditional on Spending				
	Sales Tax Holiday Date	Non-Sales Tax Holiday Date	Difference	Diff-in-Diff
Sales Tax Holiday State	$ 114.73	$ 106.36	$ 8.37	
Non Sales Tax Holiday State	$ 113.69	$ 111.09	$ 2.61	
Difference	$ 1.03	$ (4.73)		
Diff-in-Diff				$ 5.76

Table 3B: Difference in Difference of Means: Apparel Spending

Apparel				
Average Spending				
	Sales Tax Holiday Date	Non-Sales Tax Holiday Date	Difference	Diff-in-Diff
Sales Tax Holiday State	$ 2.29	$ 1.41	$ 0.88	
Non Sales Tax Holiday State	$ 1.50	$ 1.33	$ 0.18	
Difference	$ 0.79	$ 0.09		
Diff-in-Diff				$ 0.71
% Positive Spending				
	Sales Tax Holiday Date	Non-Sales Tax Holiday Date	Difference	Diff-in-Diff
Sales Tax Holiday State	2.4%	1.7%	0.7%	
Non Sales Tax Holiday State	1.7%	1.5%	0.1%	
Difference	0.7%	0.1%		
Diff-in-Diff				0.6%
Average Spending Conditional on Spending				
	Sales Tax Holiday Date	Non-Sales Tax Holiday Date	Difference	Diff-in-Diff
Sales Tax Holiday State	$ 108.48	$ 99.57	$ 8.90	
Non Sales Tax Holiday State	$ 102.51	$ 100.36	$ 2.16	
Difference	$ 5.96	$ (0.79)		
Diff-in-Diff				$ 6.75

Notes: Tables 3A and 3B cover the period from May-September 2003.

Table 4: Baseline specification with Covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Other Apparel	Non-Apparel	Big Box	Books and Supplies	Applicances and Computers	Other
Dummy=1 if STH on Any Item	1.173***	0.752***	0.430***	0.0971***	0.106***	0.119***	0.421*	0.226***	-0.0188	-0.0412	0.255
	(0.236)	(0.0906)	(0.0793)	(0.0134)	(0.0322)	(0.0343)	(0.247)	(0.0509)	(0.0406)	(0.0694)	(0.292)
Age Squared	0.152***	-0.0203***	-0.0129***	-2.83e-05	-0.00164	-0.00570**	0.172***	0.00920*	-0.000715	-0.00483	0.169***
	(0.0334)	(0.00558)	(0.00471)	(0.000598)	(0.00102)	(0.00244)	(0.0295)	(0.00462)	(0.00173)	(0.00378)	(0.0266)
Age Squared	0.00279**	1.90e-05	2.85e-06	1.38e-05**	-3.54e-07	3.02e-05	0.00281**	0.000188**	-2.10e-05	-3.06e-05	-0.00257***
	(0.000360)	(5.55e-05)	(4.64e-05)	(6.21e-06)	(8.53e-06)	(2.43e-05)	(0.000322)	(4.56e-05)	(1.63e-05)	(4.04e-05)	(0.000291)
Income (Thousands)	0.0497***	0.00569***	0.00401***	0.000260**	0.000323**	0.00109***	0.0440***	0.000585*	0.000733**	0.00189***	0.0408***
	(0.00506)	(0.000533)	(0.000384)	(4.34e-05)	(3.67e-05)	(0.000150)	(0.00462)	(0.000310)	(9.00e-05)	(0.000268)	(0.00419)
Income Squared	-3.31e-06**	-9.52e-07**	-5.69e-07**	-4.39e-08**	-5.36e-08**	-1.85e-07**	-7.36e-06**	-1.06e-07*	-1.27e-07**	-3.24e-07***	-6.80e-06***
	(1.41e-06)	(1.38e-07)	(9.58e-08)	(8.40e-09)	(7.64e-09)	(3.52e-08)	(1.28e-06)	(5.30e-08)	(2.21e-08)	(6.18e-08)	(1.18e-06)
FICO Score	0.0256***	0.00213***	0.00170***	1.00e-04**	8.10e-05	0.000248**	0.0235***	0.000911**	0.000377**	0.00101***	0.0212***
	(0.00242)	(0.000272)	(0.000235)	(2.61e-05)	(6.11e-05)	(0.000107)	(0.00219)	(0.000195)	(5.68e-05)	(0.000180)	(0.00192)
Dummy=1 if Coapplicant	4.801***	0.252***	0.209***	0.0304***	0.0241***	-0.0121	4.549***	0.531***	0.0757***	0.125***	3.817***
	(0.380)	(0.0306)	(0.0216)	(0.00437)	(0.00667)	(0.0145)	(0.364)	(0.0424)	(0.0120)	(0.0342)	(0.322)
Constant	-10.17***	-0.262	-0.281	-0.0627***	0.0466	0.0352	-9.907***	0.789***	0.00568	-0.463***	-10.24***
	(1.668)	(0.221)	(0.223)	(0.0202)	(0.0470)	(0.100)	(1.515)	(0.162)	(0.0571)	(0.141)	(1.386)
Observations	7,913,907	7,913,907	7,913,907	7,913,907	7,913,907	7,913,907	7,913,907	7,913,907	7,913,907	7,913,907	7,913,907
R-squared	0.003	0.001	0.001	0.000	0.000	0.000	0.003	0.001	0.000	0.000	0.003
STH Effect as % of Average Daily Spending	0.0775	0.525	0.404	1.930	0.981	0.565	0.0307	0.230	-0.0818	-0.0744	0.0214
Robust standard errors in parentheses											
*** p<0.01, ** p<0.05, * p<0.1											

Notes: The data cover the time period from February 8 – October 20, 2003. We estimate a GLS regression for overall spending and various components of spending controlling for whether there is a sales tax holiday, age, age squared, income, income squared, FICO score, a co-applicant flag, calendar date and state of residence. Standard errors are clustered by state. The main independent variable of interest is the indicator variable for a sales tax holiday on any item.

Table 5A: Back to School Sample, Controlling for Covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Other Apparel	Non-Apparel	Big Box	Books and Supplies	Applicances and Computers	Other
Dummy=1 if STH on Any Item	1.133***	0.758***	0.443***	0.0993***	0.103***	0.112***	0.375	0.223***	-0.0249	-0.0396	0.216
	(0.234)	(0.0900)	(0.0794)	(0.0134)	(0.0323)	(0.0338)	(0.249)	(0.0518)	(0.0411)	(0.0699)	(0.299)
Age Squared	0.115***	-0.0180***	-0.0117**	6.67e-05	-0.00153	-0.00479**	0.133***	0.00985**	-0.00462**	-0.00684	0.135***
	(0.0354)	(0.00627)	(0.00517)	(0.000667)	(0.00129)	(0.00210)	(0.0321)	(0.00368)	(0.00210)	(0.00457)	(0.0284)
Age Squared	-0.00245***	-1.34e-05	-1.81e-05	-1.42e-05**	-1.93e-06	2.08e-05	-0.00244***	-0.000195***	1.34e-05	-8.53e-06	-0.00225***
	(0.000382)	(6.14e-05)	(5.12e-05)	(6.76e-06)	(1.06e-05)	(2.12e-05)	(0.000347)	(3.69e-05)	(1.88e-05)	(4.95e-05)	(0.000308)
Income (Thousands)	0.0503***	0.00560***	0.00392***	0.000225***	0.000329***	0.00113***	0.0447***	0.000677**	0.000783***	0.00211***	0.0412***
	(0.00498)	(0.000515)	(0.000354)	(4.00e-05)	(4.25e-05)	(0.000160)	(0.00458)	(0.000324)	(0.000113)	(0.000285)	(0.00412)
Income Squared	-8.42e-06***	-9.29e-07***	-6.48e-07***	-3.81e-08***	-5.38e-08***	-1.90e-07***	-7.49e-06***	-1.31e-07**	-1.34e-07***	-3.59e-07***	-6.87e-06***
	(1.37e-06)	(1.35e-07)	(9.27e-08)	(7.34e-09)	(8.13e-09)	(3.61e-08)	(1.24e-06)	(5.54e-08)	(2.52e-08)	(6.57e-08)	(1.13e-06)
FICO Score	0.0246***	0.00198***	0.00162***	9.39e-05***	8.11e-05*	0.000190	0.0227***	0.000880***	0.000345***	0.000947***	0.0205***
	(0.00272)	(0.000252)	(0.000221)	(2.34e-05)	(4.83e-05)	(0.000120)	(0.00252)	(0.000208)	(5.51e-05)	(0.000205)	(0.00221)
Dummy=1 if Coapplicant	5.112***	0.285***	0.231***	0.0315***	0.0302***	-0.00761	4.827***	0.529***	0.0785***	0.145***	4.075***
	(0.402)	(0.0416)	(0.0251)	(0.00488)	(0.00896)	(0.0184)	(0.381)	(0.0400)	(0.0134)	(0.0406)	(0.345)
Constant	-10.26***	-0.252	-0.261	-0.0565**	0.0347	0.0308	-10.01***	0.743***	0.158**	-0.458**	-10.45***
	(1.924)	(0.224)	(0.217)	(0.0225)	(0.0356)	(0.0974)	(1.756)	(0.127)	(0.0617)	(0.194)	(1.557)
Observations	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935
R-squared	0.003	0.001	0.001	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.002
STH Effect as % of Average Daily Spending	0.0776	0.552	0.437	2.057	0.992	0.544	0.0284	0.234	-0.109	-0.0729	0.0188
Robust standard errors in parentheses											
*** p<0.01, ** p<0.05, * p<0.1											

Table 5B: Back to School Sample with Account Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Other Apparel	Non-Apparel	Big Box	Books and Supplies	Applicances and Computers	Other
STH on Any Item	1.164***	0.657***	0.377***	0.0884***	0.0858***	0.106***	0.507**	0.234***	-0.0317	-0.0111	0.315
	(0.209)	(0.0972)	(0.0775)	(0.0167)	(0.0286)	(0.0323)	(0.192)	(0.0523)	(0.0554)	(0.0641)	(0.249)
Constant	14.33***	1.134***	0.838***	0.0293***	0.110***	0.156***	13.20***	0.767***	0.195***	0.383***	11.85***
	(0.557)	(0.0766)	(0.0656)	(0.00602)	(0.0135)	(0.0328)	(0.584)	(0.0533)	(0.0296)	(0.0555)	(0.596)
Observations	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458
R-squared	0.066	0.040	0.021	0.018	0.011	0.059	0.064	0.040	0.029	0.045	0.062
STH Effect as % of Average Daily Spending	0.0798	0.479	0.372	1.831	0.823	0.515	0.0383	0.246	-0.138	-0.0204	0.0274
Robust standard errors in parentheses											
*** p<0.01, ** p<0.05, * p<0.1											

Notes: Tables 5A and 5B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include controls for whether there is a sales tax holiday and calendar date fixed effects. Table 5A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 5B also includes account fixed effects. Standard errors are clustered by state. The main independent variable of interest is the sales tax holiday indicator.

6A: Narrowly Defined Sales Tax Holidays, Back to School Sample, Controlling for Covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Clothing	Kids Clothing	Shoes	Big Box	Appliances	Big Box	Books and School Supplies	Big Box	Home Operations, Furnishing and Maintenace	Big Box
STH on Clothing	0.450***	0.100***	0.105***	0.222***						
	(0.0815)	(0.0133)	(0.0325)	(0.0520)						
STH on Computers/Appliances					-0.0985	0.135				
					(0.131)	(0.187)				
STH on Books/School Supplies							0.198***	0.126		
							(0.0344)	(0.193)		
STH on Household Goods									-0.604***	0.812***
									(0.105)	(0.0573)
Constant	-0.261	-0.0565**	0.0347	0.743***	-0.458**	0.744***	0.158**	0.744***	-1.904***	0.744***
	(0.217)	(0.0225)	(0.0356)	(0.127)	(0.194)	(0.127)	(0.0616)	(0.127)	(0.245)	(0.127)
Observations	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935
R-squared	0.001	0.000	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001
STH Effect as % of Average Daily Spending	0.445	2.073	1.003	0.233	-0.181	0.141	0.864	0.132	-0.878	0.852
Robust standard errors in parentheses										
*** p<0.01, ** p<0.05, * p<0.1										

6B: Narrowly Defined Sales Tax Holidays, Back to School Sample, Controlling for Account Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Clothing	Kids Clothing	Shoes	Big Box	Appliances	Big Box	Books and School Supplies	Big Box	Home Operations, Furnishing and Maintenace	Big Box
STH on Clothing	0.382***	0.0890***	0.0869***	0.235***						
	(0.0782)	(0.0168)	(0.0289)	(0.0528)						
STH on Computers/Appliances					0.0698	0.295				
					(0.146)	(0.252)				
STH on Books/School Supplies							0.356**	0.303		
							(0.144)	(0.263)		
STH on Household Goods									-0.603***	1.676***
									(0.0907)	(0.0468)
Constant	0.838***	0.0293***	0.110***	0.767***	0.383***	0.767***	0.195***	0.767***	0.555***	0.767***
	(0.0656)	(0.00602)	(0.0135)	(0.0533)	(0.0555)	(0.0533)	(0.0298)	(0.0533)	(0.0982)	(0.0533)
Observations	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458
R-squared	0.021	0.018	0.011	0.040	0.045	0.040	0.029	0.040	0.037	0.040
STH Effect as % of Average Daily Spending	0.377	1.845	0.833	0.247	0.129	0.309	1.550	0.318	-0.877	1.759
Robust standard errors in parentheses										
*** p<0.01, ** p<0.05, * p<0.1										

Notes: Tables 6A and 6B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include controls for whether there is a sales tax holiday for a particular spending category and calendar date fixed effects. Table 6A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 6B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicators.

Table 7: Estimated Price Elasticities

	Clothing Holiday					School Supply Holiday
	Clothing	Kids Clothing	Shoes	Big Box		Books and School Supplies
Elasticity Assuming 100% of Purchases Covered by the Holiday	8.78	30.08	16.55	6.09		26.34
Estimated Fraction Covered	0.5	1	1	0.15		0.3
Elasticity Adjusted for Percent Covered	17.56	30.08	16.55	40.58		87.81
Elasticity in Literature	0.7	0.7	0.7	0.7		0.9
Change in Price Needed to Match Literature	28%	97%	54%	20%		110%

Note: Table 7 presents the absolute value of price elasticities based on the findings in Table 6b assuming a fall in after tax price equal to the removal of the average sales tax.

Table 8A: Sales Tax Holiday Effects by Income Quartile, Controlling for Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Bottom Quartile (Q1) x STH	-0.652	0.713***	0.488***	0.0327	0.0463**	-0.00510		0.339
	(0.910)	(0.175)	(0.137)	(0.0305)	(0.0225)	(0.0724)		(0.235)
Second Quartile (Q2) x STH	1.082	0.845***	0.589***	0.112**	0.0790**	0.248		0.0365
	(1.046)	(0.182)	(0.0624)	(0.0535)	(0.0325)	(0.160)		(0.109)
Third Quartile (Q3) x STH	1.441	0.575***	0.147	0.0691	0.162***	0.0966		0.0789
	(0.997)	(0.175)	(0.139)	(0.0464)	(0.0488)	(0.139)		(0.0969)
Top Quartile (Q4) x STH	2.575***	0.886***	0.502**	0.173***	0.141**	0.500***		0.361***
	(0.657)	(0.279)	(0.198)	(0.0601)	(0.0611)	(0.0968)		(0.117)
Constant	-10.23***	-0.251	-0.262	-0.0555**	0.0357	0.747***		0.157**
	(1.923)	(0.222)	(0.216)	(0.0221)	(0.0356)	(0.126)		(0.0617)
Observations	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935		5,442,935
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
STH Effect as % of Average Daily Spending Q1	-0.0671	0.680	0.613	1.057	0.501	-0.00620		1.917
STH Effect as % of Average Daily Spending Q2	0.0865	0.735	0.684	3.335	0.907	0.255		0.188
STH Effect as % of Average Daily Spending Q3	0.0925	0.418	0.145	1.356	1.647	0.0878		0.334
STH Effect as % of Average Daily Spending Q4	0.122	0.436	0.345	2.290	0.974	0.467		1.125
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 8B: Sales Tax Holiday Effects by Income Quartile, Controlling for Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Bottom Quartile (Q1) x STH	1.169	0.831***	0.596***	0.0334	0.0440	0.0844		0.360
	(0.729)	(0.155)	(0.125)	(0.0303)	(0.0288)	(0.0738)		(0.221)
Second Quartile (Q2) x STH	2.655**	0.864***	0.581***	0.116**	0.0989***	0.374***		0.00381
	(1.150)	(0.155)	(0.0638)	(0.0496)	(0.0233)	(0.120)		(0.159)
Third Quartile (Q3) x STH	1.552	0.680***	0.228*	0.0710*	0.175***	0.0898		0.0583
	(1.302)	(0.175)	(0.132)	(0.0409)	(0.0444)	(0.109)		(0.0710)
Top Quartile (Q4) x STH	-0.319	0.595**	0.393**	0.153***	0.102	0.426***		0.327***
	(0.544)	(0.227)	(0.162)	(0.0504)	(0.0835)	(0.0787)		(0.107)
Constant	14.68***	1.086***	0.801***	0.0313***	0.102***	0.776***		0.195***
	(0.651)	(0.0772)	(0.0683)	(0.00794)	(0.0204)	(0.0562)		(0.0362)
Observations	5,576,384	5,576,384	5,576,384	5,576,384	5,576,384	5,576,384		5,576,384
R-squared	0.063	0.042	0.021	0.018	0.010	0.041		0.032
STH Effect as % of Average Daily Spending Q1	0.120	0.792	0.748	1.079	0.475	0.103		2.037
STH Effect as % of Average Daily Spending Q2	0.212	0.752	0.675	3.472	1.135	0.384		0.0196
STH Effect as % of Average Daily Spending Q3	0.0996	0.494	0.226	1.393	1.771	0.0817		0.247
STH Effect as % of Average Daily Spending Q4	-0.0151	0.293	0.270	2.025	0.710	0.398		1.017
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 8A and 8B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include interactions between income quartile and the dummy for whether there is a sales tax holiday and calendar date fixed effects. Table 8A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 8B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the interactions between income quartiles and the sales tax holiday indicator.

Table 9A: Sales Tax Holiday Effects by Age Group, Controlling for Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Under 25 x STH	0.659	1.071**	0.280**	-0.0590***	0.168***	0.0837		0.717***
	(1.300)	(0.498)	(0.132)	(0.0101)	(0.0501)	(0.0671)		(0.233)
Ages 25-34 x STH	0.596	0.803***	0.537***	0.0425	0.172**	0.439***		0.0325
	(0.926)	(0.265)	(0.183)	(0.0427)	(0.0655)	(0.160)		(0.188)
Ages 35-44 x STH	3.436**	1.153***	0.565***	0.227***	0.157***	0.201		0.377**
	(1.657)	(0.244)	(0.121)	(0.0572)	(0.0387)	(0.234)		(0.181)
Ages 45-54 x STH	1.900*	0.795***	0.567***	0.0983*	0.0931**	0.278*		0.280**
	(0.956)	(0.221)	(0.156)	(0.0499)	(0.0414)	(0.140)		(0.132)
Ages 55-64 x STH	-1.681	0.357**	0.389***	0.0913*	-0.0663***	0.0285		-0.120***
	(1.515)	(0.140)	(0.0950)	(0.0494)	(0.0242)	(0.254)		(0.0286)
Ages 65+ x STH	-1.207	-0.125	-0.162	0.0426	0.0264	0.0192		-0.0147
	(1.229)	(0.160)	(0.102)	(0.0728)	(0.0619)	(0.132)		(0.0524)
Constant	-10.22***	-0.249	-0.253	-0.0520**	0.0328	0.744***		0.157**
	(1.922)	(0.219)	(0.217)	(0.0214)	(0.0357)	(0.127)		(0.0616)
Observations	5,442,935	5,442,935	5,442,936	5,442,935	5,442,935	5,442,935		5,442,935
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
STH Effect as % of Average Daily Spending under 25	0.0542	0.718	0.258	-1.181	1.283	0.106		2.089
STH Effect as % of Average Daily Spending 25-34	0.0373	0.471	0.439	0.708	1.405	0.408		0.135
STH Effect as % of Average Daily Spending 35-44	0.209	0.762	0.512	3.216	1.313	0.174		1.583
STH Effect as % of Average Daily Spending 45-54	0.124	0.592	0.553	2.262	0.910	0.302		1.108
STH Effect as % of Average Daily Spending 55-64	-0.123	0.306	0.446	3.112	-0.809	0.0336		-0.568
STH Effect as % of Average Daily Spending 65+	-0.117	-0.143	-0.250	2.265	0.400	0.0285		-0.125
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 9B: Sales Tax Holiday Effects by Age Group, Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Under 25 x STH	1.434	0.816*	0.222***	-0.0508***	0.0989*	0.236**		0.570***
	(1.230)	(0.466)	(0.0791)	(0.00874)	(0.0543)	(0.100)		(0.146)
Ages 25-34 x STH	-0.210	0.511*	0.327	0.0351	0.0993	0.511***		0.00467
	(0.751)	(0.273)	(0.203)	(0.0345)	(0.0644)	(0.148)		(0.215)
Ages 35-44 x STH	3.295***	1.277***	0.657***	0.232***	0.174***	0.195		0.795
	(1.059)	(0.180)	(0.128)	(0.0632)	(0.0292)	(0.124)		(0.543)
Ages 45-54 x STH	1.808	0.843***	0.507***	0.109**	0.121***	0.380***		0.340***
	(1.146)	(0.205)	(0.131)	(0.0432)	(0.0301)	(0.0882)		(0.117)
Ages 55-64 x STH	1.069	0.259	0.281**	0.0661**	-0.0457**	0.120		0.264
	(0.652)	(0.180)	(0.111)	(0.0261)	(0.0192)	(0.128)		(0.277)
Ages 65+ x STH	-0.997	-0.0719	-0.0482	-0.00315	-0.0114	-0.0811		0.00992
	(0.660)	(0.194)	(0.217)	(0.0333)	(0.0437)	(0.0593)		(0.0209)
Constant	14.35***	1.132***	0.837***	0.0297***	0.110***	0.778***		0.196***
	(0.541)	(0.0753)	(0.0650)	(0.00611)	(0.0140)	(0.0538)		(0.0302)
Observations	6,955,338	6,955,338	6,955,338	6,955,338	6,955,338	6,955,338		6,955,338
R-squared	0.066	0.040	0.021	0.018	0.011	0.040		0.028
STH Effect as % of Average Daily Spending under 25	0.118	0.547	0.205	-1.017	0.757	0.299		1.662
STH Effect as % of Average Daily Spending 25-34	-0.0131	0.299	0.267	0.584	0.809	0.475		0.0193
STH Effect as % of Average Daily Spending 35-44	0.200	0.843	0.595	3.289	1.454	0.168		3.335
STH Effect as % of Average Daily Spending 45-54	0.118	0.628	0.494	2.499	1.178	0.413		1.343
STH Effect as % of Average Daily Spending 55-64	0.0783	0.223	0.322	2.253	-0.557	0.142		1.249
STH Effect as % of Average Daily Spending 65+	-0.0964	-0.0824	-0.0745	-0.168	-0.174	-0.121		0.0848
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 9A and 9B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include interactions between age group and the dummy for whether there is a sales tax holiday and calendar date fixed effects. Table 9A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 9B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the interactions between age group and the sales tax holiday dummy.

10A: Sales Tax Holiday Effects Based on the Probability of Having Children, Controlling for Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	-0.923	0.171	0.168	0.00725	-0.0223	0.0883		-0.162***
	(1.630)	(0.185)	(0.103)	(0.0313)	(0.0208)	(0.184)		(0.0306)
Sales Tax Holiday x Prob. Kids	5.356	1.560***	0.737**	0.242***	0.331***	0.350		-0.107
	(4.117)	(0.534)	(0.343)	(0.0701)	(0.0694)	(0.527)		(0.0667)
Prob. Kids	3.260***	0.0781	-0.0128	0.0595***	0.00469	0.535***		0.771***
	(0.733)	(0.0910)	(0.0560)	(0.0101)	(0.0125)	(0.0845)		(0.158)
Constant	-10.60***	-0.257	-0.258	-0.0623***	0.0349	0.687***		0.175***
	(1.940)	(0.227)	(0.219)	(0.0226)	(0.0359)	(0.129)		(0.0634)
Observations	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935		5,442,935
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
STH Effect as % of Average Daily Spending 25th P-tile of Prob. Kids	-0.0412	0.193	0.209	0.452	-0.0231	0.115		-0.264
STH Effect as % of Average Daily Spending 50th P-tile of Prob. Kids	0.0983	0.625	0.486	2.359	1.184	0.254		1.013
STH Effect as % of Average Daily Spending 75th P-tile of Prob. Kids	0.153	0.795	0.595	3.112	1.661	0.309		1.516
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

10B: Sales Tax Holiday Effects Based on the Probability of Having Children, Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	0.146	0.0625	0.0814	-0.0112	-0.0204**	0.0630		0.0694
	(0.822)	(0.228)	(0.189)	(0.0166)	(0.00940)	(0.0749)		(0.0879)
Sales Tax Holiday x Prob. Kids	3.167	1.721***	0.853*	0.296***	0.297***	0.529**		0.754***
	(2.168)	(0.616)	(0.488)	(0.0703)	(0.0620)	(0.208)		(0.166)
Constant	14.35***	1.132***	0.837***	0.0297***	0.110***	0.778***		0.196***
	(0.541)	(0.0753)	(0.0650)	(0.00611)	(0.0140)	(0.0538)		(0.0302)
Observations	6,955,338	6,955,338	6,955,338	6,955,338	6,955,338	6,955,338		6,955,338
R-squared	0.066	0.040	0.021	0.018	0.011	0.040		0.028
STH Effect for 25th P-tile of Prob. Kids as % of Average Daily Spending	0.0230	0.121	0.131	0.135	-0.0247	0.0994		0.499
STH Effect for 50th P-tile of Prob. Kids as % of Average Daily Spending	0.105	0.597	0.451	2.464	1.059	0.310		1.747
STH Effect for 75th P-tile of Prob. Kids as % of Average Daily Spending	0.138	0.785	0.577	3.383	1.487	0.394		2.239
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 10A and 10B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include an STH indicator and an interaction between the sales tax holiday indicator and the probability of having kids and calendar date fixed effects. Table 10A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 10B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the interaction between the sales tax holiday indicator and the probability of having kids.

Table 11A: Tax Savings by Income Group Based on Average Daily Spending

Income Quartile	Average Daily Spending on Apparel	Average STH Duration (#of Days)	Average Tax Rate	Savings
Q1	$ 2.19	6.0	0.05	$ 0.61
Q2	$ 2.39	6.0	0.05	$ 0.66
Q3	$ 2.23	6.0	0.05	$ 0.62
Q4	$ 3.00	6.0	0.05	$ 0.83

Table 11B: Tax Saving by Age Group Based on Average Daily Spending

Age Group	Probability Kids	Average Daily Spending on Apparel	Average STH Duration (#of Days)	Average Tax Rate	Savings
<25	0.56	$ 2.83	6.0	0.05	$ 0.78
25-34	0.76	$ 2.63	6.0	0.05	$ 0.73
35-44	0.86	$ 3.08	6.0	0.05	$ 0.85
45-54	0.68	$ 2.44	6.0	0.05	$ 0.68
55-64	0.34	$ 1.57	6.0	0.05	$ 0.45
65+	0.23	$ 0.97	6.0	0.05	$ 0.28

12A: The Effects of Sales Tax Holiday Duration, Controlling for Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	0.302	1.183***	0.929***	0.0689	0.266**	0.336		0.0843
	(1.491)	(0.307)	(0.226)	(0.0687)	(0.105)	(0.270)		(0.194)
Sales Tax Holiday x Holiday Length	0.142	-0.0714	-0.0824**	0.00535	-0.0279*	-0.0196		0.0331
	(0.234)	(0.0455)	(0.0329)	(0.00994)	(0.0161)	(0.0391)		(0.0485)
Constant	-10.26***	-0.252	-0.261	-0.0565**	0.0347	0.743***		0.158**
	(1.924)	(0.224)	(0.217)	(0.0225)	(0.0356)	(0.127)		(0.0616)
Observations	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935		5,442,935
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
STH Effect as % of Average Daily Spending 3 Day Holiday	0.0499	0.706	0.673	1.761	1.754	0.291		0.800
STH Effect as % of Average Daily Spending 7 Day Holiday	0.0889	0.498	0.348	2.204	0.685	0.209		1.377
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

12B: The Effects of Sales Tax Holiday Duration, Controlling for Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	0.993	1.080***	0.808***	0.0409	0.280***	0.506*		1.113
	(1.138)	(0.346)	(0.228)	(0.0586)	(0.103)	(0.286)		(0.779)
Sales Tax Holiday x Holiday Length	0.0302	-0.0693	-0.0712*	0.00804	-0.0323**	-0.0452		-0.220
	(0.176)	(0.0537)	(0.0383)	(0.00994)	(0.0148)	(0.0419)		(0.194)
Constant	14.33***	1.134***	0.838***	0.0293***	0.110***	0.767***		0.195***
	(0.557)	(0.0765)	(0.0655)	(0.00603)	(0.0135)	(0.0533)		(0.0297)
Observations	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458		7,076,458
R-squared	0.066	0.040	0.021	0.018	0.011	0.040		0.029
STH Effect as % of Average Daily Spending 3 Day Holiday	0.0742	0.635	0.587	1.348	1.757	0.388		1.974
STH Effect as % of Average Daily Spending 7 Day Holiday	0.0825	0.434	0.306	2.015	0.519	0.198		-1.857
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 12A and 12Bb cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include a sales tax holiday indicator, an interaction between the sales tax holiday indicator and the length of the holiday, and calendar date fixed effects. Table 12A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 12B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the interaction between the sales tax holiday indicator and the length of the holiday.

13A: The Effects of the Sales Tax Rate, Controlling for Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	-0.0556	0.693	0.532	0.0226	0.0583	-0.0849		0.614*
	(1.363)	(0.575)	(0.493)	(0.0494)	(0.228)	(0.238)		(0.315)
Sales Tax Holiday x Suspended State Tax Rate	0.244	0.0155	-0.0170	0.0160*	0.00955	0.0634		-0.0934
	(0.283)	(0.114)	(0.0940)	(0.00897)	(0.0524)	(0.0505)		(0.0750)
Constant	-10.26***	-0.252	-0.261	-0.0565**	0.0347	0.743***		0.158**
	(1.924)	(0.224)	(0.217)	(0.0225)	(0.0356)	(0.127)		(0.0616)
Observations	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935	5,442,935		5,442,935
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
STH Effect as % of Average Daily Spending 4% Rate	0.0464	0.539	0.475	1.462	0.834	0.110		1.046
STH Effect as % of Average Daily Spending 6% Rate	0.113	0.584	0.408	2.786	1.201	0.376		0.232
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

13B: The Effects of the Sales Tax Rate, Controlling for Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	1.768	1.141*	0.808	-0.0640	-0.0538	0.115		1.077
	(1.145)	(0.626)	(0.489)	(0.0619)	(0.186)	(0.254)		(0.882)
Sales Tax Holiday x Suspended State Tax Rate	-0.122	-0.0975	-0.0875	0.0314**	0.0288	0.0247		-0.162
	(0.232)	(0.129)	(0.105)	(0.0123)	(0.0415)	(0.0575)		(0.188)
Constant	14.33***	1.134***	0.838***	0.0293***	0.110***	0.767***		0.195***
	(0.557)	(0.0767)	(0.0657)	(0.00602)	(0.0135)	(0.0533)		(0.0298)
Observations	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458		7,076,458
R-squared	0.066	0.040	0.021	0.018	0.011	0.040		0.029
STH Effect as % of Average Daily Spending 4% Rate	0.0961	0.618	0.539	0.625	0.314	0.198		1.872
STH Effect as % of Average Daily Spending 6% Rate	0.0627	0.334	0.194	3.227	1.421	0.302		0.463
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 13A and 13B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include a sales tax holiday indicator, an interaction between the sales tax holiday indicator and the tax rate, and calendar date fixed effects. Table 13A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 13B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the interaction between the sales tax holiday indicator and the tax rate.

14A: Spending Two Weeks Before and After Holiday, Controlling for Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
2 Weeks Before STH	0.628	0.163	0.181	0.0116	-0.0118	0.0131		0.0389
	(0.493)	(0.233)	(0.139)	(0.0106)	(0.0185)	(0.0349)		(0.0258)
Week Before STH	-0.0385	0.0296	0.102	-0.00444	-0.00569	-0.0350		0.0824***
	(0.315)	(0.0594)	(0.0634)	(0.0108)	(0.0189)	(0.0309)		(0.0266)
STH	1.141***	0.779***	0.499***	0.0672***	0.101***	0.228***		0.211***
	(0.246)	(0.0944)	(0.0917)	(0.0140)	(0.0340)	(0.0584)		(0.0356)
Week After STH	0.244	0.195	0.0987	-0.00229	0.00571	-0.00350		0.0659
	(0.442)	(0.151)	(0.0633)	(0.00615)	(0.0192)	(0.0593)		(0.0659)
2 Weeks After STH	0.0311	0.0131	0.0829	-0.00720	-0.00755	0.0586		0.0824
	(0.341)	(0.0820)	(0.0668)	(0.0218)	(0.0175)	(0.0754)		(0.0521)
Constant	-10.14***	-0.242	-0.246	-0.0638***	0.0359	0.775***		0.164**
	(1.935)	(0.225)	(0.217)	(0.0202)	(0.0358)	(0.126)		(0.0620)
Observations	5,443,578	5,443,578	5,443,578	5,443,578	5,443,578	5,443,578		5,443,578
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
Average Day Before and After	0.216	0.100	0.116	-0.000585	-0.00484	0.00830		0.0674
P-Value	0.303	0.219	0.000456	0.957	0.757	0.193		0.0321
Sum of STH Effects	12.90	7.477	6.239	0.387	0.468	1.600		2.616
P-Value	0.0388	0.00373	0.0392	0.263	0.411	0.801		0.00568
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

14B: Spending Two Weeks Before and After Holiday, Controlling for Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
2 Weeks Before STH	0.187	0.119	0.169	0.0199**	-0.0174	0.0352		0.0571
	(0.333)	(0.171)	(0.107)	(0.00913)	(0.0187)	(0.0370)		(0.0456)
Week Before STH	0.0332	0.0850	0.0993*	0.00210	-0.00389	-0.0193		0.0491*
	(0.273)	(0.0570)	(0.0514)	(0.00778)	(0.0125)	(0.0343)		(0.0270)
STH	1.196***	0.690***	0.442***	0.0553***	0.0828**	0.241***		0.371***
	(0.207)	(0.0923)	(0.0735)	(0.0104)	(0.0315)	(0.0590)		(0.136)
Week After STH	0.460	0.202*	0.111***	0.0128	0.00422	-0.00241		0.0465
	(0.278)	(0.108)	(0.0411)	(0.00770)	(0.00850)	(0.0520)		(0.0897)
2 Weeks After STH	0.155	0.138	0.158**	-0.00689	-0.0177	0.0369		0.123*
	(0.291)	(0.104)	(0.0687)	(0.0151)	(0.0156)	(0.0632)		(0.0631)
Constant	14.33***	1.134***	0.841***	0.0263***	0.110***	0.767***		0.195***
	(0.558)	(0.0783)	(0.0661)	(0.00512)	(0.0135)	(0.0542)		(0.0299)
Observations	7,077,100	7,077,100	7,077,100	7,077,100	7,077,100	7,077,100		7,077,100
R-squared	0.066	0.040	0.022	0.015	0.011	0.040		0.029
Average Day Before and After	0.209	0.136	0.134	0.00696	-0.00868	0.0126		0.0688
P-Value	0.254	0.0241	0.00653	0.371	0.610	0.653		0.00597
Sum of STH Effects	13.02	7.939	6.413	0.527	0.254	1.797		3.204
P-Value	0.0108	2.96e-05	4.87e-05	0.0463	0.474	0.100		0.189
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 14A and 14B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both tables include indicators for the STH and separate indicators for the periods one and two weeks before and after the STH, and calendar date fixed effects. Table 14A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 14B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the indicators for the weeks before and after the sales tax holiday.

Table 15: Dissipation of Effects of Clothing Sales Tax Holiday on Apparel Spending, Controlling for Account Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Apparel	Apparel	Apparel	Apparel	Apparel	Apparel	Apparel	Apparel	Apparel
8 Weeks Before STH									0.00507
									(0.0625)
7 Weeks Before STH								-0.0136	-0.0173
								(0.0407)	(0.0377)
6 Weeks Before STH							-0.0285	-0.0229	-0.0267
							(0.173)	(0.179)	(0.174)
5 Weeks Before STH						-0.00566	-0.0118	-0.00582	-0.00982
						(0.0842)	(0.0955)	(0.101)	(0.0993)
4 Weeks Before STH					-0.143***	-0.149***	-0.155**	-0.149**	-0.153**
					(0.0483)	(0.0481)	(0.0587)	(0.0616)	(0.0647)
3 Weeks Before STH				0.264***	0.243**	0.237**	0.230**	0.237**	0.232**
				(0.0945)	(0.0927)	(0.0945)	(0.103)	(0.111)	(0.106)
2 Weeks Before STH			0.123	0.148	0.127	0.120	0.113	0.120	0.116
			(0.174)	(0.176)	(0.178)	(0.183)	(0.199)	(0.204)	(0.202)
1 Weeks Before STH		0.0941	0.112*	0.138**	0.114*	0.107*	0.100*	0.108*	0.103*
		(0.0700)	(0.0645)	(0.0682)	(0.0627)	(0.0597)	(0.0582)	(0.0608)	(0.0591)
STH	0.665***	0.684***	0.701***	0.723***	0.694***	0.686***	0.680***	0.687***	0.682***
	(0.0978)	(0.0934)	(0.0947)	(0.0988)	(0.0961)	(0.0974)	(0.108)	(0.114)	(0.110)
1 Week After STH		0.177	0.195*	0.227**	0.204*	0.193*	0.185*	0.194*	0.188*
		(0.112)	(0.107)	(0.103)	(0.104)	(0.108)	(0.105)	(0.107)	(0.105)
2 Weeks After STH			0.135	0.158	0.137	0.128	0.118	0.129	0.123
			(0.110)	(0.117)	(0.115)	(0.113)	(0.119)	(0.126)	(0.121)
3 Weeks After STH				0.0321	0.0104	0.00221	-0.00571	0.0111	0.00432
				(0.0751)	(0.0777)	(0.0807)	(0.0800)	(0.0839)	(0.0851)
4 Weeks After STH					-0.115	-0.125	-0.132	-0.119	-0.129
					(0.0918)	(0.0965)	(0.0996)	(0.104)	(0.110)
5 Weeks After STH						-0.112	-0.121	-0.107	-0.117
						(0.0916)	(0.0814)	(0.0792)	(0.0814)
6 Weeks After STH							-0.0730	-0.0559	-0.0661
							(0.170)	(0.169)	(0.175)
7 Weeks After STH								0.197***	0.185**
								(0.0725)	(0.0747)
8 Weeks After STH									-0.111
									(0.119)
Constant	1.134***	1.134***	1.134***	1.134***	1.134***	1.134***	1.134***	1.134***	1.134***
	(0.0766)	(0.0773)	(0.0781)	(0.0792)	(0.0781)	(0.0779)	(0.0777)	(0.0779)	(0.0777)
Observations	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458
R-squared	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Sum of STH Effects	3.991	5.997	8.160	11.10	8.197	6.891	5.619	7.785	6.383
P-Value	1.22e-08	6.75e-08	5.32e-05	0.000242	0.00884	0.0637	0.289	0.222	0.340
Robust standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Notes: Table 15 covers the time period from May - September 2003. We estimate a simple GLS regression for apparel spending. We include a sales tax indicator and separate indicators for the periods up to eight weeks before and after the STH, calendar date fixed effects, and account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the indicators for the weeks before and after the sales tax holiday

Table 16: Effect of Sales Tax Holiday on Clothing in Four Month Window, Alternative Specifications

	Apparel Spending		
	(1)	(2)	(3)
Specification	Account Fixed Effects	Covariates Including State Dummies	Covariates Excluding State Dummies
8 Weeks Before STH	0.00507	-0.0220	0.0221
	(0.0625)	(0.0470)	(0.159)
7 Weeks Before STH	-0.0173	0.0452	0.0873
	(0.0377)	(0.0512)	(0.135)
6 Weeks Before STH	-0.0267	-0.109	-0.0669
	(0.174)	(0.108)	(0.100)
5 Weeks Before STH	-0.00982	0.101	0.144*
	(0.0993)	(0.125)	(0.0747)
4 Weeks Before STH	-0.153**	-0.106	-0.0589
	(0.0647)	(0.0838)	(0.116)
3 Weeks Before STH	0.232**	0.313**	0.357*
	(0.106)	(0.138)	(0.182)
2 Weeks Before STH	0.116	0.186	0.228
	(0.202)	(0.252)	(0.147)
1 Weeks Before STH	0.103*	0.0829	0.121
	(0.0591)	(0.0759)	(0.146)
STH	0.682***	0.804***	0.918***
	(0.110)	(0.114)	(0.102)
1 Week After STH	0.188*	0.217	0.242
	(0.105)	(0.150)	(0.183)
2 Weeks After STH	0.123	0.0391	0.0544
	(0.121)	(0.0841)	(0.146)
3 Weeks After STH	0.00432	0.0864	0.0917
	(0.0851)	(0.0903)	(0.166)
4 Weeks After STH	-0.129	-0.0329	-0.0379
	(0.110)	(0.116)	(0.126)
5 Weeks After STH	-0.117	-0.0132	-0.135
	(0.0814)	(0.0933)	(0.146)
6 Weeks After STH	-0.0661	0.00282	-0.167
	(0.175)	(0.233)	(0.230)
7 Weeks After STH	0.185**	0.226*	0.0361
	(0.0747)	(0.118)	(0.102)
8 Weeks After STH	-0.111	-0.125	-0.320**
	(0.119)	(0.135)	(0.123)
Constant	1.134***	-0.254	0.493*
	(0.0777)	(0.225)	(0.286)
Observations	7,076,458	5,442,936	5,442,936
R-squared	0.040	0.001	0.001
Sum of STH Effects	6.383	11.07	9.696
P-Value	0.340	0.0635	0.311
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Notes: Table 16 covers the time period from May - September 2003. We estimate a simple GLS regression for apparel spending. All three columns include a sales tax indicator and separate indicators for the periods eight weeks before and after the STH, and calendar date fixed effects. Column (1) includes account fixed effects; column (2) includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence; column (3) includes controls for age, age squared, income, income squared, FICO score, and a co-applicant flag . Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the indicators for the weeks before and after the sales tax holiday.

Table 17: Spending Two Weeks Before and After Holiday, Controlling for Covariates and Region-Date

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
2 Weeks Before STH	0.367	0.217	0.238*	0.0214**	-0.0343	-0.0167		-0.0332
	(0.594)	(0.222)	(0.125)	(0.00960)	(0.0264)	(0.0524)		(0.0318)
Week Before STH	-0.679	-0.0875	0.0999	-0.00676	-0.0248	-0.0488		0.0462
	(0.469)	(0.107)	(0.0764)	(0.0118)	(0.0175)	(0.0472)		(0.0343)
STH	0.400	0.514***	0.297***	0.0521***	0.0681**	0.198**		0.196***
	(0.475)	(0.114)	(0.108)	(0.0168)	(0.0279)	(0.0778)		(0.0495)
Week After STH	-0.408	0.178	0.0220	-0.00943	0.00111	-0.0946		0.0402
	(0.566)	(0.164)	(0.0908)	(0.00844)	(0.0120)	(0.0639)		(0.0800)
2 Weeks After STH	-0.364	0.0405	0.0871	-0.00135	-0.0330*	0.0525		0.0853*
	(0.453)	(0.0754)	(0.0736)	(0.0133)	(0.0189)	(0.0681)		(0.0505)
Constant	-8.879***	0.176	0.0522	-0.0504**	0.0979***	0.370***		0.0809
	(1.950)	(0.228)	(0.217)	(0.0202)	(0.0357)	(0.126)		(0.0620)
Observations	5,443,578	5,443,578	5,443,578	5,443,578	5,443,578	5,443,578		5,443,578
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
Average Day Before and After	-0.271	0.0871	0.112	0.000961	-0.0228	-0.0269		0.0346
P-Value	0.418	0.0533	0.00863	0.917	0.112	0.461		0.109
Sum of STH Effects	-5.190	5.519	4.910	0.339	-0.229	0.434		1.644
P-Value	0.641	0.338	0.0550	0.310	0.656	0.746		0.296
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Table 17 covers the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Table 17 includes controls for region-date, a sales tax holiday indicator, and separate indicators for the periods two weeks before and after the STH age, age squared, income, income squared, fico scores, and co-applicant flag. The main independent variables of interest are the sales tax holiday indicator and the indicators for the weeks before and after the sales tax holiday.

18: Spending Two Weeks Before and After Holiday, Controlling for Covariates and Temperature Category-Date

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
2 Weeks Before STH	0.482	0.156	0.176	0.0125	-0.0140	-0.0149		-0.00122
	(0.463)	(0.218)	(0.125)	(0.0125)	(0.0139)	(0.0361)		(0.0232)
Week Before STH	-0.139	0.0395	0.116*	-0.00345	-0.0121	-0.0527*		0.0548*
	(0.417)	(0.0602)	(0.0609)	(0.0116)	(0.0153)	(0.0291)		(0.0318)
STH	0.906**	0.715***	0.440***	0.0750***	0.0920***	0.211***		0.193***
	(0.382)	(0.0815)	(0.0731)	(0.0123)	(0.0286)	(0.0537)		(0.0375)
Week After STH	0.258	0.224	0.126*	-0.00598	-0.0400	-0.0313		0.0502
	(0.442)	(0.150)	(0.0670)	(0.00670)	(0.0354)	(0.0707)		(0.0713)
2 Weeks After STH	0.0259	0.0373	0.0997	-0.0148	-0.0154	0.0310		0.0841
	(0.334)	(0.0826)	(0.0672)	(0.0206)	(0.0134)	(0.0719)		(0.0520)
Constant	-10.28***	-0.114	-0.155	-0.0585***	0.0552	0.720***		0.173***
	(1.924)	(0.263)	(0.256)	(0.0194)	(0.0406)	(0.148)		(0.0624)
Observations	5,416,083	5,416,083	5,416,083	5,416,083	5,416,083	5,416,083		5,416,083
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
Average Day Before and After	0.157	0.114	0.129	-0.00292	-0.0204	-0.0170		0.0469
P-Value	0.476	0.00256	0.0181	0.798	0.966	0.477		0.138
Sum of STH Effects	9.829	7.482	6.263	0.368	-0.0184	0.790		1.980
P-Value	0.168	0.165	0.000163	0.309	0.155	0.585		0.0350
Robust standard errors in parenthes								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Table 18 covers the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Table 18 includes controls for temperature category-date, a sales tax holiday indicator, and separate indicators for the periods two weeks before and after the STH age, age squared, income, income squared, fico scores, and co-applicant flag. The main independent variables of interest are the sales tax holiday indicator and the indicators for the weeks before and after the sales tax holiday.

19: Spending Two Weeks Before and After Holiday, Controlling for Covariates and School Start Date-Date

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
2 Weeks Before STH	1.424**	0.522**	0.387**	0.0150	0.0198	-0.0141		-0.0213
	(0.541)	(0.203)	(0.148)	(0.0154)	(0.0128)	(0.0684)		(0.0287)
Week Before STH	-0.110	0.0118	0.0411	0.00323	0.0238**	-0.0312		0.0668**
	(0.587)	(0.101)	(0.102)	(0.0133)	(0.0109)	(0.0607)		(0.0319)
STH	0.864	0.812***	0.557***	0.0633**	0.0983	0.199		0.186***
	(0.672)	(0.188)	(0.194)	(0.0256)	(0.0665)	(0.120)		(0.0408)
Week After STH	0.198	0.178	-0.0288	0.00112	0.0401***	-0.0740		-0.00173
	(0.654)	(0.242)	(0.104)	(0.0110)	(0.00872)	(0.0892)		(0.0625)
2 Weeks After STH	-0.256	-0.233*	-0.0221	0.0236	-0.0170	0.157*		0.0292
	(0.532)	(0.118)	(0.0768)	(0.0140)	(0.0205)	(0.0922)		(0.0586)
Constant	-11.18***	-0.0525	-0.189	-0.0487*	0.00897	0.260		0.0982
	(2.714)	(0.283)	(0.236)	(0.0255)	(0.0338)	(0.161)		(0.0706)
Observations	3,825,072	3,825,072	3,825,072	3,825,072	3,825,072	3,825,072		3,825,072
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
Average Day Before and After	0.314	0.120	0.0943	0.0107	0.0167	0.00945		0.0183
P-Value	0.316	0.181	0.214	0.123	0.0529	0.465		0.153
Sum of STH Effects	13.97	8.222	5.982	0.680	1.056	1.457		1.151
P-Value	0.168	0.00411	0.0282	0.327	0.0287	0.859		0.529
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Table 19 covers the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Table 19 includes controls for school start category-date, a sales tax holiday indicator, and separate indicators for the periods two weeks before and after the STH age, age squared, income, income squared, fico scores, and co-applicant flag. The main independent variables of interest are the sales tax holiday indicator and the indicators for the weeks before and after the sales tax holiday.

Table 20A: Nearby Zip Codes, With Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Tax Holiday	1.196***	0.785***	0.465***	0.102***	0.107***	0.218***		0.198***
	(0.246)	(0.0894)	(0.0785)	(0.0129)	(0.0324)	(0.0539)		(0.0344)
Tax Holiday <17 Miles	1.855*	0.454**	0.399*	0.0627	0.0535	-0.121		-0.137***
	(1.022)	(0.221)	(0.210)	(0.0398)	(0.0418)	(0.135)		(0.0242)
Constant	-8.727***	0.210	0.0119	-0.0366	0.0647*	-0.327**		0.0475
	(1.928)	(0.226)	(0.216)	(0.0223)	(0.0361)	(0.126)		(0.0617)
Observations	5,442,936	5,442,936	5,442,936	5,442,936	5,442,936	5,442,936		5,442,936
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 20B: Nearby Zip Codes, With Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Tax Holiday	1.246***	0.684***	0.398***	0.0909***	0.0898***	0.230***		0.356**
	(0.218)	(0.0966)	(0.0781)	(0.0166)	(0.0287)	(0.0542)		(0.144)
Tax Holiday <17 Miles	1.784**	0.453**	0.405***	0.0448	0.0727	-0.120		-0.0109
	(0.850)	(0.184)	(0.128)	(0.0284)	(0.0488)	(0.105)		(0.0393)
Constant	14.33***	1.134***	0.838***	0.0293***	0.110***	0.767***		0.195***
	(0.556)	(0.0769)	(0.0659)	(0.00601)	(0.0135)	(0.0533)		(0.0298)
Observations	7,076,457	7,076,457	7,076,457	7,076,457	7,076,457	7,076,457		7,076,457
R-squared	0.066	0.040	0.021	0.018	0.011	0.040		0.029
Robust standard errors in parenthes								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 20A and 20B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both Tables include a sales tax holiday indicator, an indicator for an out of state STH in a zipcode less than 17 miles away, and calendar date fixed effects. Table 20A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 20B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the indicators for the living within 17 miles of a sales tax holiday.

Table 21A: Nearby Zip Codes, With Covariates

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	1.360***	0.860***	0.515***	0.114***	0.109***	0.189***		0.207***
	(0.261)	(0.0943)	(0.0796)	(0.0129)	(0.0330)	(0.0560)		(0.0408)
Tax Holiday <17 Miles	2.017*	0.533**	0.452**	0.0757*	0.0566	-0.144		-0.129***
	(1.035)	(0.206)	(0.195)	(0.0408)	(0.0421)	(0.134)		(0.0320)
Tax Holiday > 17 & <50 Miles	0.762	0.196*	0.164	0.0501*	-0.0172	-0.0496		-0.0345
	(0.719)	(0.117)	(0.0993)	(0.0267)	(0.0124)	(0.0657)		(0.0469)
Tax Holiday >50 & <150	0.249	0.309**	0.195**	0.0384***	0.0370*	-0.0326		0.00113
	(0.450)	(0.130)	(0.0958)	(0.0130)	(0.0198)	(0.0715)		(0.0540)
Tax Holiday >150 & <250	0.391	0.0566	0.0264	0.0101	-0.0134	-0.131**		0.0487
	(0.743)	(0.118)	(0.111)	(0.0139)	(0.0129)	(0.0646)		(0.0552)
Constant	-8.733***	0.208	0.0106	-0.0370	0.0648*	-0.327**		0.0473
	(1.927)	(0.226)	(0.216)	(0.0224)	(0.0361)	(0.126)		(0.0617)
Observations	5,442,936	5,442,936	5,442,936	5,442,936	5,442,936	5,442,936		5,442,936
R-squared	0.003	0.001	0.001	0.000	0.000	0.001		0.000
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 21B: Nearby Zip Codes, With Account Fixed Effects

	Clothing Holiday							School Supply Holiday
	(1)	(2)	(3)	(4)	(5)	(6)		(7)
VARIABLES	Total Spending	Apparel	Clothing	Kids Clothing	Shoes	Big Box		Books and Supplies
Sales Tax Holiday	1.268***	0.761***	0.453***	0.107***	0.0917***	0.215***		0.360**
	(0.243)	(0.0967)	(0.0781)	(0.0164)	(0.0296)	(0.0525)		(0.144)
Tax Holiday <17 Miles	1.812**	0.533***	0.461***	0.0608**	0.0749	-0.130		-0.00601
	(0.844)	(0.166)	(0.111)	(0.0283)	(0.0498)	(0.102)		(0.0400)
Tax Holiday > 17 & <50 Miles	0.112	0.0836	0.0516	0.0451*	-0.0184	0.0113		-0.00156
	(0.331)	(0.0956)	(0.0877)	(0.0242)	(0.0183)	(0.0335)		(0.0317)
Tax Holiday >50 & <150	0.107	0.365***	0.262**	0.0456**	0.0325*	0.00212		-0.0314
	(0.485)	(0.133)	(0.0983)	(0.0175)	(0.0177)	(0.0448)		(0.0455)
Tax Holiday >150 & <250	-0.0652	0.0346	0.0274	0.0227**	-0.0142	-0.129***		0.0393
	(0.571)	(0.0994)	(0.0915)	(0.00985)	(0.0181)	(0.0416)		(0.0483)
Constant	14.33***	1.134***	0.838***	0.0293***	0.110***	0.767***		0.195***
	(0.556)	(0.0772)	(0.0662)	(0.00596)	(0.0134)	(0.0533)		(0.0298)
Observations	7,076,457	7,076,457	7,076,457	7,076,457	7,076,457	7,076,457		7,076,457
R-squared	0.066	0.040	0.021	0.018	0.011	0.040		0.029
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Notes: Tables 21A and 21B cover the time period from May - September 2003. We estimate a simple GLS regression for overall spending and various components of spending. Both Tables include a sales tax holiday indicator, an indicator for an out of state STH in a zipcode less than 17 miles away, between 17 and 50 miles away, between 50 and 150 miles away, between 150 and 250 miles away, and calendar date fixed effects. Table 21A also includes controls for age, age squared, income, income squared, FICO score, a co-applicant flag, and state of residence. Table 21B also includes account fixed effects. Standard errors are clustered by state. The main independent variables of interest are the sales tax holiday indicator and the indicators for the living within different groups of miles of a sales tax holiday.

Table 22A: Random Sales Tax Holidays Covariate Specification

Covariate Specification	Random Holidays				Actual Holidays		
	Mean	Standard Deviation	95% CI		Estimate	Standard Error	95% CI
Total Spending	0.155	0.725	-1.156 to 1.675		1.132	0.234	0.662 to 1.603
Clothing Spending	0.005	0.116	-0.205 to 0.225		0.443	0.079	0.283 to 0.602
Kids Clothing Spending	0.001	0.017	-0.030 to 0.0436		0.099	0.013	0.072 to 0.126
Note: Statistics on Random Holidays are based on 100 randomly chosen sales tax holidays.							

Table 22B: Random Sales Tax Holidays, Account Fixed Effects

Fixed Effects Specification	Random Holidays				Actual Holidays		
	Mean	Standard Deviation	95% CI		Estimate	Standard Error	95% CI
Total Spending	0.119	0.602	-0.976 to 1.238		1.164	0.209	0.744 to 1.584
Clothing Spending	0.000	0.107	-0.207 to 0.223		0.344	0.078	0.221 to 0.532
Kids Clothing Spending	0.002	0.016	-0.026 to 0.035		0.0884	0.017	0.056 to 0.122
Note: Statistics on Random Holidays are based on 100 randomly chosen sales tax holidays.							

Notes: Tables 22A and 22B present the mean, standard deviation, and 95% confidence interval from estimates of total spending, clothing spending, and kids clothing spending for randomly generated sales tax holidays where the estimates are calculated in the same way as those presented in Tables 5A and 5B. The last three columns compared these results to the estimates in Tables 5A and 5B.

Figure 1: Distribution of Age of Account Holder with and without STH

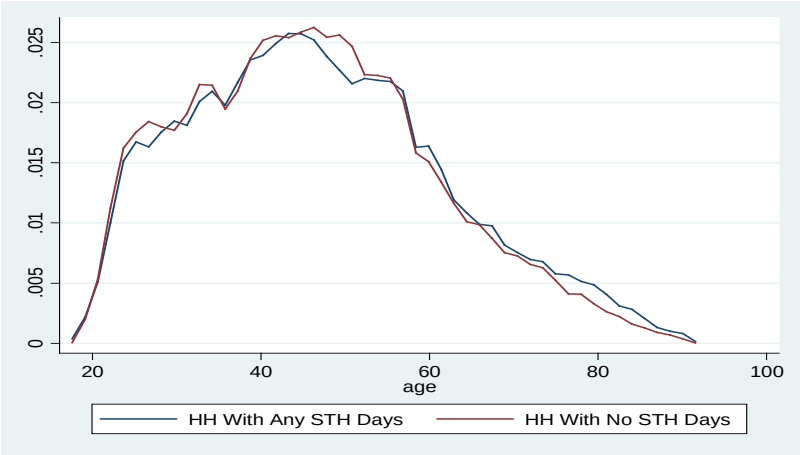


Figure 2: Distribution of Account Holder FICO scores with and without STH

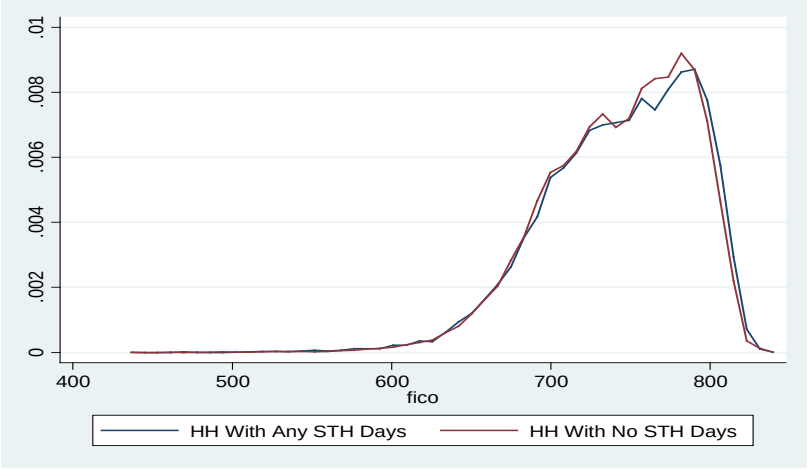


Figure 3: Distribution of Households Income scores with and without STH

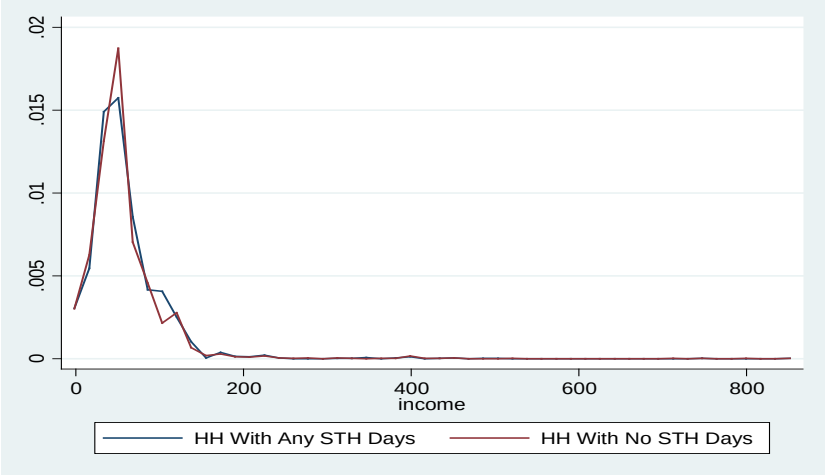


Figure 4: Apparel Spending Before, During and After Sales Tax Holiday, All Households

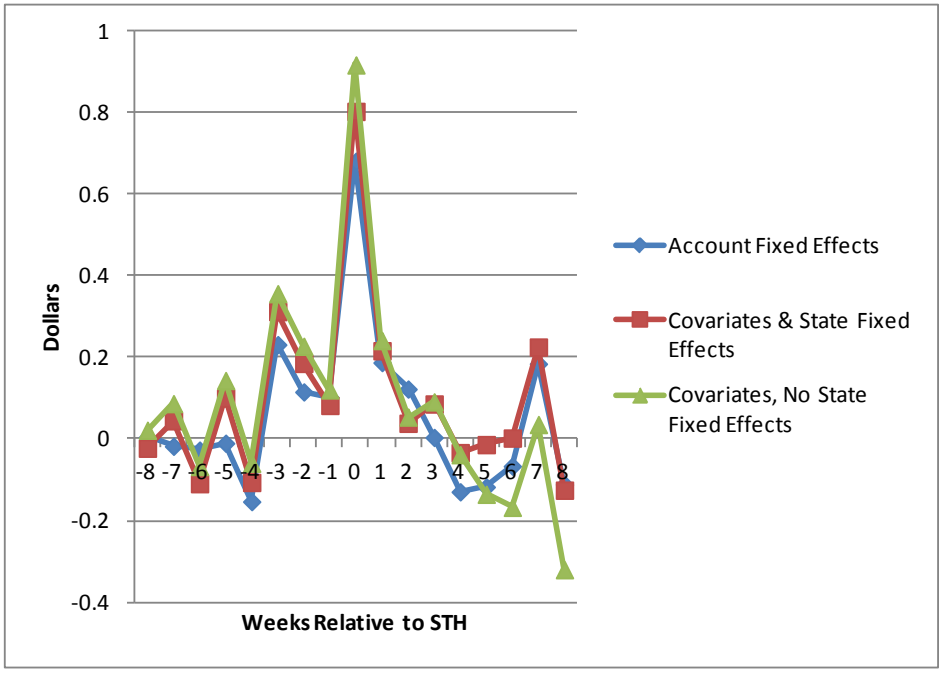
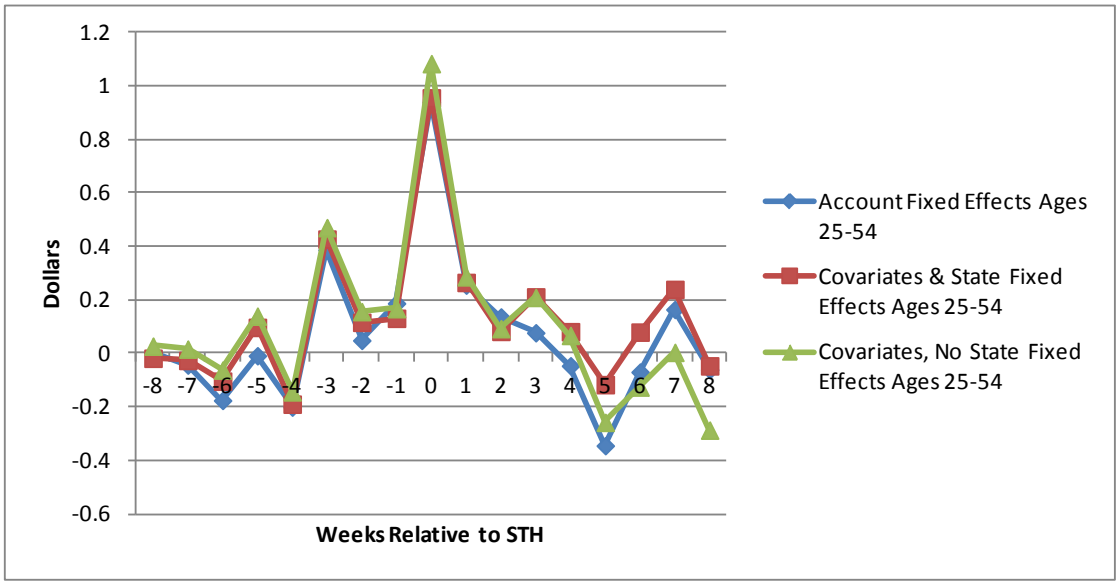


Figure 5: Apparel Spending Before, During and After Sales Tax Holiday, Households Ages 25-54



Working Paper Series

A series of research studies on regional economic issues relating to the Seventh Federal Reserve District, and on financial and economic topics.

Working Paper Series *(continued)*

The Price of Gasoline and the Demand for Fuel Economy:
Evidence from Monthly New Vehicles Sales Data **WP-09-15**
Thomas Klier and Joshua Linn

Estimation of a Transformation Model with Truncation,
Interval Observation and Time-Varying Covariates **WP-09-16**
Bo E. Honoré and Luojia Hu

Self-Enforcing Trade Agreements: Evidence from Time-Varying Trade Policy **WP-09-17**
Chad P. Bown and Meredith A. Crowley

Too much right can make a wrong: Setting the stage for the financial crisis **WP-09-18**
Richard J. Rosen

Can Structural Small Open Economy Models Account
for the Influence of Foreign Disturbances? **WP-09-19**
Alejandro Justiniano and Bruce Preston

Liquidity Constraints of the Middle Class **WP-09-20**
Jeffrey R. Campbell and Zvi Hercowitz

Monetary Policy and Uncertainty in an Empirical Small Open Economy Model **WP-09-21**
Alejandro Justiniano and Bruce Preston

Firm boundaries and buyer-supplier match in market transaction:
IT system procurement of U.S. credit unions **WP-09-22**
Yukako Ono and Junichi Suzuki

Health and the Savings of Insured Versus Uninsured, Working-Age Households in the U.S. **WP-09-23**
Maude Toussaint-Comeau and Jonathan Hartley

The Economics of "Radiator Springs:" Industry Dynamics, Sunk Costs, and
Spatial Demand Shifts **WP-09-24**
Jeffrey R. Campbell and Thomas N. Hubbard

On the Relationship between Mobility, Population Growth, and
Capital Spending in the United States **WP-09-25**
Marco Bassetto and Leslie McGranahan

The Impact of Rosenwald Schools on Black Achievement **WP-09-26**
Daniel Aaronson and Bhashkar Mazumder

Comment on "Letting Different Views about Business Cycles Compete" **WP-10-01**
Jonas D.M. Fisher

Macroeconomic Implications of Agglomeration **WP-10-02**
Morris A. Davis, Jonas D.M. Fisher and Toni M. Whited

Accounting for non-annuitization **WP-10-03**
Svetlana Pashchenko

Working Paper Series *(continued)*

Robustness and Macroeconomic Policy **WP-10-04**
Gadi Barlevy

Benefits of Relationship Banking: Evidence from Consumer Credit Markets **WP-10-05**
Sumit Agarwal, Souphala Chomsisengphet, Chunlin Liu, and Nicholas S. Souleles

The Effect of Sales Tax Holidays on Household Consumption Patterns **WP-10-06**
Nathan Marwell and Leslie McGranahan

Gathering Insights on the Forest from the Trees: A New Metric for Financial Conditions **WP-10-07**
Scott Brave and R. Andrew Butters

Identification of Models of the Labor Market **WP-10-08**
Eric French and Christopher Taber

Public Pensions and Labor Supply Over the Life Cycle **WP-10-09**
Eric French and John Jones

Explaining Asset Pricing Puzzles Associated with the 1987 Market Crash **WP-10-10**
Luca Benzoni, Pierre Collin-Dufresne, and Robert S. Goldstein

Prenatal Sex Selection and Girls' Well-Being: Evidence from India **WP-10-11**
Luojia Hu and Analía Schlosser

Mortgage Choices and Housing Speculation **WP-10-12**
Gadi Barlevy and Jonas D.M. Fisher

Did Adhering to the Gold Standard Reduce the Cost of Capital? **WP-10-13**
Ron Alquist and Benjamin Chabot

Introduction to the *Macroeconomic Dynamics*:
Special issues on money, credit, and liquidity **WP-10-14**
Ed Nosal, Christopher Waller, and Randall Wright

Summer Workshop on Money, Banking, Payments and Finance: An Overview **WP-10-15**
Ed Nosal and Randall Wright

Cognitive Abilities and Household Financial Decision Making **WP-10-16**
Sumit Agarwal and Bhashkar Mazumder

Complex Mortgages **WP-10-17**
Gene Amromin, Jennifer Huang, Clemens Sialm, and Edward Zhong

The Role of Housing in Labor Reallocation **WP-10-18**
Morris Davis, Jonas Fisher, and Marcelo Veracierto

Why Do Banks Reward their Customers to Use their Credit Cards? **WP-10-19**
Sumit Agarwal, Sujit Chakravorti, and Anna Lunn

Working Paper Series *(continued)*

The impact of the originate-to-distribute model on banks before and during the financial crisis **WP-10-20**
Richard J. Rosen

Simple Markov-Perfect Industry Dynamics **WP-10-21**
Jaap H. Abbring, Jeffrey R. Campbell, and Nan Yang

Commodity Money with Frequent Search **WP-10-22**
Ezra Oberfield and Nicholas Trachter

Corporate Average Fuel Economy Standards and the Market for New Vehicles **WP-11-01**
Thomas Klier and Joshua Linn

The Role of Securitization in Mortgage Renegotiation **WP-11-02**
Sumit Agarwal, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, and Douglas D. Evanoff

Market-Based Loss Mitigation Practices for Troubled Mortgages Following the Financial Crisis **WP-11-03**
Sumit Agarwal, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, and Douglas D. Evanoff

Federal Reserve Policies and Financial Market Conditions During the Crisis **WP-11-04**
Scott A. Brave and Hesna Genay

The Financial Labor Supply Accelerator **WP-11-05**
Jeffrey R. Campbell and Zvi Hercowitz

Survival and long-run dynamics with heterogeneous beliefs under recursive preferences **WP-11-06**
Jaroslav Borovička

A Leverage-based Model of Speculative Bubbles (Revised) **WP-11-07**
Gadi Barlevy

Estimation of Panel Data Regression Models with Two-Sided Censoring or Truncation **WP-11-08**
Sule Alan, Bo E. Honoré, Luojia Hu, and Søren Leth–Petersen

Fertility Transitions Along the Extensive and Intensive Margins **WP-11-09**
Daniel Aaronson, Fabian Lange, and Bhashkar Mazumder

Black-White Differences in Intergenerational Economic Mobility in the US **WP-11-10**
Bhashkar Mazumder

Can Standard Preferences Explain the Prices of Out-of-the-Money S&P 500 Put Options? **WP-11-11**
Luca Benzoni, Pierre Collin-Dufresne, and Robert S. Goldstein

Business Networks, Production Chains, and Productivity: A Theory of Input-Output Architecture **WP-11-12**
Ezra Oberfield

Equilibrium Bank Runs Revisited **WP-11-13**
Ed Nosal

Working Paper Series *(continued)*

Are Covered Bonds a Substitute for Mortgage-Backed Securities? **WP-11-14**
Santiago Carbó-Valverde, Richard J. Rosen, and Francisco Rodríguez-Fernández

The Cost of Banking Panics in an Age before "Too Big to Fail" **WP-11-15**
Benjamin Chabot

Import Protection, Business Cycles, and Exchange Rates:
Evidence from the Great Recession **WP-11-16**
Chad P. Bown and Meredith A. Crowley

Examining Macroeconomic Models through the Lens of Asset Pricing **WP-12-01**
Jaroslav Borovička and Lars Peter Hansen

The Chicago Fed DSGE Model **WP-12-02**
Scott A. Brave, Jeffrey R. Campbell, Jonas D.M. Fisher, and Alejandro Justiniano

Macroeconomic Effects of Federal Reserve Forward Guidance **WP-12-03**
Jeffrey R. Campbell, Charles L. Evans, Jonas D.M. Fisher, and Alejandro Justiniano

Modeling Credit Contagion via the Updating of Fragile Beliefs **WP-12-04**
Luca Benzoni, Pierre Collin-Dufresne, Robert S. Goldstein, and Jean Helwege

Signaling Effects of Monetary Policy **WP-12-05**
Leonardo Melosi

Empirical Research on Sovereign Debt and Default **WP-12-06**
Michael Tomz and Mark L. J. Wright

Credit Risk and Disaster Risk **WP-12-07**
François Gourio

From the Horse's Mouth: How do Investor Expectations of Risk and Return
Vary with Economic Conditions? **WP-12-08**
Gene Amromin and Steven A. Sharpe

Using Vehicle Taxes To Reduce Carbon Dioxide Emissions Rates of
New Passenger Vehicles: Evidence from France, Germany, and Sweden **WP-12-09**
Thomas Klier and Joshua Linn

Spending Responses to State Sales Tax Holidays **WP-12-10**
Sumit Agarwal and Leslie McGranahan