



The LendingTree Mortgage Rate Competition Index

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In economic theory, “the law of one price” posits that in a competitive market for a homogeneous product, prices should converge to the extent that a single market price exists with which all participants transact. It is seldom observed, however, as real-world frictions interfere with price discovery and some market participants may value factors other than price, such as brand.

In the mortgage market, for example, studies have found that search costs are a barrier to the concept of one price, with the Consumer Financial Protection Bureau finding that borrowers pay billions of dollars in interest above the best price available in the market¹.

On the other hand, lenders often face challenges crafting the optimal pricing strategy that fits with their business strategy and cost structure while meeting competitive challenges.

For these reasons, increasing price transparency in the mortgage market would be beneficial to market price discovery.

One way to accomplish this is to craft measures of price competition as a reference to market participants.

This is the method we’ll lay out in this paper.

To our knowledge, the approach we present here is not available in the marketplace.

Measuring price competition

LendingTree’s function as a leading loan marketplace creates a unique opportunity to evaluate how the market operates in regard to product pricing. Although loan design is often standardized — thus a homogenous base product — pricing considerations incorporate many unique borrower and property parameters. Thus, the final product is bespoke.

Our survey of research into price competition in the mortgage market found a few approaches to measure price or rate dispersion.

One way is to rely on rate sheets to observe the breadth of market prices on offer. Alexandrov and Koulayev, researchers at the CFPB, studied price dispersion using this method and found that rates varied as much as 50 basis points.

¹ Alexandrov, Alexei and Koulayev, Sergei, “No Shopping in the U.S. Mortgage Market: Direct and Strategic Effects of Providing Information” (March 14, 2017). Consumer Financial Protection Bureau Office of Research Working Paper No. 2017-01. Available at SSRN: <https://ssrn.com/abstract=2948491> or <http://dx.doi.org/10.2139/ssrn.2948491>

The LendingTree Mortgage Rate Competition Index

Another approach is to analyze closed loans as Woodward and Hall² did in their 2012 study of consumers' mortgage shopping habits.

Many studies utilize funded loans, and compare average prices on a select subset of loans within limited loan characteristics to the best price available in the market at the time of origination. The studies thus have no choice but to evaluate the pricing environment long after participants are making decisions in the marketplace. The studies also cannot get to the true price variation in the market as no loan is ever associated with more than one price. Instead, they utilize statistical approaches to isolate loan characteristics and create comparable populations.

On the LendingTree marketplace, every qualifying borrower receives up to five offers from our network of over 500 lenders, one of the largest in the industry. What makes our data uniquely insightful is that this is one of the rare instances when multiple prices can be observed for the borrower for the same property at the same time using the same information.

We measure price differences applied to the same risk profile from the borrower side; therefore, any differences in price can be confidently assigned to lender characteristics, preferences and constraints. Even beyond the mortgage market, it is one of the closest representations of pure price competition in the economy, particularly for final goods to consumers.

The LendingTree Mortgage Rate Competition Index

The index uses our data to measure how competitive the market is by evaluating the competing offers of lenders. We considered a number of approaches to measure price dispersion, including:

- Standard deviation
- Coefficient of variation
- High – low APR spread
- Interquartile range of APR

In the end, we elected to use the simple **high – low APR spread**. It's a measure that we think is the most transparent as it is most easily interpreted by the widest range of market participants, particularly consumers.

² Woodward, Susan E., and Robert E. Hall. 2012. "Diagnosing Consumer Confusion and Sub-Optimal Shopping Effort: Theory and Mortgage-Market Evidence" *American Economic Review*, 102(7): 3249-76.

The LendingTree Mortgage Rate Competition Index

Other key features of the index are:

APR — We prefer to utilize the APR as lenders often make changes to points and other fees in response to changing interest rates. In our opinion, the APR is the most representative total price.

Product choice — Our headline index is for the 30-year conforming fixed-rate loan. This is the most popular benchmark product in the marketplace and we find it to be most representative.

Refinance and purchase — We separate the two markets as we anticipated that competition is driven by different dynamics in these marketplaces. Both borrower and lender incentives vary across the two. This was later validated by our analysis.

The richness of our data allows us to create indices for a large variation of loan characteristics, including product type, geography, property type, credit quality and lender type, among others.

Frequency: We construct the index on a weekly basis to enable analysis relative to other market measures.

How is the index formulated?

A mortgage shopper enters their information on the LendingTree website. They input loan variables including the proposed amount and down payment, property variables including property type and location, and personal information including income. LendingTree transmit this data, including a credit pull, to lenders who evaluate the borrower against their lending parameters in their pricing engines. Interested lenders return a rate and fee offer. For our index we combine the rate and fees into an APR and calculate the spread as follows:

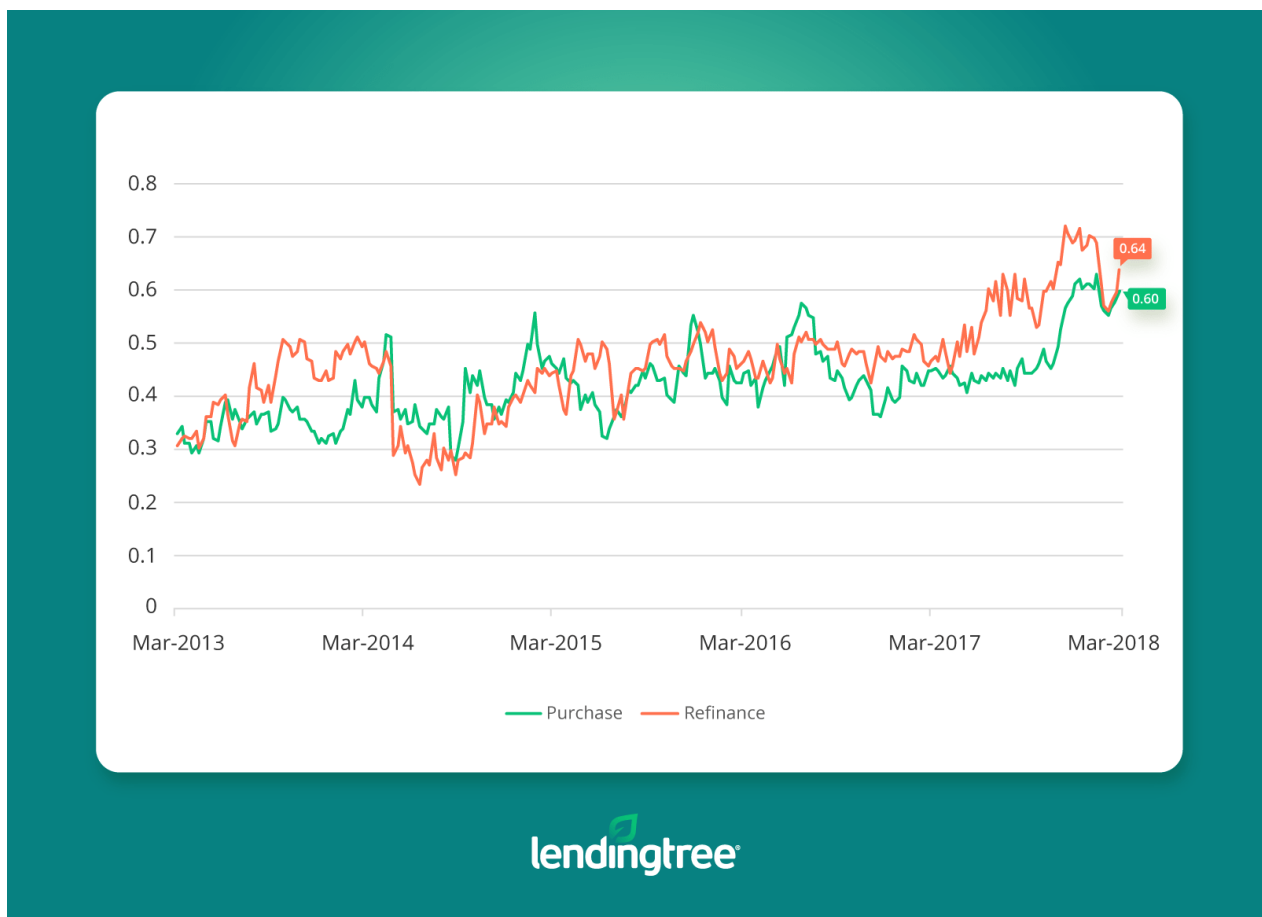
<u>Offers</u>	<u>APR</u>
Lender 1	4.21
Lender 2	4.33
Lender 3	4.40
Lender 4	4.55
Lender 5	4.62

The LendingTree Mortgage Rate Competition Index

The spread is the difference between the highest and lowest offers, in this example $4.62 - 4.21 = 0.41$. We repeat this calculation across 30-yr loans that week and then find the median of the individual spread which is our index value for that week. This is done separately for the population of purchase and refinance loan requests.

We present our headline indices below and some interesting research findings.

Fig. 1 Mortgage Price Competition Index — 2013-2018



The LendingTree Mortgage Rate Competition Index

General observations

Price dispersion always exists and is quite volatile. On aggregate, dispersion is a bit higher in the refinance market, averaging 45 basis points, compared with 41 in the purchase market, although not persistently. This is not surprising given that in refinance transactions the mortgage is the primary product, whereas in a home purchase, the mortgage is an auxiliary product to the home.

Refinance transactions are often explicitly interest rate-driven with borrowers more likely attentive to interest rates. Over our five-year sample, the spread ranged from 28 to 63 basis points in purchase and from 23 to 72 in the refinance market.

We also found that the correlation between purchase and refinance price competition can vary considerably. We believe this is function of the market structure in which there are at

times two distinct markets. Lenders often emphasize one market or the other depending upon their tactical and strategic business goals.

The LendingTree Mortgage Rate Competition Index

Fig. 2 Purchase and Refinance Price Competition Rolling 52 Week Correlation



We evaluated the correlation of the price competition indices against the following market measures that we believed would be relevant:

- 30-year mortgage interest rate (Freddie Mac)
- 10-year treasury (Treasury)
- 10-year treasury volatility (CBOE)
- Mortgage-Treasury Spread (30-year mortgage less 10-year treasury)
- Purchase Applications Index (MBA)
- Refinance Applications Index (MBA)

The LendingTree Mortgage Rate Competition Index

Fig. 3 Purchase Index Correlations With Market Indicators

Purchase					
	6 Month	1 Year	2 Year	3 Year	5 Year
30-yr Mortgage Rate	0.57	0.42	0.07	0.03	-0.18
10-yr Treasury Rate	0.62	0.64	0.14	0.09	-0.15
10-yr Treasury Volatility	-0.11	-0.33	-0.34	-0.46	-0.21
Mortgage-Treasury Spread	-0.44	-0.68	-0.28	-0.20	0.03
Purchase Applications (Seasonally Adjusted)	0.59	0.24	0.25	0.38	0.47
Purchase Applications (Not Seasonally Adjusted)	-0.38	-0.69	-0.14	-0.10	0.10
Refinance Applications	-0.66	-0.57	-0.03	0.01	0.16



As with the correlations between the purchase and refinance competition indices, we found variation over time. In different market environments, such as whether one is in a refinance market or not, the relationships vary as lender strategies adjust to the market. Our table shows correlations for our entire 5-year data set. Our discussion focuses on the shorter term measures (6 months and 1 year) as these are most relevant to the current market environment.


For purchases, the most correlated factors were the refinance and purchase applications index, the level of rates (represented by either treasury or mortgage rates) and the interaction between the rates, or the spread. Notably, lower application volume is associated with wider APR spread in purchase and vice versa. A possible cause could be some lenders becoming more aggressive in low volume environments to fill capacity or meet production targets. In particular, as the volatile refi volume falls, originators can find themselves with many idle hands and thus pursue more purchase volume. When volume is heavy, lenders compete on price to a lesser extent.

The LendingTree Mortgage Rate Competition Index

Refinance market competition also shows a strong relationship with the application volume indices. However, the relationship to rates is weak, with price competition showing a stronger negative correlation to interest rate volatility.

Fig. 4 Refinance Index Correlations With Market Indicators

Refinance					
	6 Month	1 Year	2 Year	3 Year	5 Year
30-yr Mortgage Rate	0.02	-0.10	0.30	0.25	-0.08
10-yr Treasury Rate	0.07	0.21	0.46	0.39	-0.03
10-yr Treasury Volatility	-0.58	-0.70	-0.74	-0.72	-0.35
Mortgage-Treasury Spread	-0.25	-0.74	-0.72	-0.58	-0.11
Purchase Applications (Seasonally Adjusted)	0.54	0.08	0.36	0.50	0.70
Purchase Applications (Not Seasonally Adjusted)	-0.60	-0.78	-0.32	-0.16	0.22
Refinance Applications	-0.39	-0.27	-0.45	-0.38	-0.09



Our statistical analysis of the mortgage rate competition index is not exhaustive. Further examination of rolling correlations (not shown here) revealed that the relationships between the index and other market variables vary. This is consistent with many other financial series whose relationships can change with the market environment. Our analysis does satisfy our initial goal of unearthing meaningful relationships between the competition index and relevant mortgage market measures.

The LendingTree Mortgage Rate Competition Index

Conclusion

We believe the LendingTree Mortgage Rate Competition Index is an important addition to the data available on the housing and mortgage markets with many potential utilities of which we give some examples below:

For lenders

Price elasticity and optimization: The index provides insights that could enhance lender pricing strategies by enabling real-time price competitiveness by product type, geography, property type and credit quality.

For consumers

Dollar value of consumer savings: Our accompanying Consumer Mortgage Savings Tracker increases transparency for borrowers who pay billions of dollars in additional interest by not being aware of the benefits of shopping around for mortgages.

For policymakers

Identifying market inefficiencies: Policymakers may be able to identify areas of higher or lower price competition, which could reflect underserved populations. Policymakers may also use the index for borrower education.

For economists and other researchers

Mortgage industry research: Our analysis of the relationships between the index and other variables just scratches the surface. The index could be a useful data point for understanding other mortgage market dynamics. A potential research topic may look like the question below.

The LendingTree Mortgage Rate Competition Index

What does it mean for a mortgage market to be competitive?

Is a market where lenders are clustered together more or less competitive than one where they are more dispersed? The question is more complicated than it may appear at first glance. Consider a market with low volume where lenders reduce margins to gain share

and are thus clustered together with a tight dispersion of offered rates. If a few lenders lower rates, the spread increases, but the market becomes more competitive. If, on the other hand, some lenders compete on other factors or find the margin compression unbearable, and raise rates, the spread increases but the rates market arguably becomes less competitive. In both instances, we have increases in spread reflecting different changes in rate competition. Further research could uncover deeper dynamics on how lenders price in different environments.

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^[1] Alexandrov, Alexei and Koulayev, Sergei, "No Shopping in the U.S. Mortgage Market: Direct and Strategic Effects of Providing Information" (March 14, 2017). Consumer Financial Protection Bureau Office of Research Working Paper No. 2017-01. Available at SSRN: <https://ssrn.com/abstract=2948491> or <http://dx.doi.org/10.2139/ssrn.2948491>

^[2] Woodward, Susan E., and Robert E. Hall. 2012. "Diagnosing Consumer Confusion and Sub-Optimal Shopping Effort: Theory and Mortgage-Market Evidence" *American Economic Review*, 102(7): 3249-76.