California Carpet Stewardship Programme: Review of Analysis by Bates White

Report to Changing Markets

Tanzir Chowdhury
Dr Chris Sherrington

22nd August 2017

Report for Stichting Changing Markets

Prepared by Tanzir Chowdhury and Chris Sherrington

Approved by

………………………………………………….

Dr Chris Sherrington

(Project Director)

Eunomia Research & Consulting Ltd
37 Queen Square
Bristol
BS1 4QS

United Kingdom

Tel: +44 (0)117 9172250
Fax: +44 (0)8717 142942

Web: www.eunomia.co.uk

Executive Summary

The Carpet and Rug Institute (CRI) funded a recently published study, by Bates White Economic Consulting, that investigated the impact of the California Carpet Stewardship Programme (CCSP) assessment fee (and the increases to date in the assessment fee) on California carpet shipments. The study suggests that the assessment fees have had a notable impact, reducing shipments, and that future possible increases in the fee will cause a further reduction in sales.

Eunomia Research & Consulting Ltd (Eunomia) was commissioned by Stichting Changing Markets to undertake an analysis of the Bates White study in order to provide a critique that considers whether or not the study is methodologically sound, and whether the claims made in the study can be substantiated based on the data presented and the analytical techniques applied.

Our critique of the Bates White study determines that it suffers from a number of methodological weaknesses. Accordingly, the claims made in the study cannot be substantiated on the basis of the data presented and the analytical techniques applied.

Contents

1.0 Introduction

The Carpet and Rug Institute (CRI) funded a recently published study, by Bates White Economic Consulting, that investigated the impact of the California Carpet Stewardship Programme (CCSP) assessment fee (and the increases to date in the assessment fee) on California carpet shipments.[1] The study suggests that the assessment fees have had a notable impact, reducing shipments, and that future possible increases in the fee will cause a further reduction in sales.

Eunomia Research & Consulting Ltd (Eunomia) was commissioned by Stichting Changing Markets to undertake an analysis of the Bates White study in order to provide a critique that considers whether or not the study is methodologically sound, and whether the claims made in the study can be substantiated based on the data presented and the analytical techniques applied.

The critiques of the Bates White study is presented in Section 2.0.

2.0 Review of Bates White Study

The Bates White study, entitled 'Impact of CCSP Assessment Fees on California Carpet Shipments', seeks to quantify the impact of the assessment fee on California carpet shipments. The authors consider the time period from April 2015 to March 2016, and subsequently through to the end of 2016.[2] Their approach is to use a difference-in-differences regression model to compare changes in California carpet shipments with carpet shipments to the rest of the United States.

The authors state that:

> *Our analysis demonstrates that the assessment fee has had a significant, negative impact on California carpet shipments. In particular, our analysis demonstrates that the assessment fee reduced carpet shipments to California by more than 4% from April 2015 to March 2016 and by more than 6% through year-end 2016*

However, the report suffers from a number of methodological weaknesses. Accordingly, the claims made in the study cannot be substantiated on the basis of the data presented and the analytical techniques applied.

---

[1] Bates White Economic Consulting (2017) Impact of CCSP Assessment Fees on California Carpet Shipments, June 29 2017, available at http://www.calrecycle.ca.gov/Carpet/FeeAssess.pdf

[2] The authors note that due to apparent data limitations they did not consider any effects of the assessment fee in the period from July 1 2011 to March 31 2015.

The following issues have been identified:

- Exclusion of the price of carpets, or changes in the price of carpets, from the analysis:
    - The analysis considers the impact of the assessment fee on the demand for carpets, where demand will primarily depend on the price of carpets (including the assessment fee). The price of carpets could be different in California compared to the rest of the US, and/or the price could have changed differently in California compared to the rest of the US (by more than the assessment fee) over the period of analysis. However, no account is taken of the price of carpets.
    - A US price comparison website for carpets notes the following typical prices per square foot:[3]
        - Good quality - $1.00 to $5.00
        - Better quality - $4.00 to $8.50
        - Best quality - $7.70 to $17+
    - Taking $8 as a representative amount, on a square yard basis this equates to $72. Accordingly with the most recent increase in the assessment, to $0.25 per square yard, it adds 0.35% to the price of an average carpet. This proportion of overall price would be higher for cheaper, poor quality carpets, and lower for the best quality carpets.
    - All regressions and elasticity calculations should include the price of carpets.
- Exclusion of substitute products and other relevant factors that might affect demand:
    - The price of substitute products (i.e. alternative flooring types such as wood or stone) can change demand for carpet. This has not been included (or even mentioned) in the analysis.
    - People in California could prefer other flooring materials over carpet, which could negatively affect the demand for carpet.
    - Weather can affect the choice of flooring products, and the hot and humid weather in California could have a negative impact on demand for carpets
- DID Regression Model:
    - For the Difference-in-differences (DID) estimation, if the price of carpets in California is different from, or changed to a greater or lesser extent than, the rest of the US, the entire analysis would be redundant. Even if the price levels and changes were the same between the regions, this should have been mentioned in the analysis.
    - Fixed effect dummy variables for California (designed to capture the differential impact on demand for California compared to the rest of the

[3] See http://www.carpetpriceguides.com/ accessed 22nd August 2017

US), and fixed effect dummy variables for time-periods (designed to capture the differential impact on demand over different periods of time) were included. However, the model should have also included 'interaction dummy variables' (dummy for California multiplied by dummy for time-periods) to account for possible differential changes in demand between California and the rest of the US) over time.
  - Adjusted R-squared values are reported to be 1 (which is the maximum possible value) – suggesting that the regression is a perfect fit for each variable for all data. This is not possible, and suggests that these R-squared values have been rounded up to 1, meaning that the relative explanatory power of different model specifications cannot be compared by the reader.
  - Explanatory variables (population, housing permits, etc.) and fixed effect dummy variables were used in separate specifications. Including these in the same regression model would be desirable and would better explain the variations in the demand curve.
- Elasticity:
  - The implied elasticity calculation assumes that there is no shift in the demand curve between the start and end point of the elasticity calculation. However, the demand curve could have shifted because of a change in consumer preference, price and availability of substitutes (wood, tiles, laminated floors, etc.).
  - For the elasticity calculation to hold true, demand would have to be linear, meaning that the relationship between changes in price and quantity demanded varies at the same proportion for each level of price. However, it is more realistic to assume a non-linear demand function, i.e. quantity demanded changes disproportionately at different levels of price. In fact by using logarithmic transformation on their dependent and independent variables in the DID regression they have implicitly assumed the demand function to be non-linear. Therefore their elasticity calculation cannot possibly hold true.
  - For the implied elasticity calculation, the change in price between the start and end point was assumed to be just the change in assessment fee level, whereas the actual change in overall price could have been greater than the change in the assessment fee, making the implied elasticity calculation invalid.