Online Appendix for "Steering in One Click: Platform Self-Preferencing in the Amazon Buy Box"

Devesh Raval

Harvard Law School

devesh.raval@gmail.com

December 31, 2023

A Appendix

A.1 Additional Figures

I examine an example where no offer wins the Buy Box in Figure A.1. In Figure A.1a, the area in the red box does not provide a price, unlike Figure 1a, and just states "Available from these Sellers". Similarly, the Buy Box located in the green box does not have a one click button, although one can click through to see offers. Figure A.1b depicts the offers available; inside the green box is a FBA offer with a 2 day delivery time for $29.99.

In Figure A.2, I depict the share of products with a Buy Box winner where the winner is Amazon Retail (red) or either Amazon Retail or a FBA third party offer (blue).

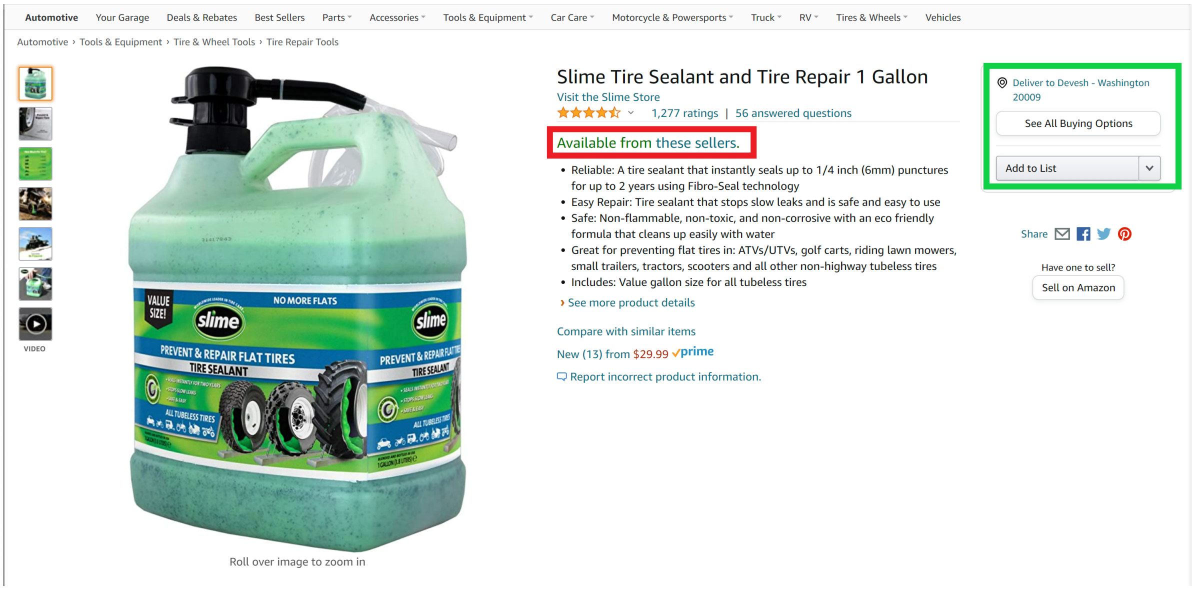
In Figure A.3, I include category level estimates of the price premia for Amazon Retail over FBA, and Amazon Retail over FBM, for the primary sample. The top figure examines a nested logit model where the outside option of no Buy Box winner is in a separate nest, while the bottom figure examines a multinomial logit model excluding merchant offers that were never recorded as ever having won the Buy Box.

A.2 Predictive Accuracy

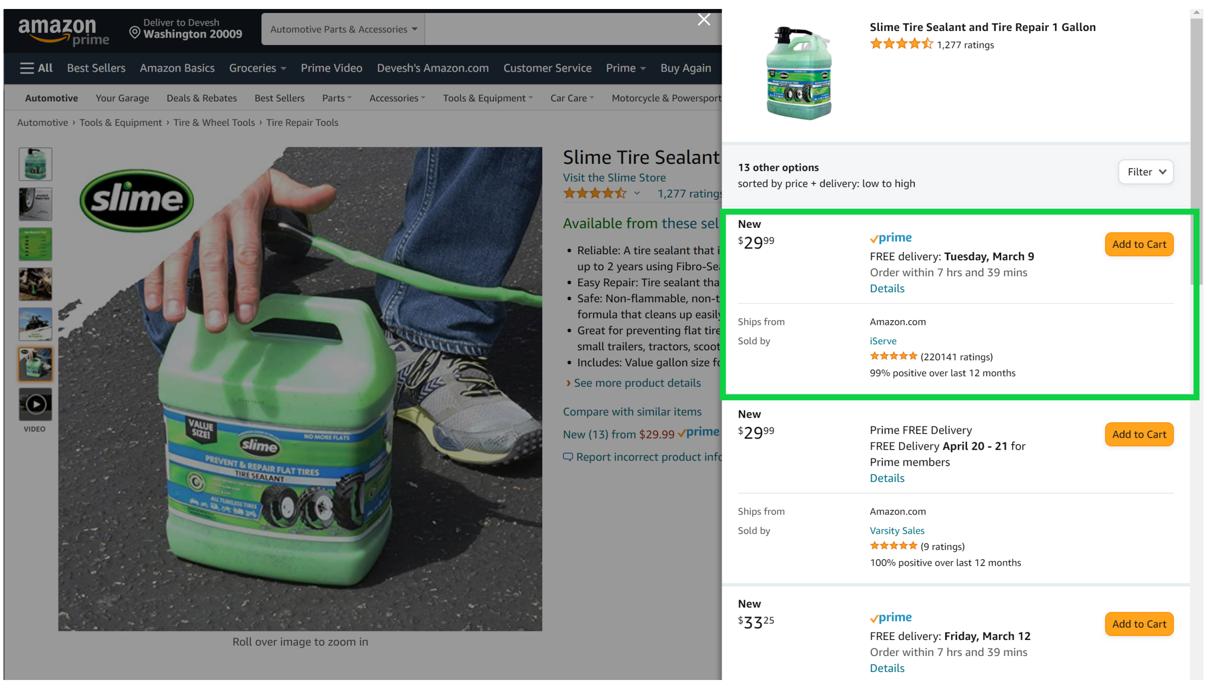
I examine how well my empirical model approximates the Buy Box algorithm by comparing the actual winners of the Buy Box to the empirical model's predictions. For each product, I predict the Buy Box winner as the offer with the maximum probability of being chosen. For this section, I use estimates of the empirical model estimated at the category level.

Table A.1 examines prediction accuracy by comparing model predictions to the actual winner of the Buy Box. The first column of the table is the actual share of products by winner type, and the first row of the table is the predicted share of products by winner type. Overall, the model predicts aggregate shares of each type of offer fairly well, except for the share where there is no Buy Box winner. The model overpredicts Amazon Retail's share of Buy Box winners by 2.5 percentage points, with a predicted share of 32.2% compared an actual share of 29.7%, and overpredicts FBA's share by 0.9 percentage points, with a predicted share of 38.5% compared to an actual share of 37.4%. The model underpredicts FBM's share by 2.3 percentage points (26.8% predicted compared to 29.1% actual) and underpredicts the share with no Buy Box winner by 1.5 percentage points (2.4% predicted compared to 3.9% actual).

The next four rows and columns of Table A.1 report the share predicted of each winner type given the actual winner of the Buy Box. The model predicts Amazon Retail wins the Buy Box 99.1% of the time when it does, and that FBA wins the Buy Box 97.4% of the time when it does. The model performs slightly worse for FBM offers – it predicts FBM wins the Buy Box 85% when an FBM offer wins the Buy Box, predicting Amazon Retail 7.4% of the time, FBA 4.6% of the time, and No Winner 3.0% of the time. Finally, the model performs much worse when no offer wins the Buy Box. The model predicts that no one wins the Buy Box 36% of the time when there is no winner, predicting that FBA wins 15% of the time and that FBM wins 49% of the time.



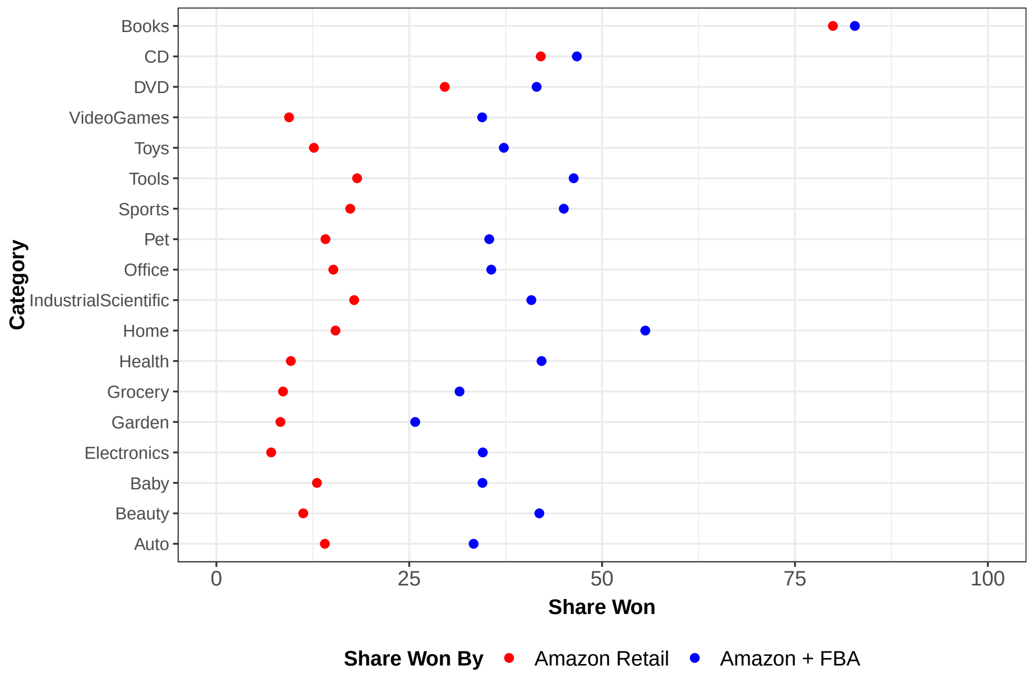
(a) Product Detail Page



(b) Product Offers

Figure A.1 Example: Product With No Buy Box Winner

Note: Example of Product Detail Page and Offers for "Slime Tire Sealant and Tire Repair 1 Gallon" (ASIN B013J2RRFQ), taken on March 7, 2021.



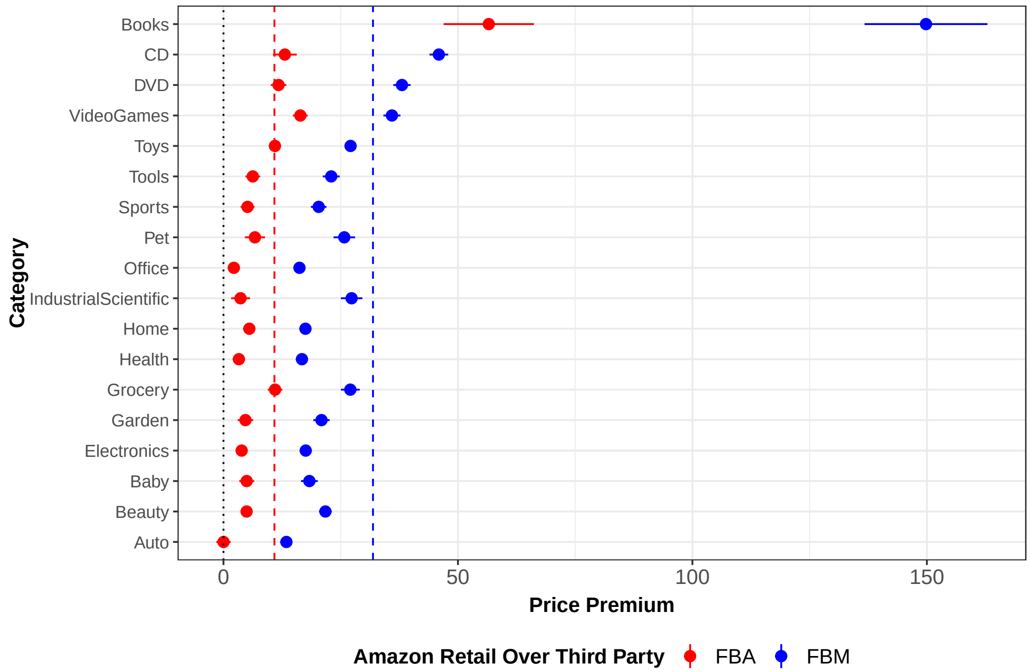
Note: All estimates based on the primary sample of products in the US, UK, Germany, and France, and use sample weights. Categories are ordered based on the median number of offers in the primary sample.

Figure A.2 Share of Products Where Buy Box Winner Amazon or Amazon + FBA

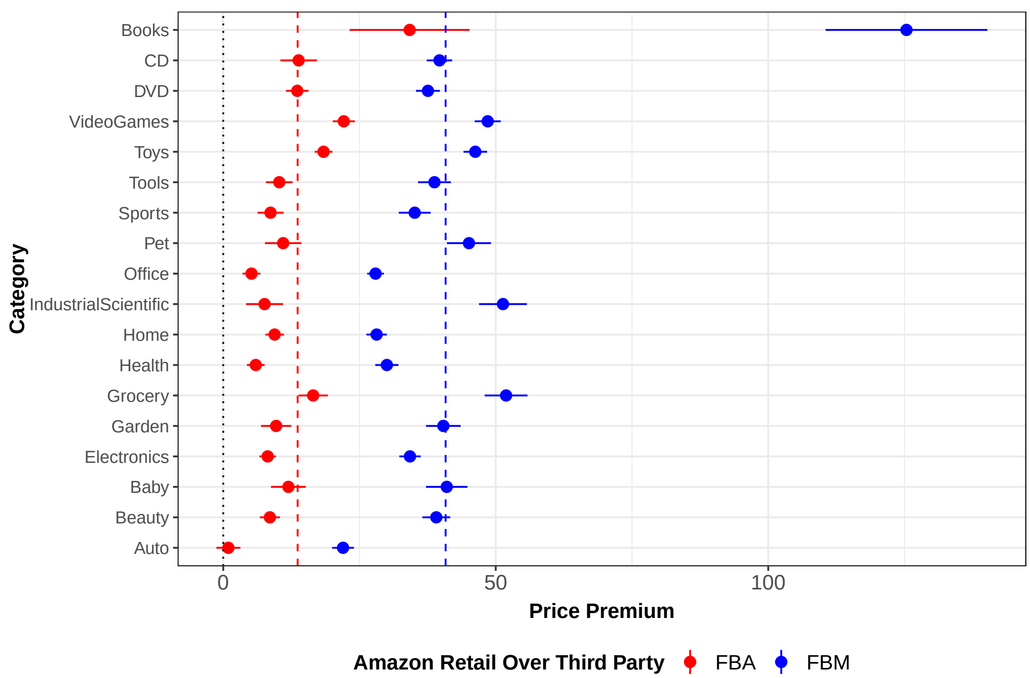
Table A.1 Prediction Accuracy of Empirical Model

		Predicted Winner			
Winner	Share	Amazon Retail	FBA	FBM	No Winner
Share Predicted		32.2%	38.5%	26.8%	2.4%
Amazon Retail	29.7%	**99.1%**	0.5%	0.3%	0.1%
FBA	37.4%	1.9%	**97.4%**	0.4%	0.2%
FBM	29.1%	7.4%	4.6%	**85.0%**	3.0%
No Winner	3.9%	0.2%	15.1%	48.6%	**36.1%**

Note: Predicted winners based on the offer with the maximum probability among offers for a product, using estimates of the empirical model at the category level. I examine four offer types – Amazon Retail, FBA, FBM, and no Buy Box winner. The first row is the share predicted for each offer type, while the first column is the actual share for each offer type. The next four rows and columns provide the share of the predicted offer type of the Buy Box winner for each actual Buy Box winner's offer type. For example, Amazon Retail is the predicted Buy Box winner 99.1% of the time when Amazon Retail wins the Buy Box, and FBA is the predicted Buy Box winner 0.5% of the time.



(a) Nested Logit



(b) Only Winning Offers

Figure A.3 Additional Specifications

Note: The figures report estimates of the "Is FBA" and "Is FBM" coefficients in (1) divided by the price coefficients. Each row represents a product category and depicts the point estimate and 95% Confidence Interval. The red dashed vertical line depicts the estimate for Amazon Retail over FBA, and the blue dashed vertical line depicts the estimate for Amazon Retail over FBM, for the baseline specification (i.e. the first column in Table I). The top figure examines the primary sample using a nested logit model where the outside option of no Buy Box winner is its own nest. The bottom figure examines a multinomial logit model excluding offers that were never recorded as winning the Buy Box. All estimates are based upon the primary sample.

Next, I examine how often the empirical model predicts the correct offer as the Buy Box winner across product categories. Overall, the model correctly predicts the Buy Box offer 88% of the time across all categories, and 80% of the time for just products with multiple offers. Figure A.4 depicts these estimates by product category for all products as well as just products with multiple offers. The model best predicts Books, with the Buy Box winner predicted correctly 95% of the time for both all products and products with multiple offers. The model performs the worst for Video Games, predicting 75% of Buy Box winners correctly for all products and 65% for products with multiple offers. For the median category, the model predicts 90% of all products correctly and 80% of products with multiple offers correctly.[1]

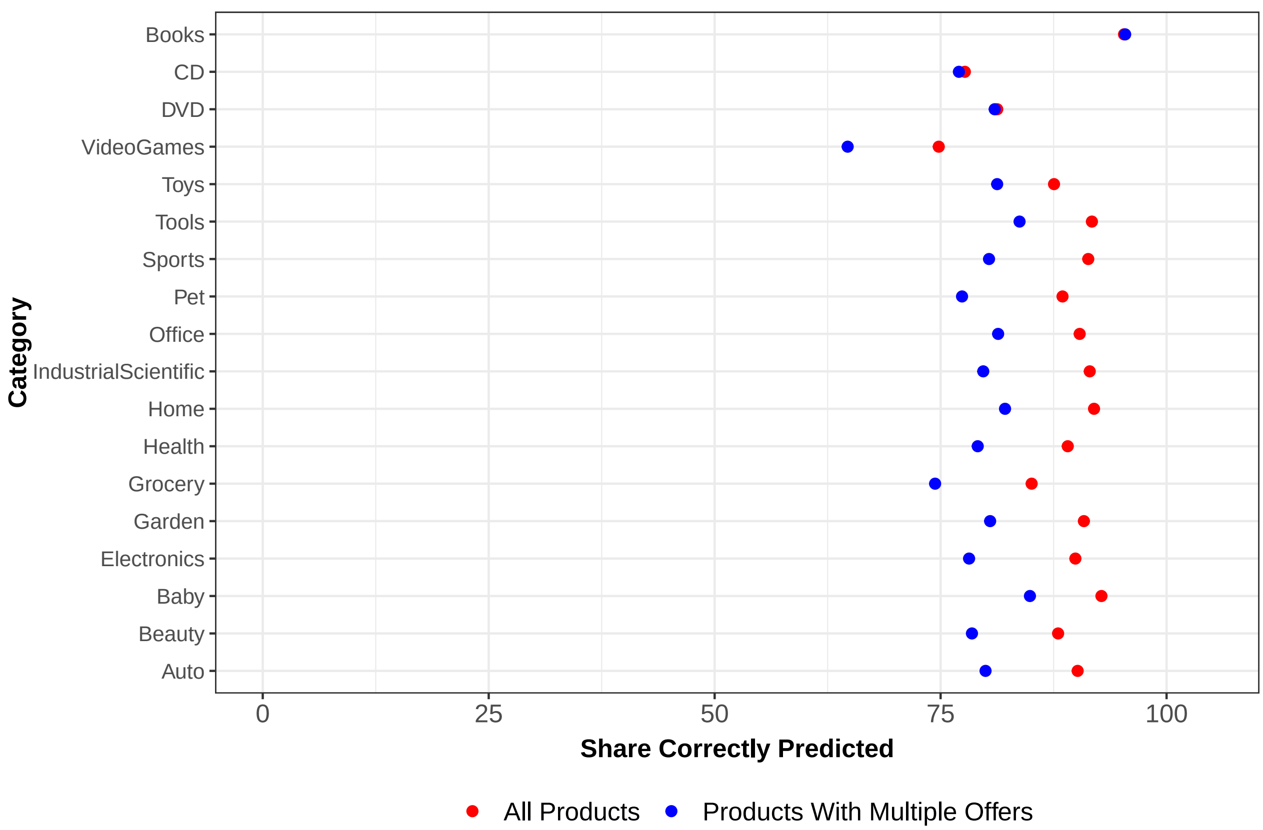


Figure A.4 Percent Correctly Predicted by Product Category

Note: The figure depicts estimates of the share correctly predicted by category. Predicted winners based on the offer with the maximum probability among offers for a product, using estimates of the empirical model at the category level.

[1] These estimates are quite high compared to empirical demand estimation. For example, Raval et al. (2021) document that demand models predict 40% to 44% of choices correctly for a set of hospital markets.

Table A.2 Samples by Category and Country Set

Category	US, UK, DE, FR	JP, CA, IT, ES, MX
Automotive (Auto)	1	0
Baby Products (Baby)	1	0
Beauty & Personal Care (Beauty)	1	0
Books	1	0
CDs & Vinyl (CD)	1	0
Movies & TV (DVD)	1	1
Electronics	2	1
Patio, Lawn, & Garden (Garden)	1	0
Grocery & Gourmet Food (Grocery)	1	0
Health & Household (Health)	1	0
Home & Kitchen (Home)	2 (1 for US)	1
Industrial & Scientific (IndustrialScientific)	1	0
Office Products (Office)	2	1
Pet Supplies (Pet)	1	0
Sports & Outdoors (Sports)	1	0
Tools & Home Improvement (Tools)	1	0
Toys & Games (Toys)	2	1
Video Games	2	1

A.3 Samples and Categories

Table A.3 and Table A.4 provide the category names for each category by country.

References

Raval, Devesh, Ted Rosenbaum, and Nathan Wilson, "How Do Machine Learning Algorithms Perform in Predicting Hospital Choices? Evidence From Changing Esnvironments," Technical Report 2021.

Table A.3 Category Names by Country for Primary Dataset

Category	US	UK	DE	FR
Auto	Automotive	Automotive	Auto & Motorrad	Auto et Moto
Baby	Baby Products	Baby Products	Baby	Bébé et Puériculture
Beauty	Beauty & Personal Care	Beauty	Beauty	Beauté et Parfum
Books	Books	Books	Bücher	Livres
CD	CDs & Vinyl	CDs & Vinyl	Musik-CDs & Vinyl	CD et Vinyles
DVD	Movies & TV	DVD & Blu-ray	DVD & Blu-ray	DVD et Blu-ray
Electronics	Electronics	Electronics & Photo	Elektronik & Foto	High-Tech
Garden	Patio, Lawn & Garden	Garden & Outdoors	Garten	Jardin
Grocery	Grocery & Gourmet Food	Grocery	Lebensmittel & Getränke	Epicerie
Health	Health & Household	Health & Personal Care	Drogerie & Körperpflege	Hygiène et Santé
Home	Home & Kitchen	Home & Kitchen	Küche, Haushalt & Wohnen	Cuisine et Maison
IndustrialScientific	Industrial & Scientific	Business, Industry & Science	Gewerbe, Industrie & Wissenschaft	Commerce, Industrie et Science
Office	Office Products	Stationery & Office Supplies	Bürobedarf & Schreibwaren	Fournitures de bureau
Pet	Pet Supplies	Pet Supplies	Haustier	Animalerie
Sports	Sports & Outdoors	Sports & Outdoors	Sport & Freizeit	Sports et Loisirs
Tools	Tools & Home Improvement	DIY & Tools	Baumarkt	Bricolage
Toys	Toys & Games	Toys & Games	Spielzeug	Jeux et Jouets
VideoGames	Video Games	PC & Video Games	Games	Jeux vidéo

Table A.4 Category Names by Country for Additional Countries

Category	JP	CA	IT	ES	MX
DVD	DVD	Movies & TV	Film e TV	Películas y TV	Películas y Series de TV
Electronics	家電＆カメラ	Electronics	Elettronica	Electrónica	Electrónicos
Home	ホーム＆キッチン	Home & Kitchen	Casa e cucina	Hogar y cocina	Hogar y Cocina
Office	文房具　オフィス用品	Office Products	Cancelleria e prodotti per ufficio	Oficina y papelería	Oficina y Papelería
Toys	おもちゃ	Toys & Games	Giochi e giocattoli	Juguetes y juegos	Juguetes y Juegos
VideoGames	ゲーム	Video Games	Videogiochi	Videojuegos	Videojuegos

Note: For CA Video Games and MX Office and Video Games, there are less than 25,000 products. I thus only collect a sample of 7,500 products for these samples, excluding the "tail" sample of 2,500 products with a sales rank greater than 25,000.