

The Welfare Costs of a Gross Receipts Tax

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November 2019

Gross Receipts Taxes

A gross receipts tax (GRT) is a tax on goods and services revenue at every stage of production.

- ▶ So, it's like a VAT, but firms can't deduct any costs.
- ▶ The GRT rate is typically low – less than 1%.

GRTs had been on the decline, but have recently made a comeback.

- ▶ Eight states now have a GRT on all (or most) goods and services and several additional states tax particular industries.
- ▶ Oregon is the most recent adopter of a GRT (law signed May 2019).
- ▶ Gross receipts (or production+excise taxes) have also been popular for marijuana taxation.

Why are States Choosing a GRT?

1. States are desperate for funds and the large tax base means a low rate can generate large revenues.
2. The GRT taxes services and retail sales taxes generally do not.
3. The GRT tax base provides limited opportunities for firms to engage in tax evasion – an important issue in environments with limited enforcement capacity, such as developing countries (Best et. al, 2015; Carrillo et. al, 2017) or in markets with many small businesses (Slemrod et. al, 2017).

So What is the Problem with a GRT?

- ▶ The main problem identified in the literature is tax pyramiding – taxing the same good at multiple stages of production.
- ▶ The literature has shown theoretically that this encourages firms to vertically integrate to avoid some stages of intermediate goods taxation (Kopczuk and Slemrod, 2006).
 - ▶ However, there is no evidence of how much it actually encourages vertical integration in practice.
 - ▶ And, there is no evidence of the efficiency losses that result.
- ▶ **Our paper** provides this evidence.

Washington State Marijuana Industry: Unique Opportunity to Study Gross Receipts Taxes

Two features ideal for GRT research:

- ▶ Comprehensive administrative data on *entire* supply chain
 - ▶ Universe of daily production/market activity from July 2014 - July 2017.
- ▶ Natural experiment via a tax reform
 - ▶ Changed from 25% gross receipts tax at *each* transfer in the supply chain to a *single* 37% excise tax at retail
 - ▶ Plausibly unanticipated – passed last minute in a special session, signed the day before it took effect

Benchmark for Welfare Losses

We benchmark relative to a revenue neutral excise (or sales tax) on the same taxable activity.

- ▶ In this case, we only have welfare losses because:
 - ▶ Same taxable activity for both.
 - ▶ The evasion opportunities are the same for both.
 - ▶ GRT creates distortions in intermediate goods markets that do not exist for an excise (or sales) tax. And this additional distortion comes from vertical integration/trading decisions.
- ▶ We examine two sources of welfare losses:
 - ▶ Output
 - ▶ Prices

Roadmap for this Talk

1. Marijuana background
2. Data & methods
3. Evidence of vertical integration response to elimination of GRT
4. Evidence of output response to elimination of GRT

WA Recreational Marijuana Background

WA Market Timeline

- ▶ **November 2012:** Voted to legalize marijuana in WA.
- ▶ **August 2013:** 'Cole Memo' released by DOJ.
- ▶ **July 2014:** Recreational marijuana market opened.
- ▶ **July 2015:** Tax reform implemented.
 - ▶ Changed from 25% gross receipts tax at *each* transfer in the supply chain to a *single* 37% tax at retail.

WA's Marijuana Supply Chain has Three Links

Production:

- ▶ Plants start from seed or cloned material. Can be grown indoors or outdoors.
- ▶ The average time from planting to harvest is about 4 months.
- ▶ Plants are separated into flowers and other material and dried.

Processing:

- ▶ Flowers are cured and transformed into “usable marijuana”.
- ▶ Large parent lots are subdivided into small packages (e.g. 1g, 2g, 7g) and distributed for retail sale.
- ▶ Processing takes an average of six weeks.

Retail:

- ▶ Inventory sits on the shelf for about 3 weeks before purchase.
- ▶ Individuals consume usable marijuana via an additional apparatus.

Data and Methods

Data from Washington's Traceability System

- ▶ Washington requires firms to report information to a seed-to-sale tracking/traceability system designed to be Cole-compliant.
- ▶ Firms report all movements of cannabis plants and products throughout supply chain.
- ▶ Inter-location transfers and retail sales must record price and weight sold.
- ▶ Firms must weigh plants before and after drying and throughout processing operations.
- ▶ Retail products must be tested for potency and foreign contaminants.
- ▶ Each of these steps is logged by the state – we obtain most of the variables they capture.
- ▶ We focus on usable marijuana (about 75% of the market).
- ▶ We merge this with audit and violation data.

Dependent Variables

Our vertical integration evidence will mostly come from processor-retailer market. A non-vertically integrated transaction (different producer and processor) can come from two sources:

- ▶ The firm is vertically dis-integrated (so a producer but not a processor or vice versa) – for these firms, every transaction will be vertically dis-integrated.
- ▶ Firms are vertically integrated, but the producer chooses to sell some marijuana to another processor and/or the processor chooses to buy some marijuana from another producer.

Our output evidence will come from the planting data (because this is the first point of production).

- ▶ This analysis is focused on indoor-only firms.

Main Estimating Equation

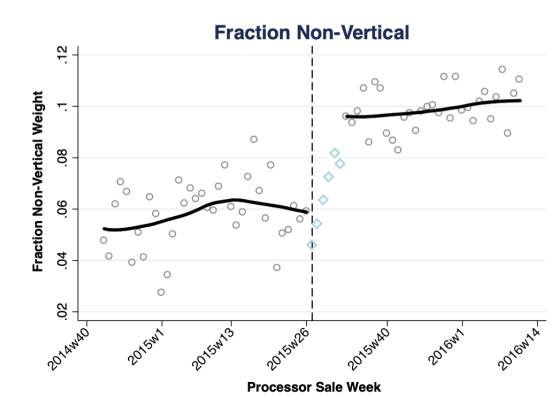
We estimate the following equation for 16 weeks on either side of the tax reform (excluding the first six weeks after the tax reform):

$$y_{it} = \alpha_0 + \alpha_1 TaxReform_t + \alpha_2 run_t + \alpha_3 TaxReform_t \cdot run_t + \alpha_{4i} + u_{it}.$$

- ▶ y_{it} : outcome of interest for firm i on day t .
- ▶ $TaxReform_{it}$: indicator that equals one after the reform.
- ▶ run_{it} : date running variable.
- ▶ α_{4i} : correlated random effects when outcome is the fraction of non-vertical marijuana sold.
- ▶ Estimates come from a linear hurdle model (with logged dependent variable) or a fractional probit model depending on the outcome.
- ▶ Restricted to firms that are in business for at least 8 weeks on either side of the tax reform.
- ▶ Estimates are clustered at firm level.

Estimates of Vertical Integration Response to Elimination of GRT

Increased Fraction of Non-Vertical Transactions



- Fraction of non-vertically integrated transactions increases by 4.6 percentage points (p-val: 0.017.). Placebo ≈ 0 .

What Else We Learn

The estimates are robust to many different sensitivity checks including:

- ▶ OLS vs. non-linear estimator.
- ▶ Transition/anticipation window choice.
- ▶ Dropping firms that were caught for reporting inaccuracies.
- ▶ Bandwidth

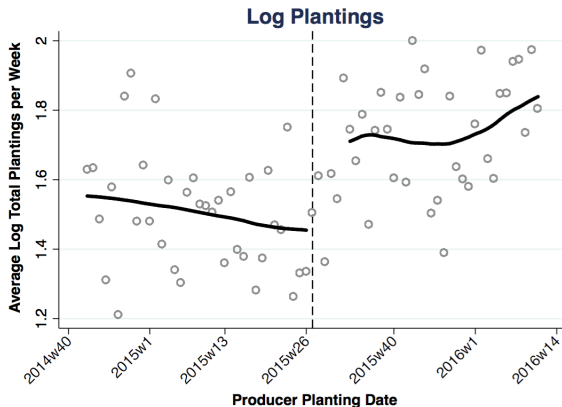
The long-run vertical integration response is more than twice as large as the short-run response.

- ▶ We determine this by examining how much less vertically integrated are new firms that enter after the reform.

The largest response comes from firms with limited or no production capacity.

Output Results

Planting Response



- ▶ Plantings increased by 23% (p -val: 0.002) and placebo ≈ 0 . Elasticity with respect to intermediate good after-tax price is 0.68.

What Else We Learn

- ▶ The estimates are robust to many different sensitivity checks including:
 - ▶ OLS vs. non-linear estimator.
 - ▶ Transition/anticipation window choice.
 - ▶ Dropping firms that were caught for reporting inaccuracies.
 - ▶ Bandwidth
- ▶ Only firms that sell in the non-vertical market in the year after the tax reform increase their output.
- ▶ When firms participate in the non-vertical market, almost 80% of them participate in only one side of the market, suggesting substantial specialization.
- ▶ All firm sizes increase production by similar percentages.

Discussion & Conclusion

Gross Receipts Taxes Create Welfare Losses

We estimate that, in the long-run, for every one percent increase in the after-tax price of intermediate goods, vertical integration decreases by 0.38 percent.

- ▶ The marijuana industry in WA will likely forever be more vertically integrated because it began with a GRT.

A decline in output is the main welfare loss.

- ▶ We estimate that for every one percent increase in the after-tax price of intermediate goods, output increases by 0.68 percent.

Small firms with limited capacity to produce their own intermediate goods are particularly harmed by the GRT.

Gross Receipts Taxes and Evasion

When tax enforcement is poor, Best et. al (2015) show that a GRT is preferred to a corporate income tax or VAT.

- ▶ Given the welfare losses documented in our paper, an excise or sales tax is preferred to all these taxes unless the tax base of the GRT/VAT relative to a sales or excise tax is particularly important.

If a GRT is chosen because of poor tax enforcement, our paper highlights the real costs of poor enforcement.

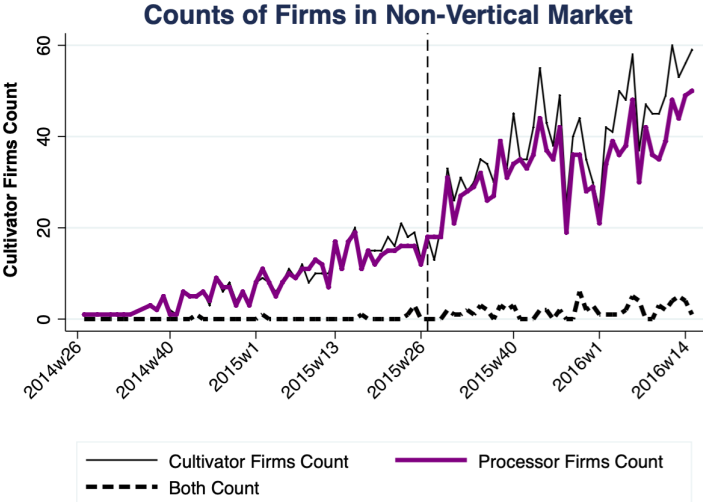
- ▶ Suppose a state chooses a GRT over a net-income based tax because enforcement is expected to be poor for the latter. As a consequence of this choice, for one every percent decrease in the after-tax price on intermediate goods, output will decline in that jurisdiction by 0.68 percent.

External Validity

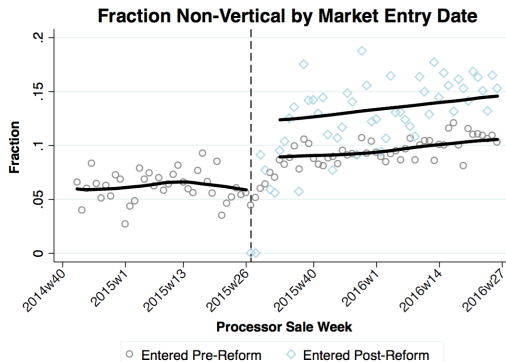
- ▶ It is very clear from this study that GRT's should not be used in the marijuana industry.
- ▶ There are several reasons to think that these estimates are a lower bound for a statewide implementation of a GRT on all goods and services:
 - ▶ This is a fairly vertically integrated industry even without a GRT, so the costs of implementing a GRT are lower.
 - ▶ There is only one intermediate good sector that is taxed and can choose whether to respond by vertically integrating. Usually, there are many.
- ▶ The degree of capacity constraints, fixed costs, and value of specialization will also matter.

Bonus Slides

New Firms Enter NV Market When GRT Eliminated

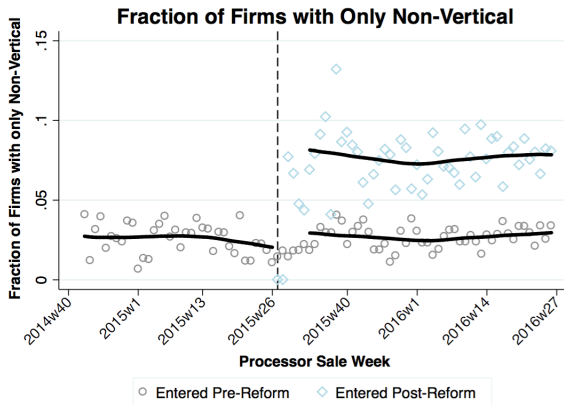


Long-Run Response



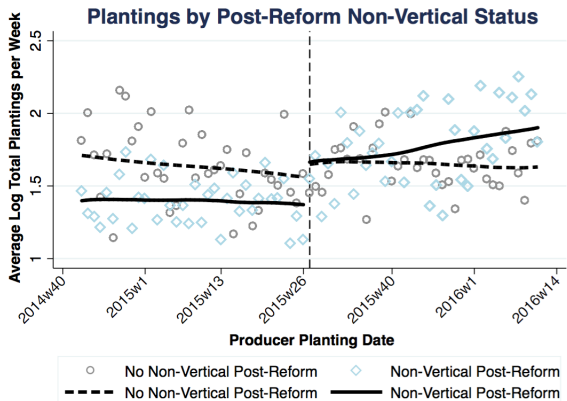
- ▶ Gap between new & old firms (controlling for experience) is 7.5 percentage points (p-val:0.098). So, long-run response is 12.8% . Elasticity of -0.38 for vertical integration with respect to the intermediate good after-tax price. Placebo ≈ 0 .

Long-Run Only Non-Vertical Response



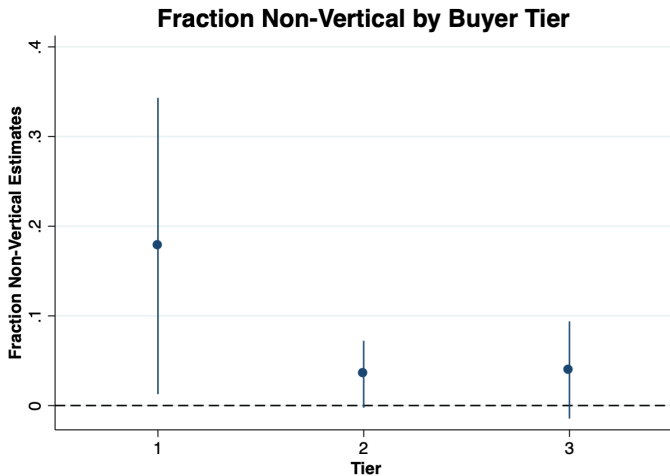
- ▶ Processors that entered after the tax reform are 8.7 percentage points (p-val: 0.020) more likely to operate exclusively non-vertically. Placebo ≈ 0 .

Planting Response



- ▶ Plantings concentrated among firms that are active in non-vertical market after GRT elimination. Placebo ≈ 0 .

Vertical Integration Heterogeneous Response by Firm Size



Planting Heterogeneous Response by Firm Size

