

# PREDICTING RESIDENTIAL PROPERTY PRICES IN ISTANBUL, TURKEY

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Data Scientist

# WHY IS IT IMPORTANT TO PREDICT HOUSING PRICES SPECIFICALLY FOR TURKEY?

In the last two years...

Turkish Lira's value has depreciated by **67%** against USD,  
Inflation exceeded **200%**,  
Housing prices have **quadrupled**.

Turkish Lira - USD

**67%**

Inflation

**>200%**

Housing Prices

**4X**





## WHY ISTANBUL?

Istanbul is the most populous city in Turkey, known for its vibrant cultural scene, historical landmarks, and as the **country's economic and cultural hub**.



This project aims to leverage predictive analytics techniques on historical housing data to develop a robust model, enabling stakeholders to

- anticipate **future price trends**,
- navigate **market fluctuations**,
- make **informed decisions** in the evolving landscape of the Turkish housing market.

## THE VOLATILE NATURE OF THE TURKISH REAL ESTATE MARKET DEMANDS UNDERSTANDING THE MARKET DYNAMICS AND ACCURATE FORECASTING OF HOUSING PRICES

# UNDERSTANDING TURKISH REAL ESTATE MARKET

WHAT FACTORS CONTRIBUTE  
TO CHANGES IN  
HOUSING  
PRICES?

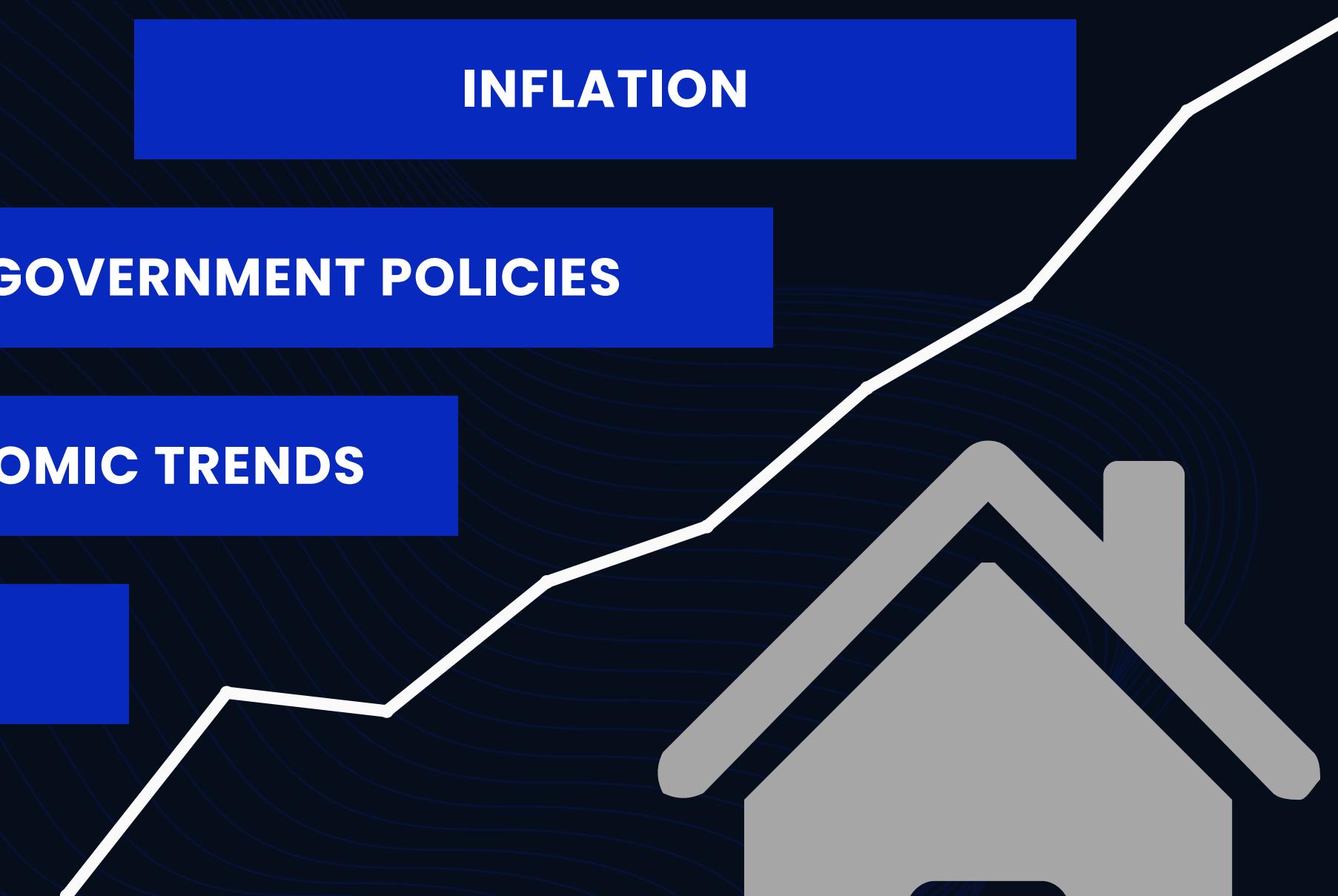
INFLATION

GOVERNMENT POLICIES

GLOBAL ECONOMIC TRENDS

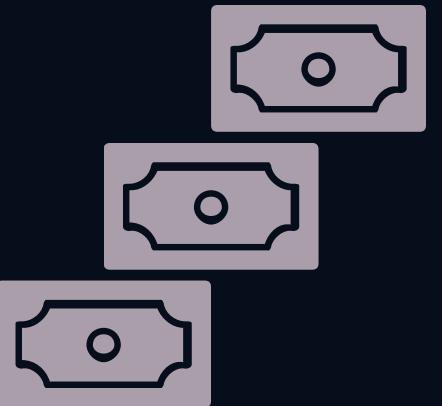
INTEREST RATES

SUPPLY AND DEMAND

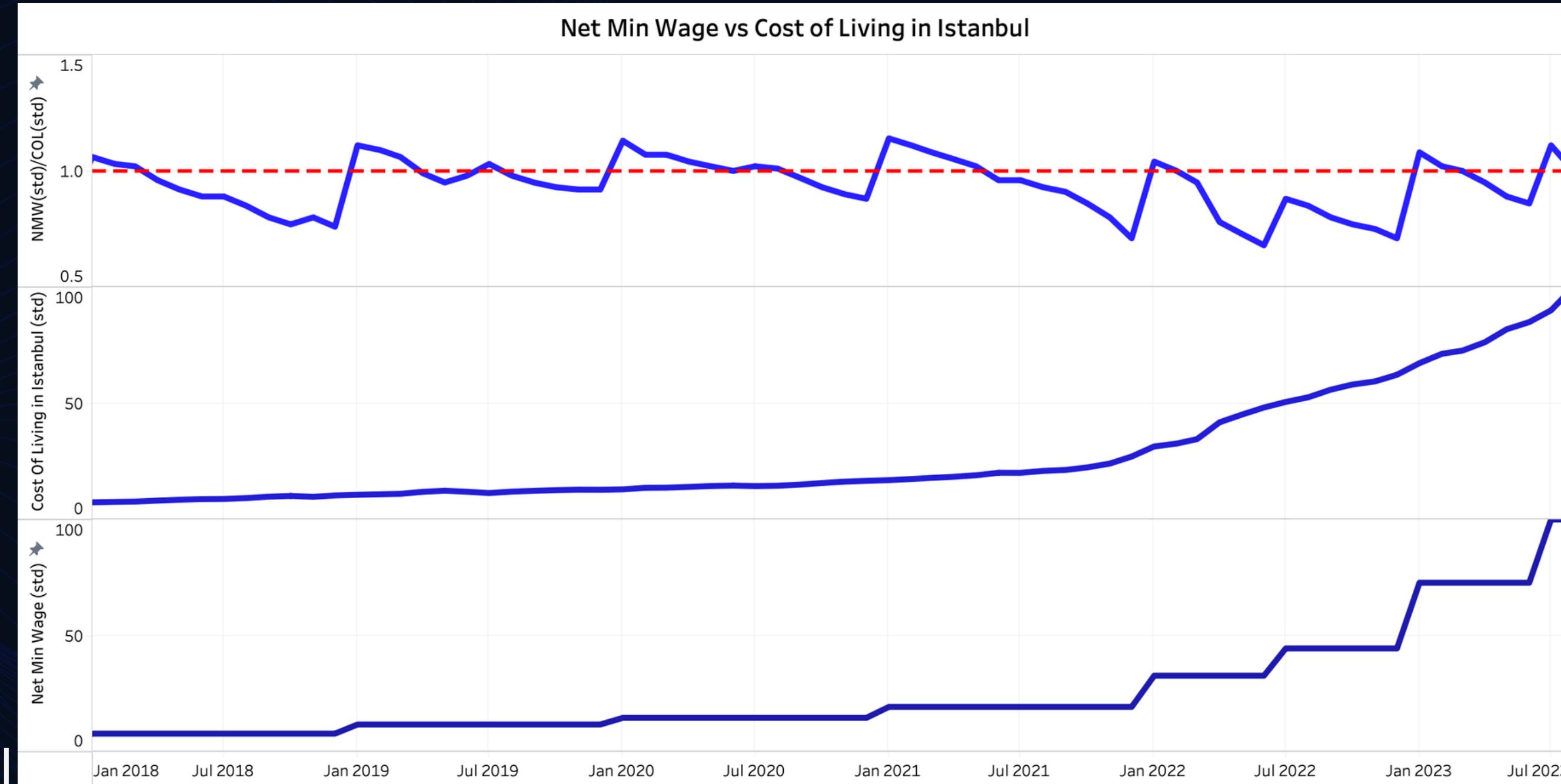


# THERE IS CLEARLY AN INCREASE IN DEMAND FOR RESIDENTIAL PROPERTIES IN TURKEY

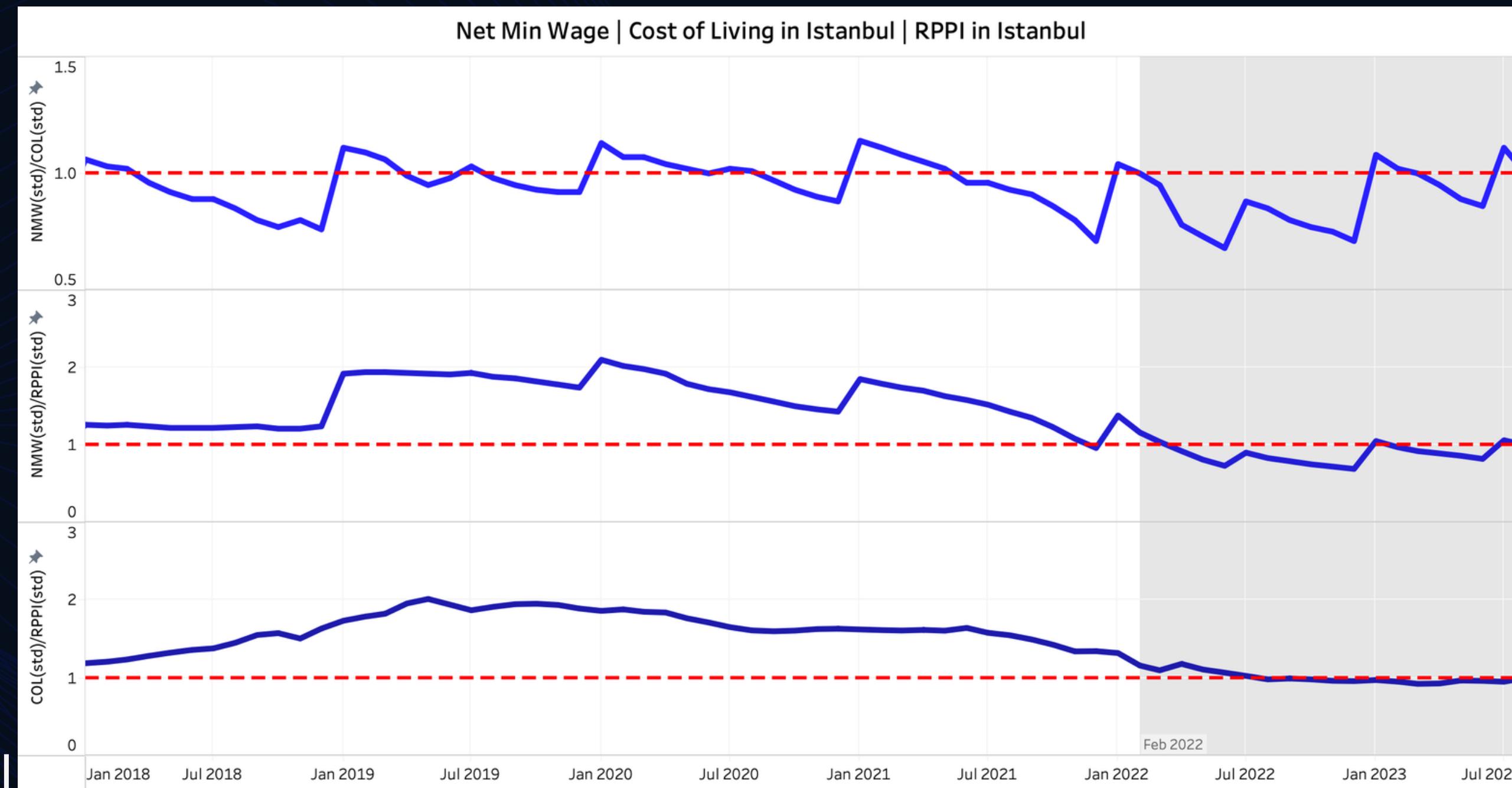
BUT, LET'S SEE HOW TURKISH PEOPLE ARE DOING FINANCIALLY



**TURKEY IS TRYING  
TO KEEP UP WITH  
THE INFLATION BY  
INCREASING  
MINIMUM WAGE  
DRASTICALLY  
EVERY YEAR**

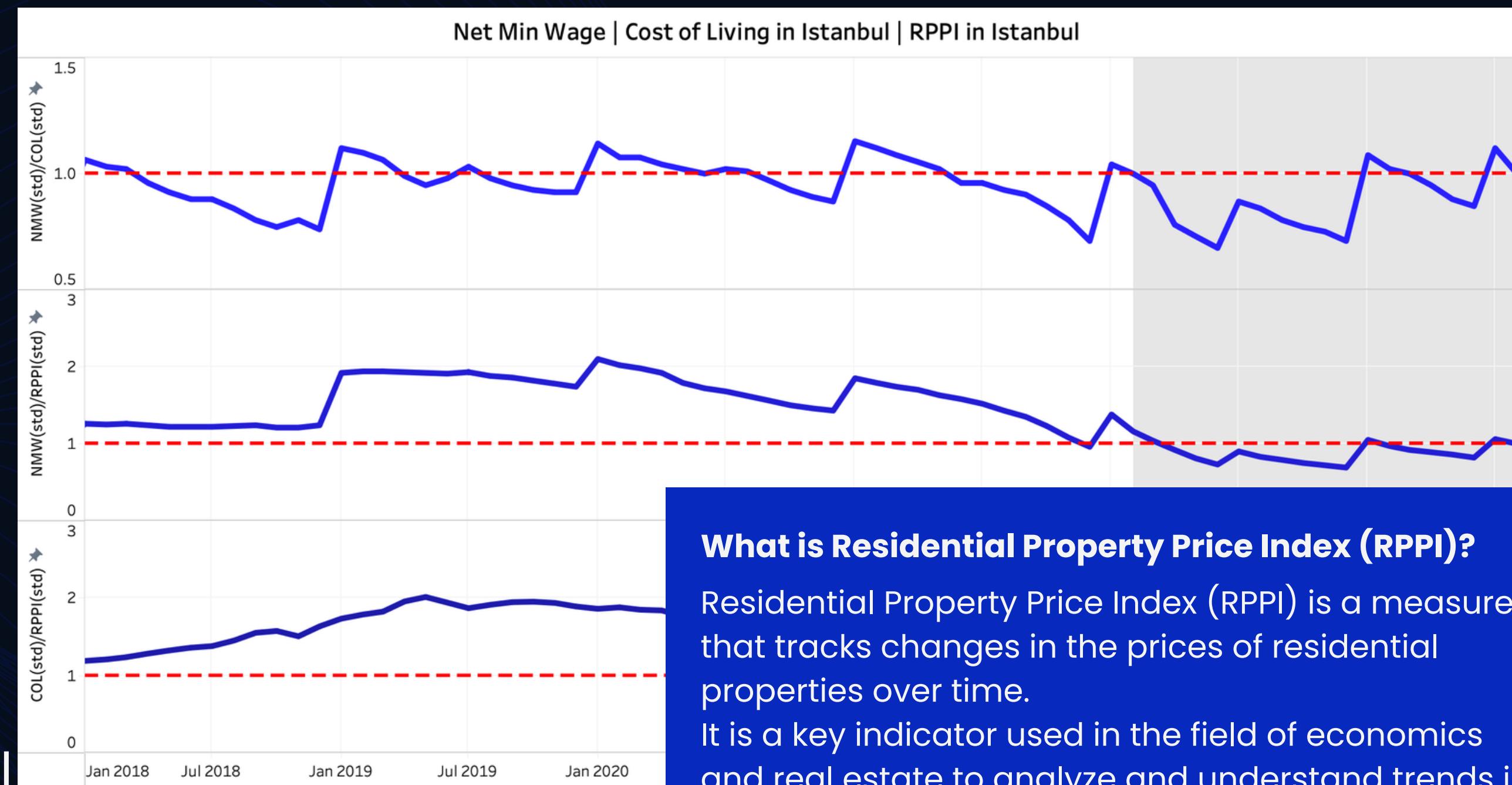


# THEY ARE TRYING TO KEEP UP WITH COST OF LIVING BUT HOW ABOUT HOUSING PRICES?



STARTING FROM  
2022, THE RATE OF  
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INDEX

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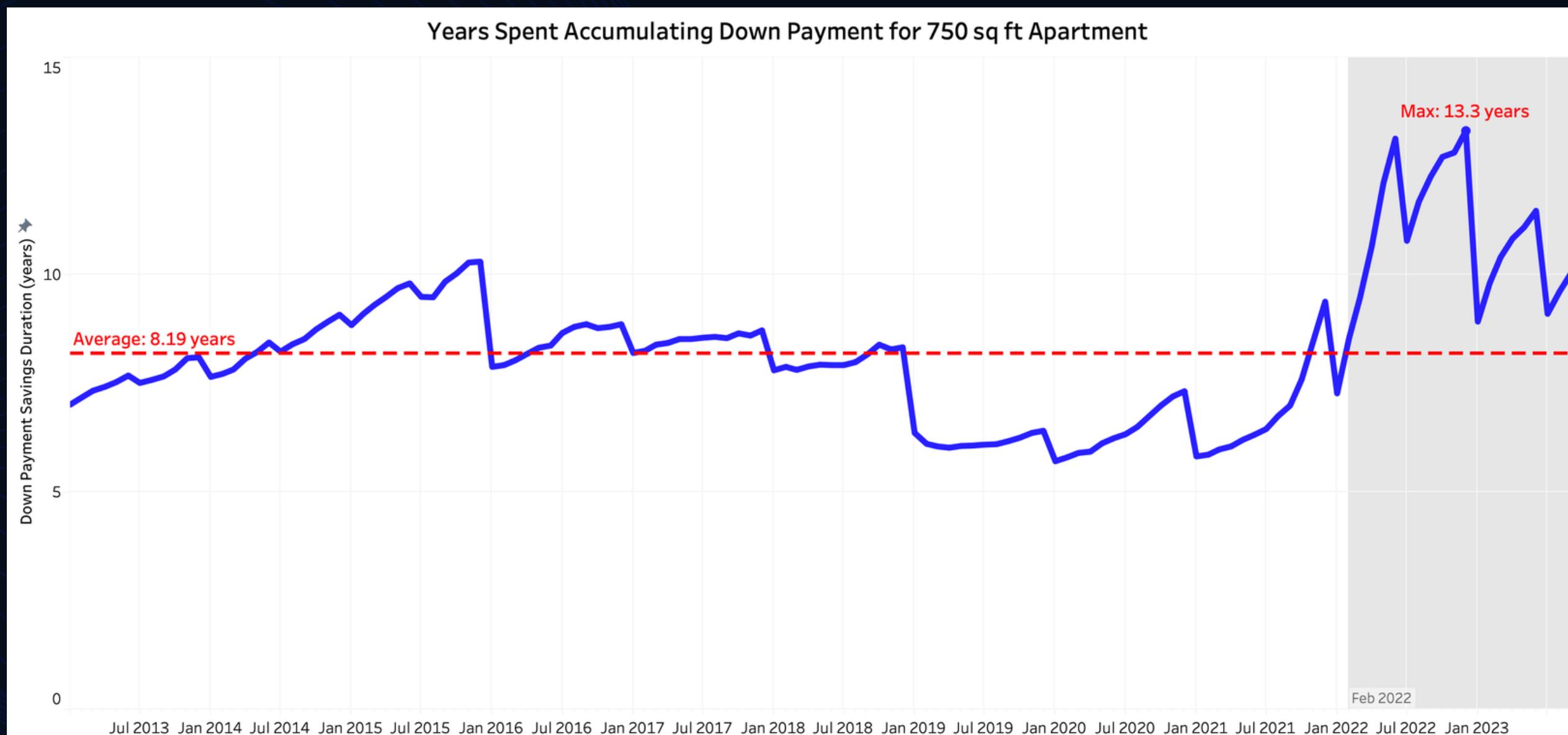


## What is Residential Property Price Index (RPPI)?

Residential Property Price Index (RPPI) is a measure that tracks changes in the prices of residential properties over time. It is a key indicator used in the field of economics and real estate to analyze and understand trends in the housing market.

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# YEARS SPENT ACCUMULATING DOWN PAYMENT FOR A 750 SQ FT APARTMENT



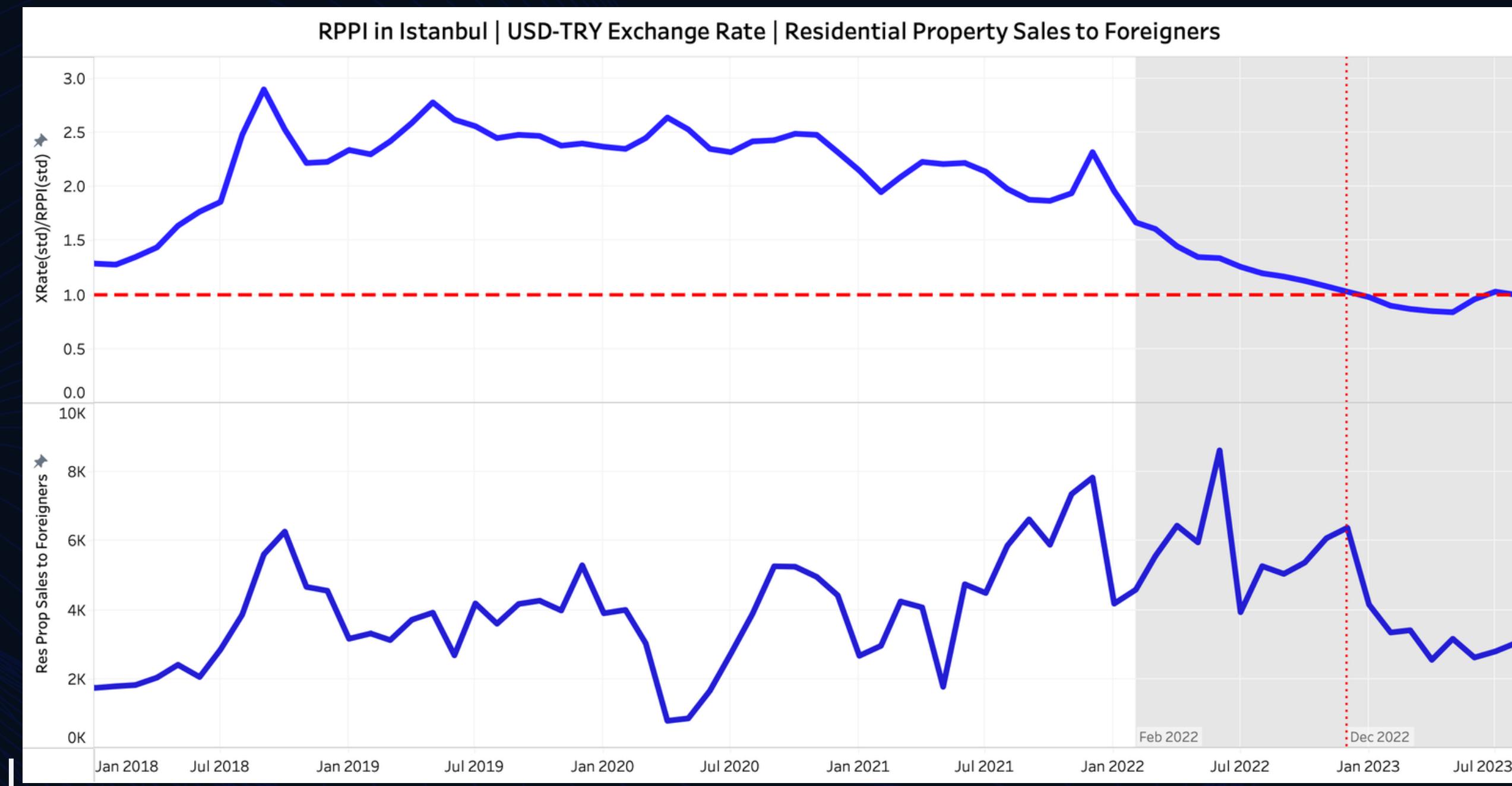
With the assumptions that

- 750 sq ft (70 sq m)
- 30% down payment
- the amount of net minimum wage saved each month

years spent saving down payment for an apartment got as high as 13.3 years.

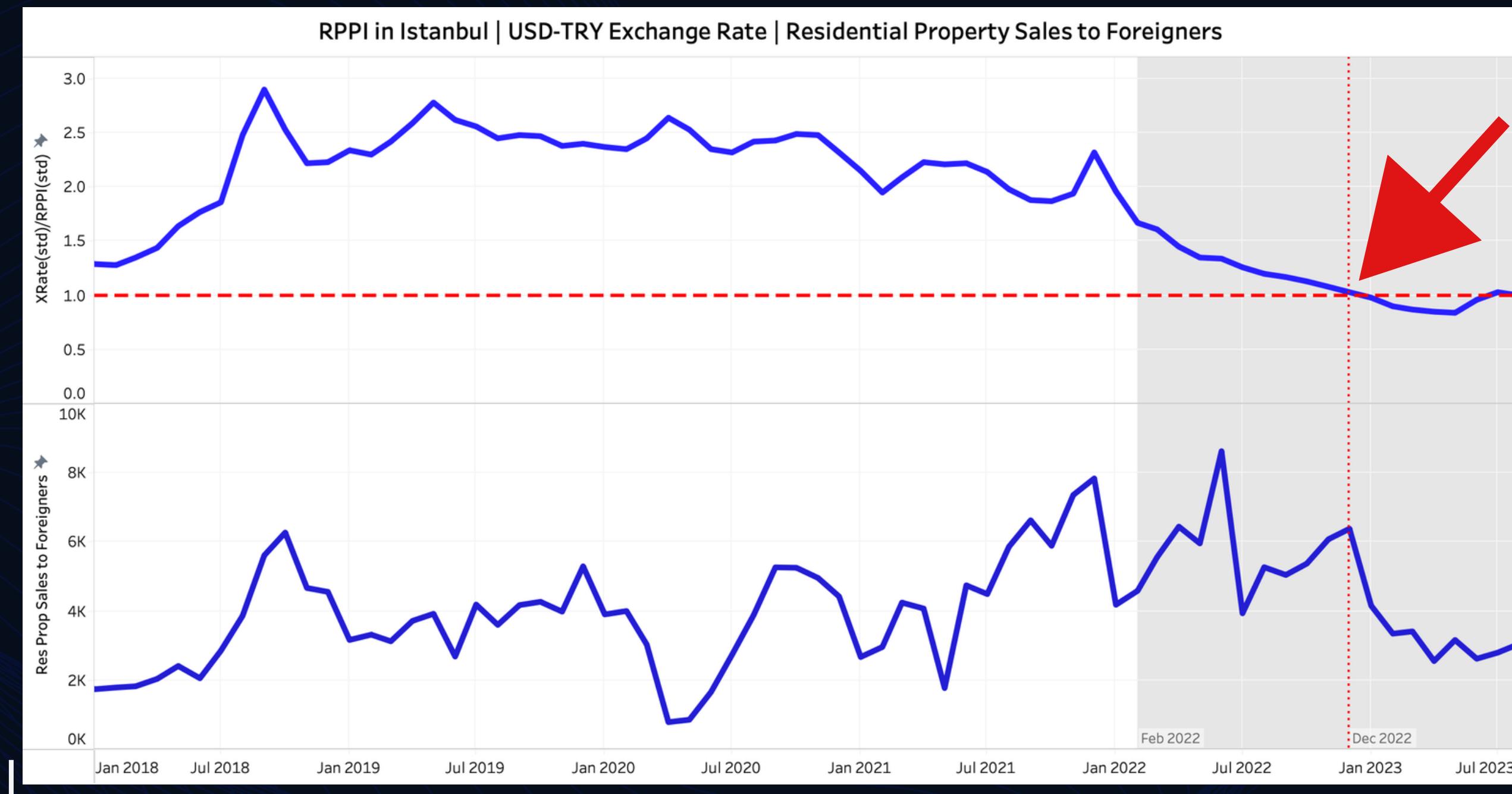
13.3 YEARS

# DOES SAVING IN USD MAKE IT EASIER FOR PEOPLE IN TURKEY TO BUY AN APARTMENT?



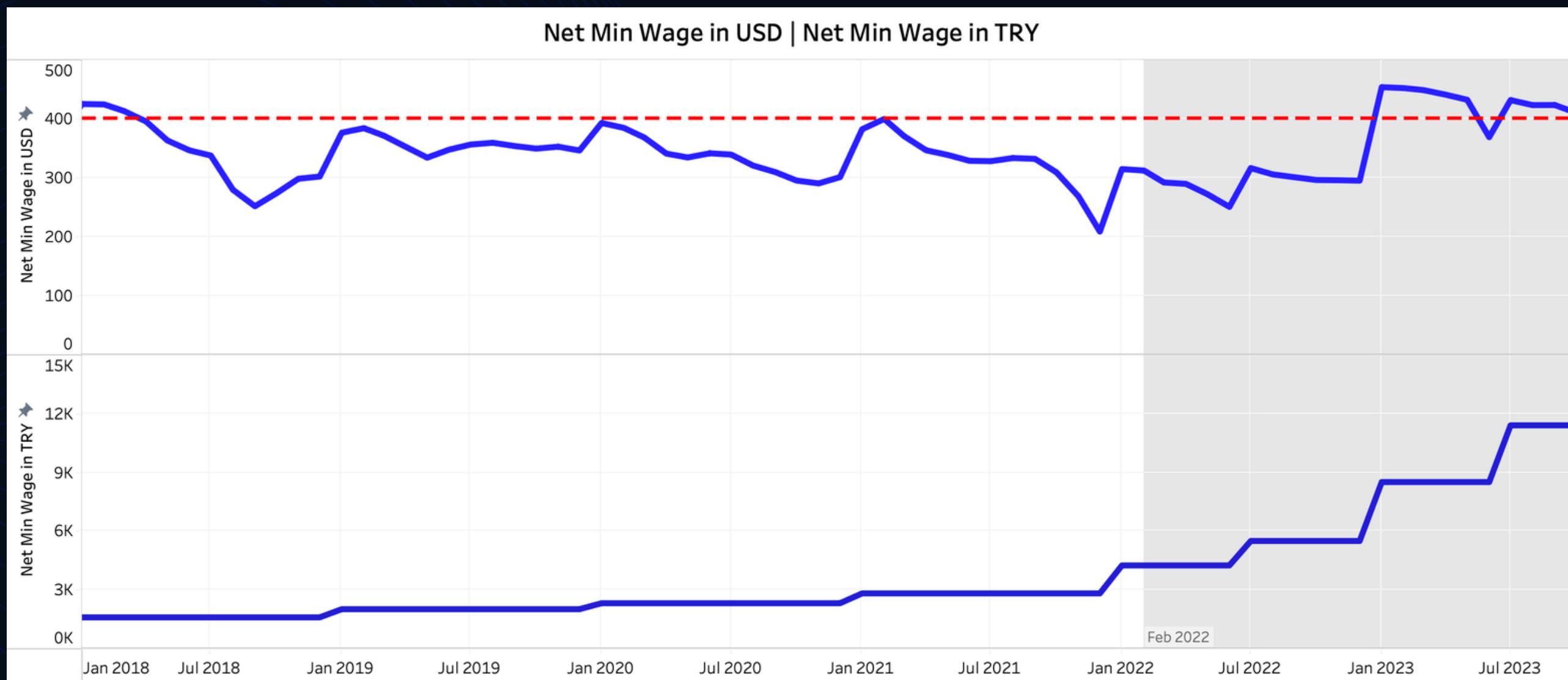
**YES! IT ACTUALLY  
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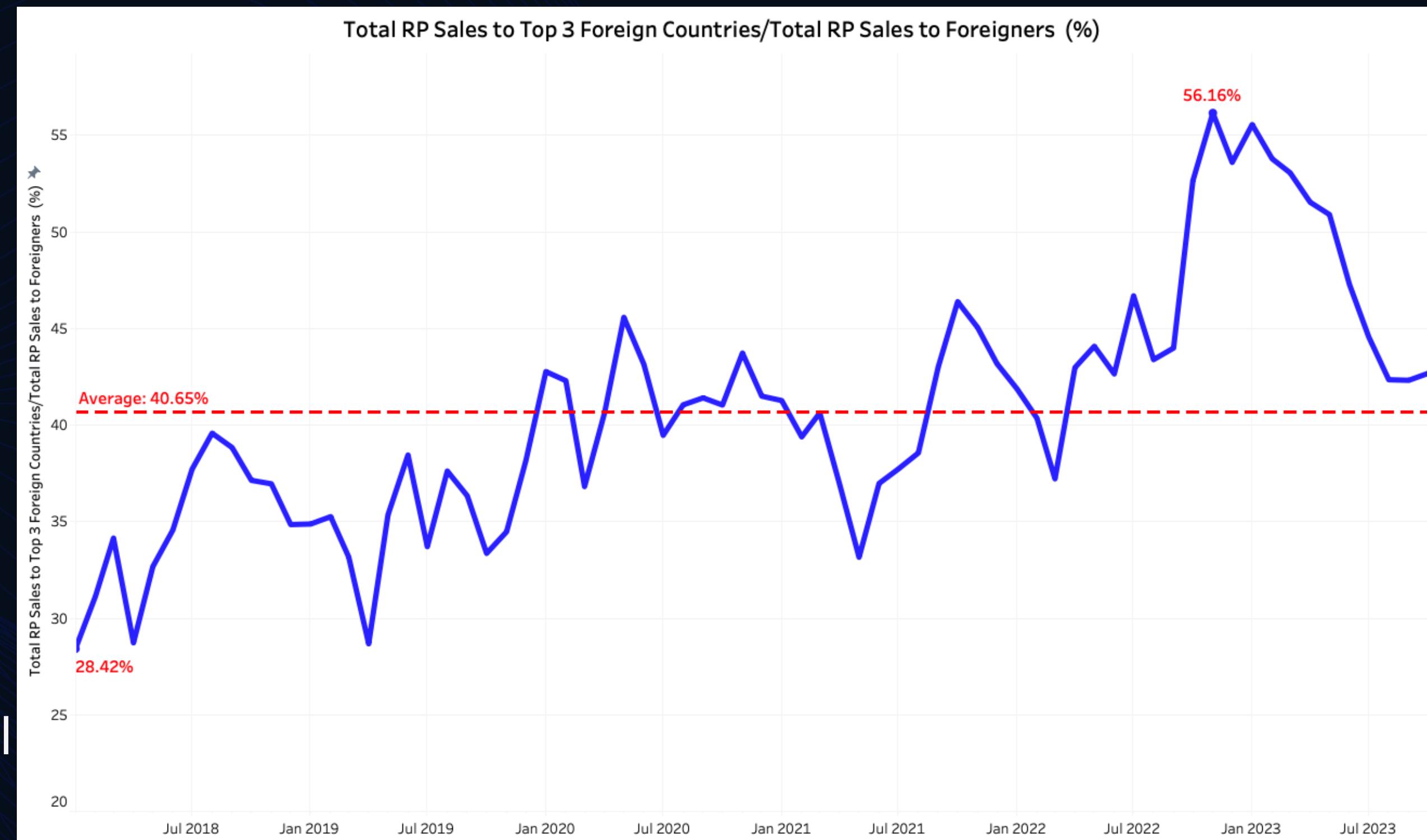
# IN CASE YOU ARE WONDERING HOW MUCH IS THE NET MINIMUM WAGE IN TURKEY IS:



IT IS TRYING TO  
KEEP UP WITH  
**\$400/MONTH**  
**(\$2.5/HOUR)** BUT  
IT GOT AS LOW AS  
**\$210/MONTH**  
**(\$1.31/HR)**

**\$ 2 . 5 / H O U R**

# REAL ESTATE INVESTMENT IN TURKEY WAS VERY PROFITABLE FOR FOREIGN INVESTORS



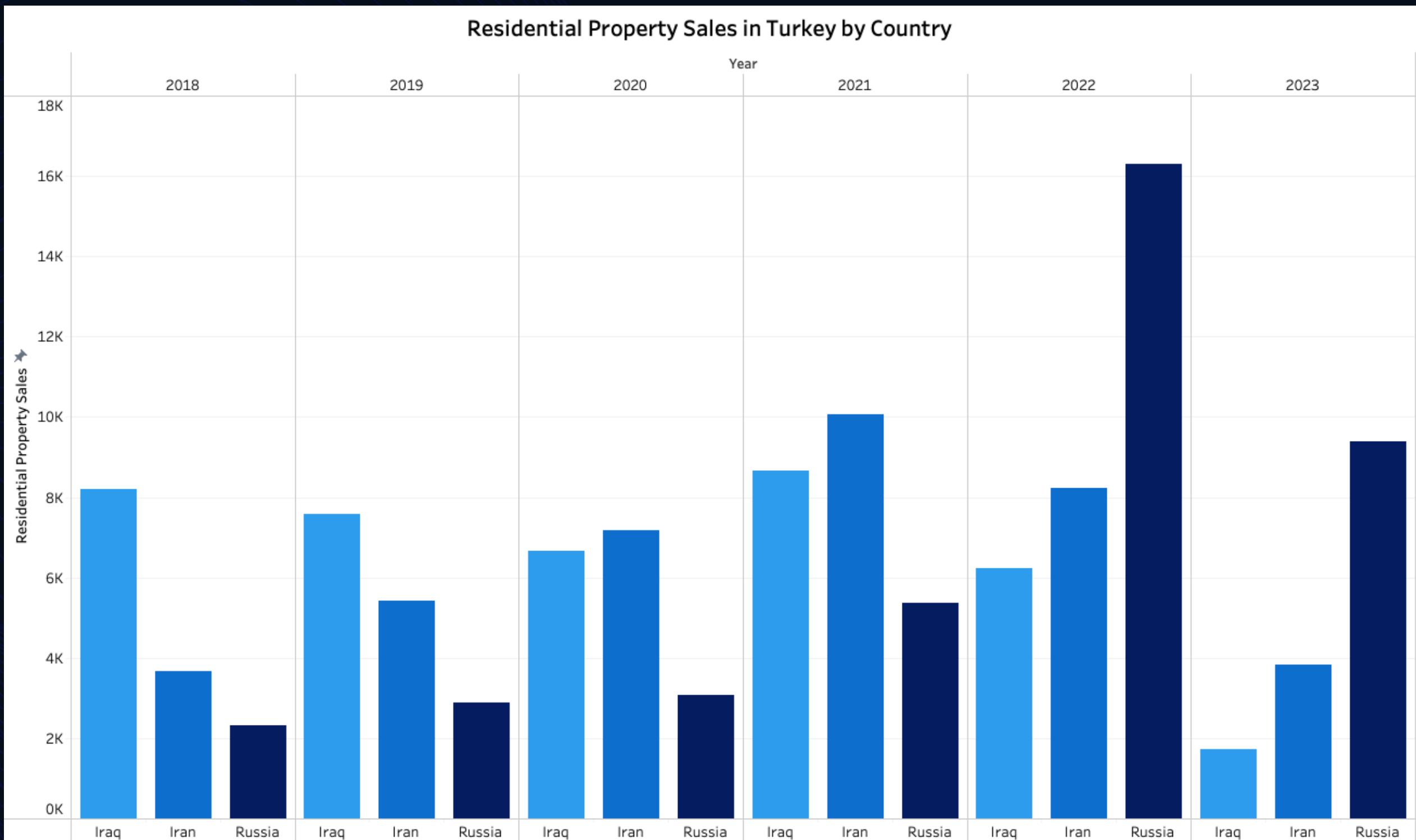
THE COUNTRIES  
THAT HAVE MADE  
THE MOST  
RESIDENTIAL  
PROPERTY  
PURCHASES IN  
TURKEY ARE:

R U S S I A

I R A N

I R A Q

# REAL ESTATE INVESTMENT IN TURKEY BY COUNTRY



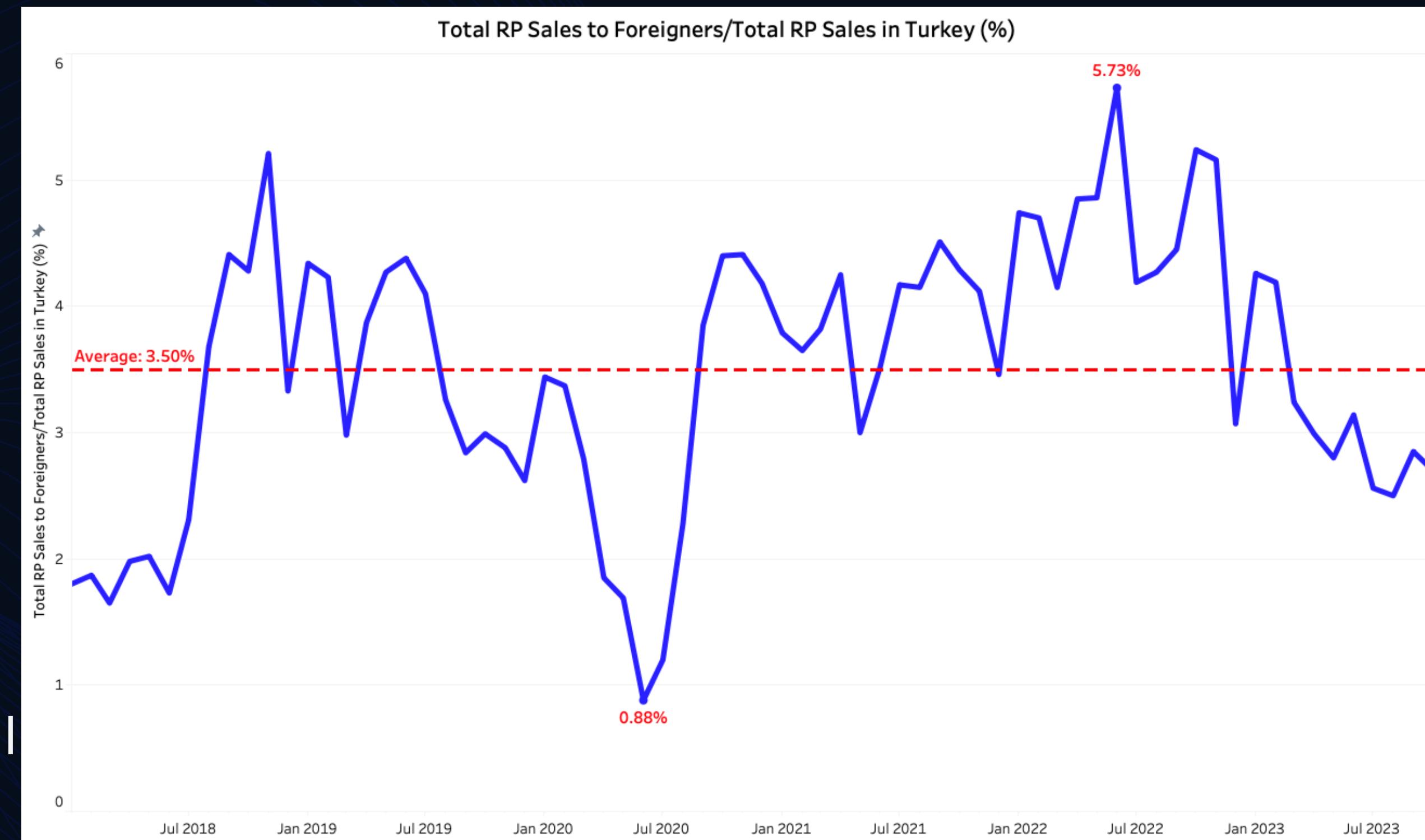
AFTER 2022, THE RUSSIA-UKRAINE WAR CONTRIBUTED TO THE RUSSIAN INTEREST IN TURKISH REAL ESTATE MARKET.

R U S S I A

I R A N

I R A Q

# PERCENTAGE OF REAL ESTATE INVESTMENT BY FOREIGN PEOPLE IN TURKEY



BUT THIS  
PERCENTAGE IS  
NOT REALISTIC, AS  
FOREIGN REAL  
ESTATE PURCHASES  
ARE PRIMARILY  
CONCENTRATED IN  
FIVE CITIES IN  
TURKEY.

# REAL ESTATE INVESTMENT BY FOREIGNERS IN TURKEY IS CONCENTRATED IN 5 CITIES



# İSTANBUL

ANTALYA

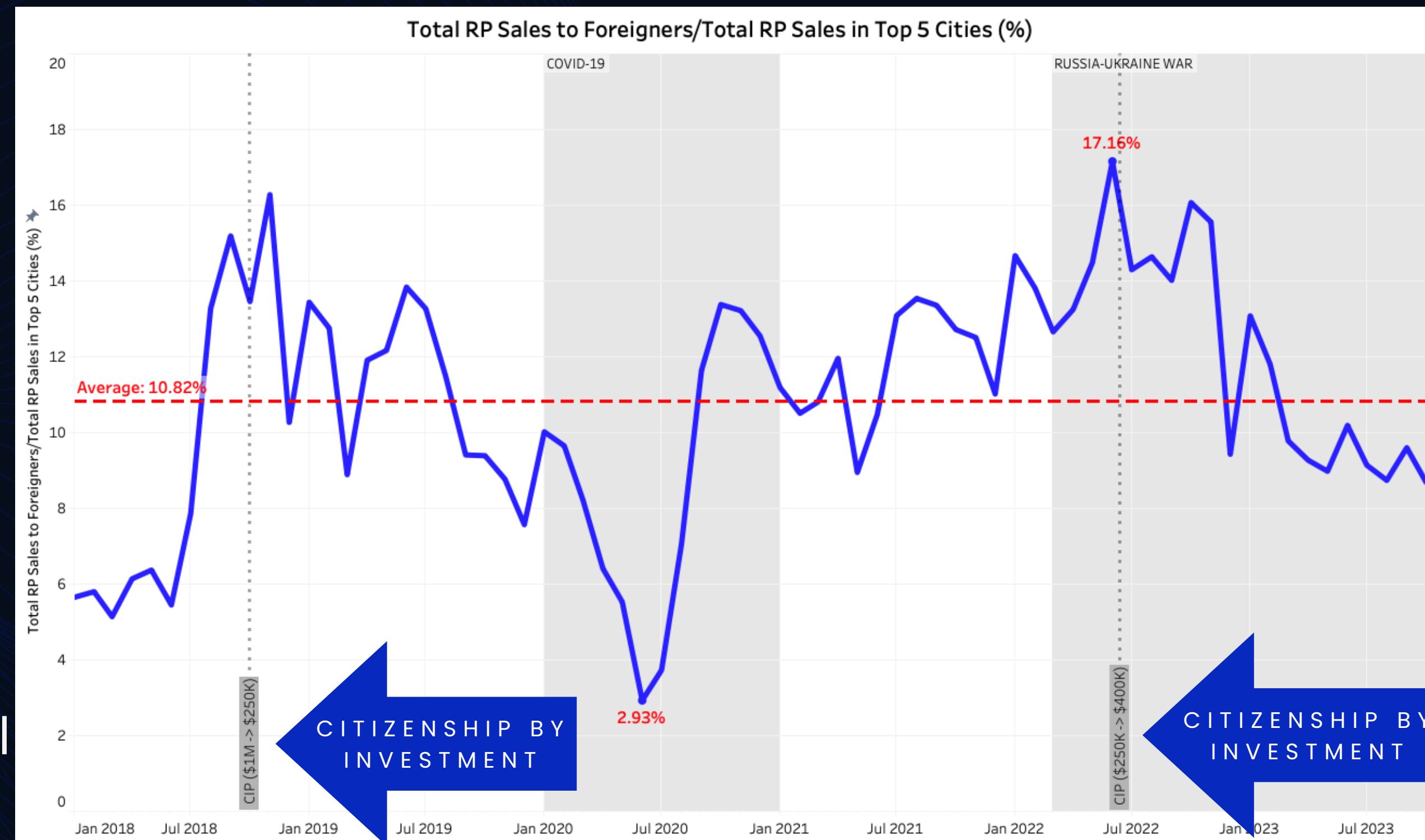
İ Z M İ R

M U G L A

MERSİN



# PERCENTAGE OF REAL ESTATE INVESTMENT BY FOREIGN PEOPLE IN THE TOP 5 CITIES



WITHIN THE FIRST 6 MONTHS AFTER THE START OF THE RUSSIA-UKRAINE WAR, RESIDENTIAL PROPERTY SALES IN THE TOP 5 CITIES IN TURKEY REACHED A POINT WHERE 1 IN EVERY 6 SALES WAS MADE TO FOREIGNERS.

1 / 6

# CONSTRUCT ML MODEL

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- 1. DATA COLLECTION**
- 2. MODEL SELECTION**
- 3. MODEL TRAINING**
- 4. MODEL EVALUATION**



# DATA COLLECTION



# MODEL SELECTION

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SINCE A QUANTITY IS PREDICTED RATHER THAN A CATEGORY, LASSO & RIDGE REGRESSION MODELS WITH VARIOUS DIFFERENT PARAMETERS APPLIED TO THE DATA OF 2014 TO 2021, AIMING TO SUCCESSFULLY PREDICT THE RESIDENTIAL PROPERTY PRICE INDEX OF ISTANBUL FOR THE YEARS OF 2022 AND 2023.



# MODEL TRAINING

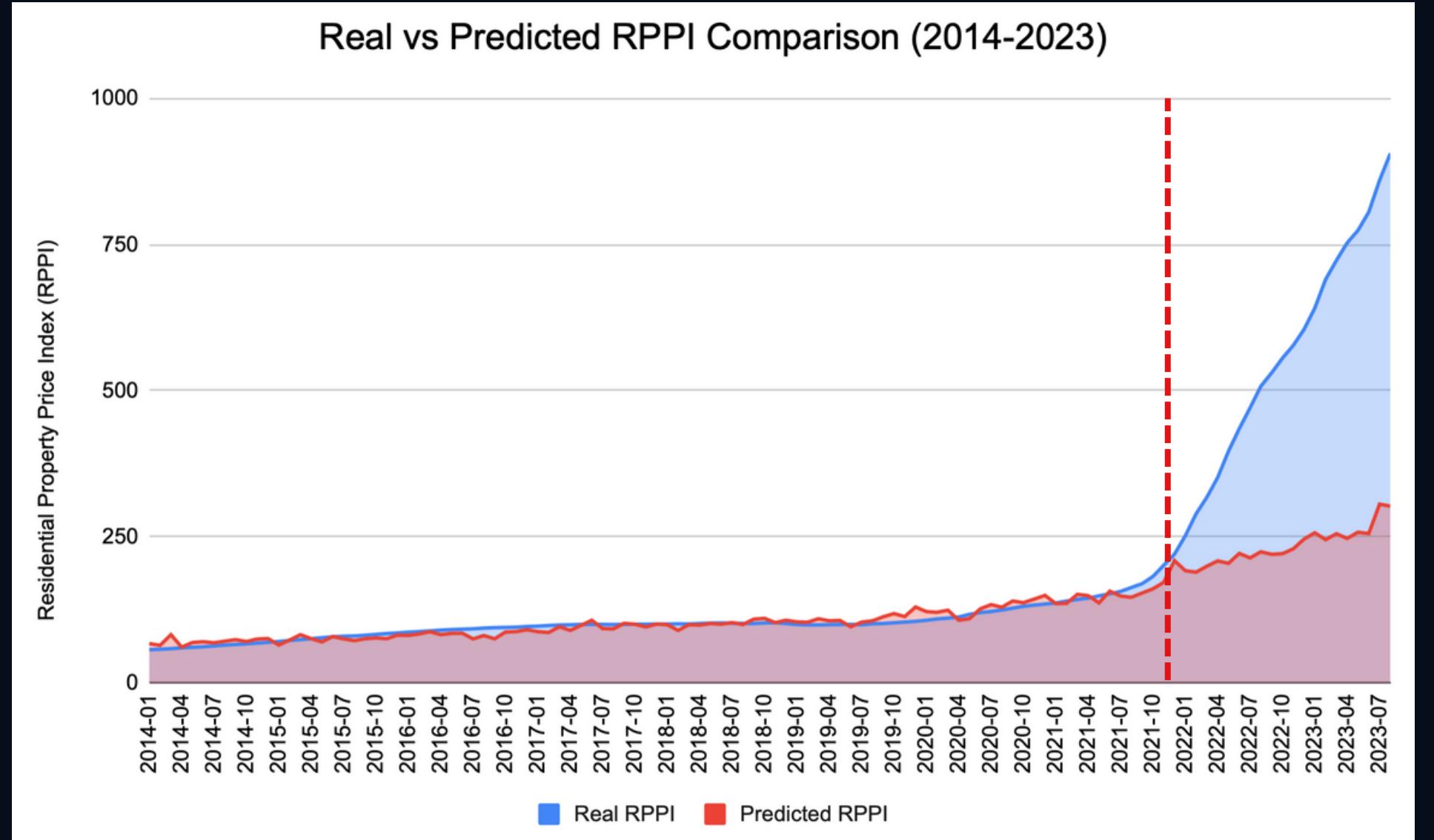
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TO ATTAIN THE BEST MODEL PERFORMANCE,  
IT'S ESSENTIAL TO USE OPTIMAL  
HYPERPARAMETERS IN MACHINE LEARNING.  
AFTER EXPLORING VARIOUS REGRESSION  
MODELS AND CONSIDERING DIFFERENT  
HYPERPARAMETERS, WE ENDED UP WITH  
26,400 DIFFERENT ML MODELS, ULTIMATELY  
SELECTING THE BEST-PERFORMING ONE.

26,400 ML  
MODELS



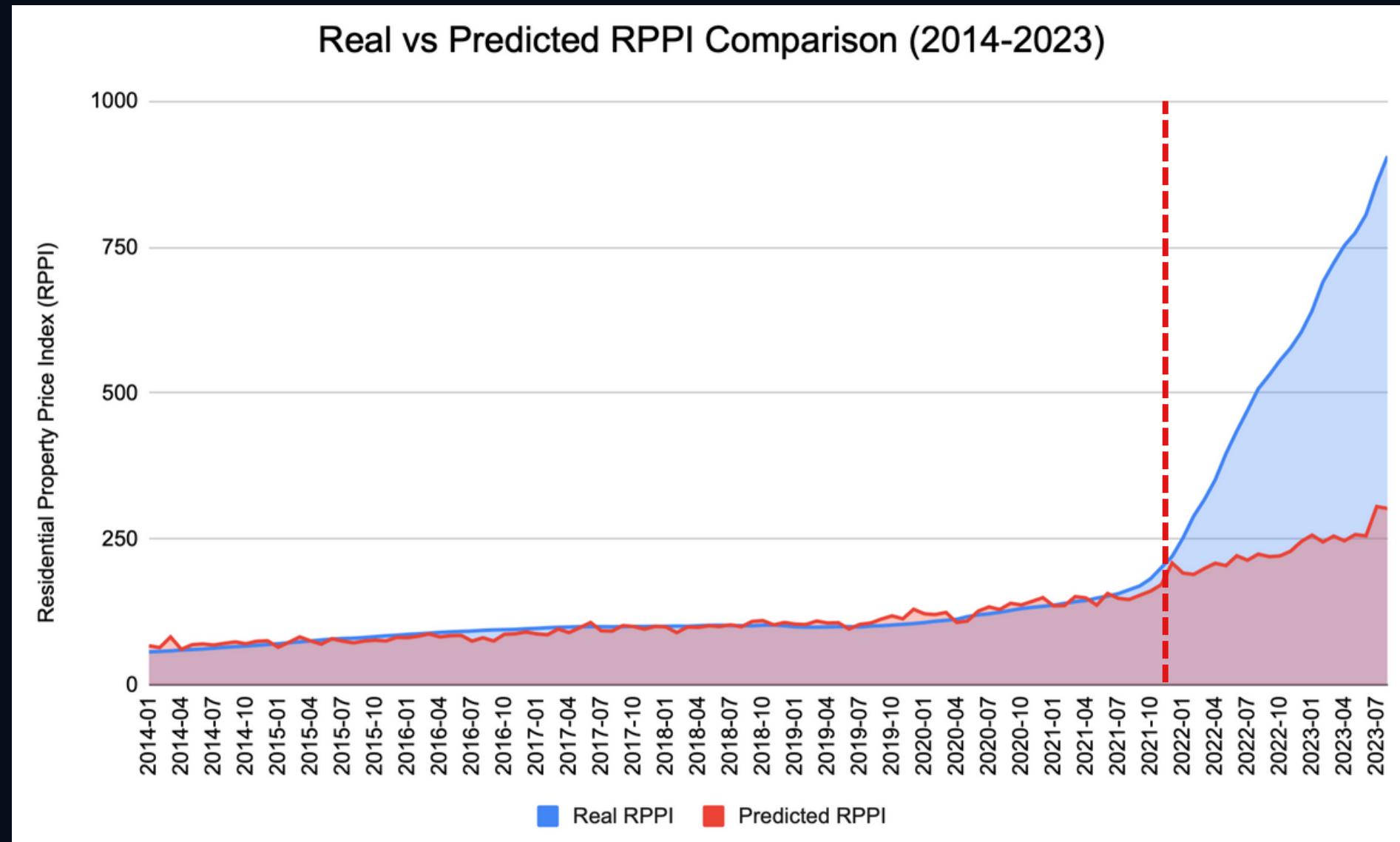
# MODEL EVALUATION



MY MODEL WAS ABLE TO  
CAPTURE AN INCREASE IN THE  
RPPI BUT WAS NOT ABLE TO  
CAPTURE THE REAL INCREASE  
AMOUNT WITH THE AVAILABLE  
DATA



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# FUTURE IMPROVEMENT

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- MORE TRAINING DATA
- TRAIN MORE MODELS WITH DIFFERENT HYPERPARAMETERS
- FIND BETTER REPRESENTATION OF FOREIGN INTEREST IN TURKISH REAL ESTATE MARKET
- USE WEB SCRAPING ON FOREIGN WEBSITES TO ACCURATELY REFLECT THE INTEREST IN TURKISH REAL ESTATE MARKET



THANK  
YOU!