CSE 6242 Fall 2019 Team 65 Project

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How To (Really) Become A Millionaire Through Real Estate

Introduction & Motivation

Who?: We are four Austin residents and one data analyst in Freddie Mac with a shared interest in buying a personal residence or rental property in the future.

Why?: To help us, and anyone else with similar interests, to make informed, cost-effective decisions about potential real estate investments in Austin, Texas.

How?: Generate long term estimates of future home values and provide interactive visualizations focused on comparing relative future growth between zip codes.

Why Investors Are Looking To Austin For Compounding Real Estate Returns In 2019

Ari Rastegar Forbes Councils Member
Forbes Real Estate Council COUNCIL POST | Paid Program
Real Estate

ROUND ROCK AUSTIN NEWS

Austin is the country's fastest-growing major metro

And the boom goes on, according to U.S. Census numbers

By Cindy Widner | @CurbedAustin | Apr 23, 2019, 1:07pm CDT

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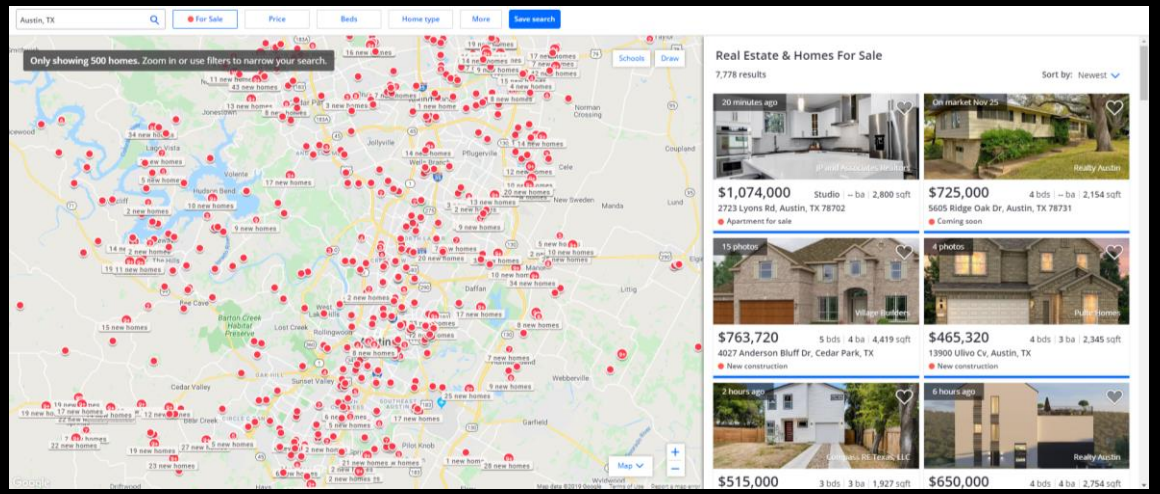


Innovation

While most existing methods focus on individual listings, our method aggregates real estate features to the zip code level.

We focus on a specific city (Austin, Texas), making our solution more robust than the state of the art.

Visualization

(1) Choose Zillow Home Value Index **(ZHVI) Series**

1 bedroom	
2 bedrooms	Condominium
3 bedrooms	Single Family
4 bedrooms	All
5+ bedrooms	

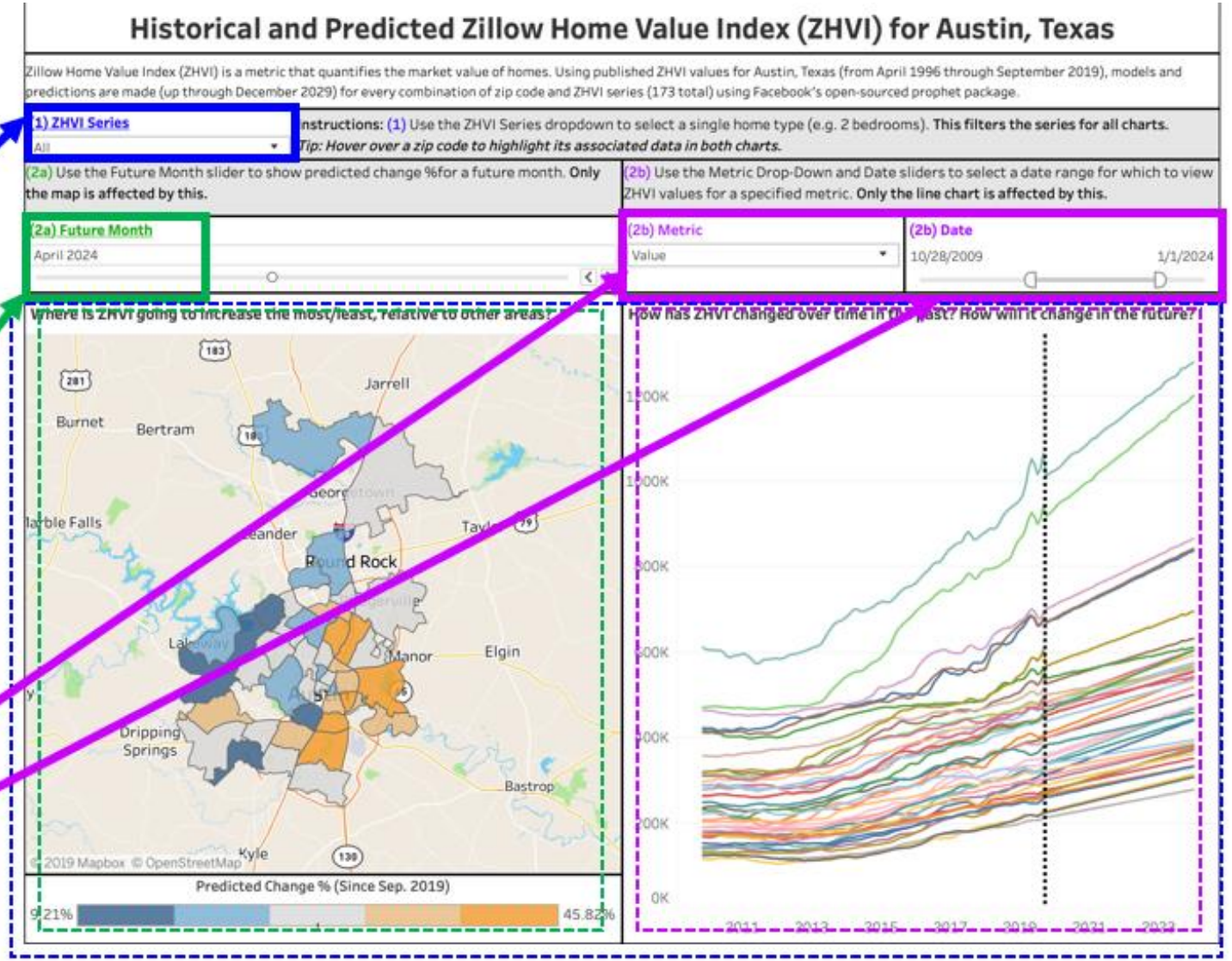
(2a) Choose **Future Month**.

Any month between October 2019 and December 2029

(2b) Choose **Metric** and **Date**

Value
Predicted Change % (Since Sep. 2019)
Rank of Predicted Change % (Since Sep. 2019)

April 1996 – December 2029



Data

Raw Data: Scraped eight Zillow Home Value Index (ZHVI)* time series (for different housing types), recorded monthly from April 1996 to Sep. 2019. In all, raw data is ~516k records (~140 MB).

*Estimate of median home value

Data Processing: Pivoted raw data from "wide" to "long" format and filtered it down to 42 Austin zip codes (~49k records).

Modeling: Built 173 prophet models, with predictions ranging from Oct. 2019 to Dec. 2029.

Experiments and Evaluation

Method: Used prophet package's `cross_validation()` and `performance_metrics()` functions (designed specifically for prophet models)

Insight: Evaluation plots and tables illustrate the results of mean absolute percentage error (MAPE) of cross validation (CV) results.

Figure 1: CV MAPE for One Zip Code and One ZHVI Series

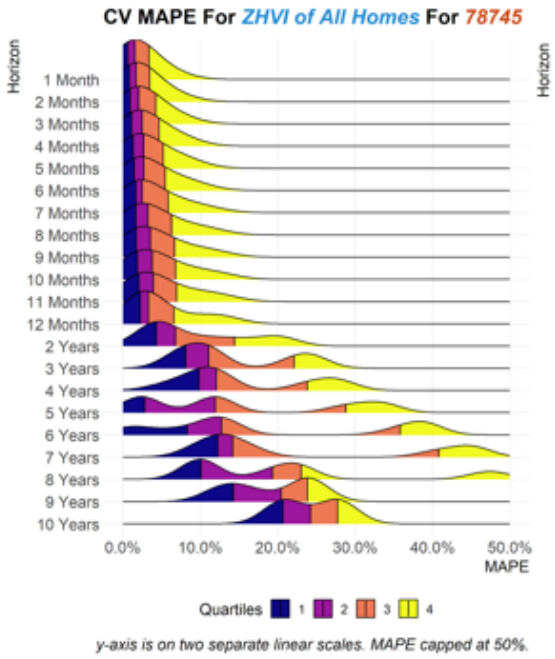


Figure 2: CV MAPE for All Zip Codes and All ZHVI Series

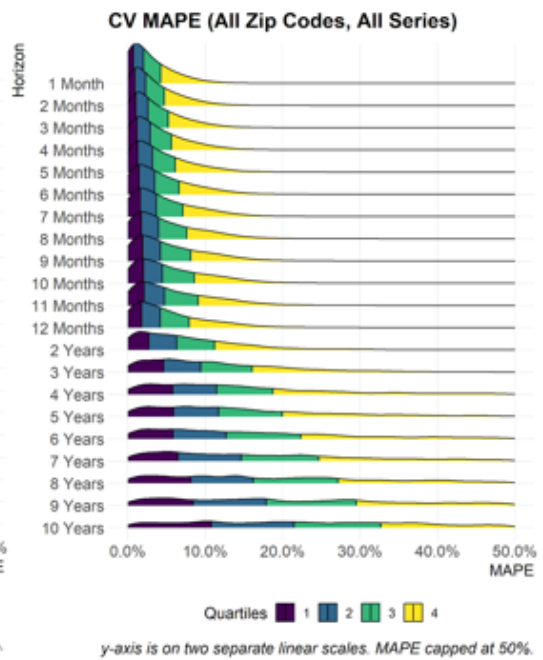


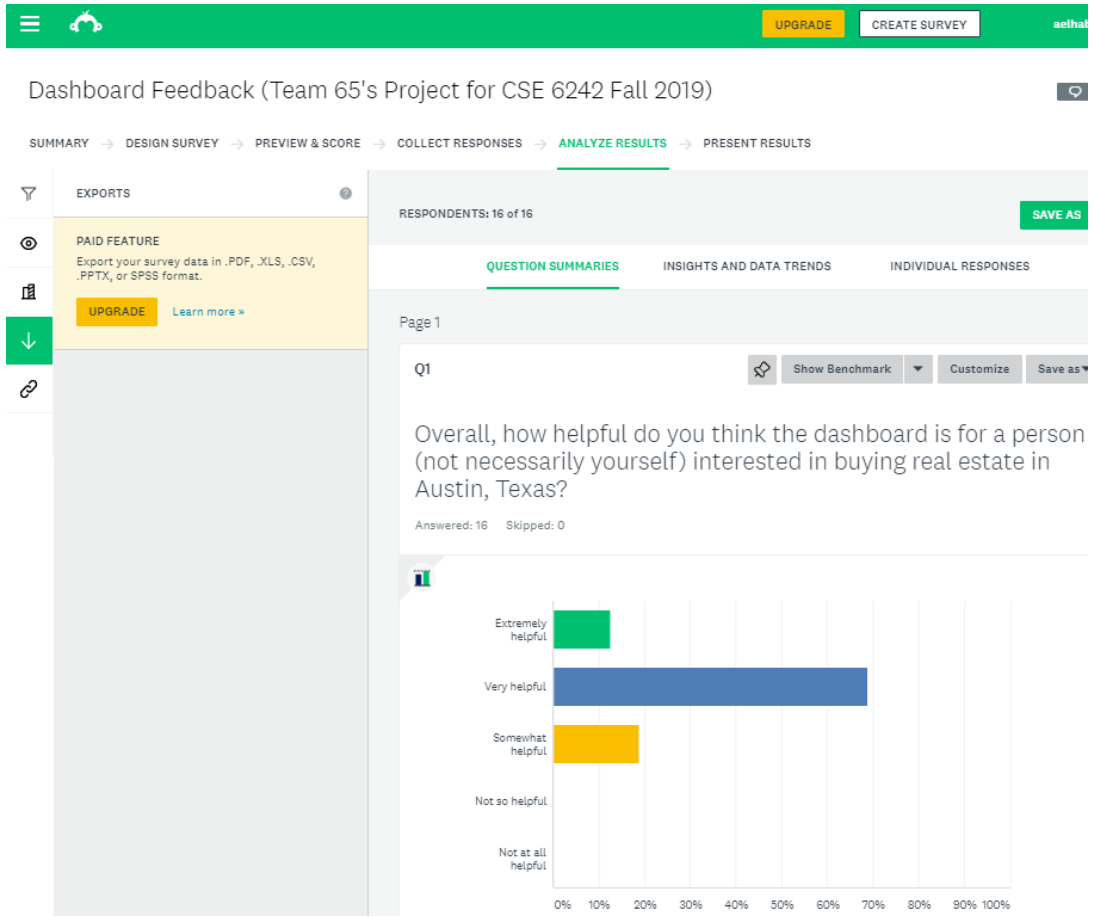
Table 1: Summary of CV MAPE By ZHVI Series

Series	Count	Min	Max	Mean
1 Bedroom	485	3.10%	47%	18.99%
2 Bedroom	3,565	1.85%	58%	14.95%
3 Bedroom	10,740	1.20%	52%	13.24%
4 Bedroom	9,420	1.73%	317%	17.90%
5 Bedroom Or More	2,816	1.48%	84%	16.03%
All Homes	18,480	0.82%	67%	14.63%
Condominium	9,680	2.12%	50%	14.12%
Single Family Residence	18,480	1.15%	64%	14.18%

Table 2: Summary of CV MAPE By Zip Code (Top and Bottom Five Zip Codes According to Mean)

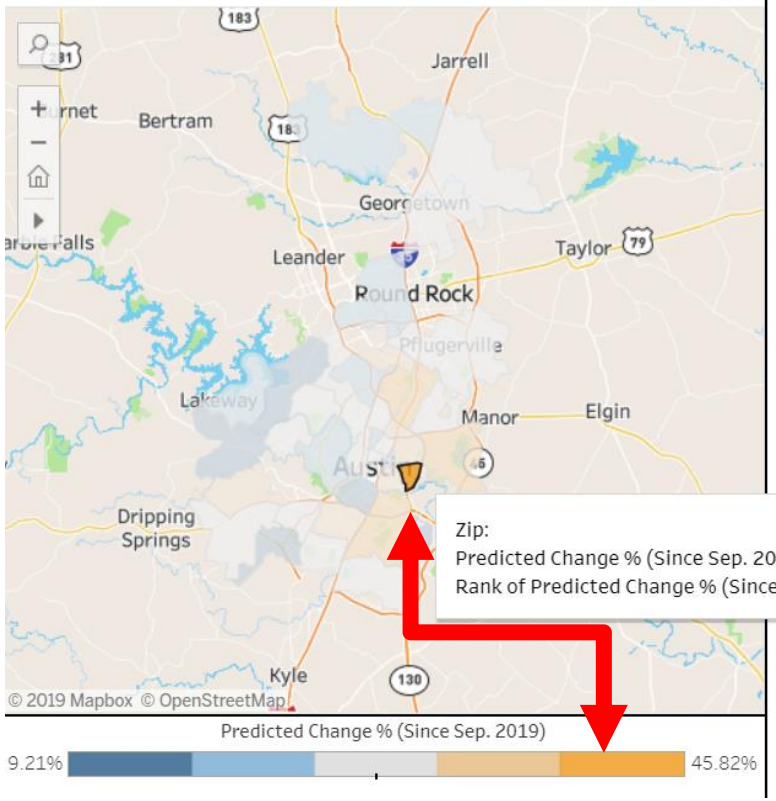
Zip	Count	Min	Max	Mean
78660	2,200	1.72%	36%	8.90%
78754	1,760	2.59%	23%	9.30%
78753	1,760	1.67%	28%	9.50%
78736	880	2.01%	22%	9.50%
78758	2,200	1.15%	31%	9.50%
78747	1,365	1.20%	38%	9.70%
78751	2,200	2.20%	64%	18.90%
78633	880	3.00%	44%	19.30%
78717	1,320	2.34%	49%	19.30%
78739	1,236	1.48%	91%	19.90%
78722	880	2.91%	55%	22.50%

Experiments and Evaluation

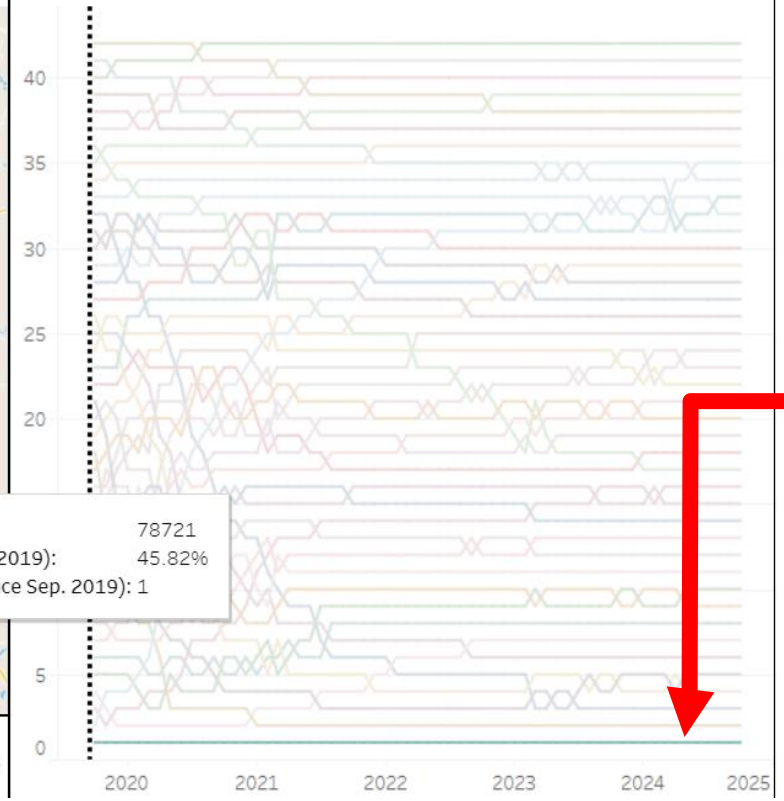


Conclusions

Where is ZHVI going to increase the most/least, relative to other areas?



How has ZHVI changed over time in the past? How will it change in the future?



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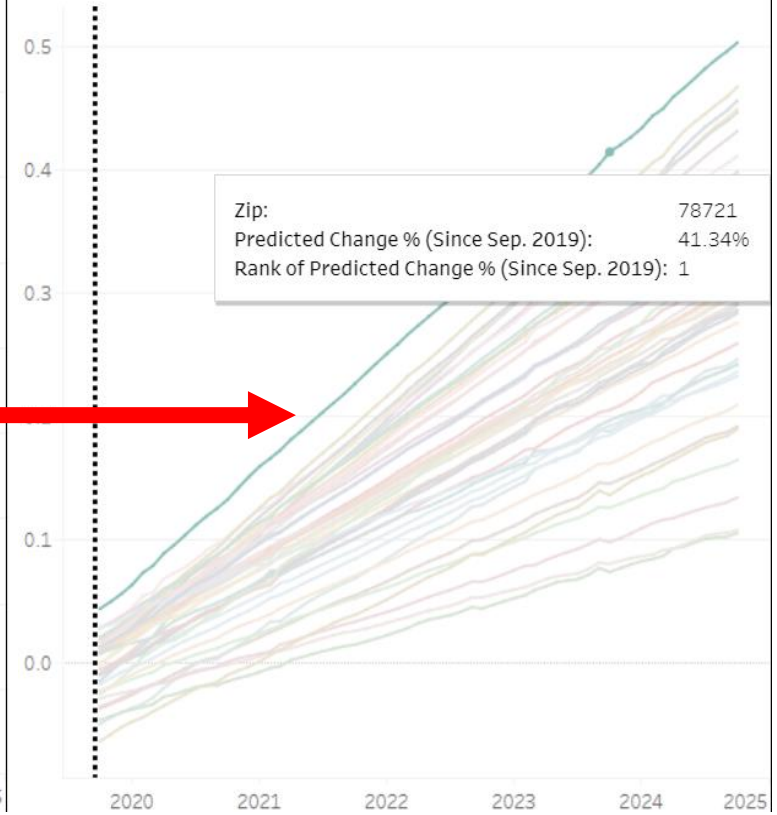

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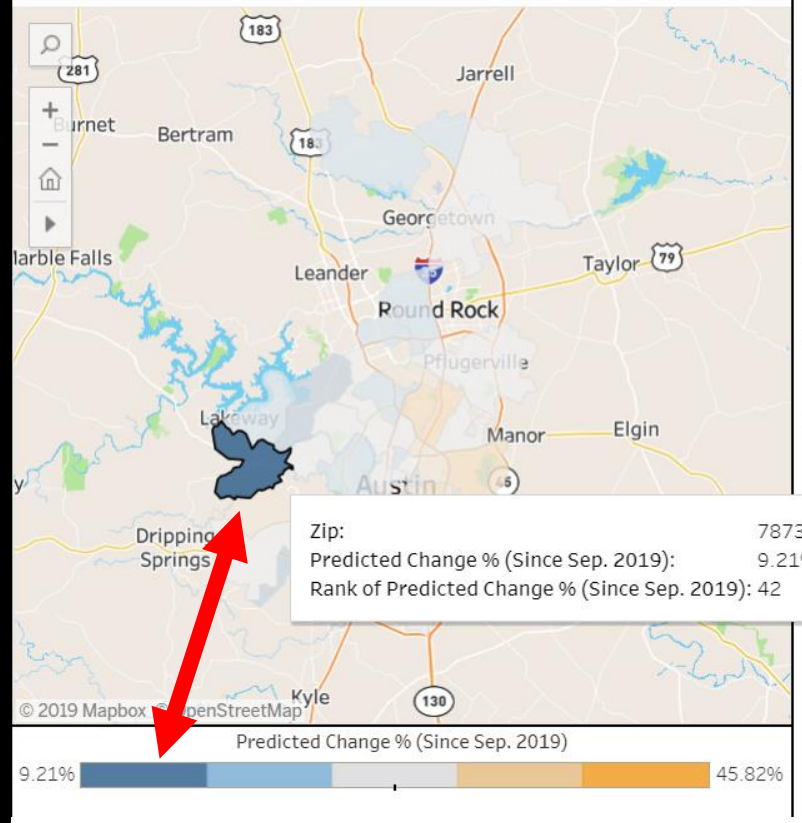

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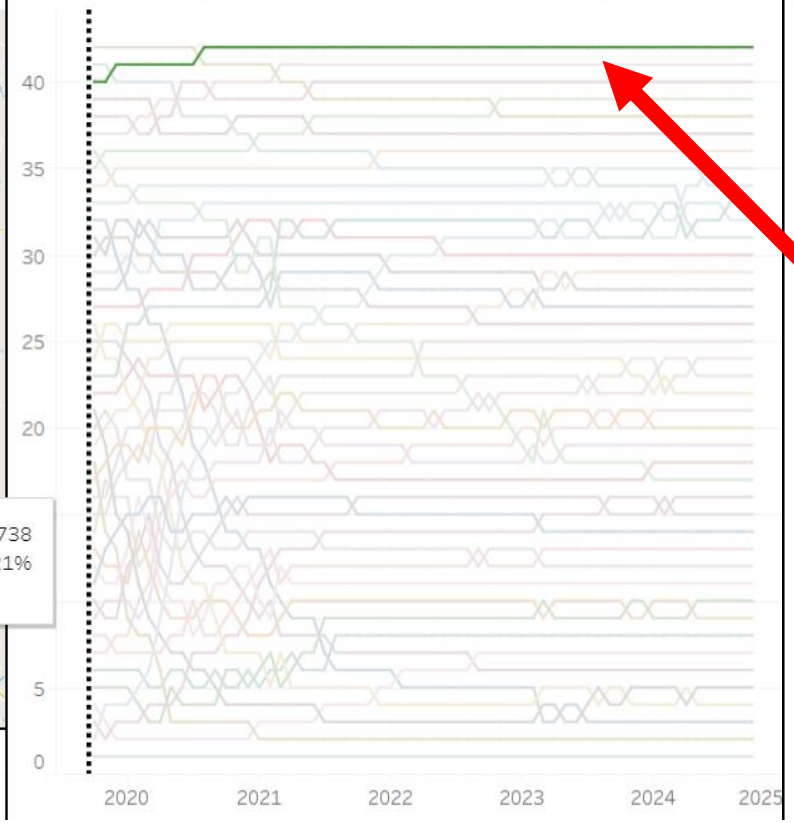

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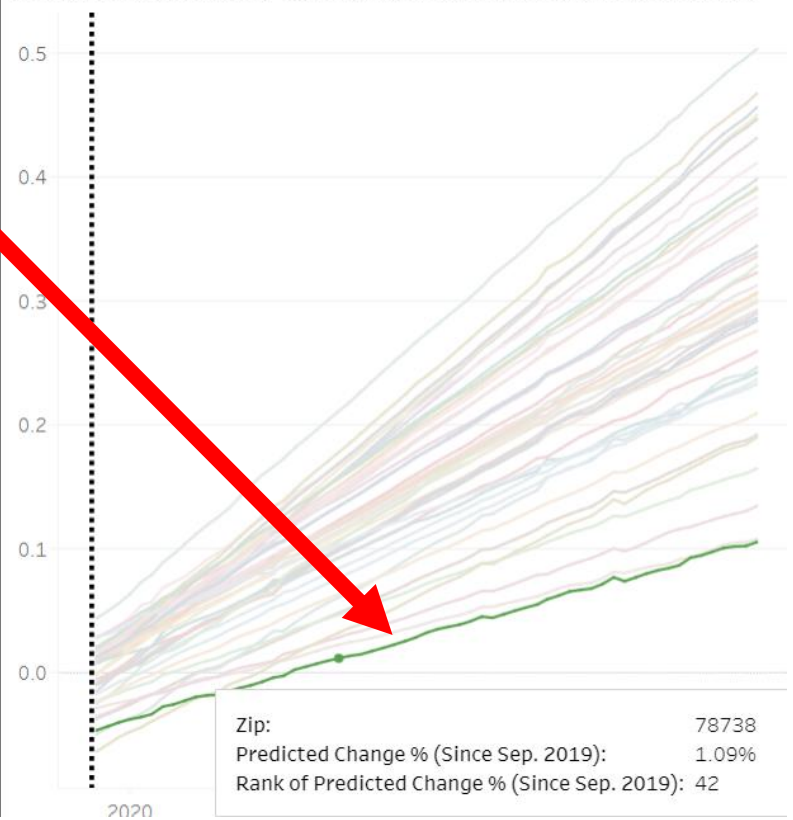

Demo