MORTGAGE IN RUSSIA 2019-2021

German Elizaveta

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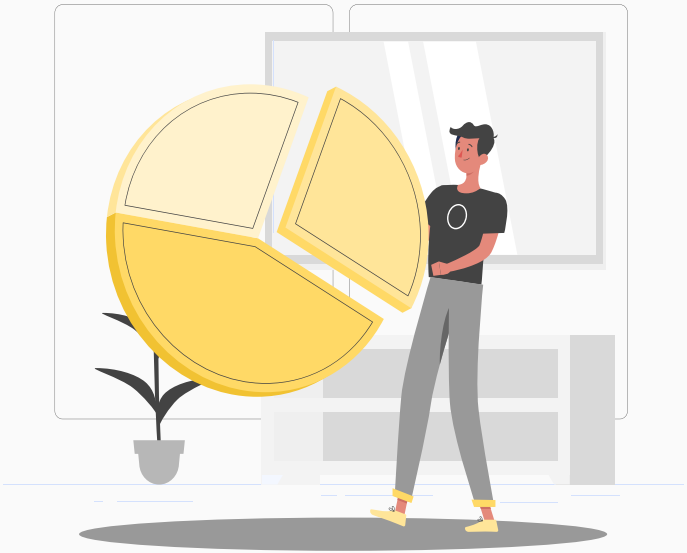


THE STORY

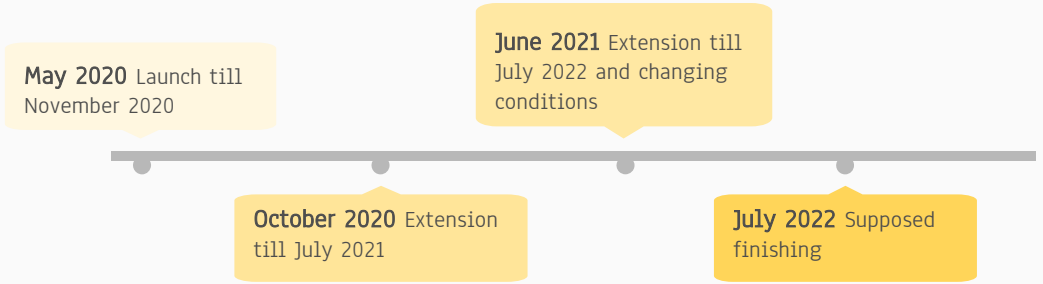
- The share of **construction sector in GDP** of Russia was **5,1%** in 2020
- **The construction** provides about **9% of jobs** in the economy
- **Mortgage** is the most important (mostly, the only) way to **improve living conditions**

APRIL-MAY 2020 – COUNTRYWIDE LOCKDOWN

- **Covid-19 crisis**: decreasing demand and pace of construction
- The **new preferential mortgage program** was introduced as a part of **governmental support** for the construction sector and citizens
- Government supports **developers** by **subsidizing mortgage rate** for buying new housing
- The experience of 2015-2016: similar measures to save sector from failing

THE PREFERENTIAL PROGRAM

- **Mortgage rate 6,5%** that remains the same for the entire loan period
- The loan amount is up to **3 million** of rubles in the regions, up to **8 million** in Moscow and St. Petersburg
- **Launched** in May 2020
- **Changes** in conditions in June 2021: increased rate **to 7,0%,** reduced loan amount **to 3 million** in all regions
- Danger: rising prices and already realized demand of "good" clients



OBJECTIVES

PREFERENTIAL PROGRAM

- Analyze the program dynamics (if there is any diffusion process)
- 2 scenarios after changing conditions – the speed of decreasing demand

MORTGAGE OVERALL

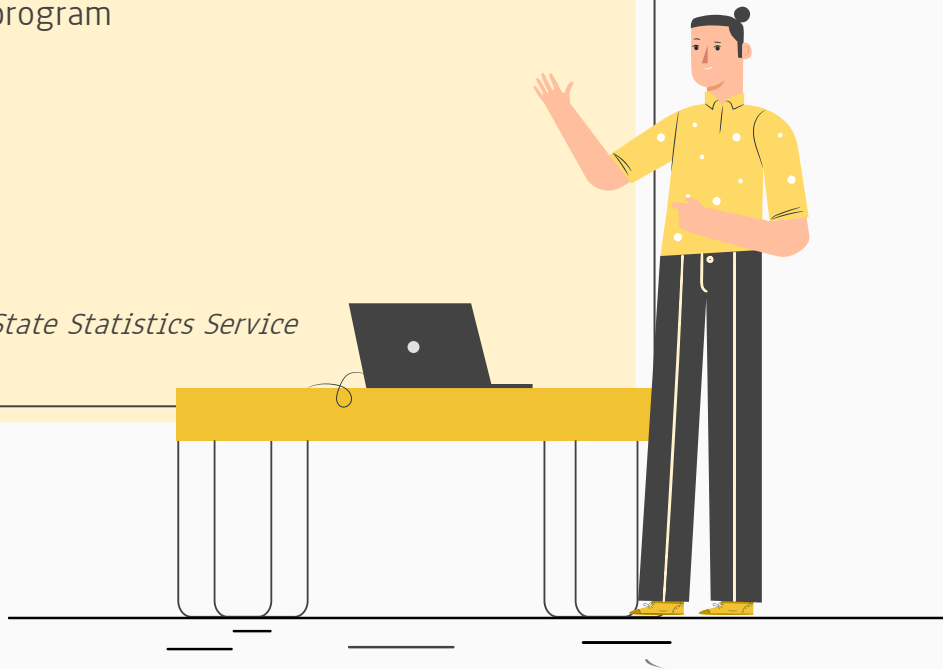
- Predict the mortgage dynamics by means of macroeconomic indicators:
  - Mortgage rate
  - Unemployment
  - Income
  - Housing prices
  - Commissioning of housing

DATA

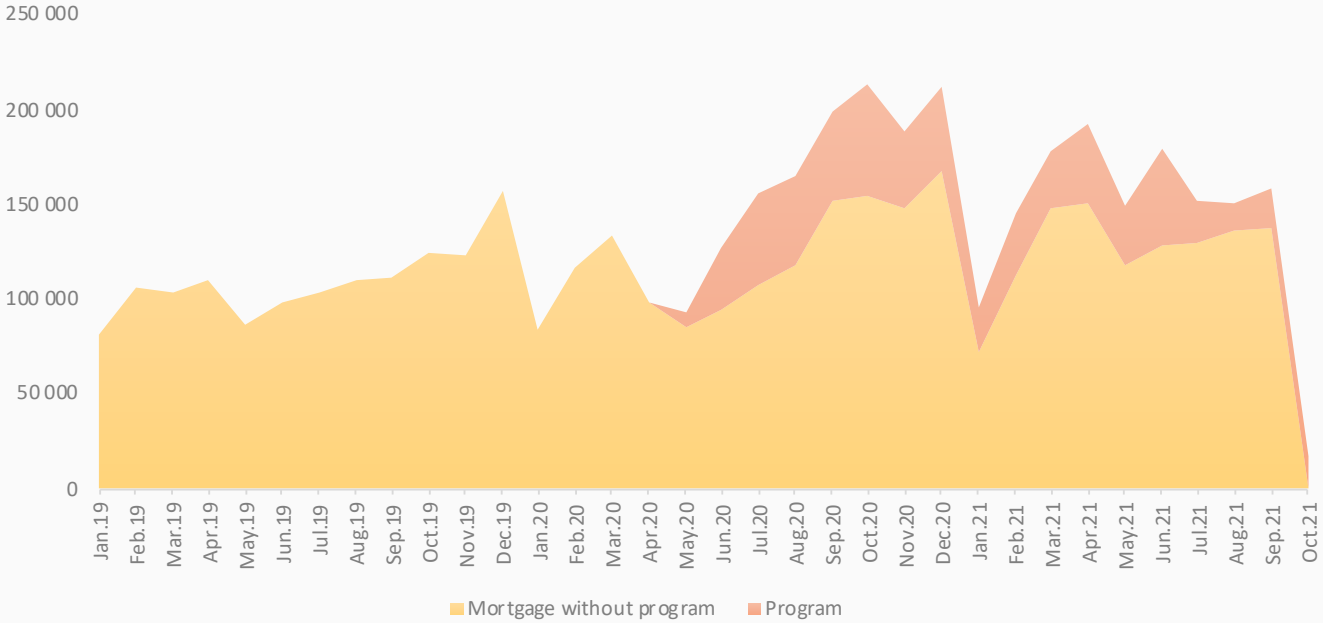
Time series from Jan 2019 to Oct 2021:

- Amount of mortgage loans overall
- Amount of loans in preferential program
- Mortgage rate (%)
- Unemployment rate (%)
- Real disposable income (%)
- Housing prices (rubles)
- Commissioning of housing (m^2)

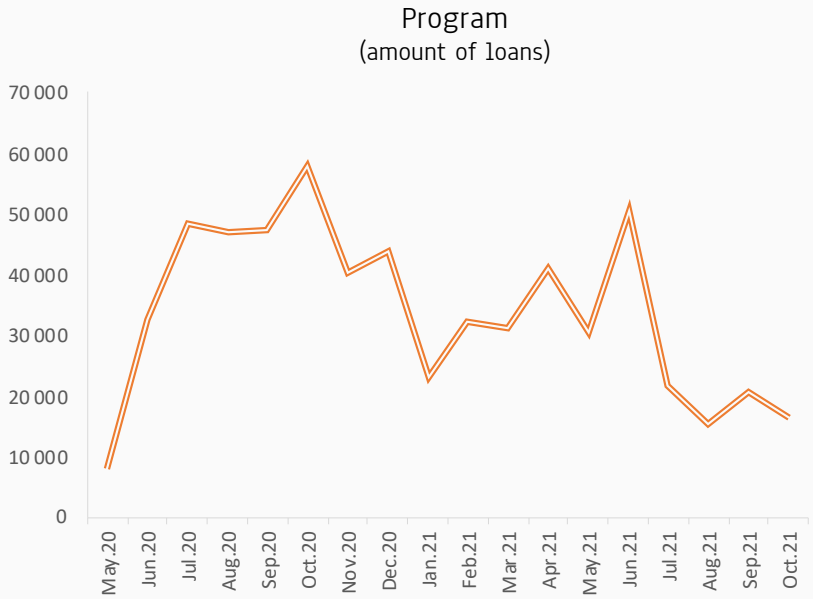
Sources: Central Bank of Russia, Federal State Statistics Service

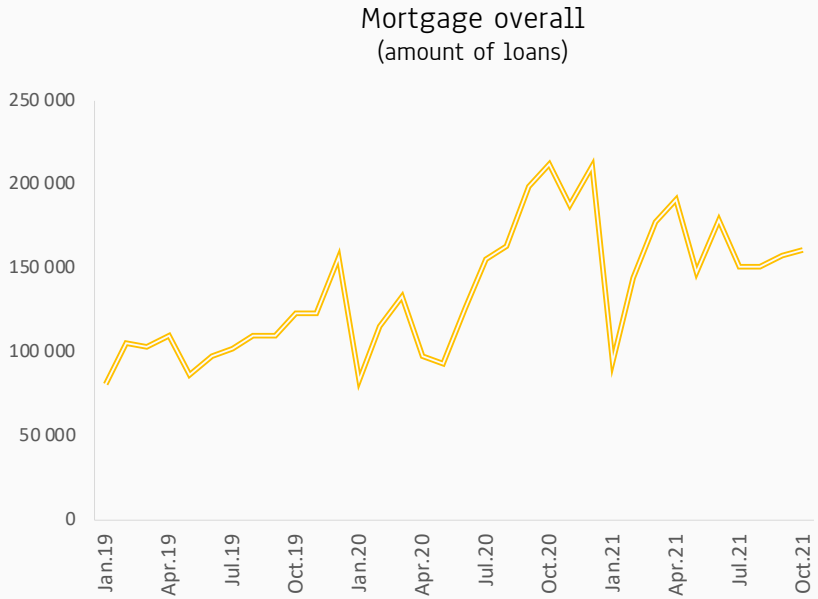


MORTGAGE 2019-2021



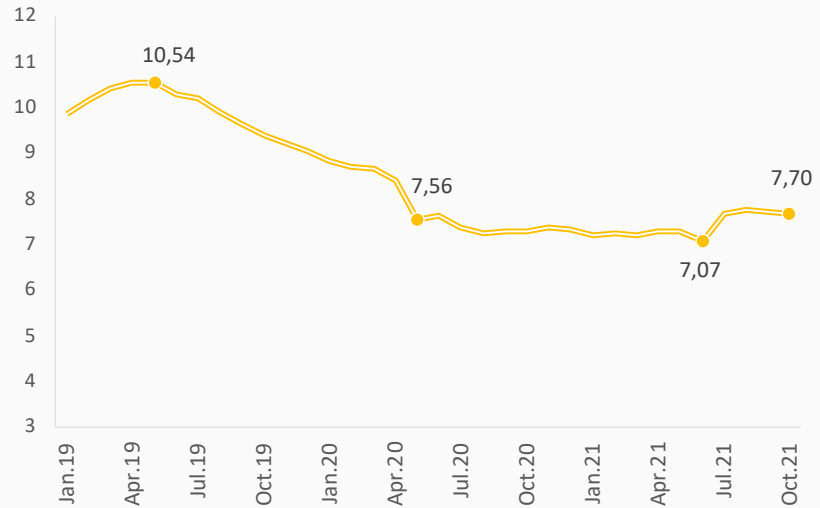
MORTGAGE 2019-2021



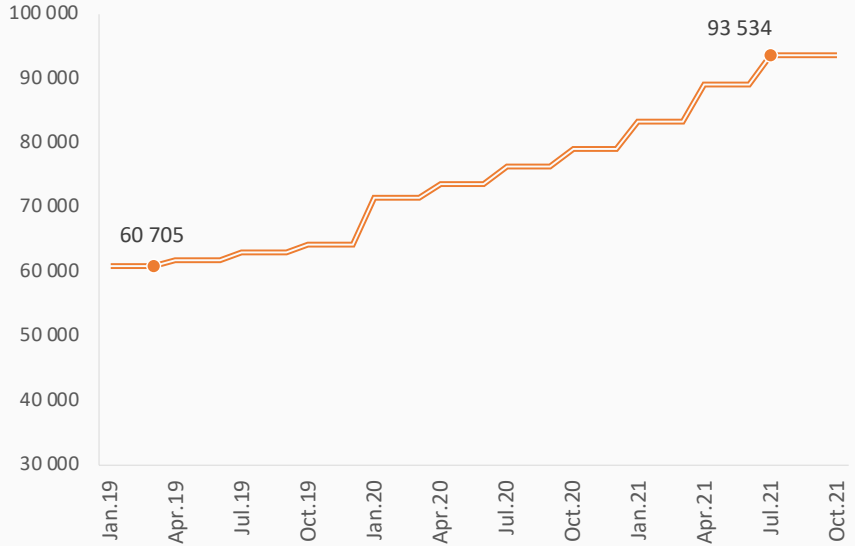


MORTGAGE RATE AND HOUSING PRICE

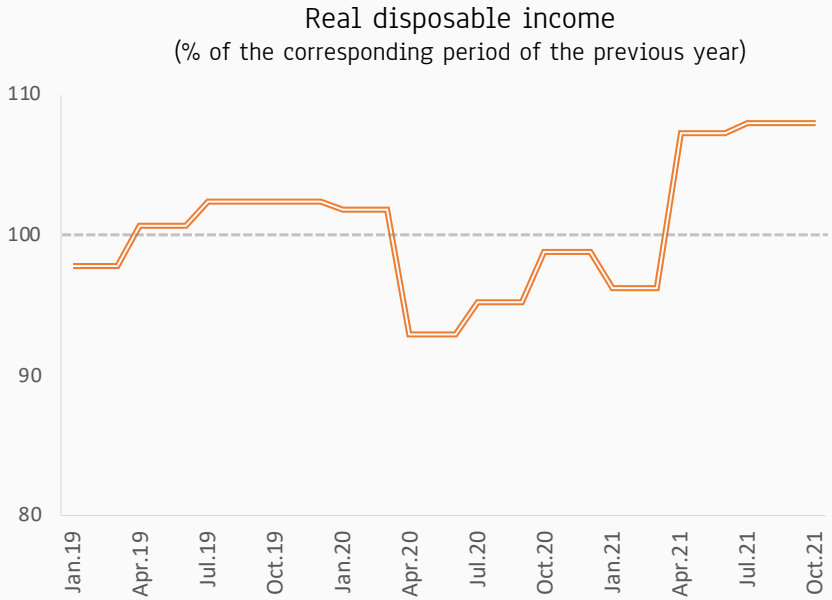
Mortgage rate (%)

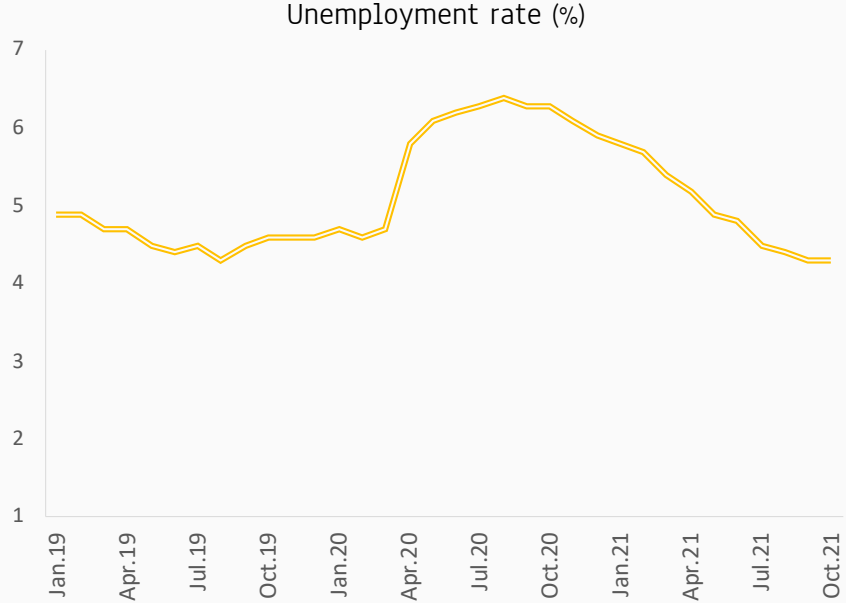


Price of 1 m^2 (rubles)



REAL DISPOSABLE INCOME AND UNEMPLOYMENT





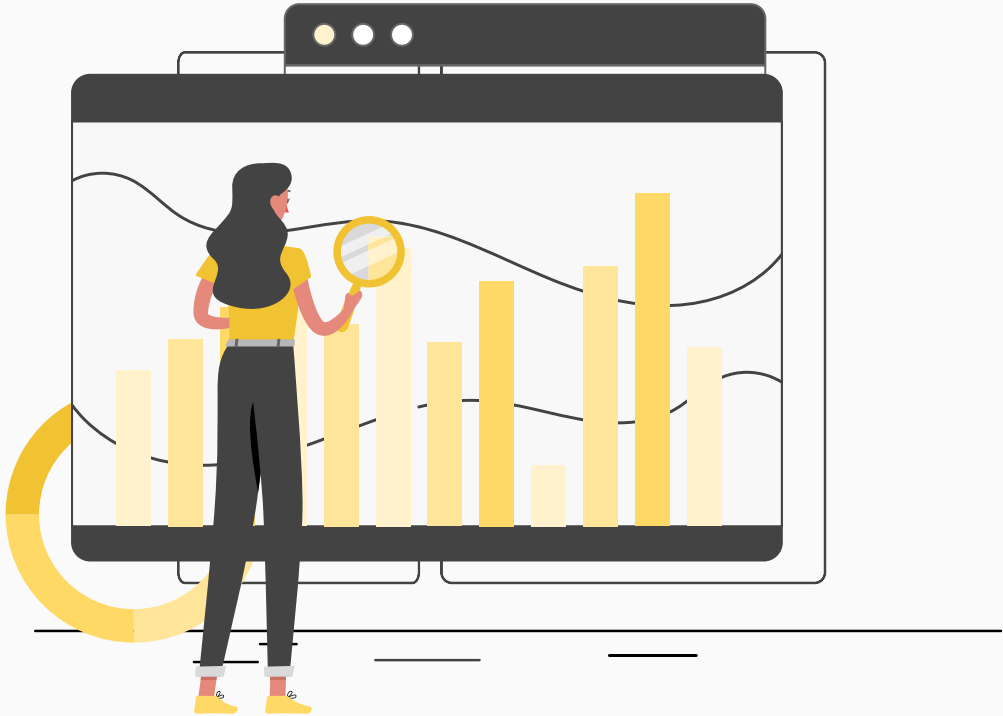
MODELS

THE PROGRAM

Bass Model
Generalized Bass Model

MORTGAGE OVERALL

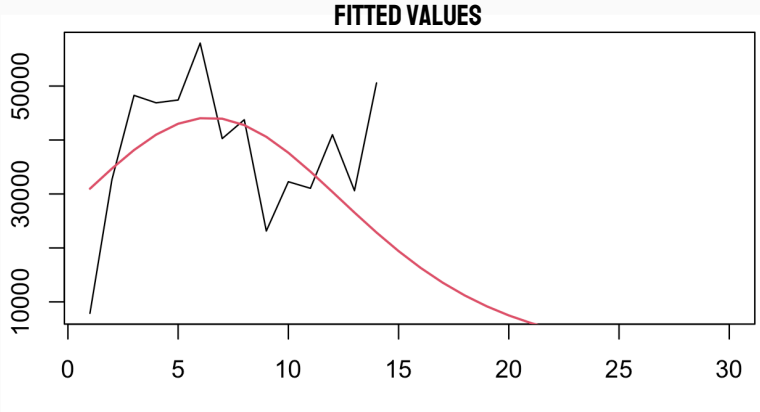
ARIMA
Linear Regression
Generalized Additive Model



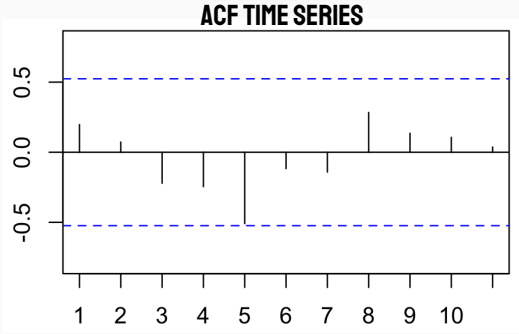
BASS MODEL

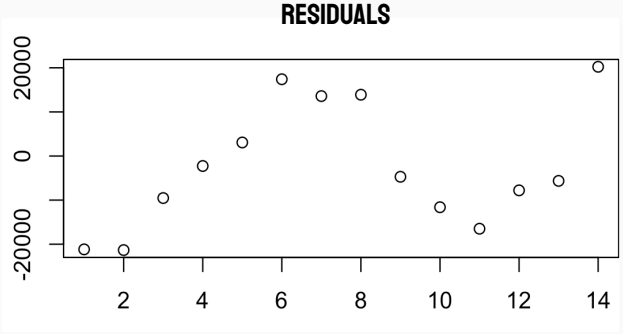
COEFFICIENT	Estimate	Std. Error	Lower bound	Upper bound	P-value
Market potential (thousand)	632,858	68,086	499,410	766,305	**0,000**
Innovation	0,043	0,004	0,036	0,050	**0,000**
Imitation	0,183	0,051	0,084	0,280	**0,004**

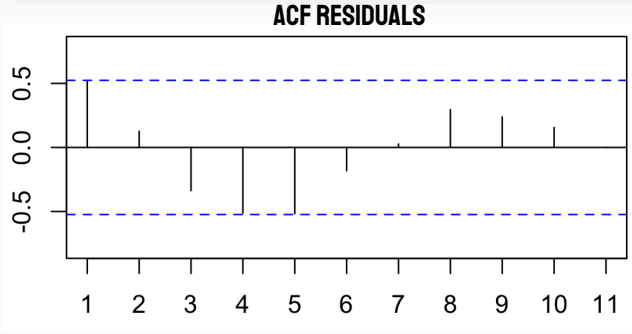
R-squared: 0.9929002



AUTOCORRELATION AND RESIDUALS

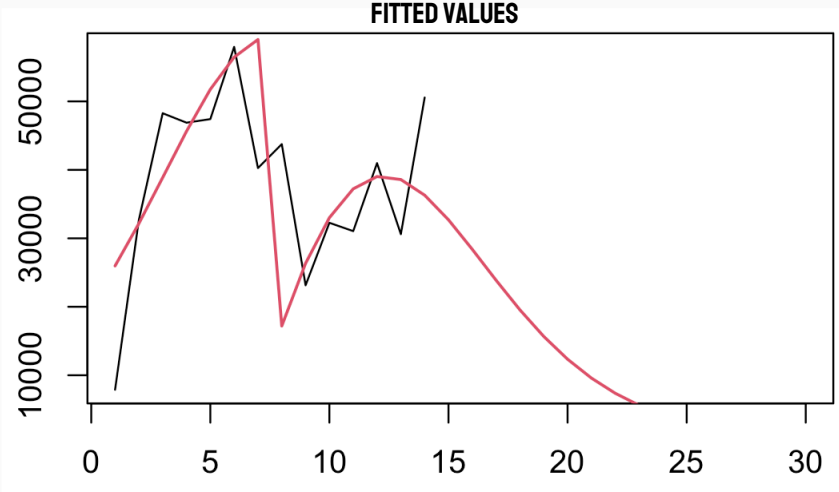






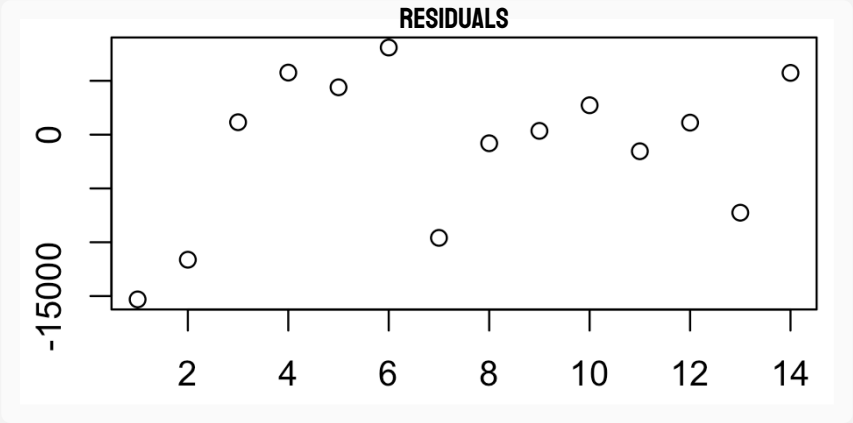
GENERALIZED BASS MODEL

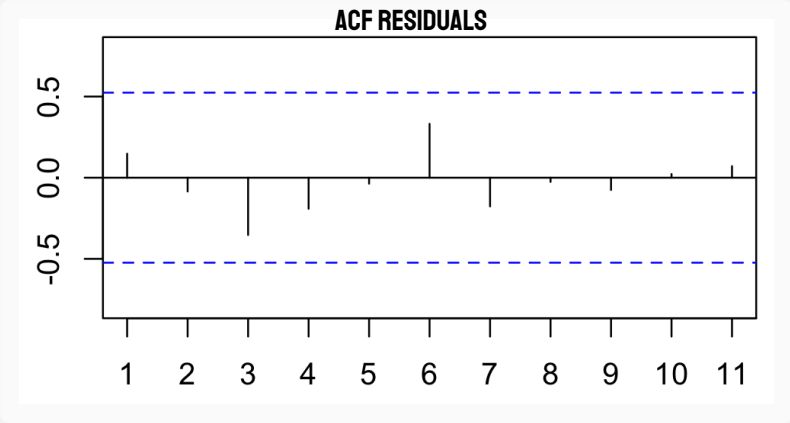
COEFFICIENT	Estimate	Std. Error	Lower bound	Upper bound	P-value
Market potential (thousand)	717 897	191 117	343 315	1 092 479	**0,006**
Innovation	0,043	0,004	0,036	0,050	**0,002**
Imitation	0,183	0,051	0,084	0,280	**0,001**
Starting time	7,460	0,466	6,548	8,373	**0,000**
Memory	-0,248	0,323	-0,882	0,385	0,464
The shock	-0,812	0,336	-1,470	-0,154	**0,042**



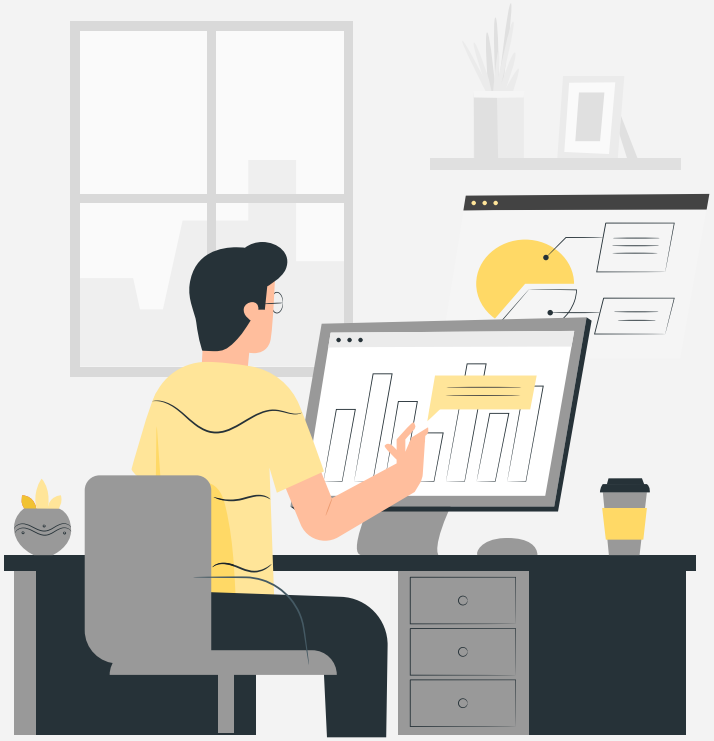
R-squared: 0.9981625

AUTOCORRELATION AND RESIDUALS





MORTGAGE PREDICTION

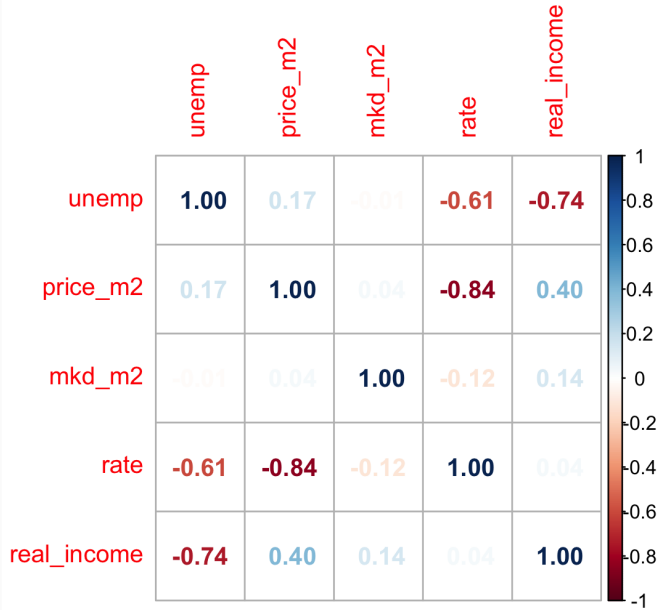


LINEAR REGRESSION: MORTGAGE OVERALL

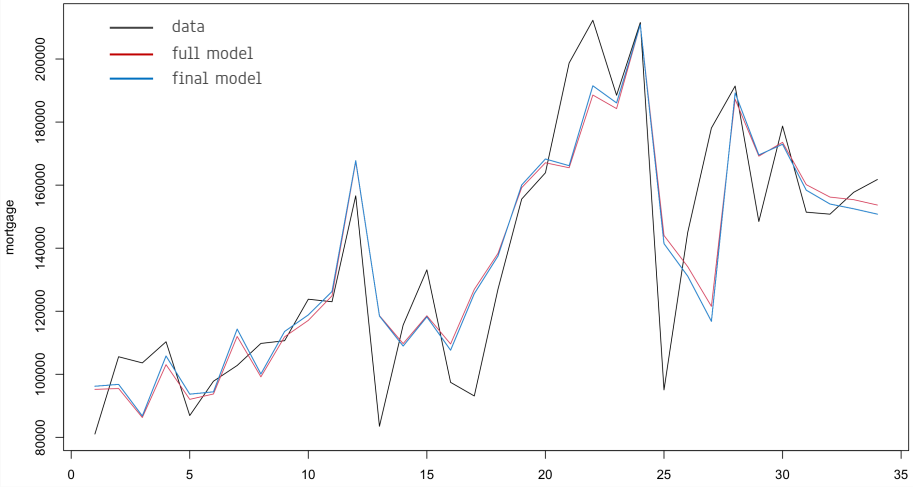
	VIF
UNEMPLOYMENT	9,9
PRICE	12,1
COMMISSIONING	1,2
MORTGAGE RATE	17,2
REAL DISPOSABLE INCOME	6,3

Durbin-Watson

Statistics = 1,6846
P-value = 0,107

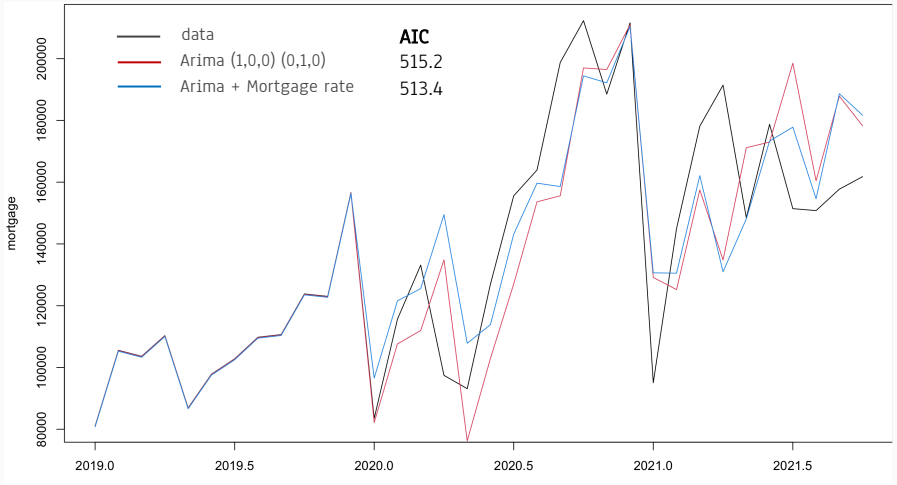


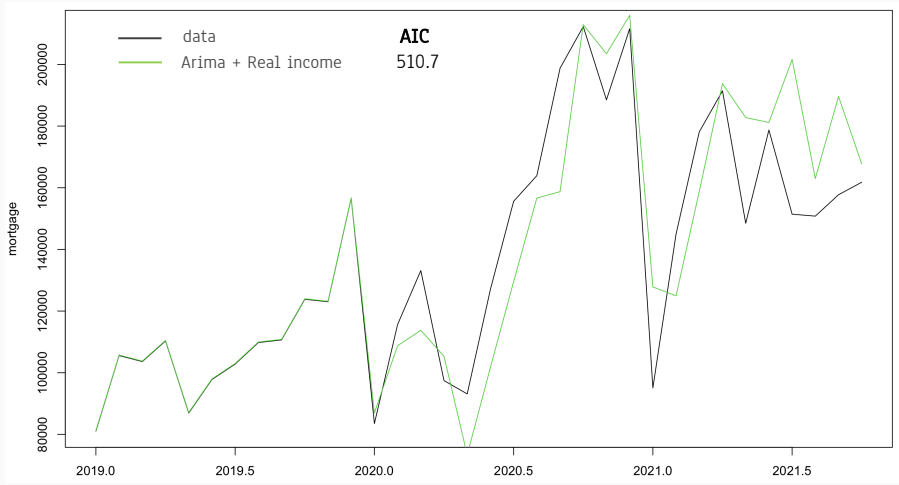
LINEAR MODELS



	FULL MODEL		FINAL MODEL	
COEFFICIENT	Estimate	P-value	Estimate	P-value
Intercept	-865 723,6	0,013	-969 313,9	0,000
Mortgage rate	-1 186,9	0,923		
Price	0,2	0,874		
Unemployment	53 531,5	0,002	58 999,9	0,000
Commissioning	5,4	0,005	5,3	0,002
Real income	7 027,7	0,001	7 815,1	0,000
Adj. R-Squared	**0,7095**		**0,7262**	

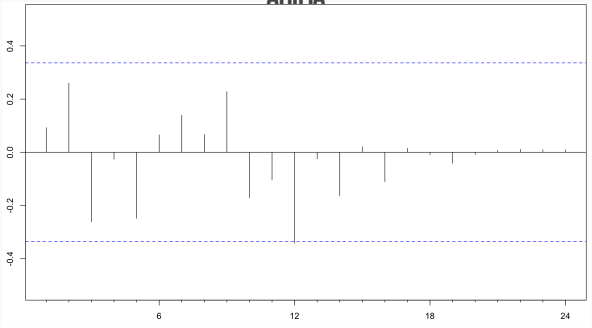
ARIMA MODELS



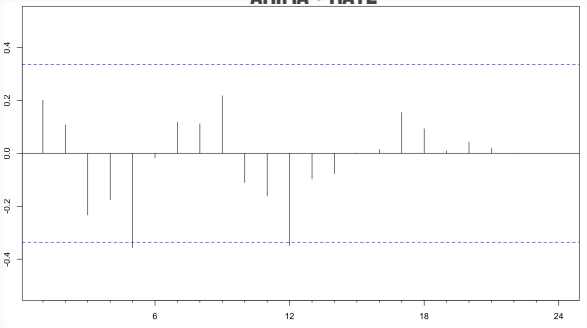


ACF DIAGNOSTICS

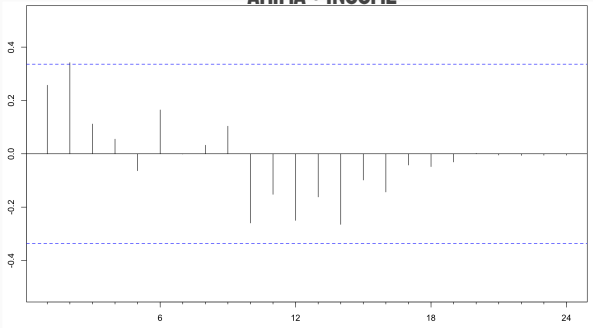
ARIMA



ARIMA + RATE

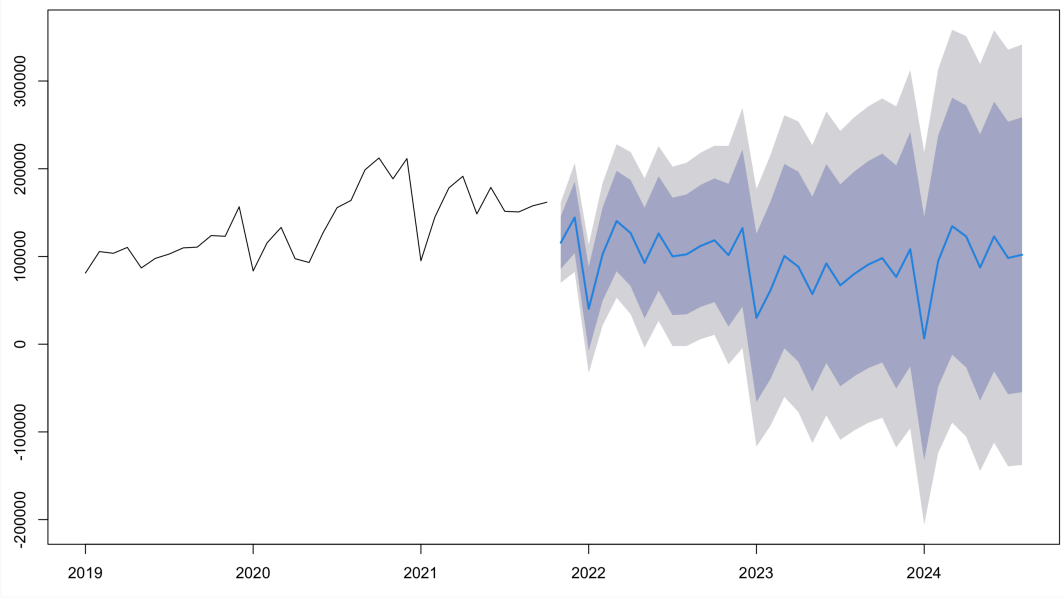


ARIMA + INCOME

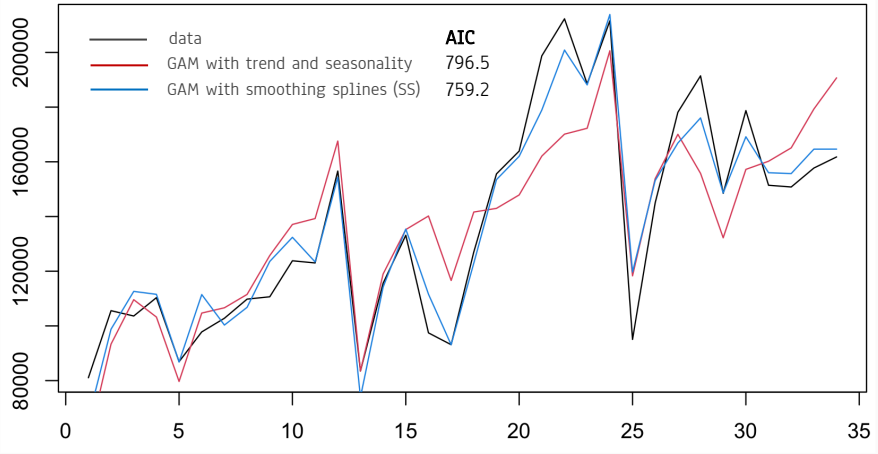


ARIMA FORECASTING

REAL DISPOSABLE INCOME AS REGRESSOR



GENERALIZED ADDITIVE MODELS

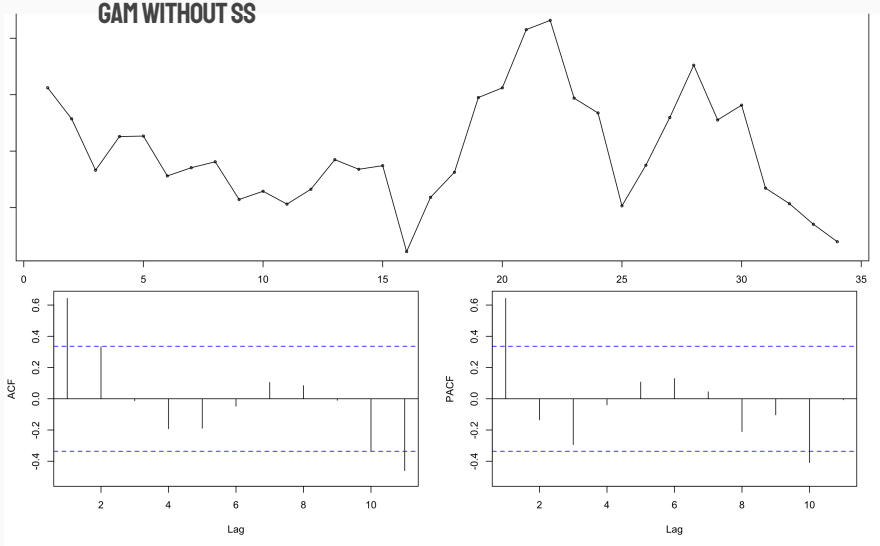


PARAMETRIC EFFECTS	F	P-value
S (trend)	118,913	**0,000**
Seasonality	7,018	**0,001**
S (income)	6,512	**0,023**

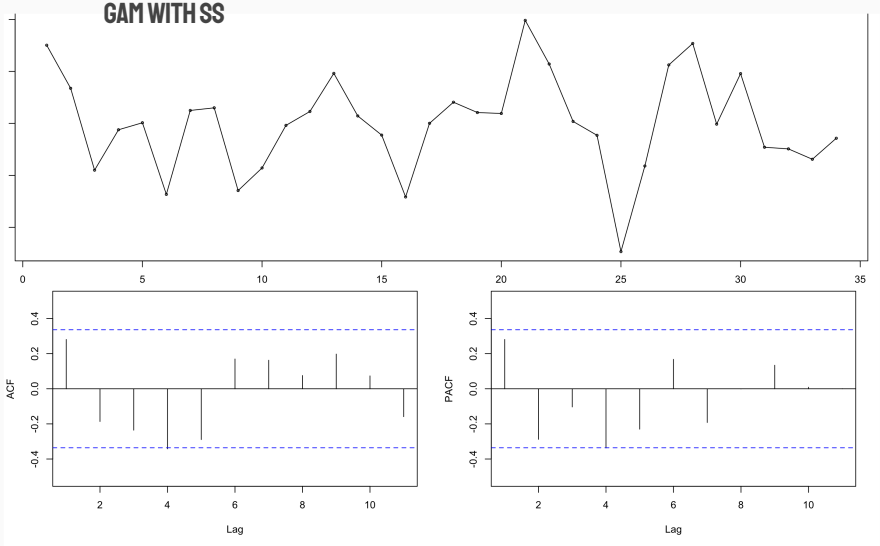
NONPARAMETRIC EFFECTS	F	P-value
S (trend)	6,971	**0,004**
S (income)	5,608	**0,010**

RESIDUALS

GAM WITHOUT SS



GAM WITH SS



CONCLUSIONS

THE PROGRAM

In order to describe the program dynamics better and be able to predict it, some **micro-level indicators** are needed that can define behavioral aspect: intentions ≠ actions
Use of questionnaires

THE MORTGAGE OVERALL

Real disposable income seems to be the strongest external indicator out of other proposed variables in the prediction of mortgage. More data can be tested.
The problem is different frequency of macroeconomic data collection: monthly, quarterly, yearly

THANK YOU