

# Data

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The data consists of three columns

column	count	unique	nan	range
Atm	8942	9	0	ATM1 - ATM9
ProcessDate	8942	1034	0	2017-01-01 - 2019-10-31
Withdrawal	8942		0	20 - 191210

The minimal withdrawal amount is 20 PLN.

## Withdrawal

Withdrawal	
count	8942
mean	25271.2
std	19715.9
min	20
25%	9960
50%	21325
75%	36935
max	191210

## Values by ATM

```
df.groupby('Atm').agg(['min', 'max', 'count'])
```

Atm	ProcessDate, min	ProcessDate, max	Withdrawal, min	Withdrawal, max	count
ATM1	2017-01-02	2019-10-31	20	93060	883
ATM2	2017-01-01	2019-10-31	570	97120	1034
ATM3	2017-01-01	2019-10-31	50	72940	1029
ATM4	2017-01-01	2019-10-31	200	85530	1028
ATM5	2017-01-01	2019-10-31	80	73080	1030
ATM6	2017-01-01	2019-10-31	300	84450	1031

Atm	ProcessDate, min	ProcessDate, max	Withdrawal, min	Withdrawal, max	count
ATM7	2017-01-02	2019-10-31	150	50790	941
ATM8	2017-01-01	2019-10-31	20	191210	1018
ATM9	2017-01-02	2019-10-31	2590	83700	948

## Index continuity

### missing days

ATM1	150
ATM2	0
ATM3	5
ATM4	6
ATM5	4
ATM6	3
ATM7	92
ATM8	16
ATM9	85

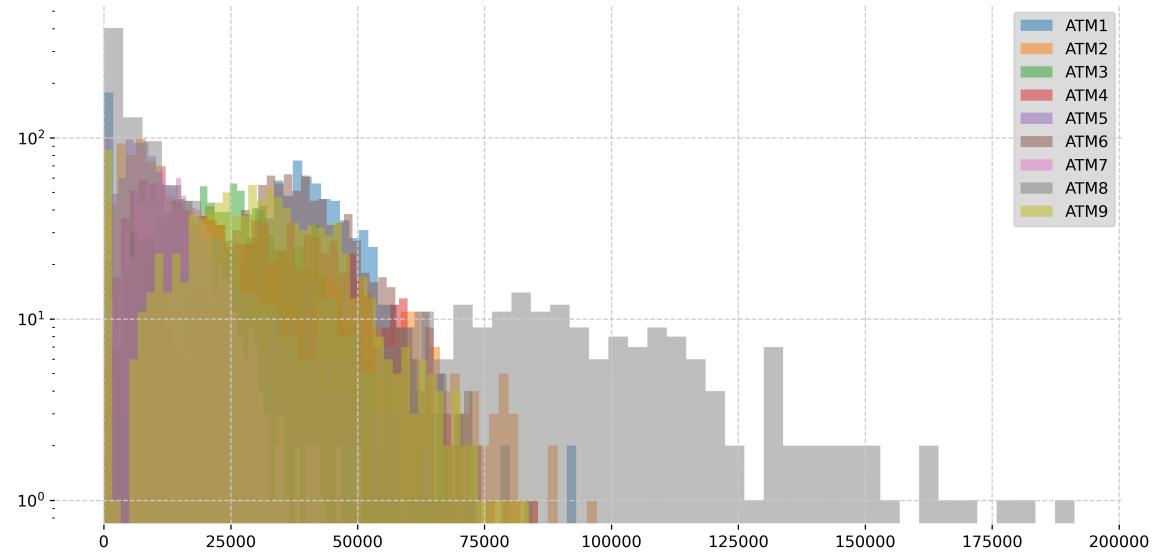
## Discontinuity by week day

	ATM1	ATM2	ATM3	ATM4	ATM5	ATM6	ATM7	ATM8	ATM9
0	7	nan	nan	nan	nan	1	9	7	7
1	5	nan	1	2	nan	nan	7	5	5
2	5	nan	nan	2	nan	nan	5	1	5
3	6	nan	nan	2	2	nan	6	2	6
4	2	nan	nan	nan	1	nan	2	nan	2
5	2	nan	1	nan	1	nan	3	nan	3
6	123	nan	3	nan	nan	2	60	1	57

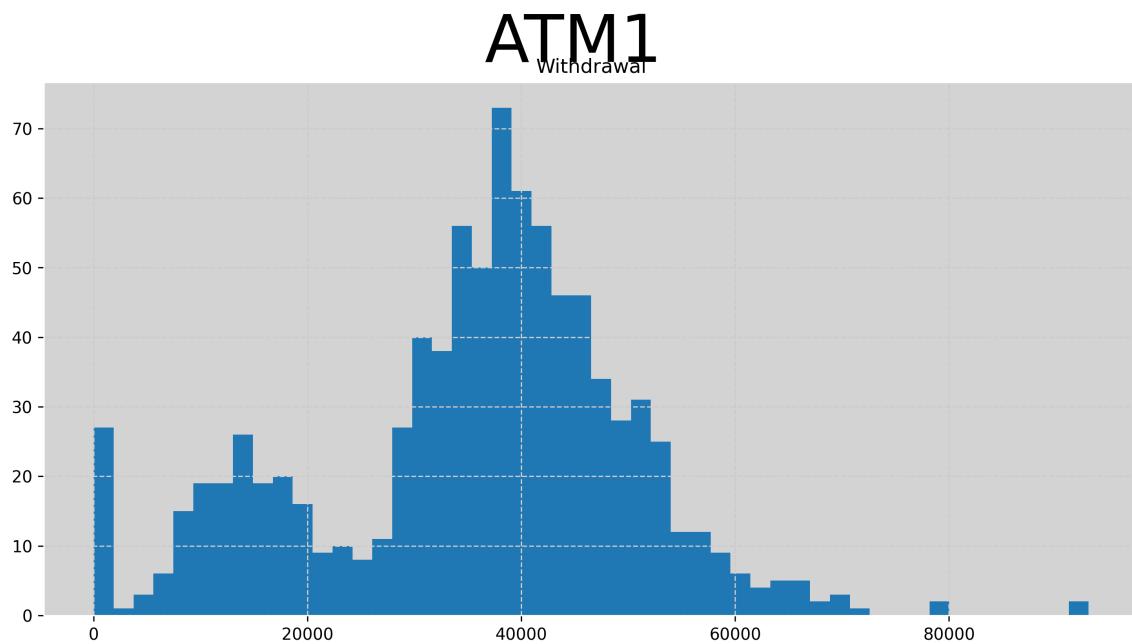
It is evident that missing days mostly coincide with Sundays. It seems those dates indicate zero withdrawals. Therefore missing dates were replaced by zero values.

## Histograms by ATM

All ATMs

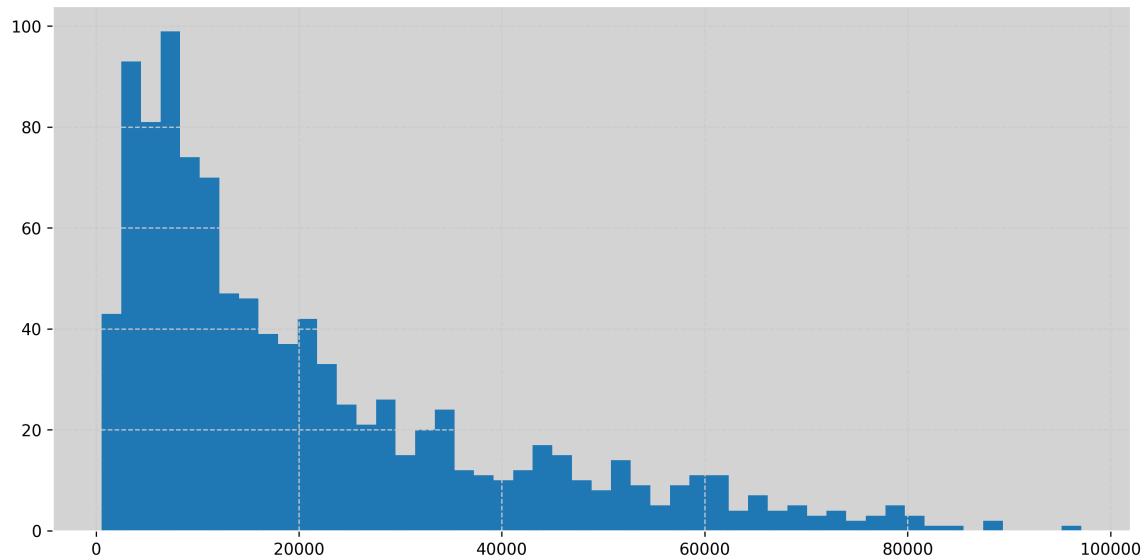


ATM1



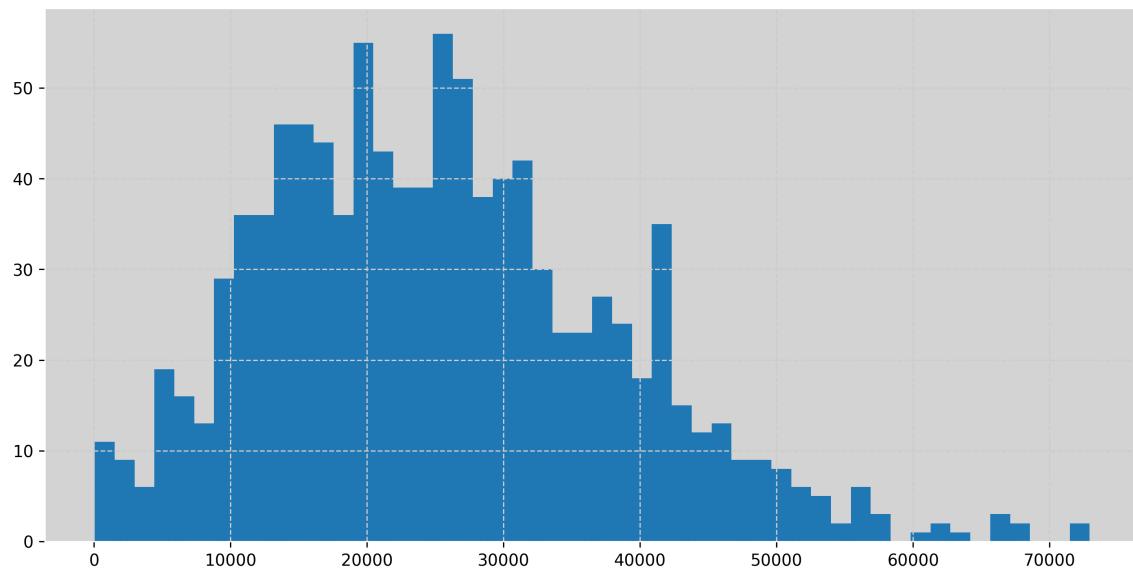
ATM2

## ATM2



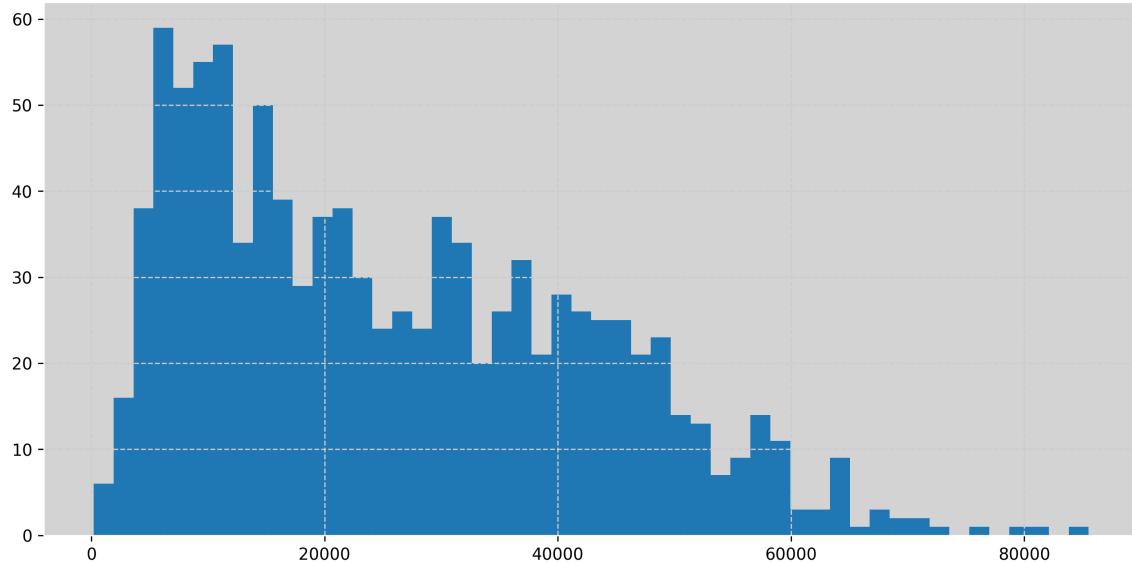
## ATM3

## ATM3



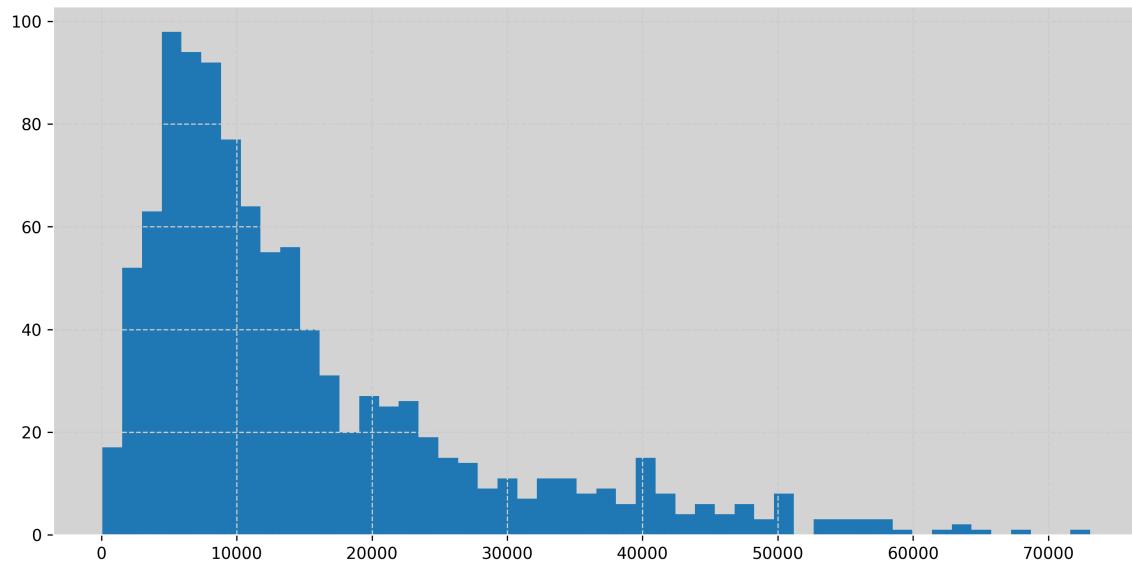
## ATM4

## ATM4 Withdrawal



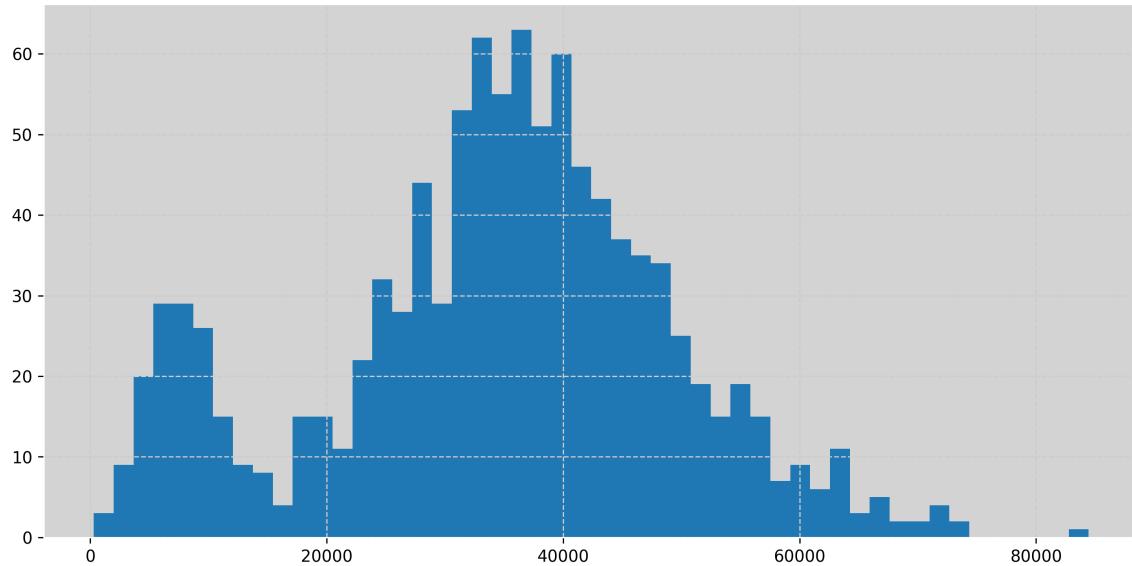
## ATM5

## ATM5 Withdrawal



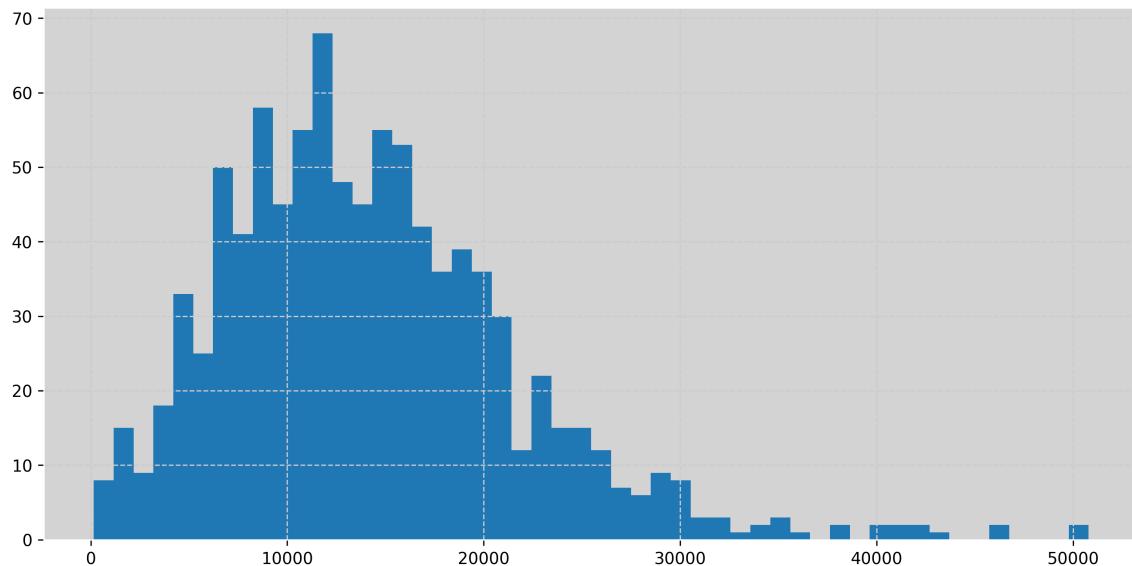
## ATM6

## ATM6



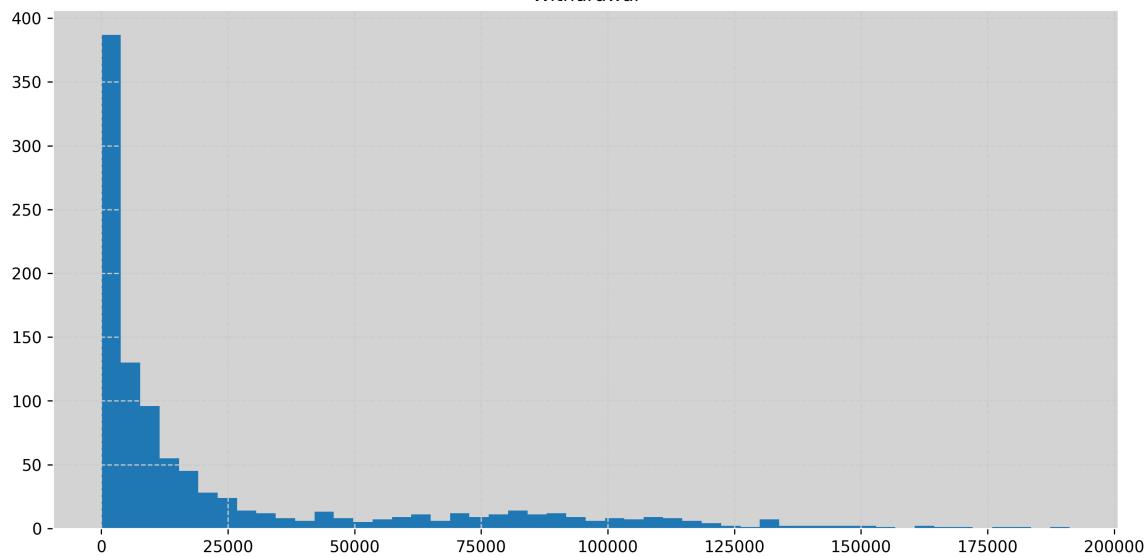
## ATM7

## ATM7



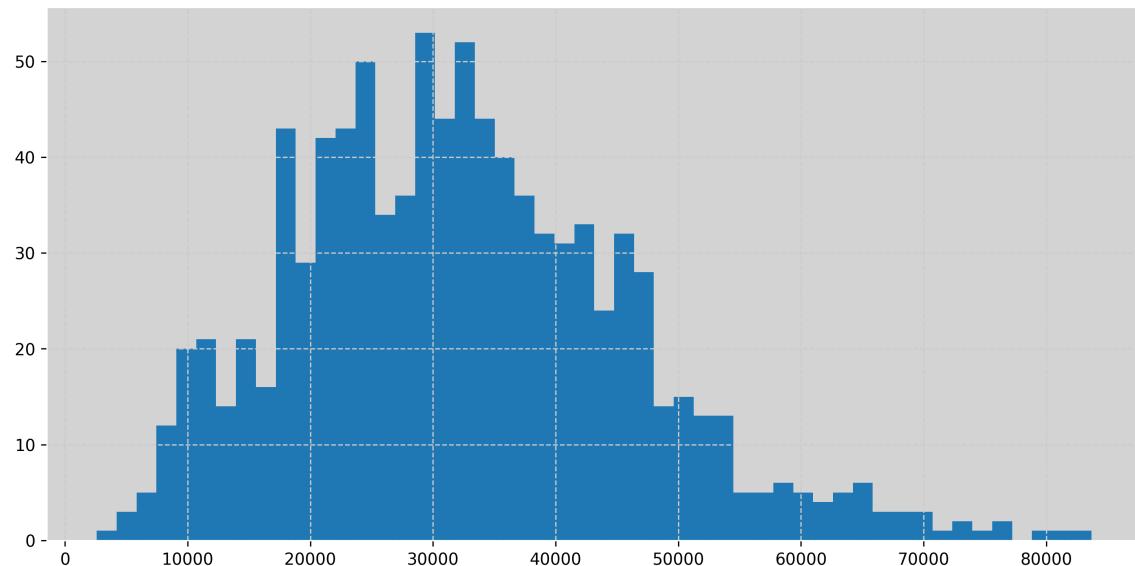
## ATM8

## ATM8



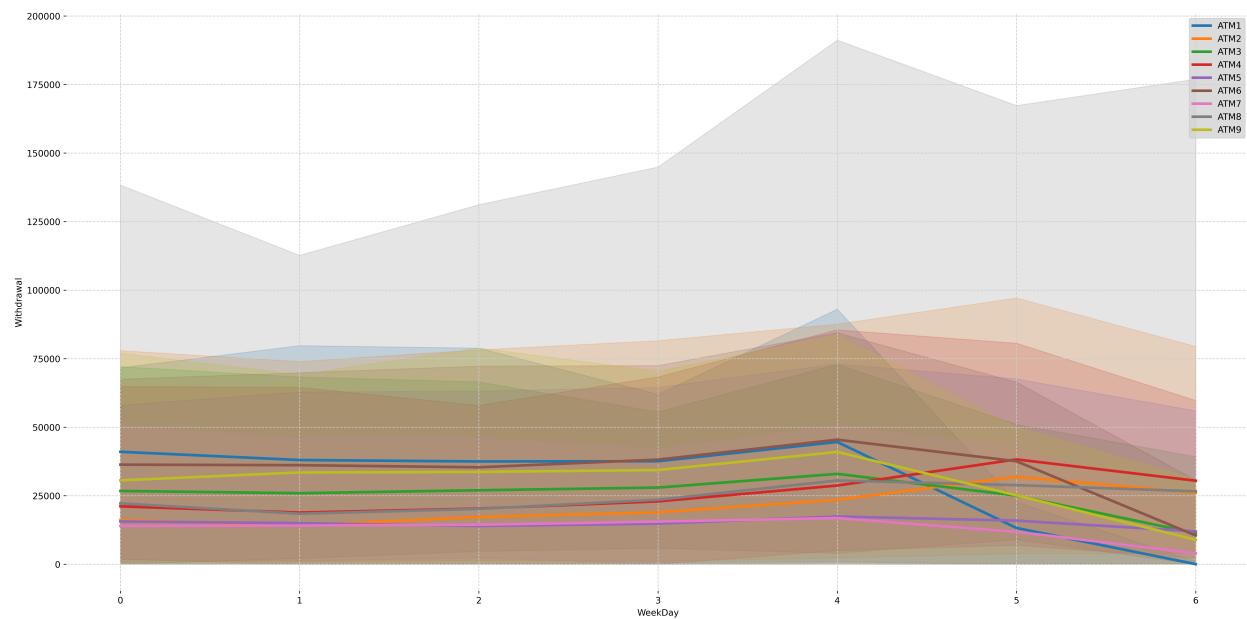
ATM9

## ATM9



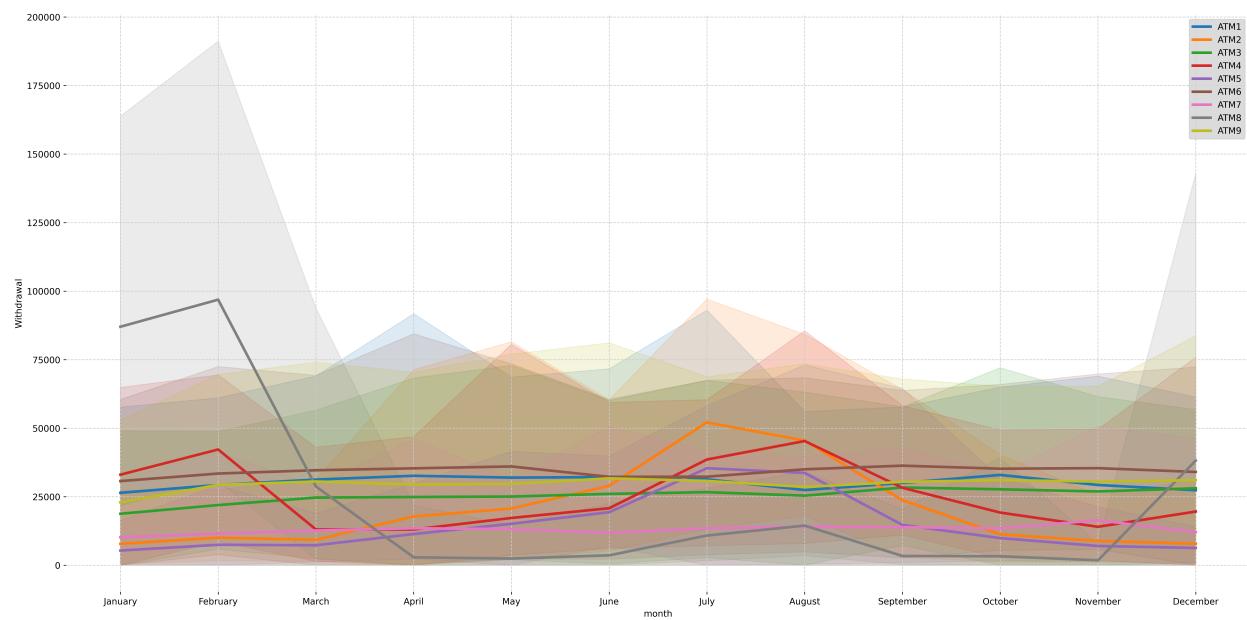
Withdrawal by Weekday

Weekday distribution



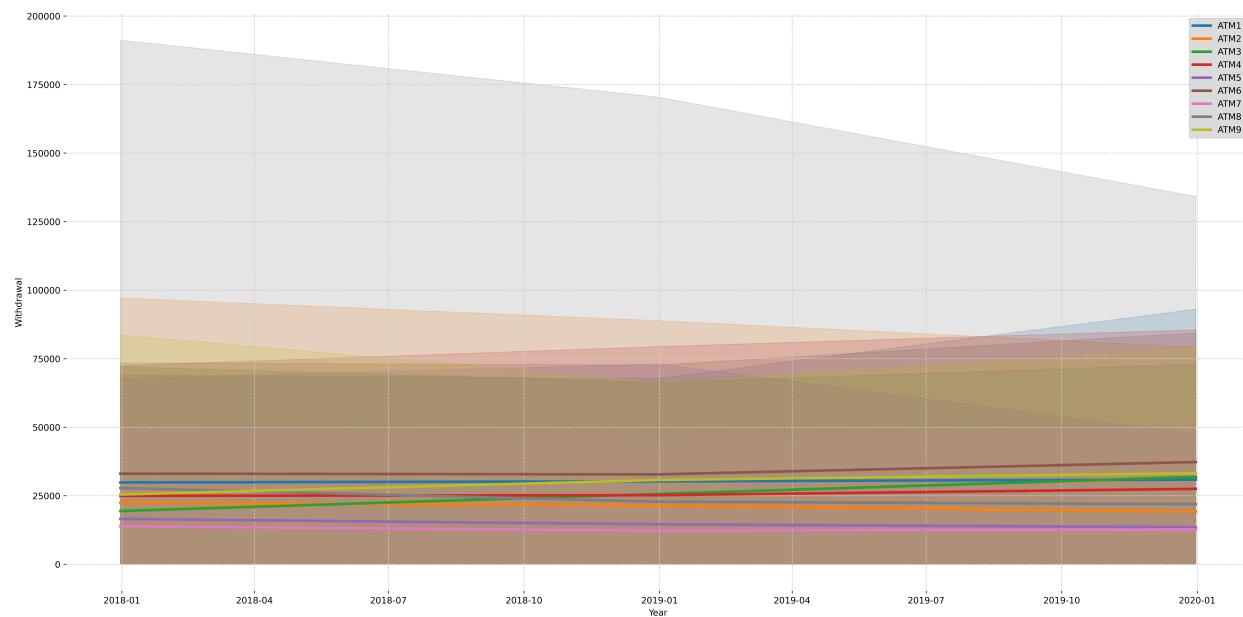
## Withdrawal by Month

Month distribution

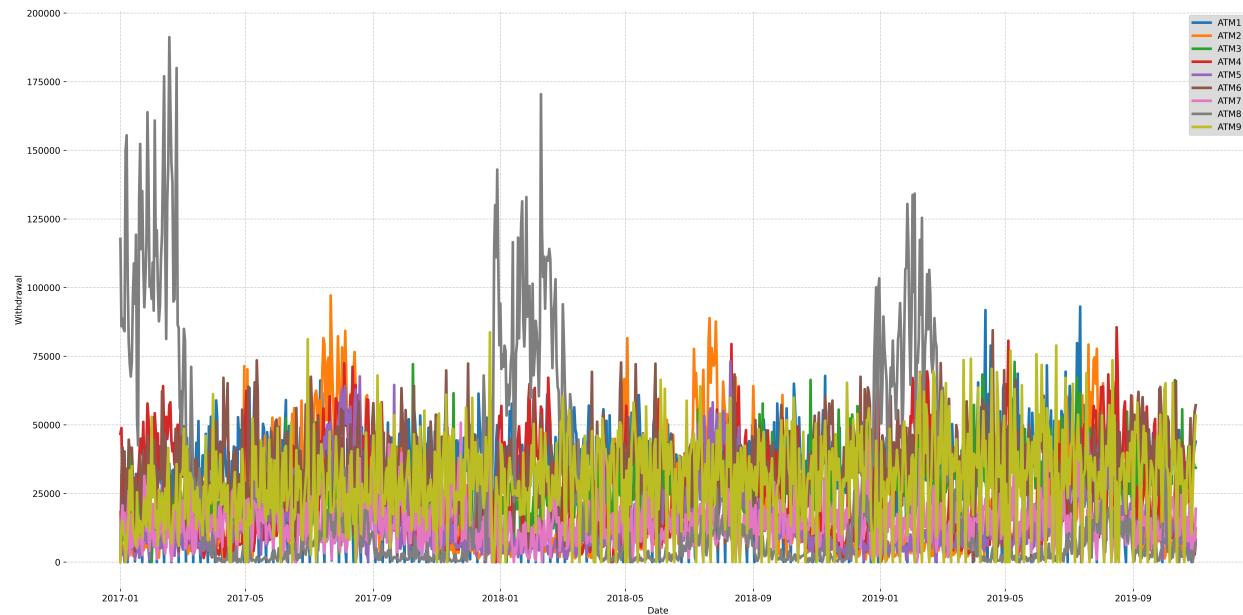


## Withdrawal by Year

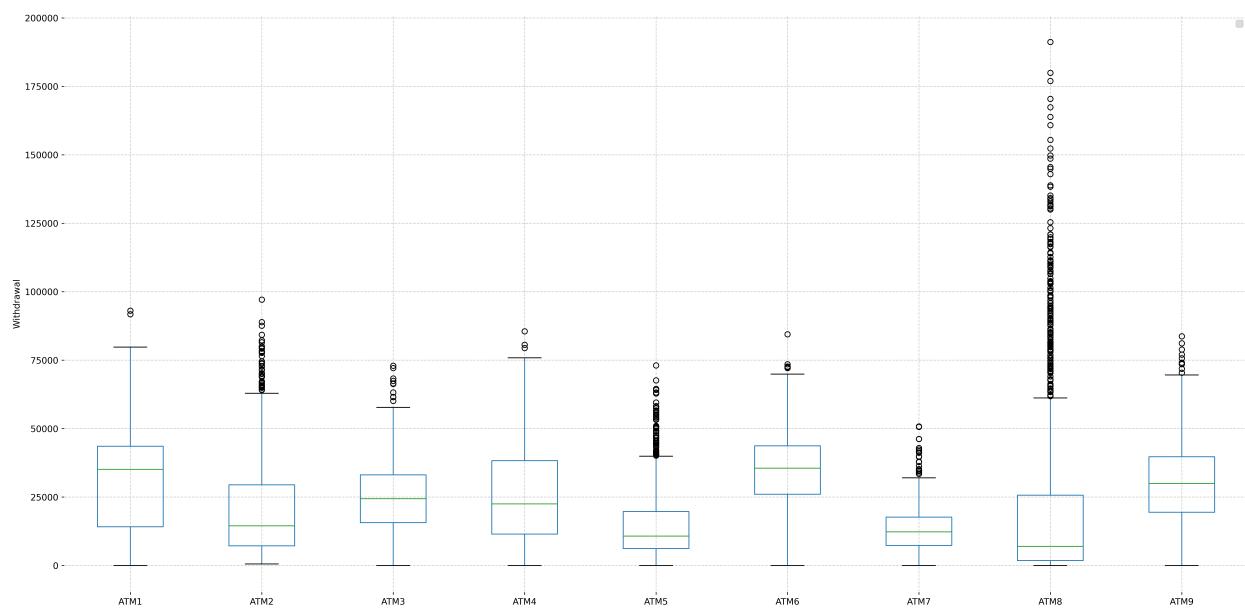
Year distribution



## Withdrawal all times



## Boxplot

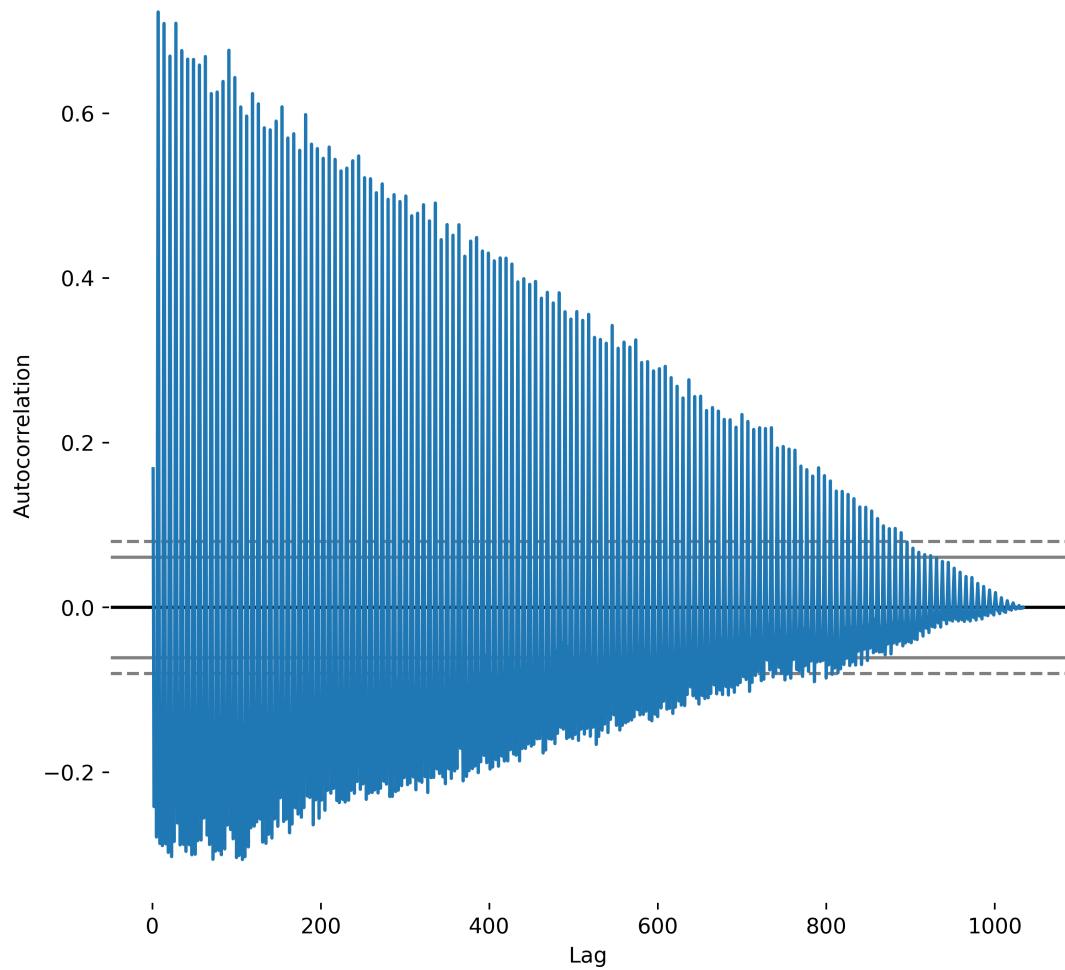


	<b>count</b>	<b>mean</b>	<b>std</b>	<b>min</b>	<b>25%</b>	<b>50%</b>	<b>75%</b>	<b>max</b>
ATM1	1034	30293.3	18679.7	0	14157.5	35100	43535	93060
ATM2	1034	21134.5	18756.4	570	7165	14495	29485	97120
ATM3	1034	25271.4	12840.9	0	15640	24410	33087.5	72940
ATM4	1034	25797.2	16771.7	0	11462.5	22485	38290	85530
ATM5	1034	14954.9	12569.3	0	6212.5	10755	19732.5	73080
ATM6	1034	34208.1	15086.3	0	26010	35530	43690	84450
ATM7	1034	12958.8	8267.86	0	7342.5	12280	17665	50790
ATM8	1034	24331	36563	0	1800	7005	25685	191210
ATM9	1034	29595.2	15854.3	0	19437.5	29955	39727.5	83700

## Autocorrelation

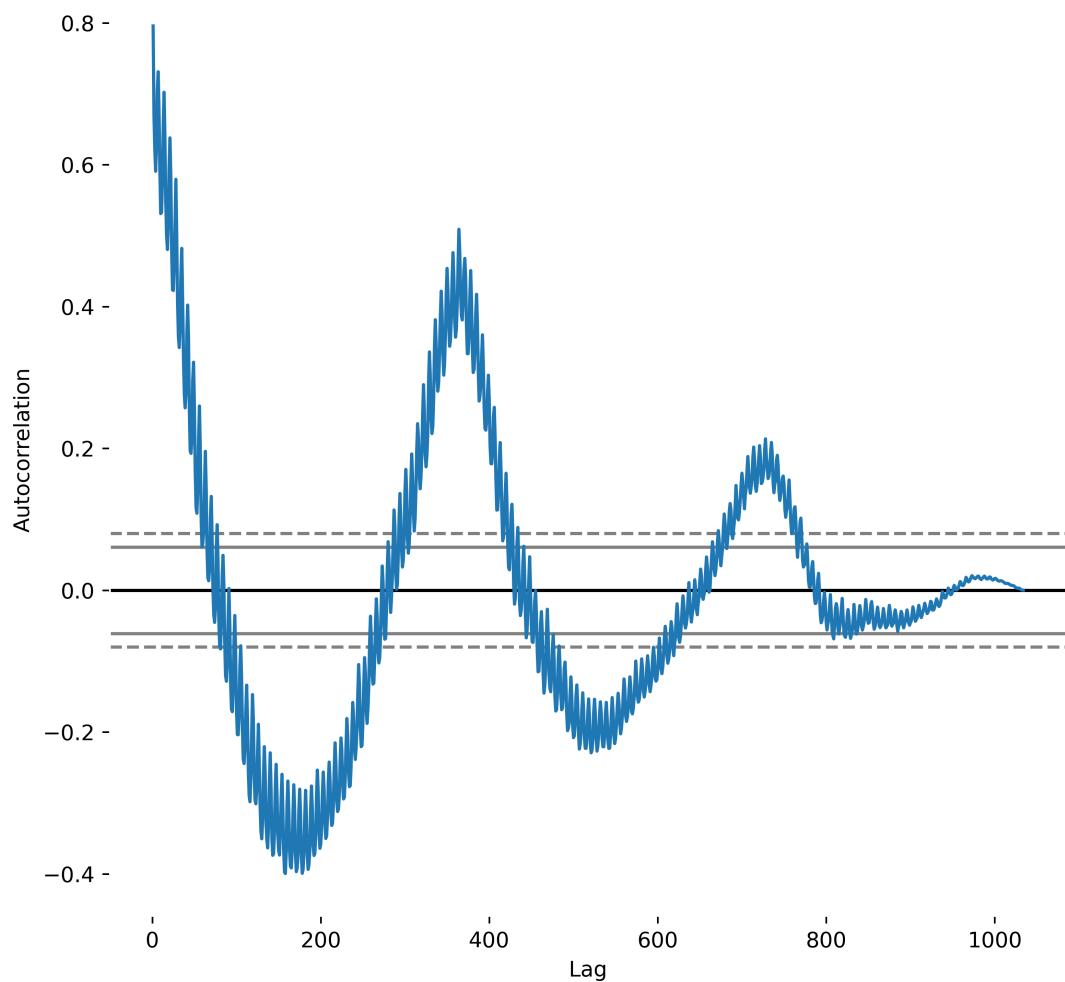
ATM1

# ATM1



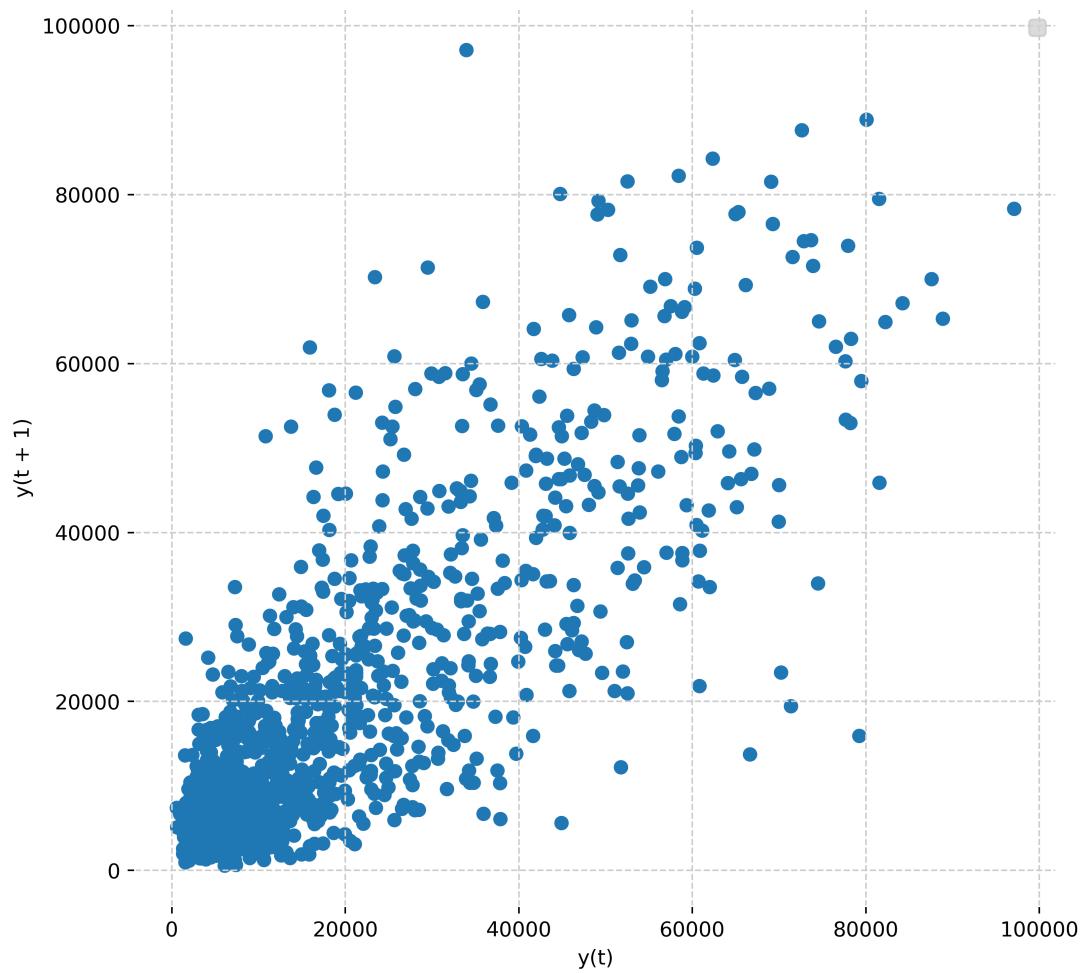
ATM2

# ATM2



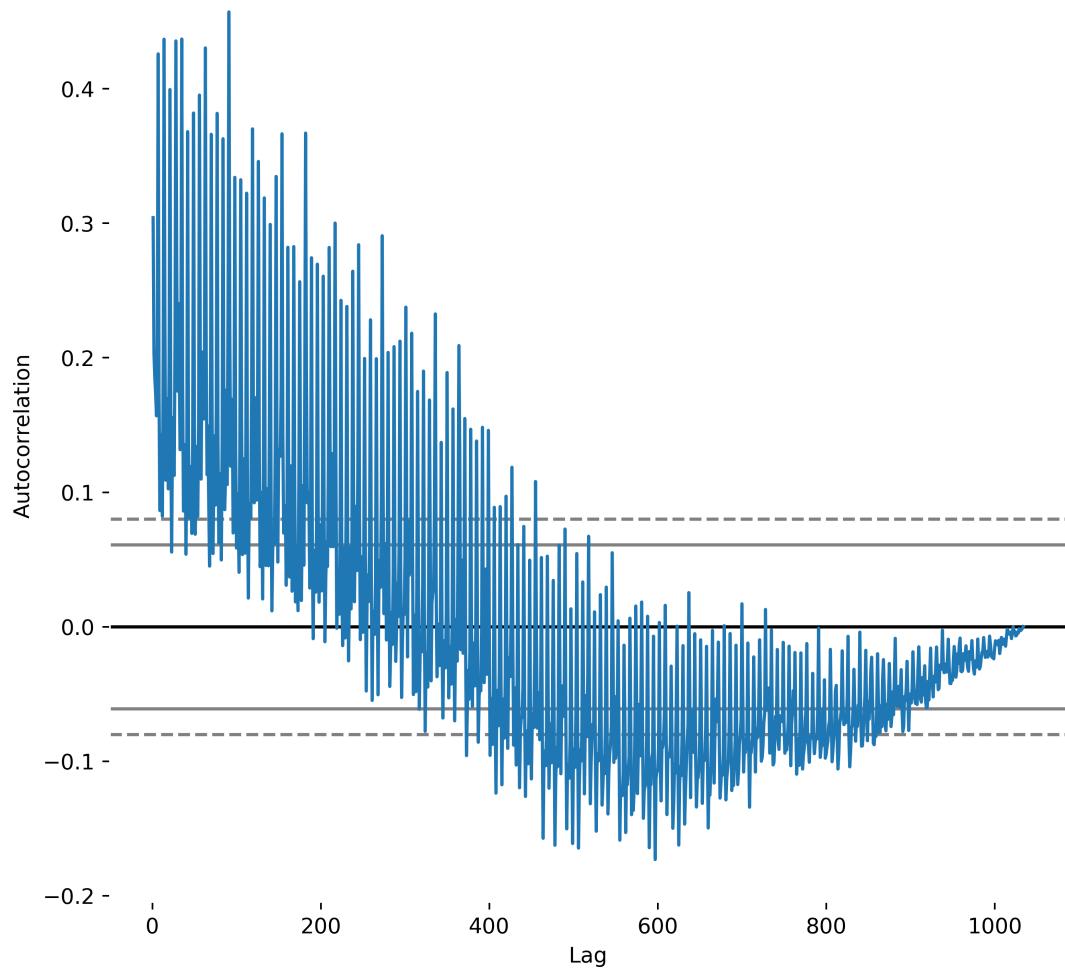
One day lag

# ATM2 Lag:1



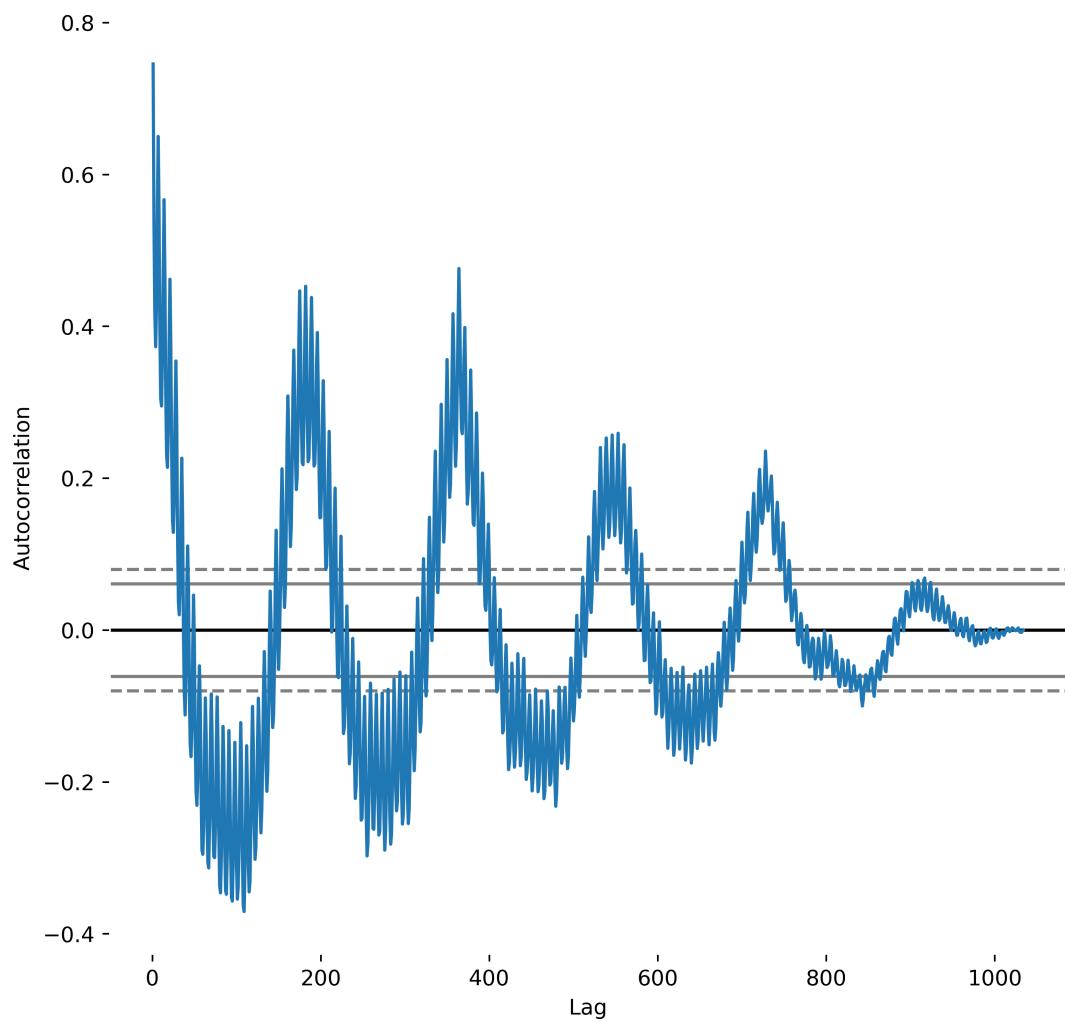
ATM3

# ATM3



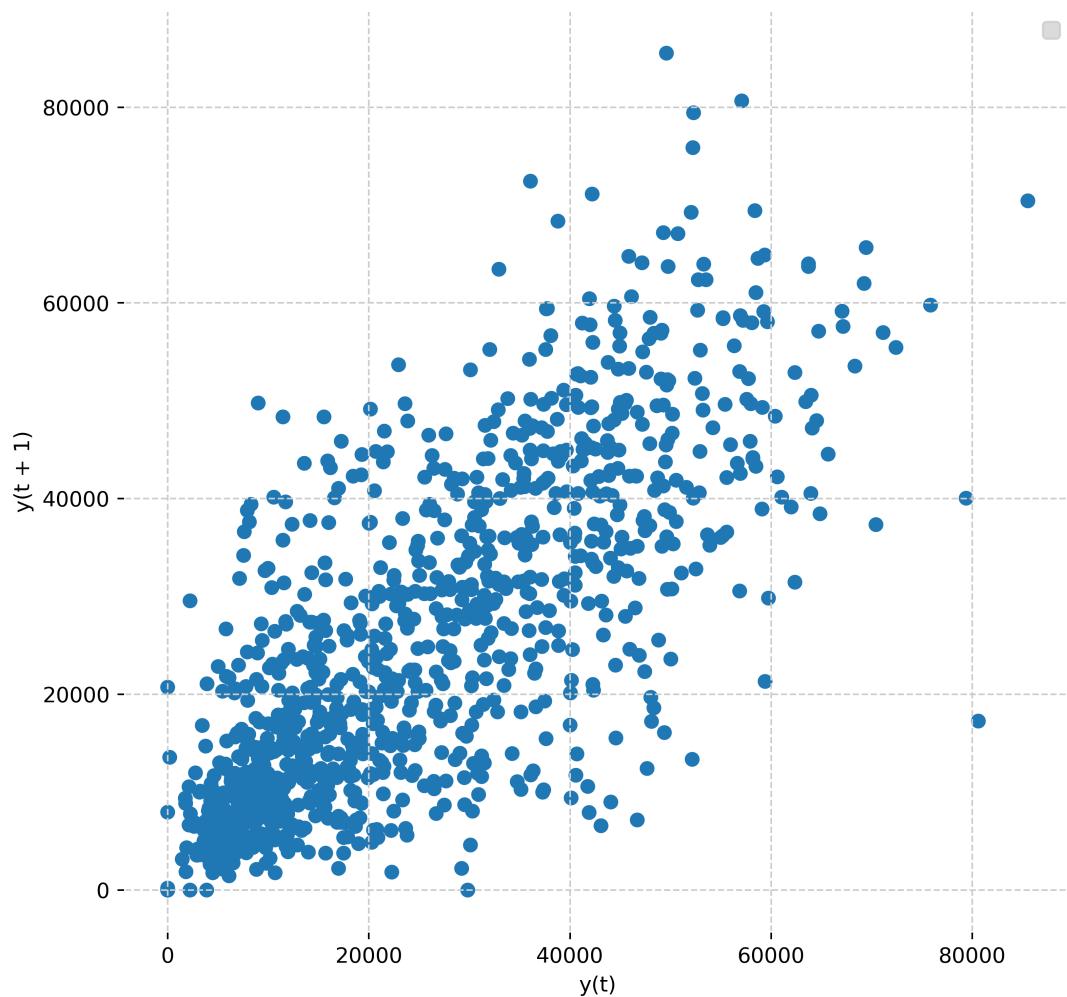
ATM4

# ATM4



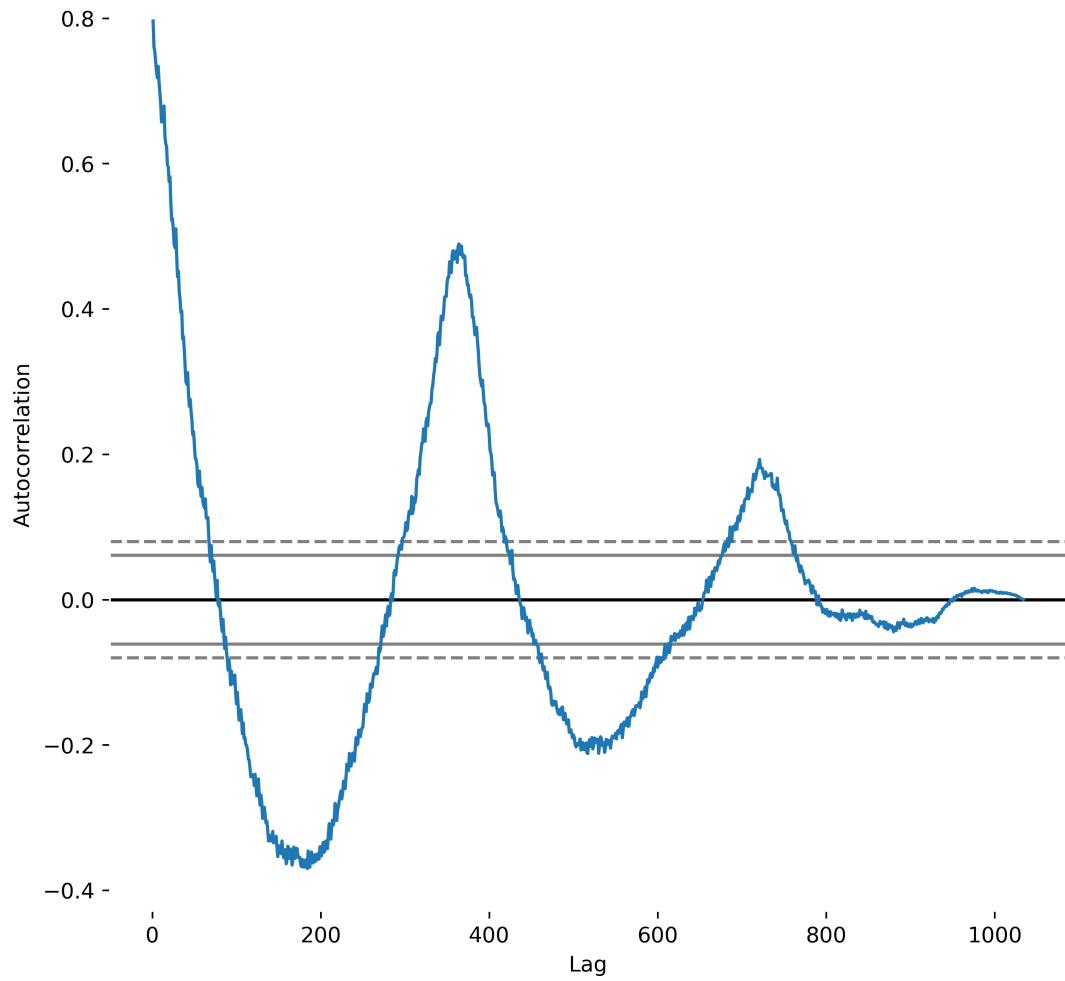
One day lag

# ATM4 Lag:1



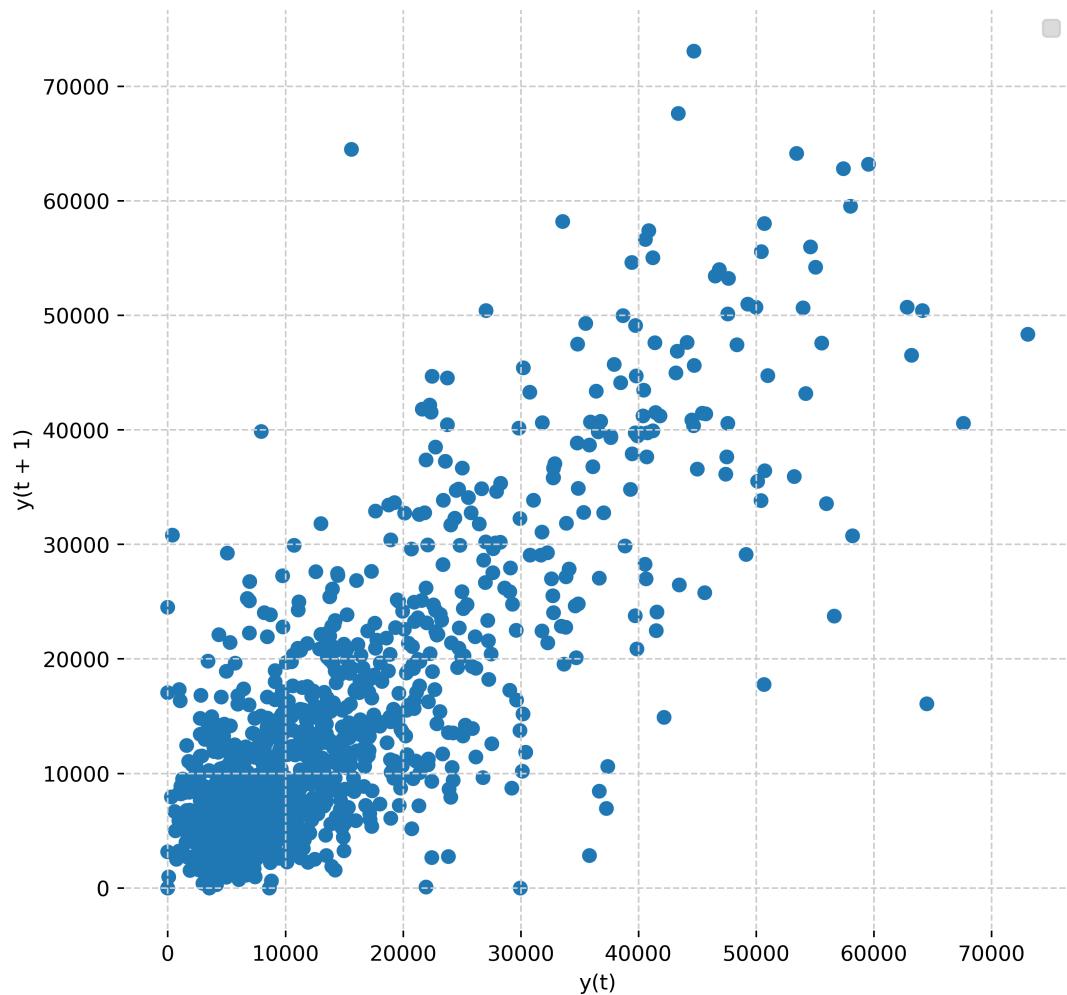
ATM5

# ATM5



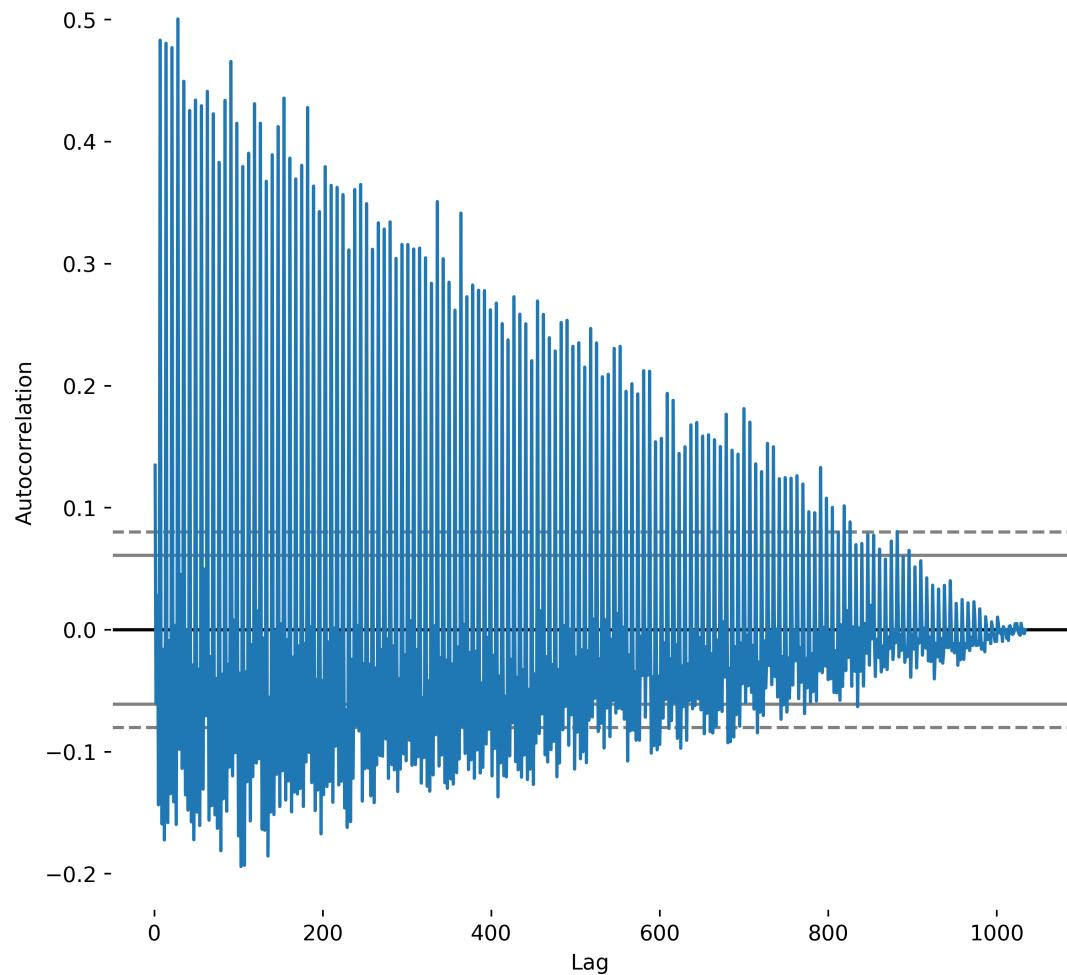
One day lag

# ATM5 Lag:1



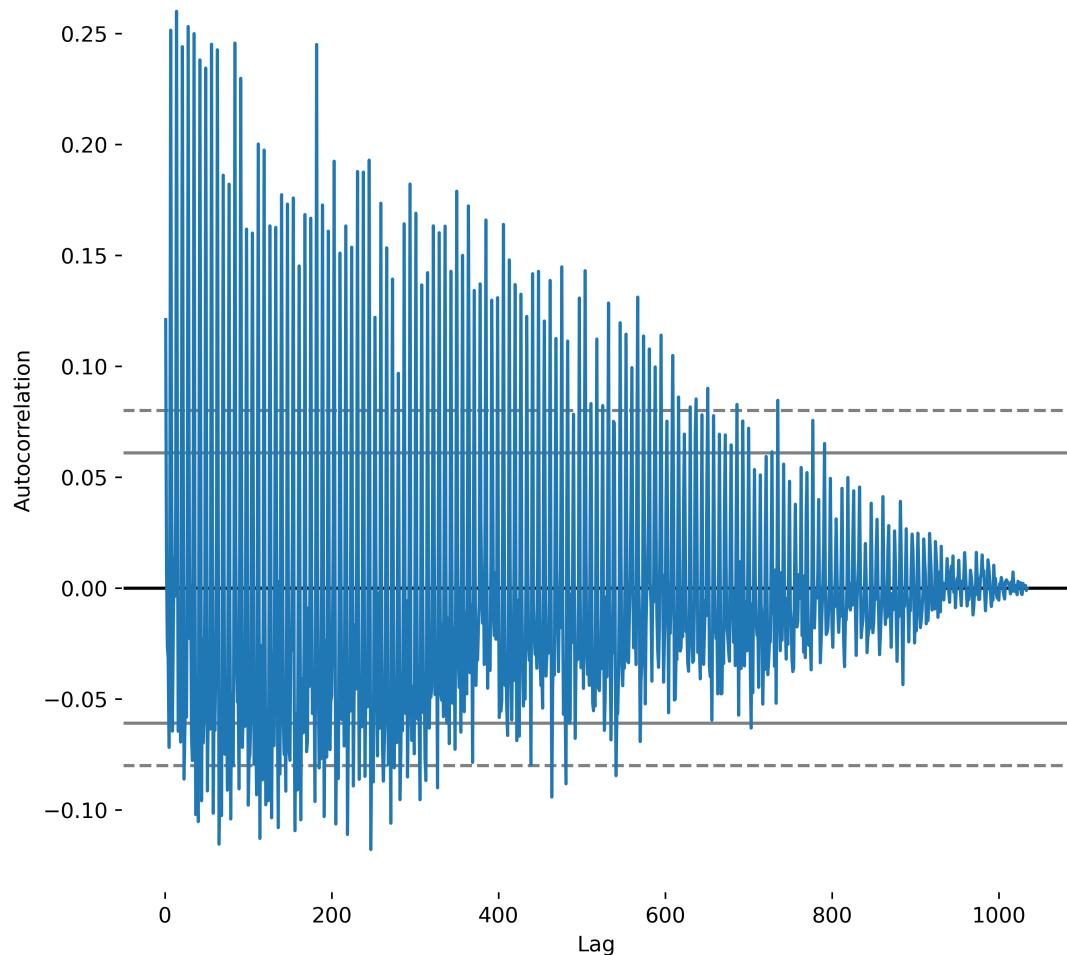
ATM6

# ATM6



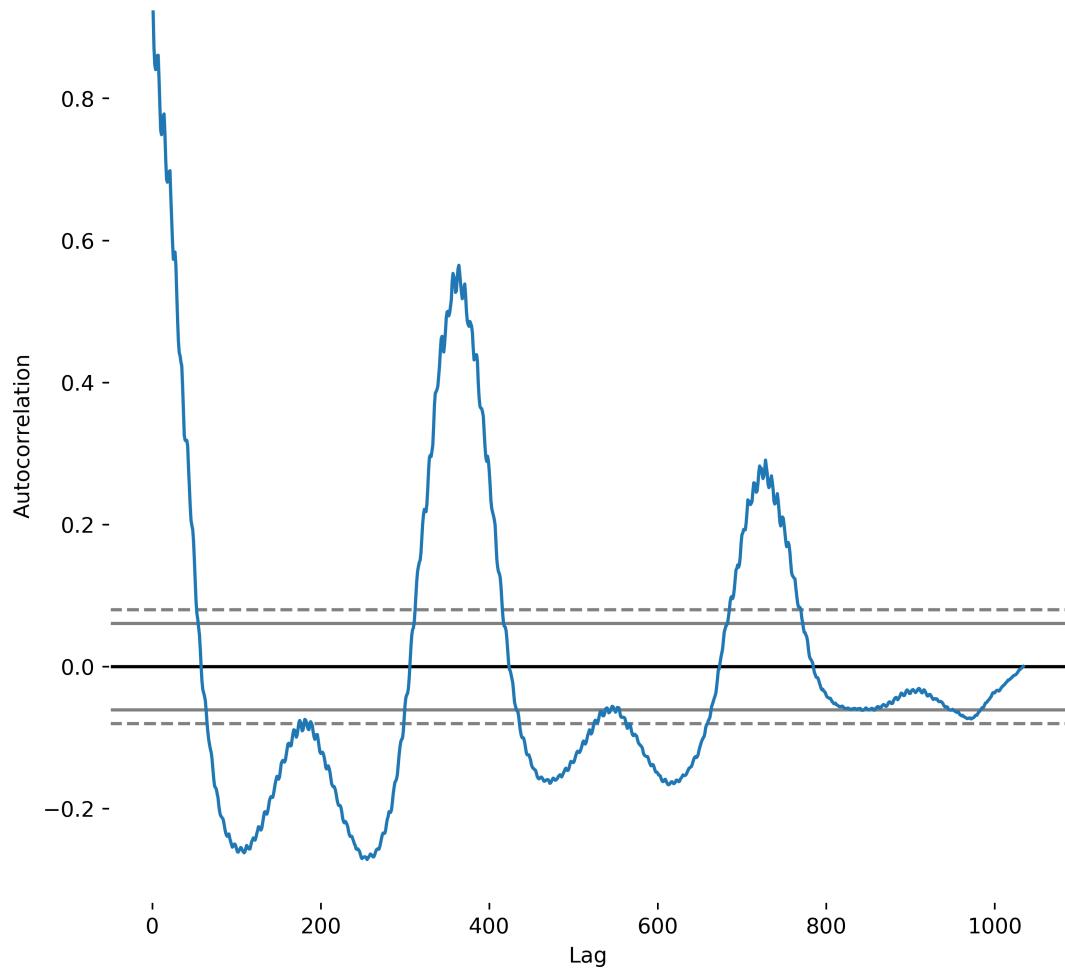
ATM7

# ATM7



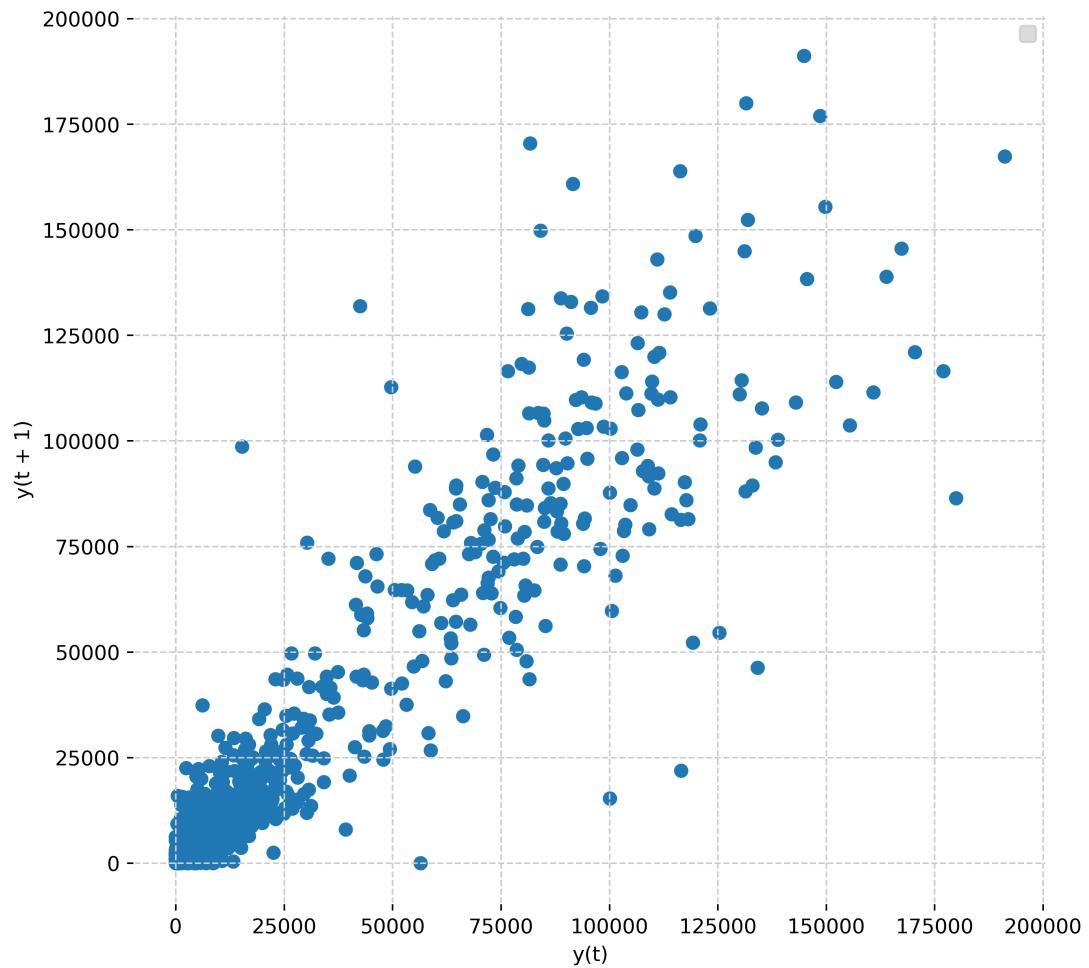
ATM8

# ATM8



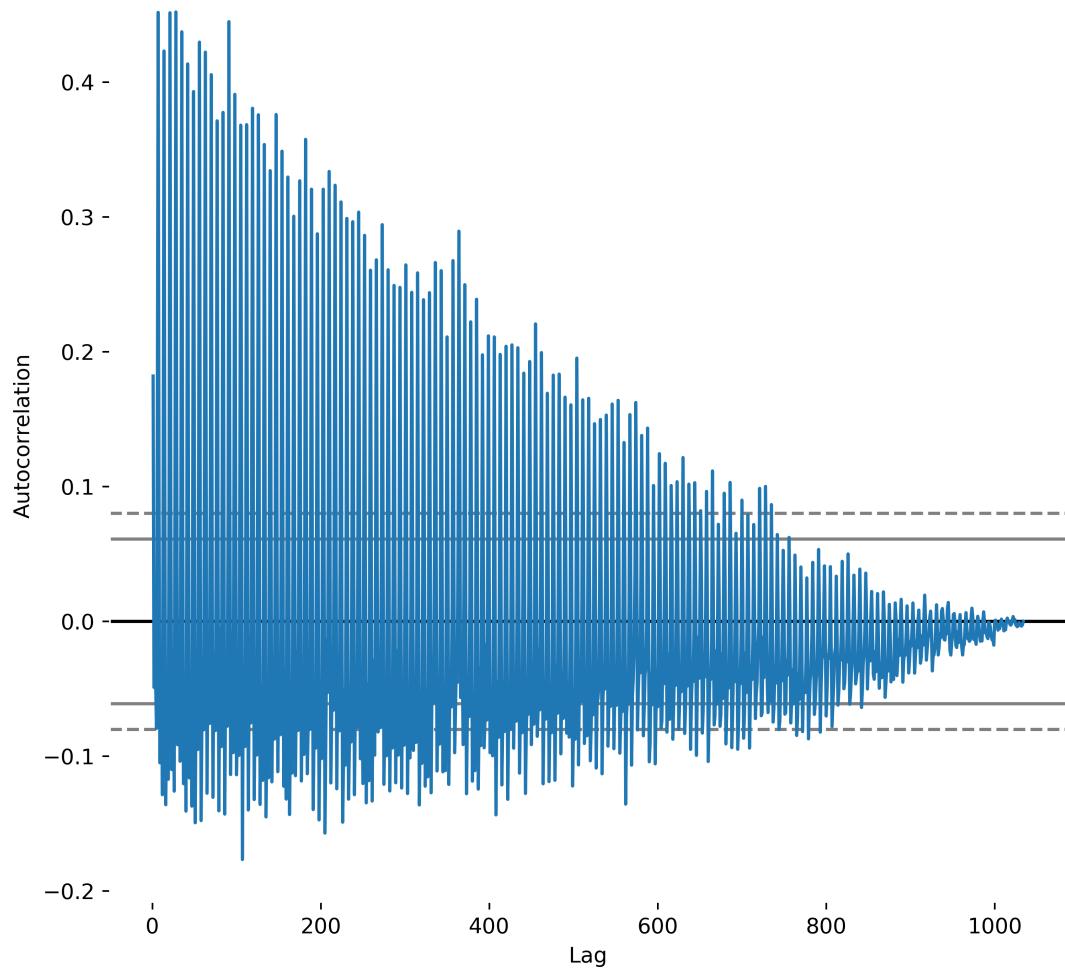
One day lag

# ATM8 Lag:1



ATM9

# ATM9



## Summary

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	<b>Season</b>	<b>Week</b>	<b>Comment</b>
ATM1	None	Yes	Essential withdrawal decay at Sundays
ATM2	Summer	Yes	
ATM3	None	Yes	
ATM4	Winter, Summer	Yes	Withdrawal increase in Saturdays
ATM5	Summer	Yes	

	<b>Season</b>	<b>Week</b>	<b>Comment</b>
ATM6	None	Yes	
ATM7	None	Yes	
ATM8	Winter, Summer	Yes	
ATM9	None	Yes	