Application for NBER Household Finance Post-Doc: Fiscal Policy, Liquidity Constraints, and the Consumption Response to VAT Increases

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Abstract

I plan to investigate the effect of liquidity constraints on the response of expenditures to pre-announced value-added tax (VAT) increases. I analyze two subsequent increases of 1 percentage point in VAT that affect only one state within a North American country. Including the combined effect of the Federal VAT rate, the effective VAT for the treated region increases from 12.875% to 13.925% on January 1st of the first treatment year, and from 13.925% to 14.975% on January 1st of the second treatment year. I analyze account-level credit card and term loan data over 36 months covering the year prior to the first VAT increase and both subsequent treatment years. Using a difference-in-differences identification strategy, preliminary results suggest an intertemporal shift in consumption for durable goods financed via term loans but an impact on credit card expenditures roughly equal to the price increase that would result from a full pass-through of the VAT increase to consumers.

1 Introduction

In the project I propose for the NBER Household Finance Post-Doc, I plan on documenting an important way through which fiscal policy— in this case, VAT increases—can have limited effects: only individuals able to shift consumption intertemporally can benefit from timing durable good consumption in response to pre-announced VAT increases. The results will have implications for the effectiveness of fiscal policy and could help understand how the progressive nature of such policies are affected by credit constraints.

I study a single treated state among a group of untreated states within a North American country. The state exposed to a VAT increase saw its state-level rate increase from 7.5% to 9.5% in two subsequent increases of one percentage point, on January 1st of two consecutive years. Because the state-level VAT rate is calculated after the 5% Federal rate—which was constant over the period studied—this amounts to an increase from 12.875% to 13.925% on January 1st of the first treatment year, and from 13.925% to 14.975% January 1st of the second treatment year. The two increases had been announced as early as two years prior to the first increase and media have largely reported the announcement.

Assuming that VAT increases are fully passed-through to consumers, they will have two effects on consumers: first, the increase in after-tax prices leads to an income effect and second, the willingness to consume earlier in order to benefit from lower relative prices leads to an intertemporal substitution effect (Crossley et al., 2009). In the context studied, the relatively small increases in VAT rates are expected to have a small effect on life-time resources for most consumers, such that the income effect is expected to be negligible. However, given the pre-announced nature of the increase, the substitution effect is likely to lead to intertemporal shifts in consumption towards periods of low VAT rates. Consumption of durables should be the most affected by the intertemporal substitution effect as they provide long-lasting service flow, they are easier to store, and their purchase is easier to time.

Recently, countries have exploited this prediction by putting forward unconventional fiscal policies in which pre-announced VAT increases are used as a way of increasing consumers' inflation expectations, with the objective of stimulating current consumption—possibly at the expense of future consumption

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(D'Acunto et al., 2016). In general, the rate at which individuals shift consumption across time depends both on the interest rate in the economy and on the intertemporal elasticity of substitution (IES).[1] A recent paper has set out to estimate the IES using a VAT increase in Japan (Cashin and Unayama, 2016). The setting in Japan does not allow for a clean counterfactual since the country in whole is treated. Furthermore, consumption is measured using a household survey with the important caveat that it does not allow to measure credit constraints, thereby omitting the impossibility for some consumers to tap credit markets to shift consumption intertemporally. In the project I propose, I will test whether liquidity constraints affect the ease of intertemporal substitution in durable consumption.

2 Research Design

I use account-level data consisting of monthly observations on the universe of a North American bank's credit card accounts — close to 5 million unique accounts. The bank allows borrowers to use their account to make purchases both with a credit card and with term loans. Two types of term loans are offered by the bank: the *bank-originated* term loans are contracted at the bank, whereas the *store-originated* term loans are contracted at selected retail stores. Importantly, *store-originated* term loans are used solely to finance "big-ticket" items over monthly installments, therefore providing a measure of durable consumption—a dimension usually ignored by research that uses only credit card data. The data include monthly information typically found on credit card statements such as total spending, total payments, balance outstanding, interest rate, and delinquency. Data also include demographics such as sex, age, credit score and partial zip code.

I analyze the consumers' response using a difference-in-differences methodology. The treated state is among 9 regions in which the bank operates. Over the three years studied, the treated state analyzed is the only one affected by VAT increases. Because there are two subsequent VAT increases—see Figure 1, Panel (c)—the year prior to the first VAT increase serves as control for the first treatment year, while the year prior to the second VAT increase serves as control for the second treatment year. The baseline estimation model can be expressed as

$$y_{i,t} = \beta_1 After_{i,t}^{1st} \times Treated_{j,t} + \beta_2 After_{i,t}^{2nd} \times Treated_{j,t} + \lambda_t + \alpha_j, \tag{1}$$

where $After_{i,t}^{1st}$ and $After_{i,t}^{2nd}$ are respectively equal to one for the period after the first VAT increase, and one for the period after the second VAT increase, and 0 otherwise. $Treated_{j,t}$ is equal to one for the state subject to the VAT increase and 0 for other states. λ_t represents year-month fixed effects and α_j represents state fixed effects. In the estimation, I also allow for state-specific time trends and state-specific calendar month effects.

[1] Papers using macro data to estimate the IES face a (now well known) aggregation bias (Attanasio and Weber, 1993), whereas micro-level evidence has mostly relied on household surveys and is therefore potentially affected by non-response rates and measurement error (Meyer et al., 2015). In addition to data issues, the fact that the interest rate is endogenous in the consumption equation means that these sets of papers need to rely on instrumental variables, with the obvious challenge of finding strong and plausible instruments.

3 Preliminary Results

Panels (a) and (b) of Figure 1 show that trends for expenditures across treated and untreated regions are plausibly parallel. Table 1 provides preliminary results on the effect of the VAT increase as estimated using equation (1). The first column shows that total expenditures on the account increase respectively by 24$ and 15$ for the treated region after the first and second VAT increase, on a baseline monthly total expenditure of about 480$. The second column shows that a large part of this increase comes from credit card expenditures. The two last sets of results estimate the average increase in *bank-originated* and *store-originated* term loans. Whereas bank loans can be used by consumers in unobserved ways by the econometrician—and are therefore not necessarily subject to VAT, *store-originated* term loans are solely used to finance durable consumption—and are almost surely always subject to VAT. Accordingly, there is no effect found on bank loans, but there is a decrease in the probability of contracting store-originated term loans of about 4 percentage point. This amounts to a reduction of 33% in the propensity to buy durable goods financed via term loans in response to each VAT increase. Panel (d) of Figure 1 shows the average dynamic response of store-originated term loans over the year prior and following a VAT increase. The affected state has an increase in take-out rate prior to the VAT increase and a decrease following it, relative to unaffected states.

4 Work to be done

I plan on extending the current basic results to uncover heterogeneous effects in consumers' liquidity constraints. Such constraints are typically measured through credit card utilization rates (Gross and Souleles, 2002) so the data used is well tailored to investigate their effect. I plan on estimating the implications the baseline results have on the measure of IES and show how these measures vary for constrained and unconstrained consumers. Lastly, as a robustness check, I plan on focusing on a set of two large cities separated only by a small bridge and located in the treated state and an immediate surrounding untreated state, respectively. For consumers in this region of the country, the possibility to buy consumption goods in either of the states should lead to a lower substitution effect.

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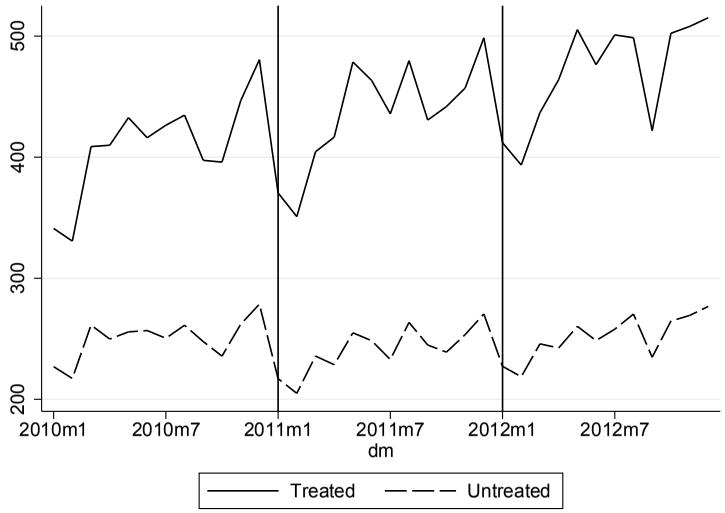
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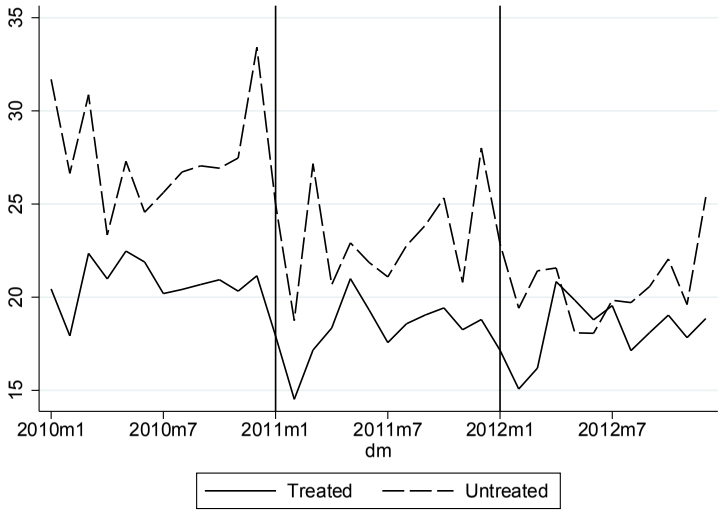
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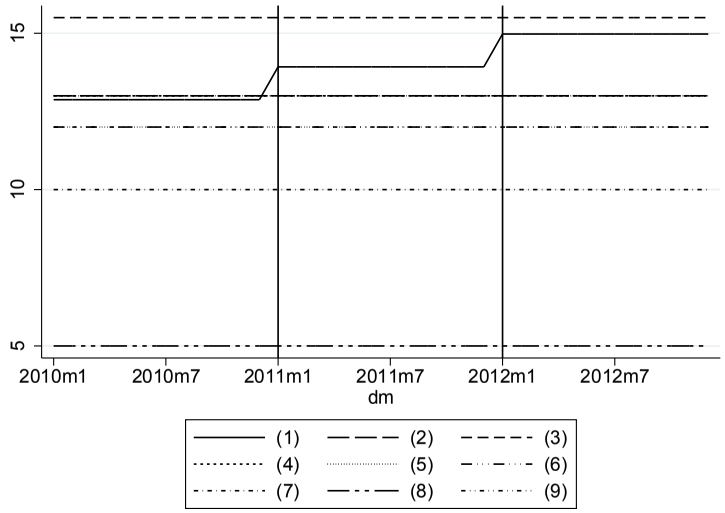
Figure 1: Preliminary Graphs



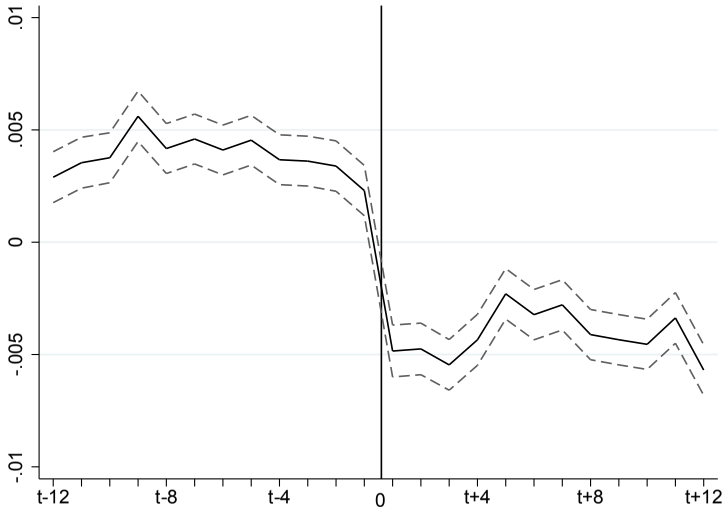
(a) Average Credit Card Expenditures



(b) Average Durable Goods Expenditures



(c) VAT Rates Across Regions



(d) Baseline Dynamics of Durable Goods Response

Note: Panel (a) shows average credit card expenditures for the treated state and for the other 8 untreated states separately. Panel (b) shows average durable good expenditures for the treated state and for the other 8 untreated states separately. Panel(c) shows the different VAT rates across states for the period studied. Panel (c) shows the estimated dynamic effects of the propensity to finance durable goods using store-originated term loans.

Table 1: Preliminary Results - Average Effects

			Bank-Originated Term Loans			Store-Originated Term Loans		
	Total Expenditures	Credit Card Expenditures	In $	$\mathbb{P}(new)$	$\$\|\$ > 0$	In $	$\mathbb{P}(new)$	$\$\|\$ > 0$
$\text{After}_1 \times$ Treated	23.9445***	24.9126***	-0.6954*	0.0000	266.2606**	-1.2943***	-0.0042***	99.8182
	(2.7461)	(2.8883)	(0.4119)	(0.0005)	(109.9229)	(0.2400)	(0.0005)	(75.8497)
$\text{After}_2 \times$ Treated	15.4644***	18.4580***	-1.3953***	0.0003	246.5552**	-1.7780***	-0.0038***	84.2002
	(2.4404)	(2.3901)	(0.3820)	(0.0005)	(109.0761)	(0.2232)	(0.0005)	(75.2581)
Date F.E.	YES	YES	YES	YES	YES	YES	YES	YES
Region F.E.	YES	YES	YES	YES	YES	YES	YES	YES
Region F.E. $\times$ Trend	YES	YES	YES	YES	YES	YES	YES	YES
Region F.E. $\times$ Cal. Month	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.003	0.004	0.000	0.009	0.020	0.000	0.006	0.005
Observations	99,864,051	101,050,102	99,864,051	99,864,051	990,173	99,864,051	99,864,051	1,226,772

Note: This table reports the results of estimating equation (1) on total expenditures, credit card expenditures, and term loan expenditures. Term loans are separated according to bank- and store-origination, with store loans providing a proxy for durable good consumption. The effects for term loans are presented for the average expenditures and separated at the intensive and extensive margins. The probability of financing a new term loan is estimated using a Logit model and average partial effects are reported. Standard errors corrected for within-account heteroscedasticity are presented in parentheses. ***, ***, and * represent significance at the 1, 5 and 10 percent level, respectively.

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Education

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Research

Publications

1. "Liquidity Constraints and Credit Card Delinquency: Evidence from Raising Minimum Payments," (with Stephen Shore), Forthcoming in the *Journal of Financial and Quantitative Analysis*, 2015

2. "Is There any Dependence Between Consumer Credit Line Utilization and Default Probability on a Term Loan? Evidence from Bank-Customer Data," (with Anne-Sophie Bergeres and Georges Dionne), *Journal of Empirical Finance*, vol. 33, 2015

Working Papers

3. "Consumption, Debt, and Delinquency Responses to an Anticipated Increase in Cash-on-Hand," first draft 2015, *submitted*

Work in Progress

4. "Fiscal Policy, Liquidity Constraints, and the Consumption Response to VAT Increases," 2016

5. "Saving Commitments, Mortgages Run-offs and Retirement: How Paying Down your Mortgage Affects Retirement and Labor Decisions," (with Steffen Andersen, Jimmy Martinez-Correa, and Stephen Shore)

Presentations (including scheduled; * by co-authors)

2017	Copenhagen Business School
2016	NFA (Mont-Tremblant, *Discussant*), IFID Conference on Household Debt (McMaster University), CIRANO Applied Micro Meetings (Montréal), Pension Research Center* (Copenhagen Business School)
2015	Laval University, Queen's University, Florida International University, Utah State University, Federal Reserve Bank of Richmond, HEC Montréal

Presentations, cont'd

2015 Household Economics and Decision-Making Conference (Cleveland Federal Reserve Bank), FMA Annual Meetings (Orlando), IBHF Household and Behavioral Finance Symposium (Cornell University)

2014 CEAR Workshop on Income Risk (Georgia State University), Huebner Foundation PhD Colloquium (ARIA Seattle Meetings)

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2. FQRSC - PhD Fellowship (2011-2012)
3. SSHRC - MSc Fellowship (2010-2011)
4. Georgia State University - PhD Fellowships (2011-2016)
5. CEAR - Small-Scale Project Funding (2015, 2016)
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