

Analysis and comparison of Covid-19 epidemic impact on online retailers trends

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Business, Economics and Financial Data
18 January 2022



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- 2 Alibaba
 - revenue analysis
 - income analysis
- 3 Amazon
 - revenue analysis
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- 4 eBay
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- 5 Conclusions

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■ Aim of the project

Analyze trends of main online retail companies in the last decade and perform a diagnostic of sudden changes in income and revenue, in particular during the Covid-19 epidemic spread period

■ Analyzed Companies

- 1 Alibaba
- 2 Amazon
- 3 eBay

■ Used Methods

with '**DIMORA**' package in R:

- 1 Auto-Correlation plot inspection
- 2 Residual Analysis
- 3 Bass Model and Generalized Bass Model
- 4 SARIMA regression

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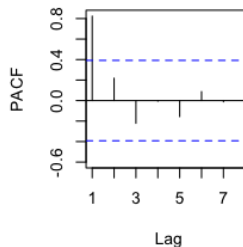
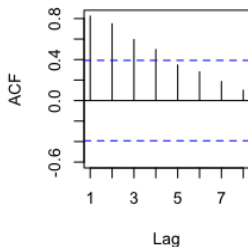
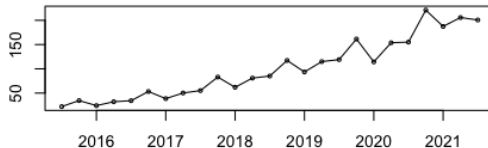
- revenue analysis
- income analysis

5 Conclusions

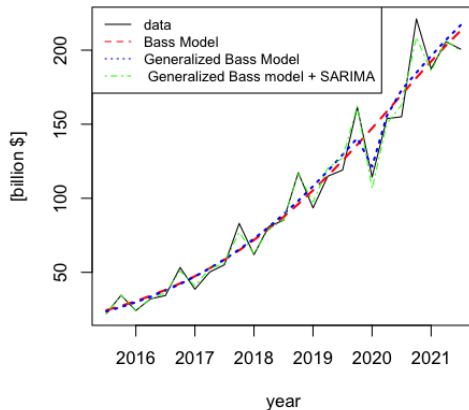
Alibaba: revenue analysis



Alibaba revenue in billion U.S. dollars



alibaba revenue in billion U.S. dollars

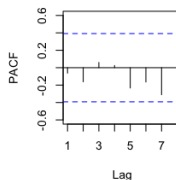
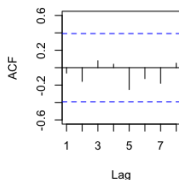
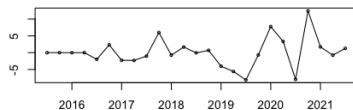


$$\tilde{R}^2 = \frac{SSE_B - SSE_{GB}}{SSE_B} = \frac{R_{GB}^2 - R_B^2}{1 - R_B^2} = 0.28 \sim 0.3$$

Alibaba: revenue analysis

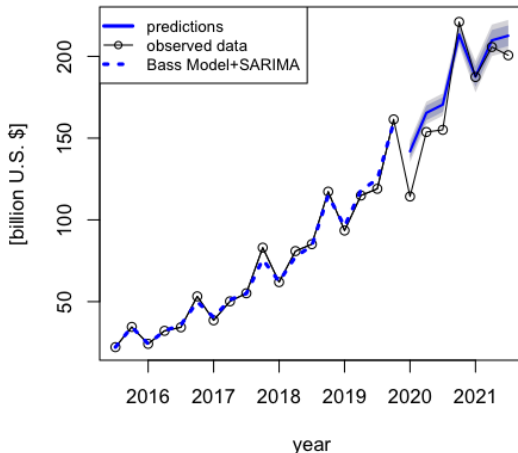


alibaba revenue
residuals on Generalized Bass model + SARIMA



m	p	q	a1	b1	c1
7792.1	$3 \cdot 10^{-3}$	10^{-1}	18.9	-13.4	-3.1
p	d	q	P	D	Q
1	0	0	0	1	0

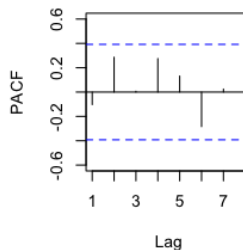
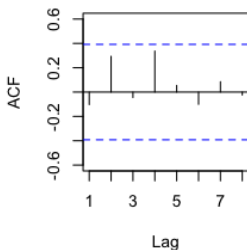
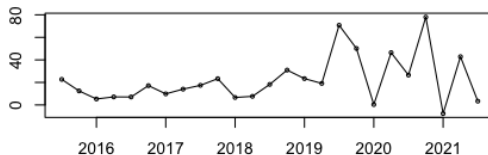
Alibaba revenue: predictions without COVID-19 epidemic

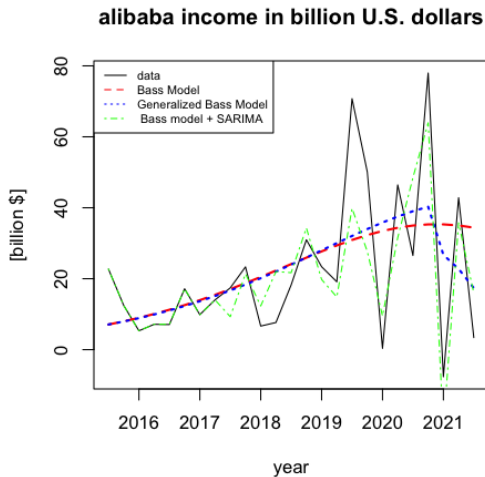


Alibaba: income analysis



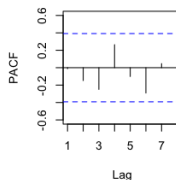
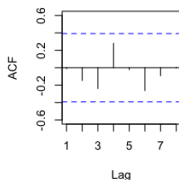
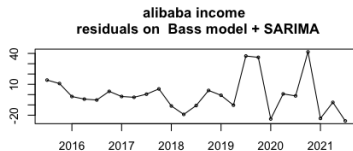
Alibaba income in billion U.S. dollars





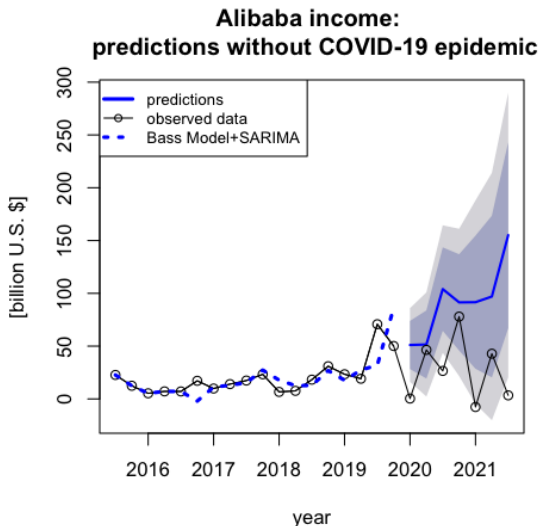
$$\tilde{R}^2 = 0.1$$

Alibaba: income analysis



m	p	q	a1	b1	c1
1302	$5 \cdot 10^{-3}$	$1.2 \cdot 10^{-1}$	22	0.25	-0.3
p	d	q	P	D	Q
1	0	0	3	2	0

Alibaba: income analysis

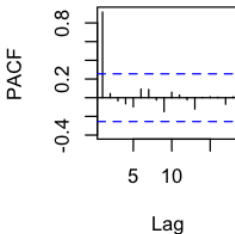
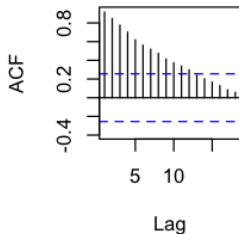
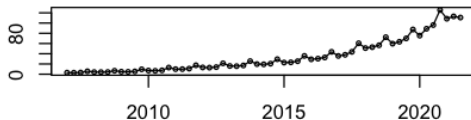


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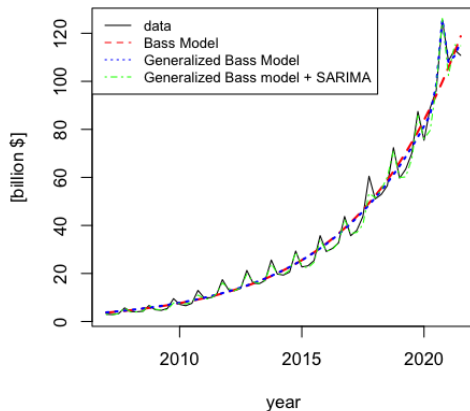
Amazon: revenue analysis



Amazon revenue in billion U.S. dollars



Amazon revenue in billion U.S. dollars

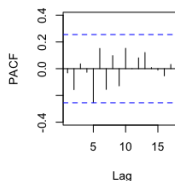
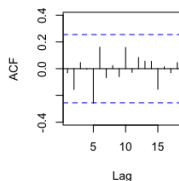
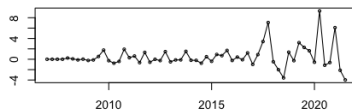


$$\tilde{R}^2 = 0.52$$

Amazon: revenue analysis

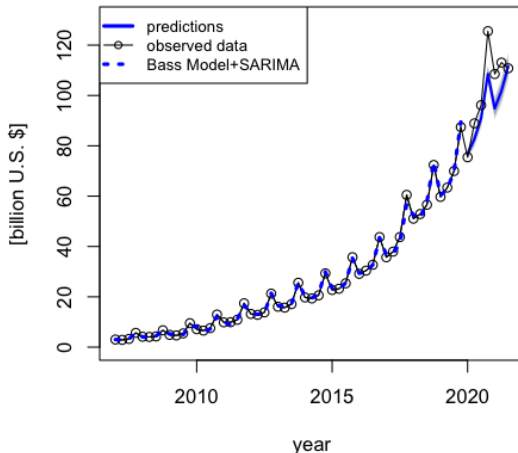


Amazon revenue
residuals on Generalized Bass model + SARIMA



m	p	q	a1	b1	c1
$4.7 \cdot 10^4$	$7.8 \cdot 10^{-5}$	$6 \cdot 10^{-2}$	54.9	-2.0	0.8
p	d	q	P	D	Q
1	0	3	0	1	0

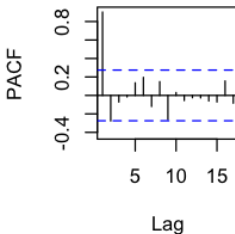
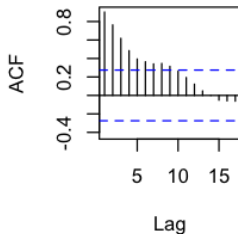
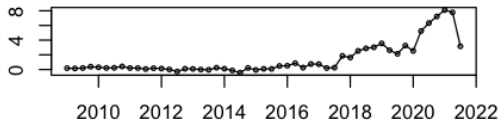
Amazon revenue: predictions without COVID-19 epidemic



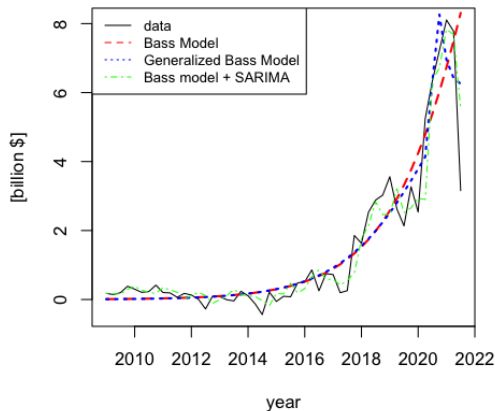
Amazon: income analysis



Amazon income in billion U.S. dollars



Amazon income in billion U.S. dollars

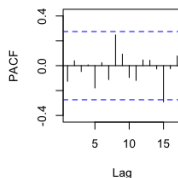
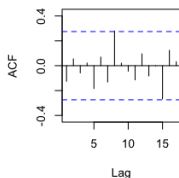
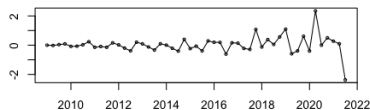


$$\tilde{R}^2 = 0.05$$

Amazon: income analysis

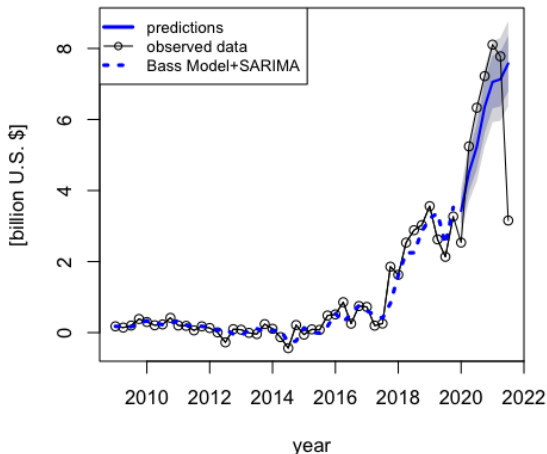


Amazon income
residuals on Bass model + SARIMA



m	p	q	a1	b1	c1
168.5	$5.1 \cdot 10^{-5}$	0.14	46.6	-0.9	1.2
p	d	q	P	D	Q
0	1	5	1	0	0

Amazon income: predictions without COVID-19 epidemic

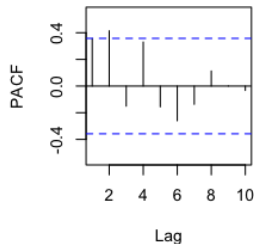
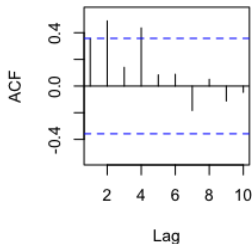
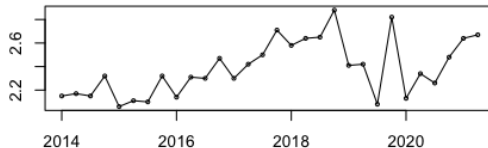


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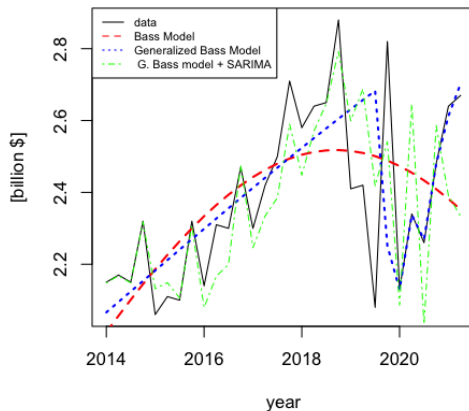
eBay: revenue analysis



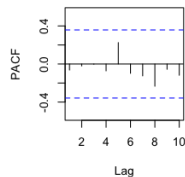
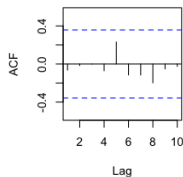
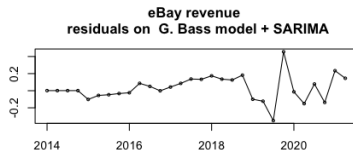
eBay revenue in billion U.S. dollars



eBay revenue in billion U.S. dollars

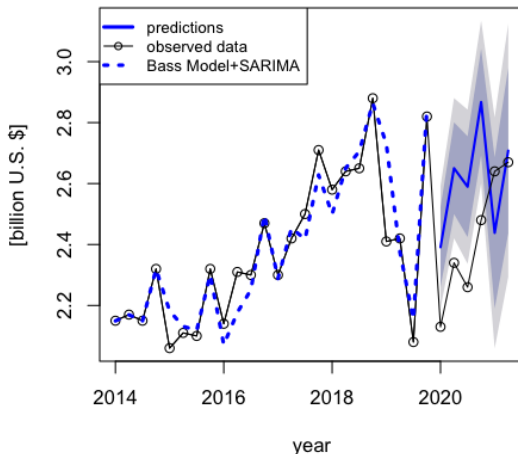


$$\tilde{R}^2 = 0.3$$



m	p	q	a1	b1	c1	a2	b2	c2
431.6	$4.7 \cdot 10^{-3}$	0.02	23.6	-1.0	-0.5	25.6	-0.4	-0.2
	p	d	q		P	D	Q	
	0	0	2		0	1	0	

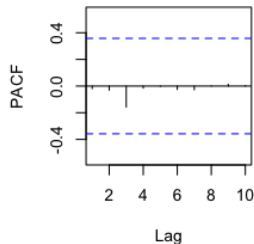
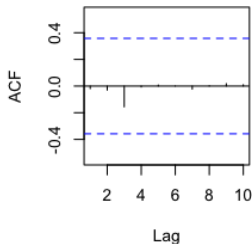
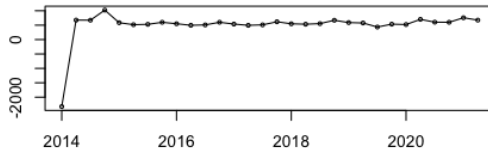
ebay revenue:
predictions without COVID-19 epidemic

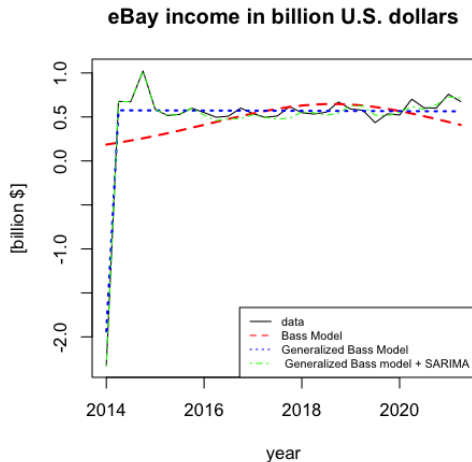


eBay: income analysis

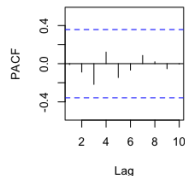
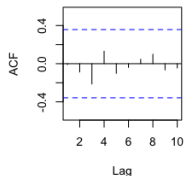
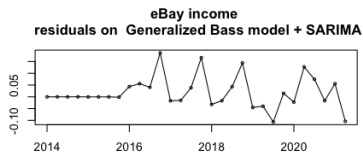


eBay income in billion U.S. dollars

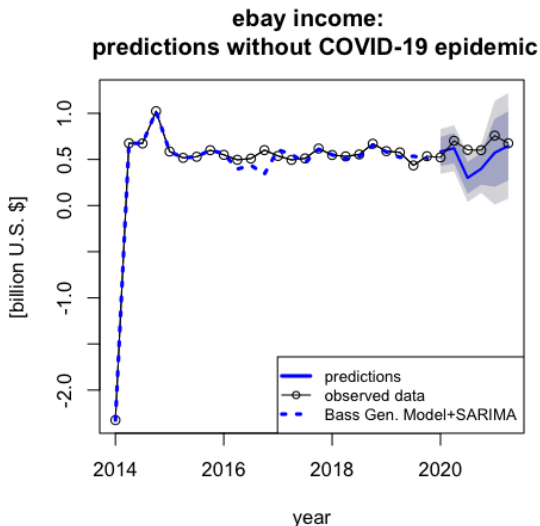




$$\tilde{R}^2 = 0.93$$



m	p	q	a1	b1	c1
241.6	$2.4 \cdot 10^{-3}$	$1.7 \cdot 10^{-3}$	-27	-0.6	-2.6
p	d	q	P	D	Q
2	0	0	0	2	3



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- **Alibaba** revenue: slight negative impact at the start of the pandemic
- **Alibaba** income: covid has a negative impact but \$2.8B fine is the real deal breaker
- **Amazon** revenue: amazon's revenue received a clear boost to its growth
- **Amazon** income: the pandemic had a positive impact but growth slows down once the spike ends
- **eBay** revenue: eBay isn't much of a seller, unlike Amazon or Alibaba is more like a tool
- **eBay** income: eBay's income is quite steady, pandemic impact is barely noticeable

Thanks for the attention!