Tentative Analysis of Kantar Smoking Data

Giuseppe Forte, UCL · June 27, 2022

We gratefully acknowledge financial support from the European Research Council (ERC) under ERC-2009-AdG grant agreement number 249529.
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Introduction

Policy Changes

The Tobacco and Related Products Regulations 2016 (TRPR) impose:

- Binding constraints on tobacco/cigarette pack size;
- Plain packaging: elimination of central marketing tool.

Relatedly, the 2017 Spring Budget changes cigarette tax formula.

Some Results, So Far

May 2017 displays a

- $\searrow$ in total cigarette expenditure;
- $\downarrow$ in number of households purchasing cigarettes.

though both were trending $\searrow$ beforehand.

Question 1: how much of $\downarrow$ is attributable to plain packaging?
Problem: no clean control. UK-wide reform, no staggering. Tax change.
So Far: tax change has negligible impact on prices.

Question 2: how does plain packaging affect competition?
Problem: need to account for tax increases.
So far: price dispersion $\downarrow$, but uncertain attribution.

Part I

The Policy

Smoking in the UK

	2014	2015	2016	2017	2018	2019
Cigarettes	83.6	81.9	79.5	77.3	73.2	70.9
Cigars	0.9	0.9	0.8	0.8	0.7	0.7
Cigarillos	0.7	0.7	0.7	0.7	0.7	0.7
Fine Cut Tobacco	12	12.5	13.3	13.8	15.2	16
Pipe Tobacco	0.4	0.4	0.4	0.4	0.4	0.4
E-Vapour Products	2.3	3.6	5.4	7	9.6	11
Heated Tobacco	0	0	0	0.1	0.2	0.2
Market Size (£10^6)	20268	20141	19969	19946	19377	19217

Source: Euromonitor. Sample years in blue.

- UK adult smokers fell from 20% to 15%, 2011 – 2019 (APS).
- Cigarettes are the biggest loser, RYO gains slightly.
- Huge growth in E-Vapour market.

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- In red, smoking products we have data for (+ nicotine replacement).

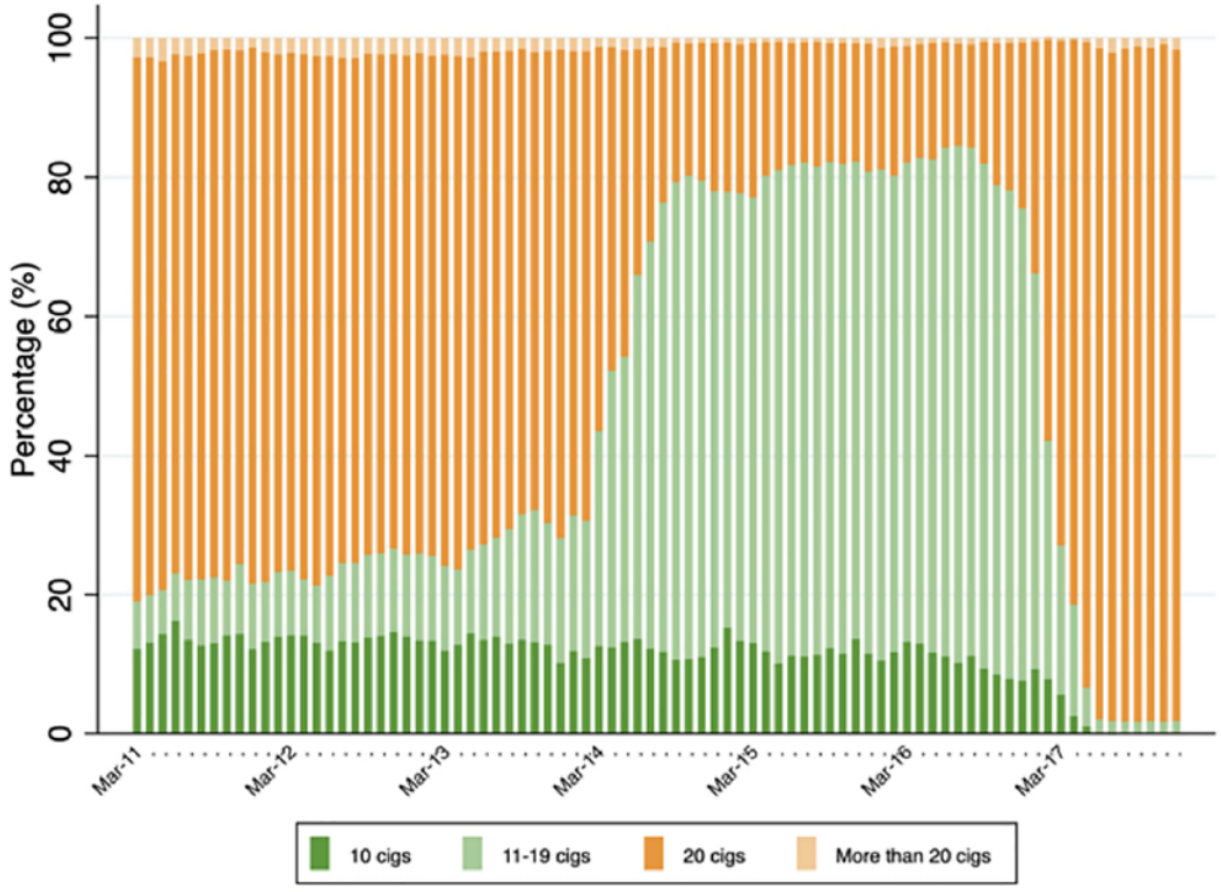
TRPR I: Small Packs are Banned

May, 20th 2016: stop to production of small packs.
May, 20th 2017: stop to retail of small packs.

TRPR, Article 14:

> *[. . .] A unit packet of cigarettes shall include at least 20 cigarettes. A unit packet of roll-your-own tobacco shall contain tobacco weighing not less than 30 g. [. . .]*

Small Packs are Relevant – Cigarettes



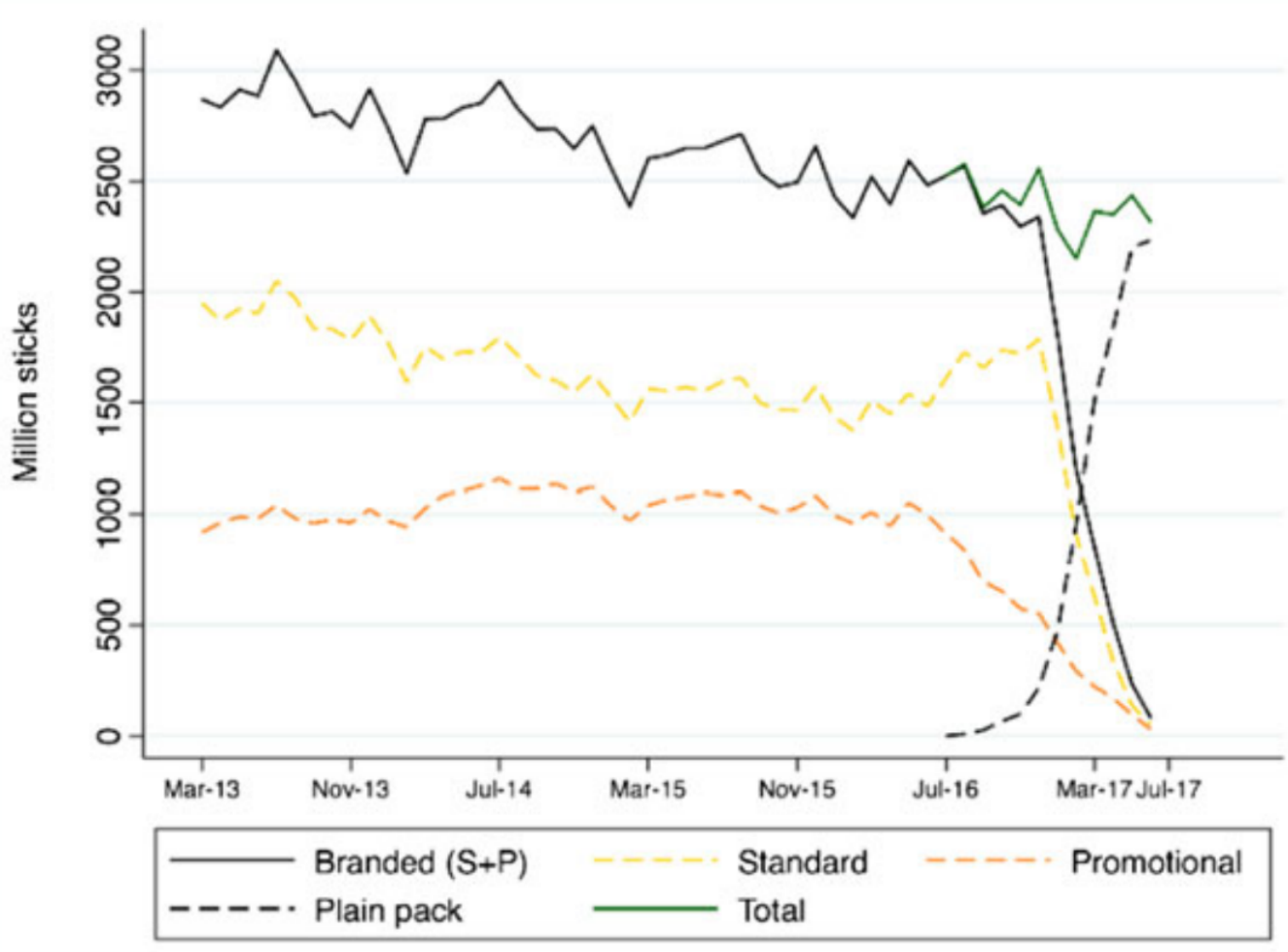
Source: Breton et al. 2020 – Kantar data.

- Why the increase in small packs? Shrinkflation / price points.
- Small packs make up 20% of RYO with little time variation.

TRPR II: Plain Packaging

The new standard pack

Plain Packaging Prevalence



Source: Breton et al. 2018 – Nielsen data.

Budget 2017: Tobacco Taxation

Spring Budget 2017 changes tobacco taxation in two ways:

- the usual yearly increase in the tobacco duty rate τ^{ℓ} (RPI + 2%)
- Minimum Excise Tax τ^{MET} – a floor on excise per 1000 cigarettes.

$$p_{jt}^{CIG} = (1 + \tau_t^{VAT})\left[R_{jt} + \max\{\tau^a p_{jt}^{RRP} + \tau_{jt}^{\ell}, \tau^{MET}\}\right]$$

The duty rate increase takes place on March, 8th 2017.
The Minimum Excise Tax is introduced on May, 20th 2017.

Recap

Multiple tobacco market changes enforced on May, 20th 2017:

- Small pack ban;
- Plain packaging;
- Tax changes.

Evidently hard to attribute a causal effect to plain packaging.

Next: introduce the data.

Part II

Data

Kantar WorldPanel I

Consumer panel of 30000 households paid to scan purchase receipts.

Average amount received per year is £75, not much variation. ?

Data provided at the date-household-store-UPC level (UPC $\approx$ barcode).

Fast moving consumer goods – food, drink, toiletries. . . household consumable supplies. No durables.

In this case: UPCs for the May 2015 – May 2018 period related to smoking, vaping, and nicotine replacement.

Kantar WorldPanel II

Merge this data set with broader Kantar information:

- Yearly household demographics;
- Shop information (chain, fascia, location);
- Food and Non-Food expenditure for all recorded shopping trips.

A shopping trip is a household-day-shop triple.

Kantar WorldPanel III

Final dataset: 13.2 million shopping occasions.

Restrict to households that have ever purchased a smoking product:

- 5200 households (17% of 30000);
- 2.4 million shopping occasions;
- 180000 smoking market purchases;
- Mean (Median) number of hh shopping trips: 287 (379).

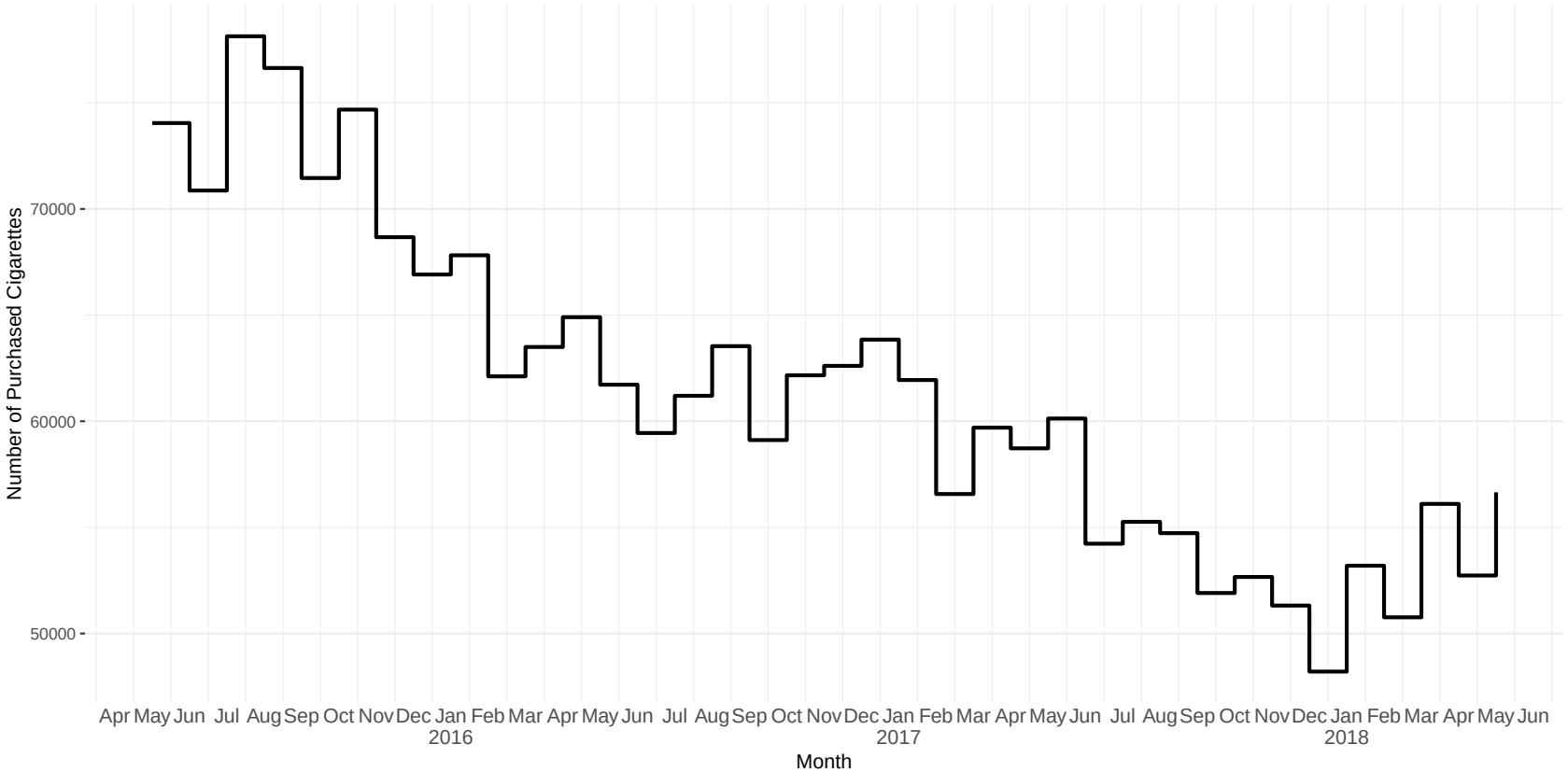
Monthly food expenditure: median £157, mean £176.
Monthly non-food non-smoking expenditure: median £46, mean £65.
Monthly total expenditure: median £227, mean £260.

Next: time-series evidence on cigarette demand.

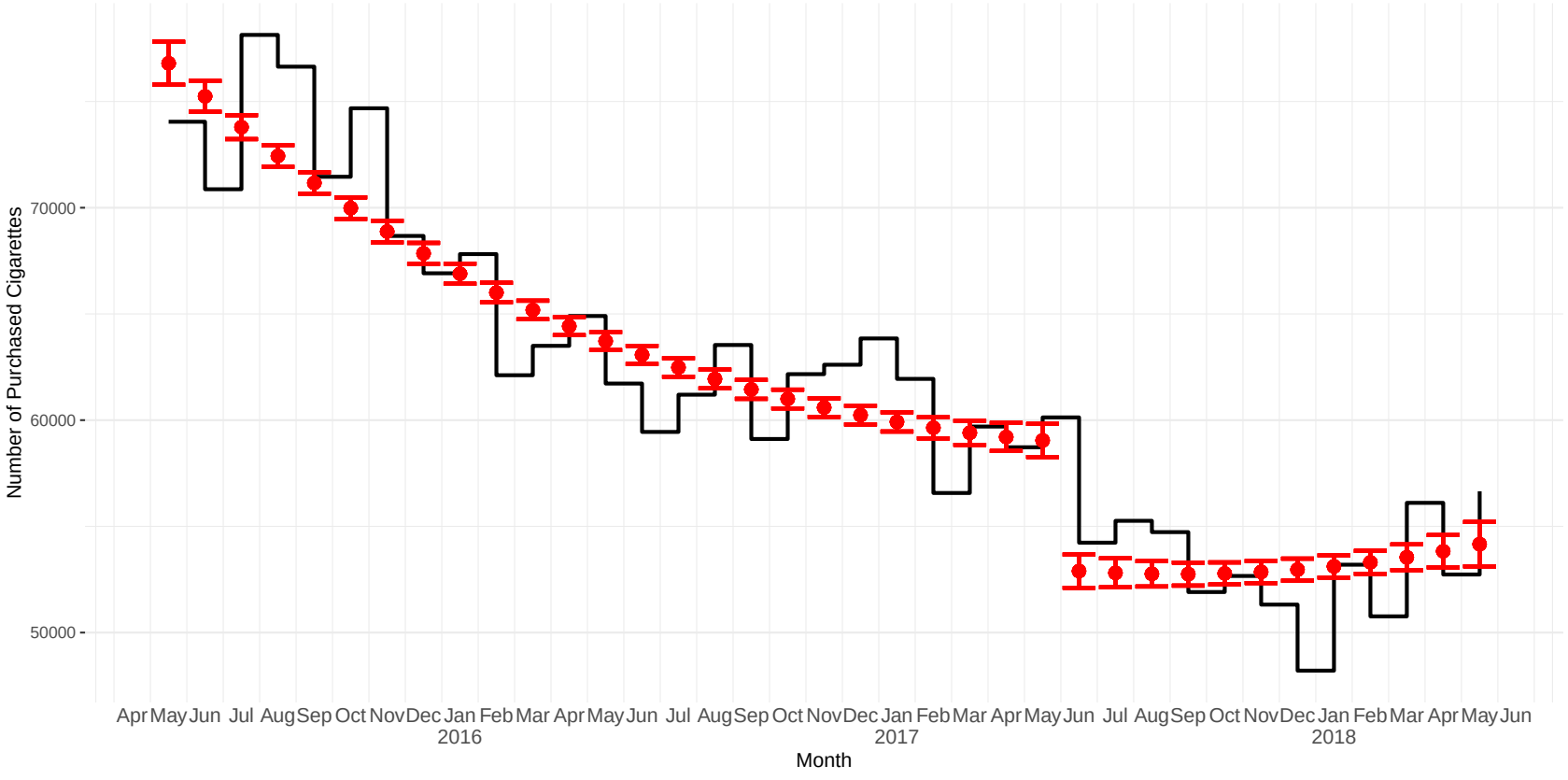
Part III

Demand

Number of Purchased Cigarettes – Time Series

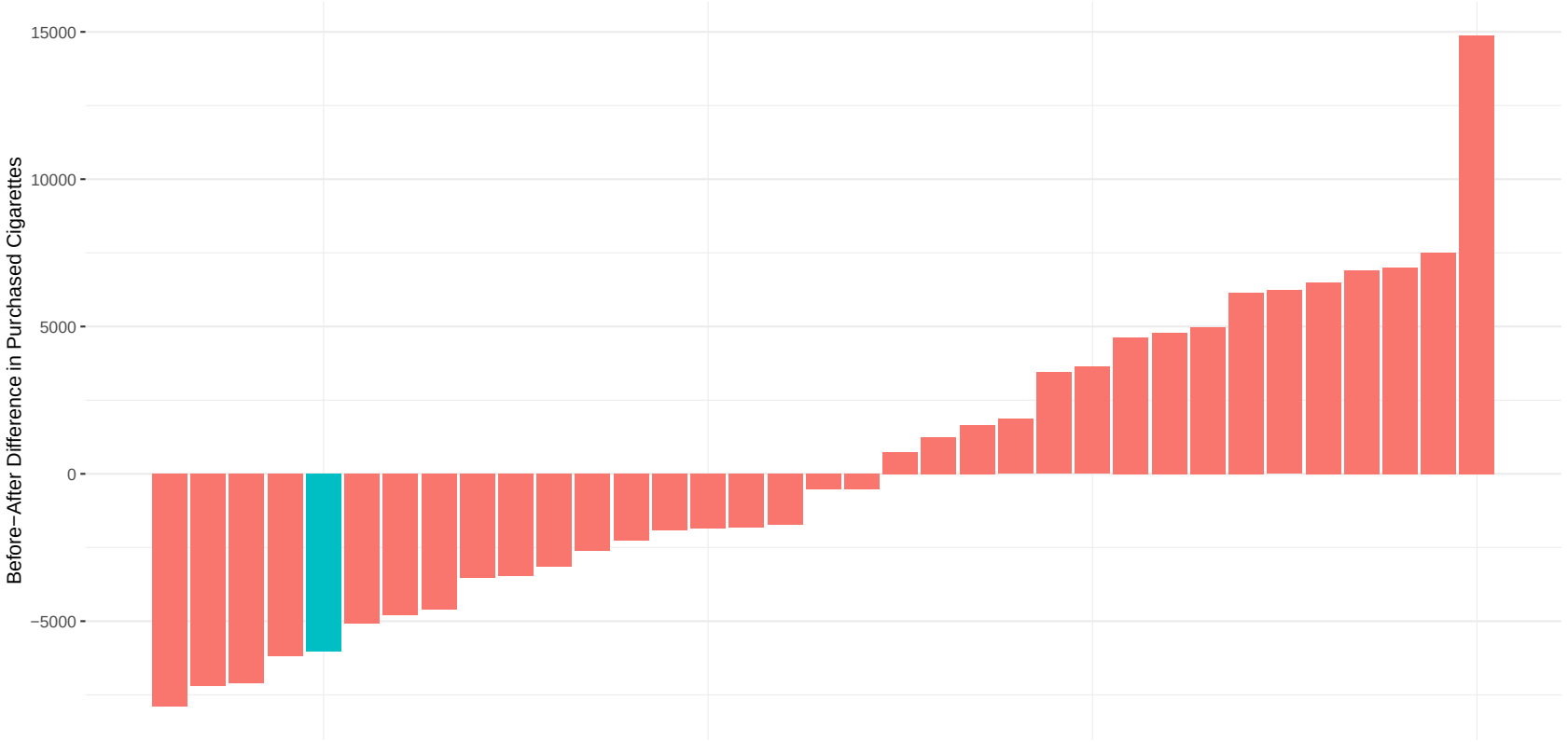


... with a Polynomial in Time and a June 2016 dummy



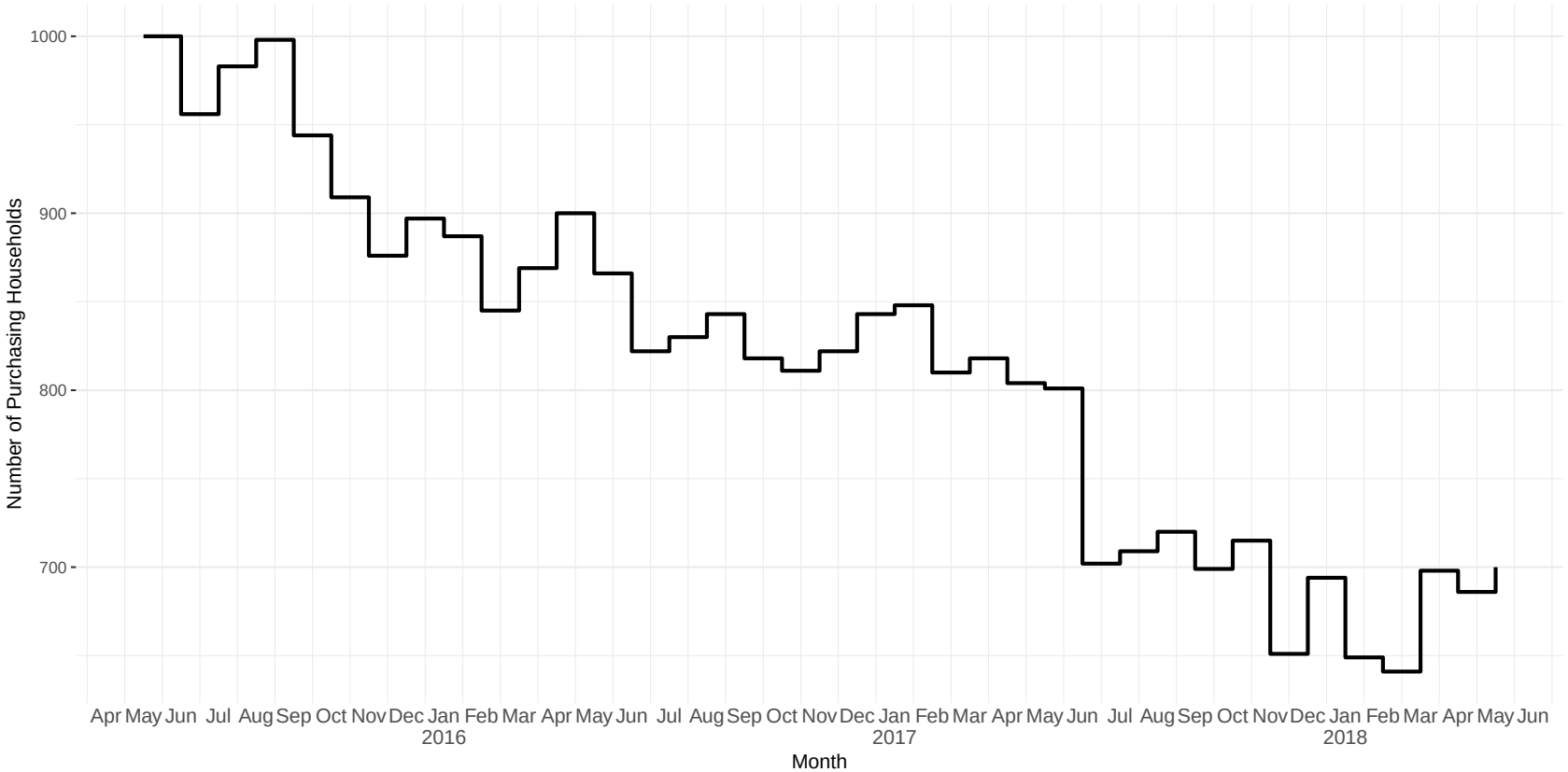
$$\widehat{\mathbb{E}(Y|\text{Pre}) - \mathbb{E}(Y|\text{Post})} = \underset{[-7482.7;-4572.1]}{-6027.4}$$

But is This Estimate Outstanding?



Not particularly.

Number of Households Purchasing Cigarettes – Time Series



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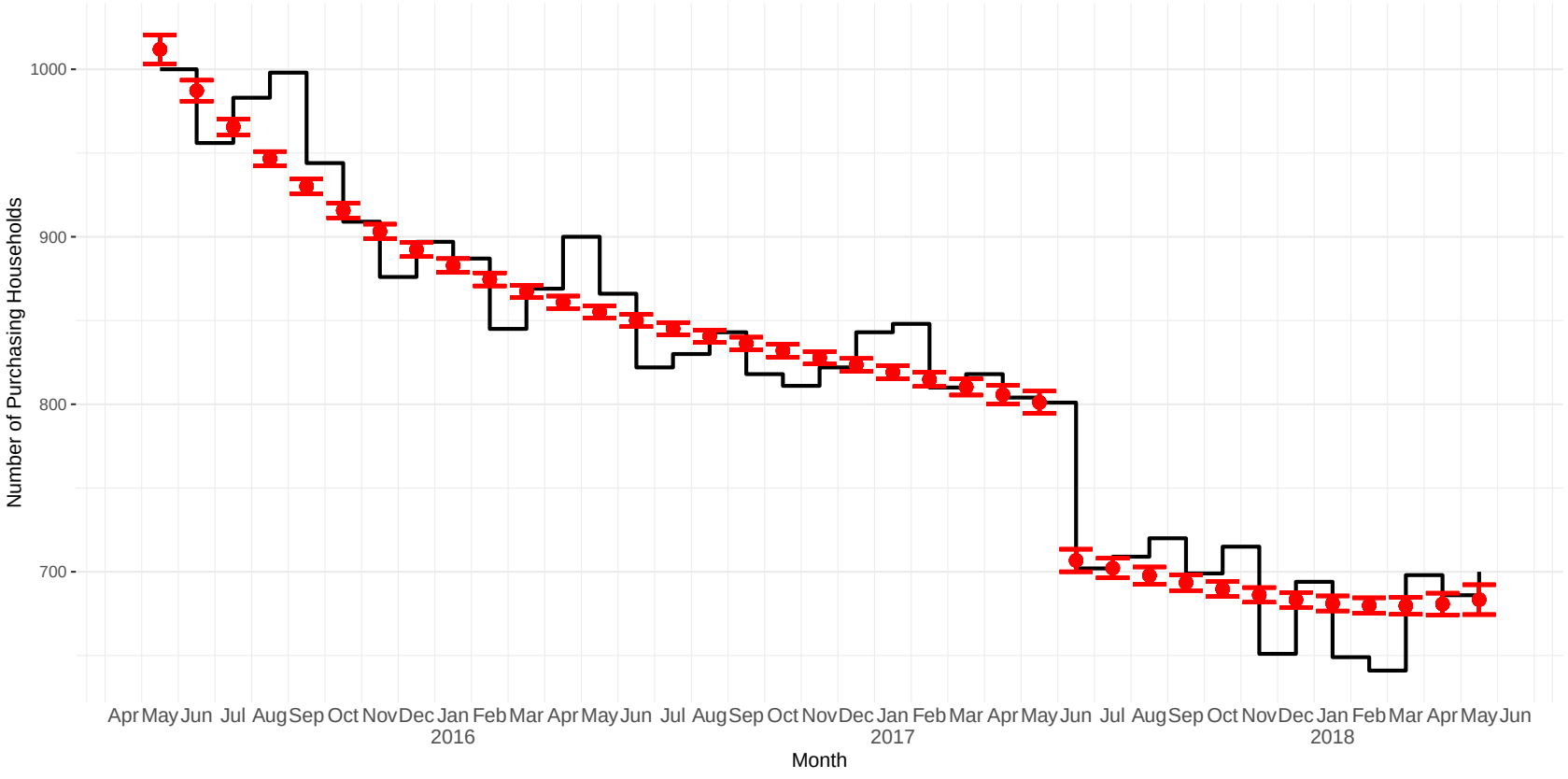
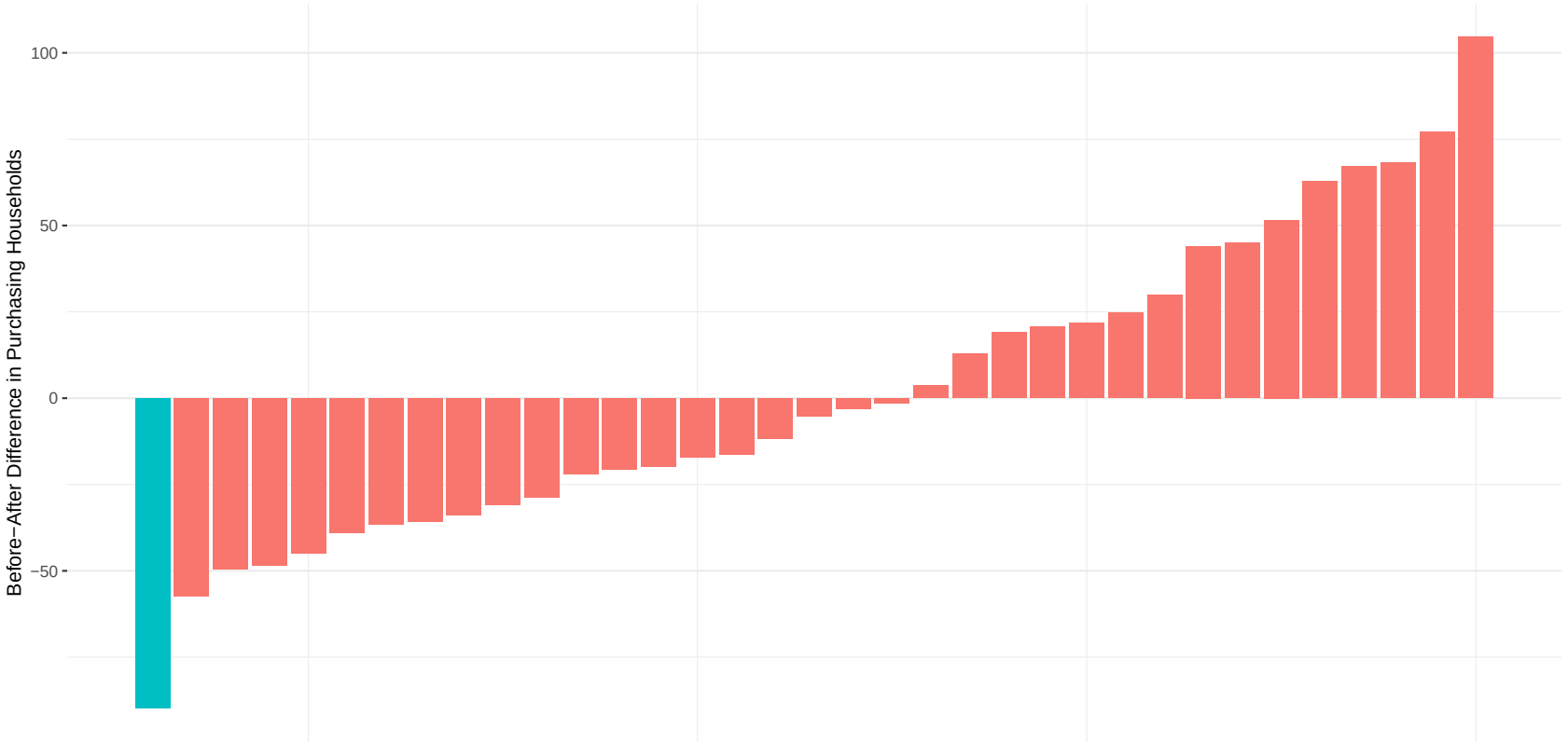


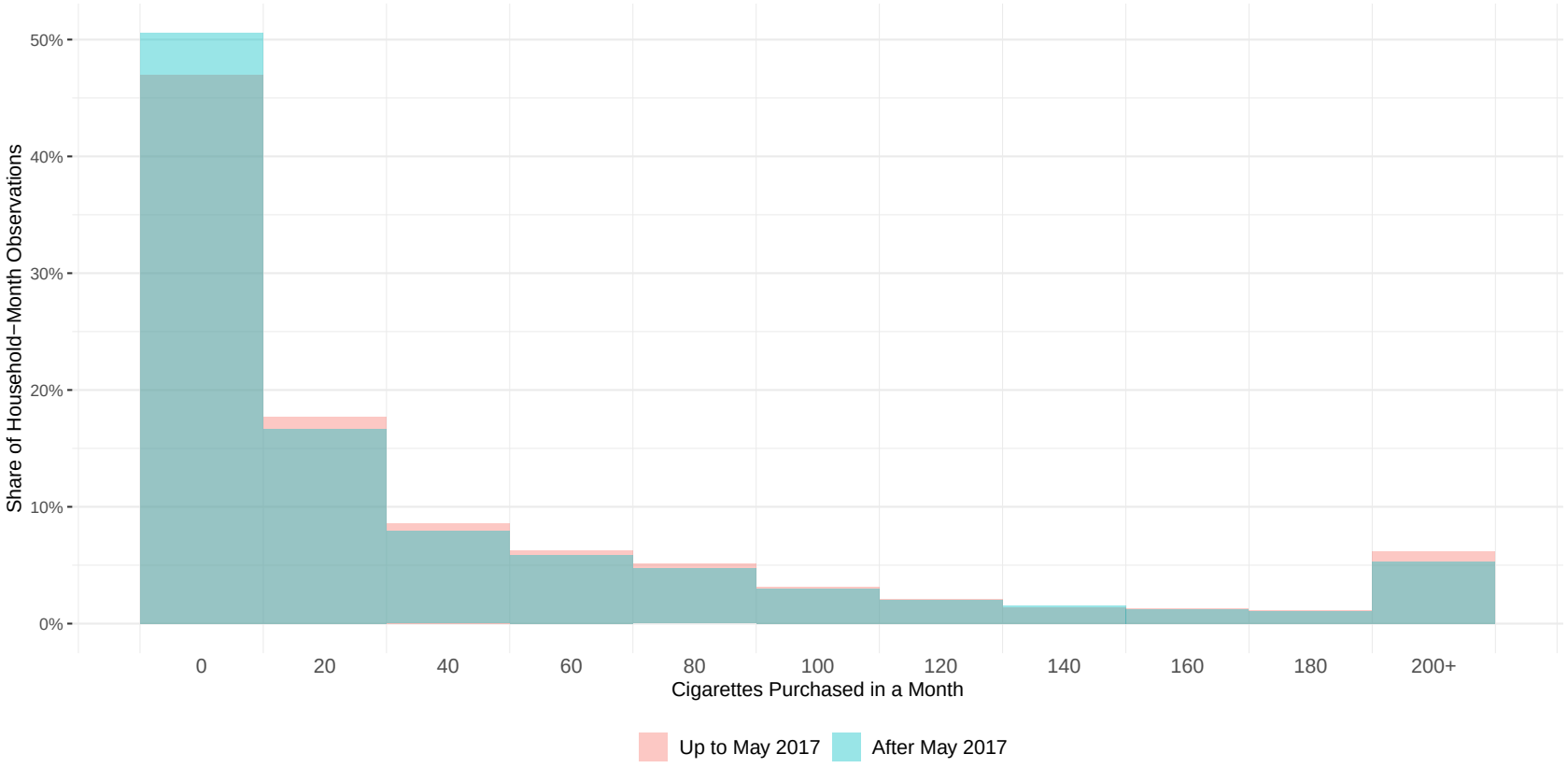
$$\widehat{\mathbb{E}(Y|Pre) - \mathbb{E}(Y|Post)} = \underset{[-102.2;-77.3]}{-89.8}$$

But is This Estimate Outstanding?



Quite so.

Who is Stopping?



Seemingly, households across the board.

Recap

↘ Trends predated the policy; yet, discernible break in May 2017:

- not as pronounced for total cigarettes purchased;
- more pronounced for households purchasing cigarettes.

Tobacco prevalence seems to have leveled after May 2017 (also in APS).
Responsive households may have all been skimmed.
(More recent surveys: smoking prevalence ↗.)

Next: what about consumer prices?

Part III

Prices

Cigarettes are Priced in Segments

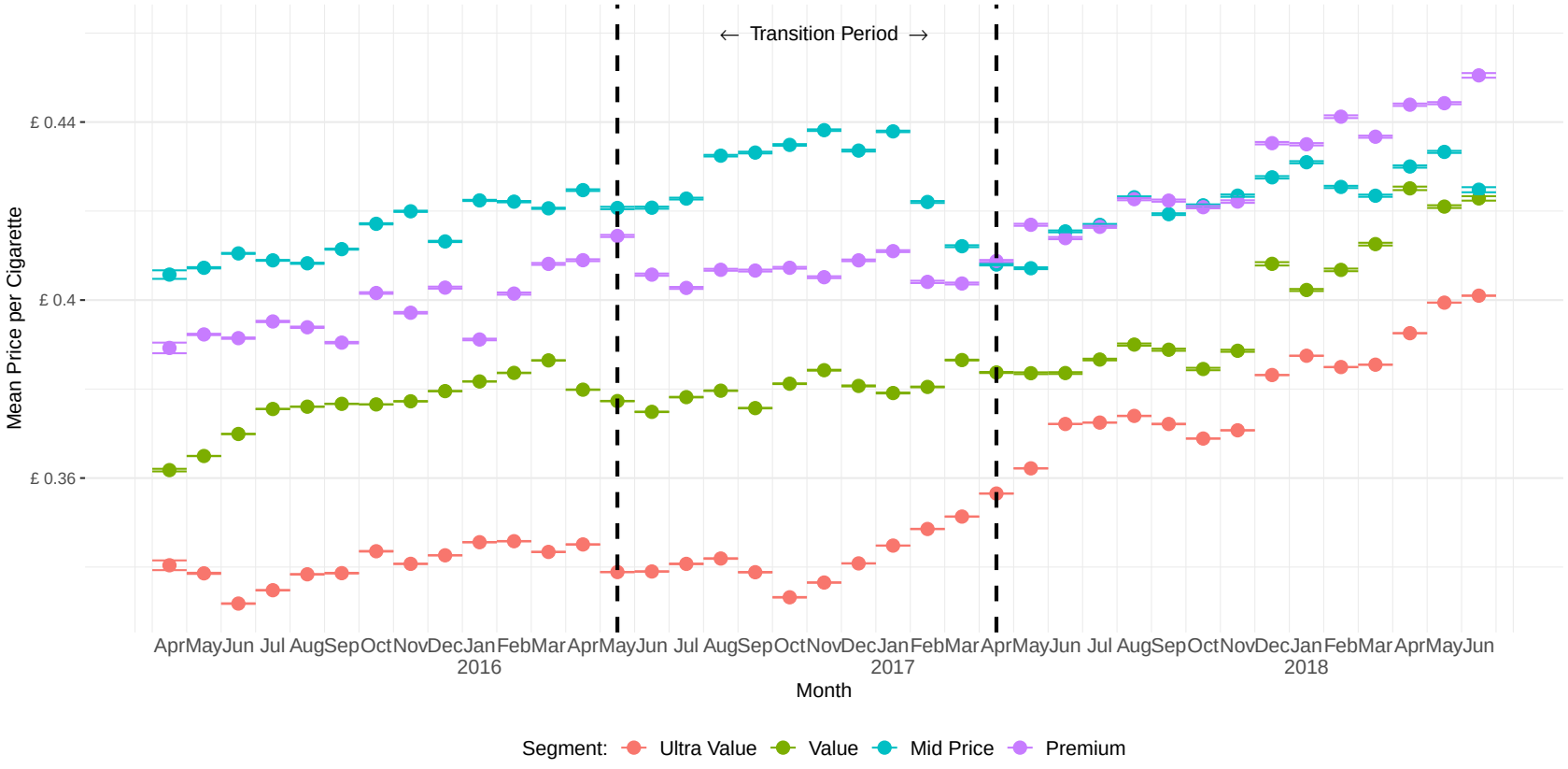
(These RRP lists are not typically available, unfortunately.)

An Equation - Apologies

$$p_{jt}^{CIG} = (1 + \tau_t^{VAT})\left[R_{jt} + \max\{\tau^a p_{jt}^{RRP} + \tau_{jt}^{\ell}, \tau^{MET}\}\right]$$

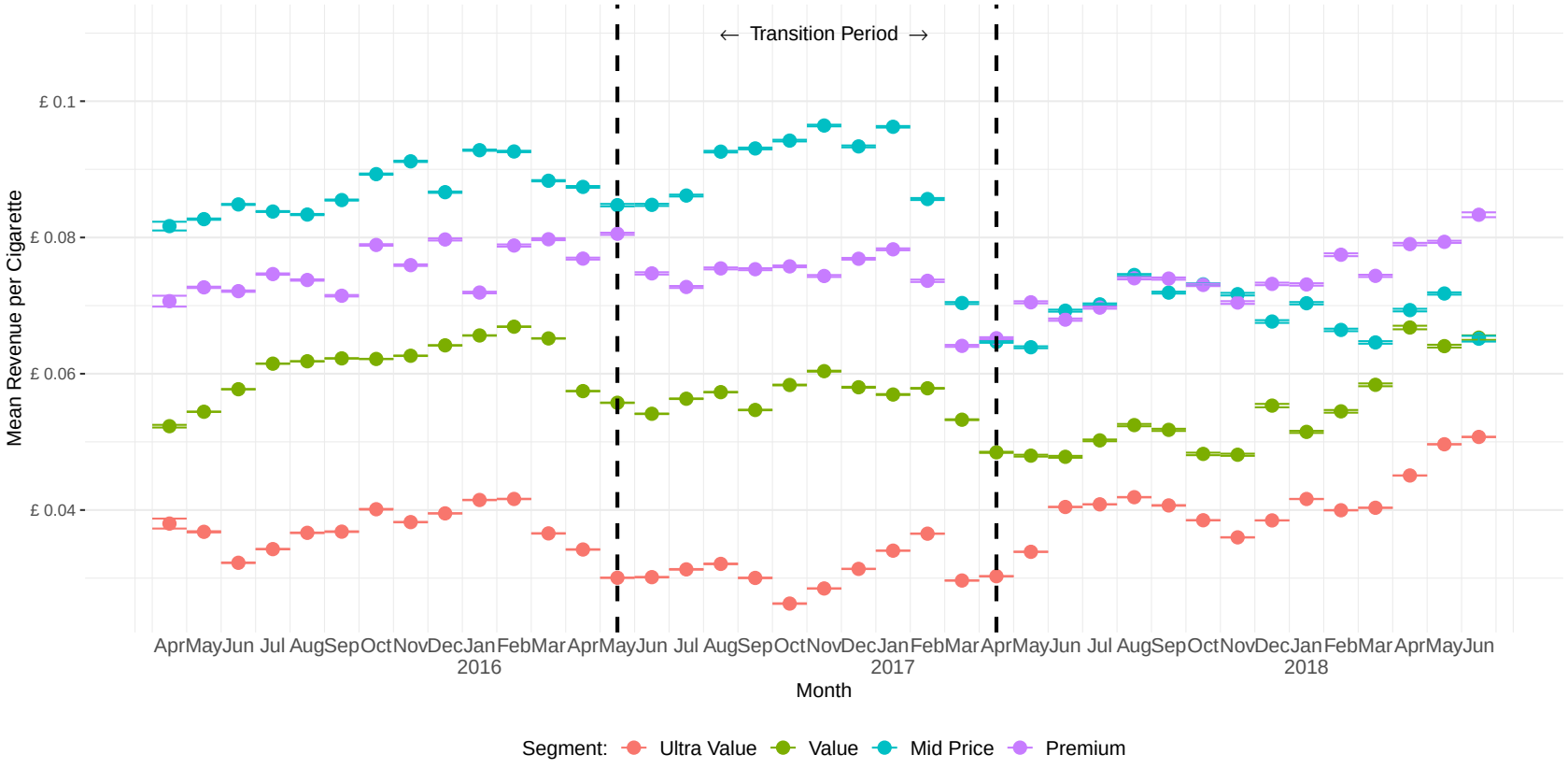
Sparse information about p_{jt}^{RRP}.
Plug p_{jt}^{CIG} and verify where possible that $p_{jt}^{RRP} \approx p_{jt}^{CIG}$ (it is).
Can thus invert to separate gross revenue R_{jt} from tax burden $p_{jt}^{CIG} - R_{jt}$.

Price Dispersion ↓ After May, 2017



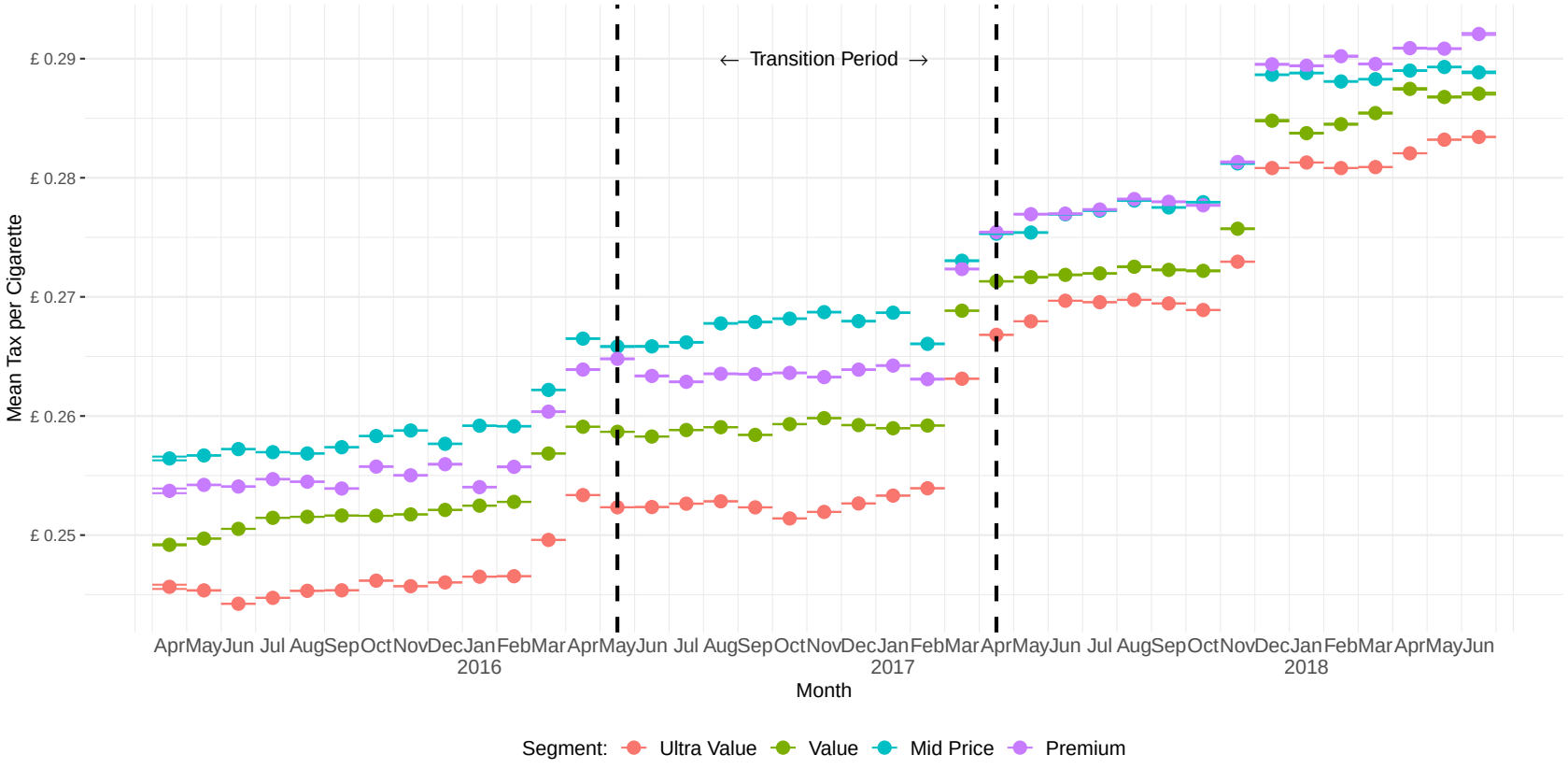
Prices do not really fall – but are producers absorbing part of $\tau^{\ell} \uparrow$?

Revenue Dispersion ↓ After May, 2017



Revenue is stable across most segments...

Tax Dispersion ↓ After May, 2017



... in the face of increasing tax burden.

Is the $\downarrow$ in Dispersion Mechanical?

Purpose of τ^{MET} is to raise break-even price and lower demand.

Ultra-Value $p \uparrow$ could be due to:

- τ^{MET} binding given pre-May, 2017 prices;
- lower differentiation?

(Hard to rationalise $p \downarrow$ for Mid Price with τ^{MET} binding, see below.)

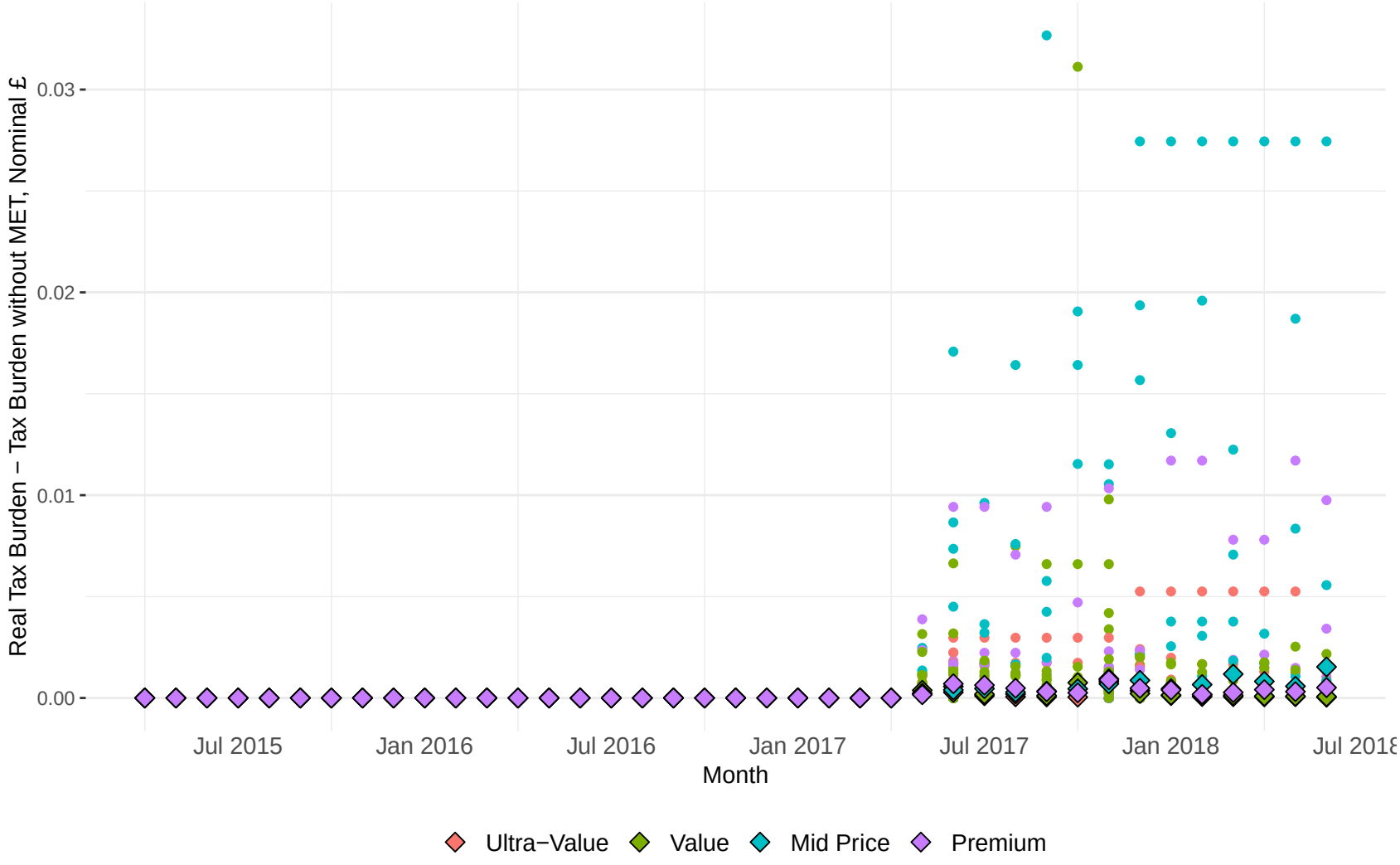
A Thought Exercise

We suspect firms may react before τ^{MET} introduced.
Comparing $p_{jt}^{CIG}|_{\tau^{MET}=0}$ with $p_{jt}^{CIG}|_{\tau^{MET}>0}$ does not do much.

Exercise: what if τ^{MET} had been exogenously introduced in May, 2016? Would it have been binding with May, 2016 prices?

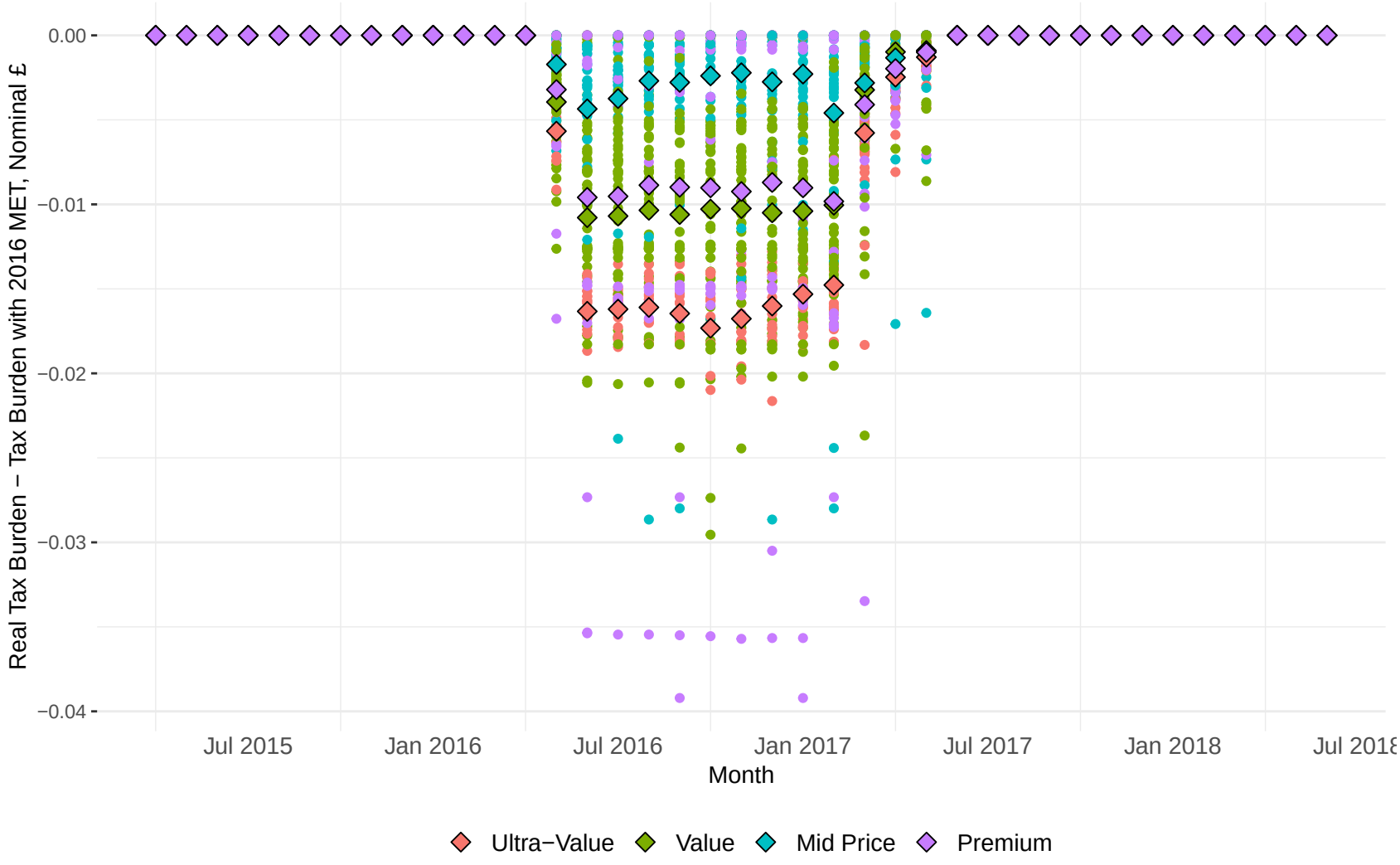
Since $p_{jt}^{RRP} \nearrow$ and $\tau^{\ell} \nearrow$ if τ^{MET} does not bind in May, 2016 neither should it bind in May, 2017.

Introducing τ^{MET} in May, 2017



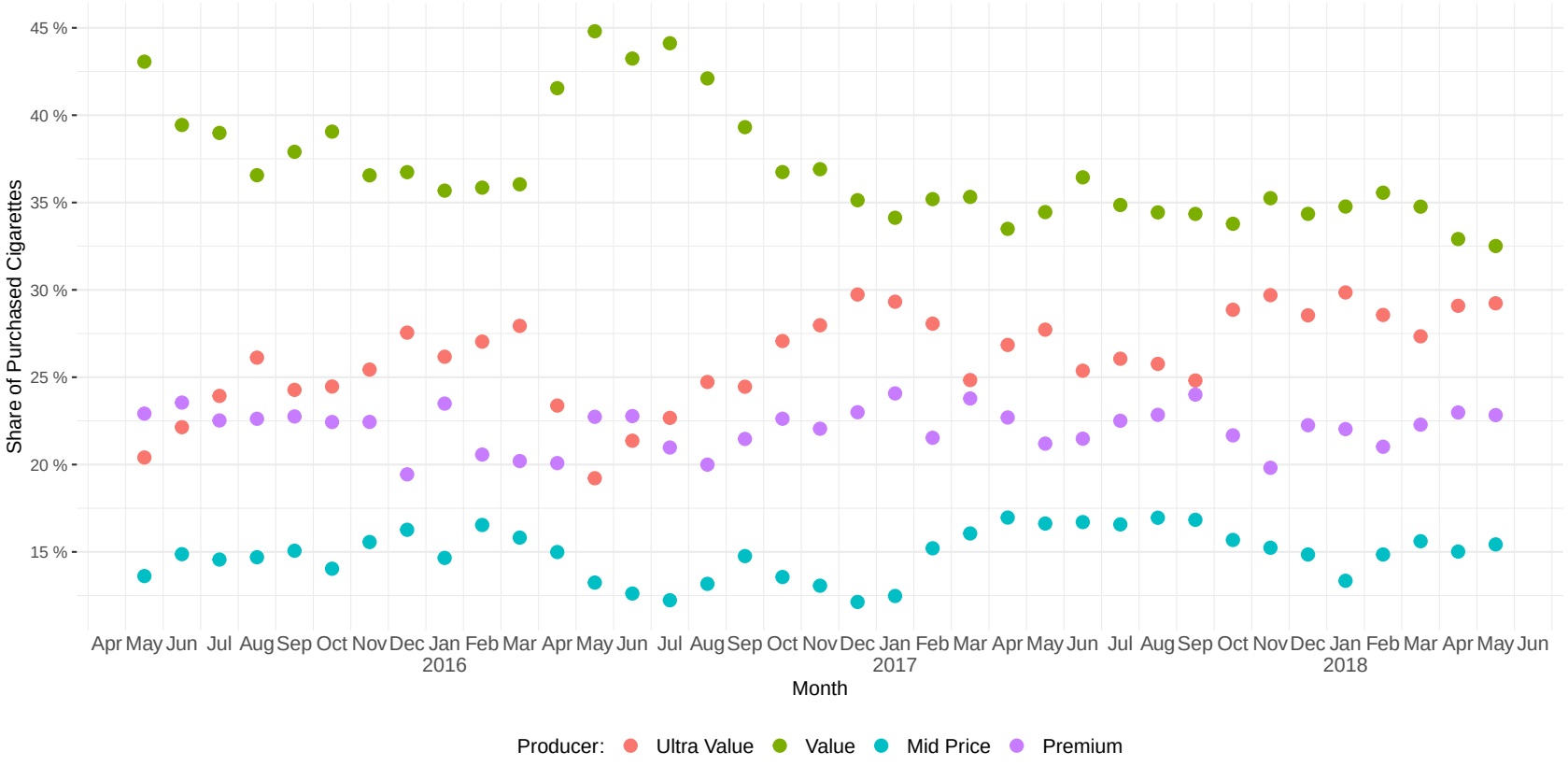
No discernible effect for all but a few transactions.

Introducing τ^{MET} in May, 2016



$\Delta\tau_{\text{Ultra-Value}} < 1.5$ pence on average, while $\Delta p_{\text{Ultra-Value}} \approx 4$ pence.

What About Market Shares?



Ultra Value ↑ at the expense of Value ↓, stable upper segments.

Little change around plain packaging.

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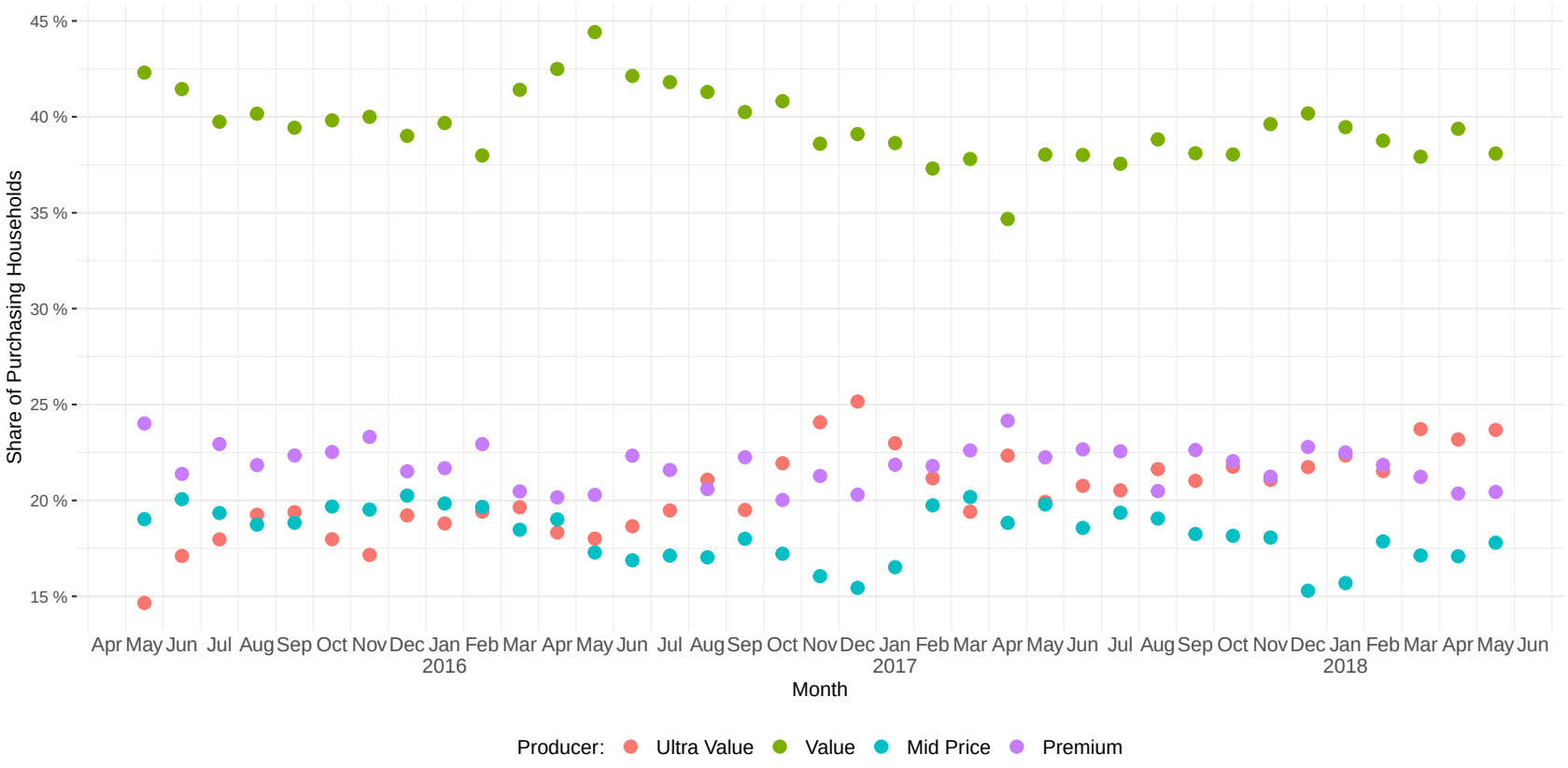

Little change around plain packaging.

Summarising

Multiple smoking market changes come into place on May, 20th 2017.
In Kantar data, demand ↓.

Is it the tax change? I don't think so.
Is it the larger packs? Could be, in part. (... I have more slides.)
Is it plain packaging? I think it is, mostly.

Price dispersion ↓ in the months of the policy changes.

Is it the tax change? Not entirely.
Is it reduced differentiation? Not evident in market shares.

Where Am I Going With This?

Not super sure.
I would like to write a paper about

$$\text{TRPR} \rightarrow \text{differentiation} \downarrow \rightarrow p \text{ dispersion} \downarrow$$

But I haven't found a compelling Figure 1.
Maybe there isn't one, and the above is too far-fetched.

Clearly need to narrow down on a 'story' and omit unrelated details.
Writing a paper about *this* policy vs. *this type* of policy.

Smoking feels like a complicated market: state dependence, evolving outside options...

References

Breton, Magdalena Opazo, John Britton, and Ilze Bogdanovica (2020). "Changes in roll-your-own tobacco and cigarette sales volume and prices before, during and after plain packaging legislation in the UK". *Tobacco Control* 29.3, pp. 263–268 (cit. on p. 10).

Breton, Magdalena Opazo, John Britton, Yue Huang, and Ilze Bogdanovica (2018). "Cigarette brand diversity and price changes during the implementation of plain packaging in the United Kingdom". *Addiction* 113.10, pp. 1883–1894 (cit. on p. 12).