

# UK Parcel Market Trends in the Pre- and Post-Covid Environment: An Initial Assessment

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# 1. Introduction

Covid-19 → impact on all aspects of life.

Health restrictions have strongly constrained mobility of all kinds.

Change in purchasing behavior → shift to distance selling.

In most countries, parcel market:

- expanding in recent years due to development of e-retail

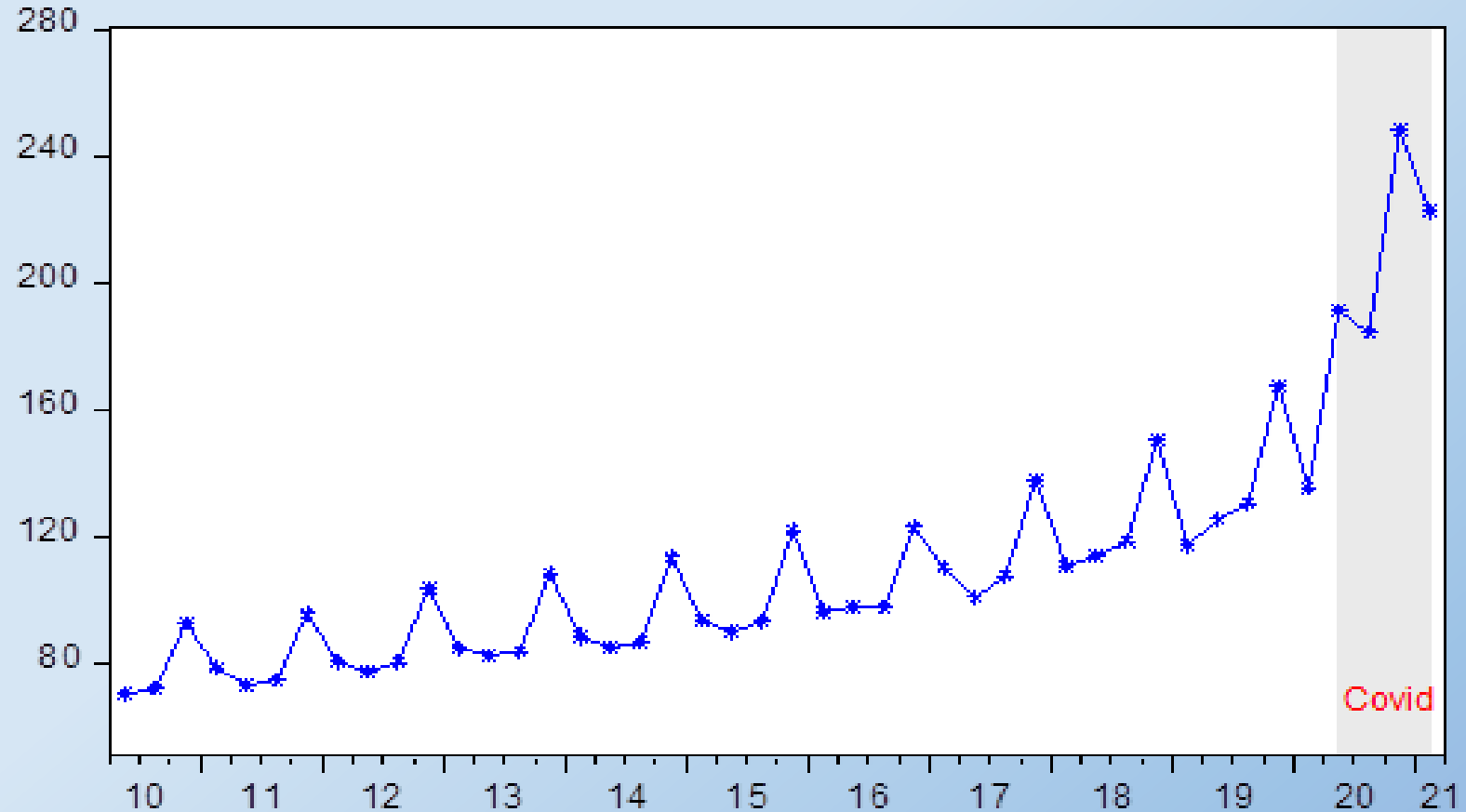
- accelerated in a post-Covid environment

This study : econometric analysis of impact of the Covid pandemic on parcel market volumes in UK

# Domestic parcel market volume : 2010q2-2021q1

Parcel volume index (2015=100)

**YoY growth rate  
pre-Covid  $\approx 7\%$**

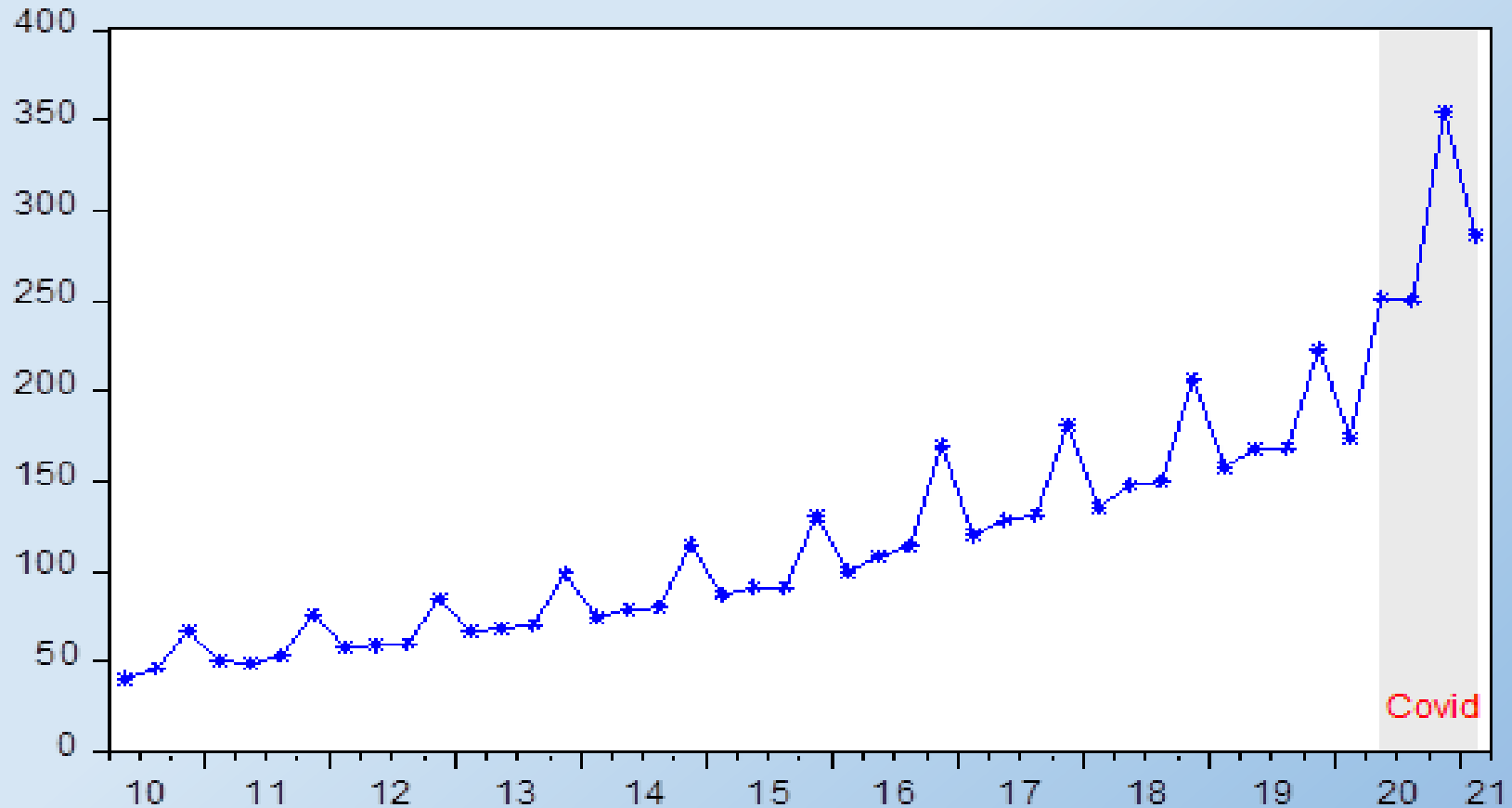


Source: Ofcom and Royal Mail Group

# Key driver : e-retail sales volumes

E-retail sales index (2015=100)

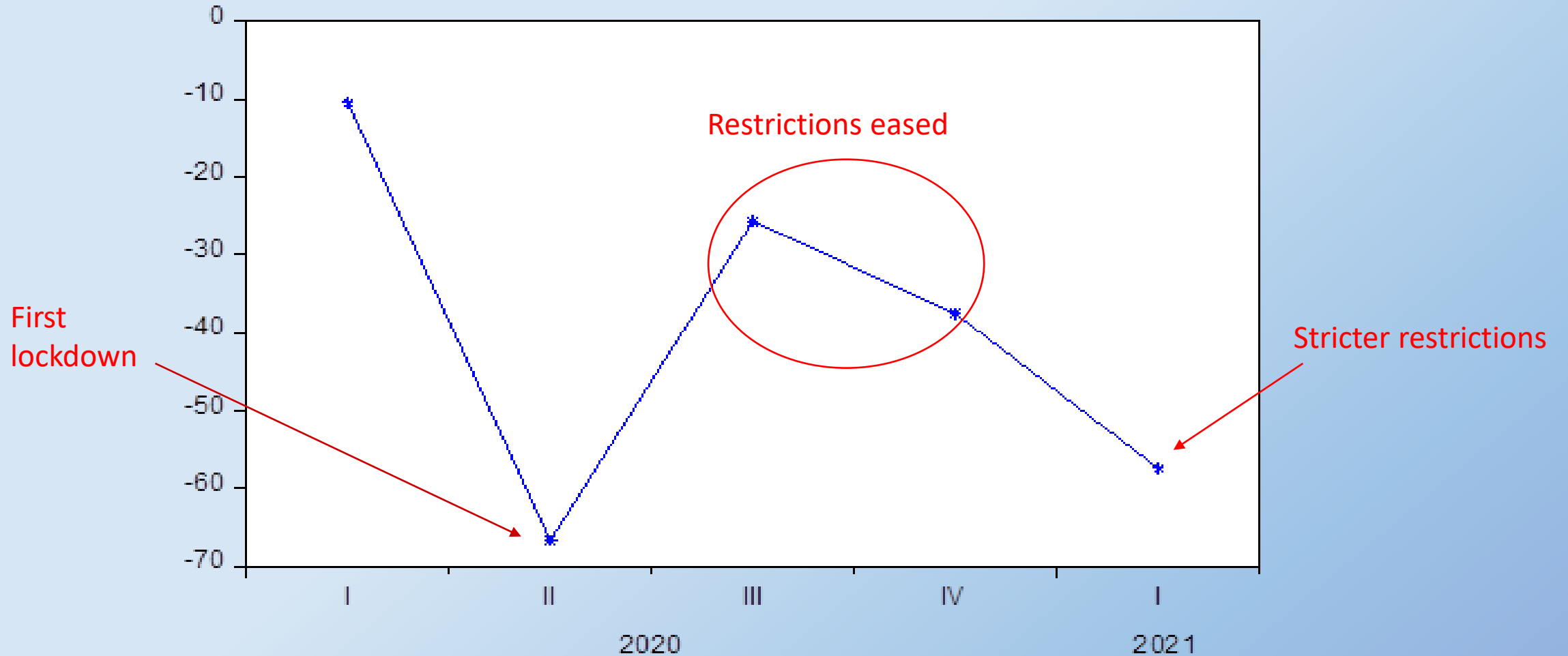
**YoY growth rate  
pre-Covid  $\approx$  15%**



Source: Office for National Statistics average weekly Internet non-food store and non-store retailing

## Retail mobility rates (RMR)

→ change in the number of visits to retail and recreation sites during Covid crisis, relative to pre-Covid period (in %)



Source: Google LLC "Google COVID-19 Community Mobility Reports"

## 2. Time series analysis of parcel market trends

Evaluation of the post-Covid uplift in parcel volumes

Use of data over *pre-Covid period* (until 2020q1):

→ estimation of an ARIMA(2,1,0) model

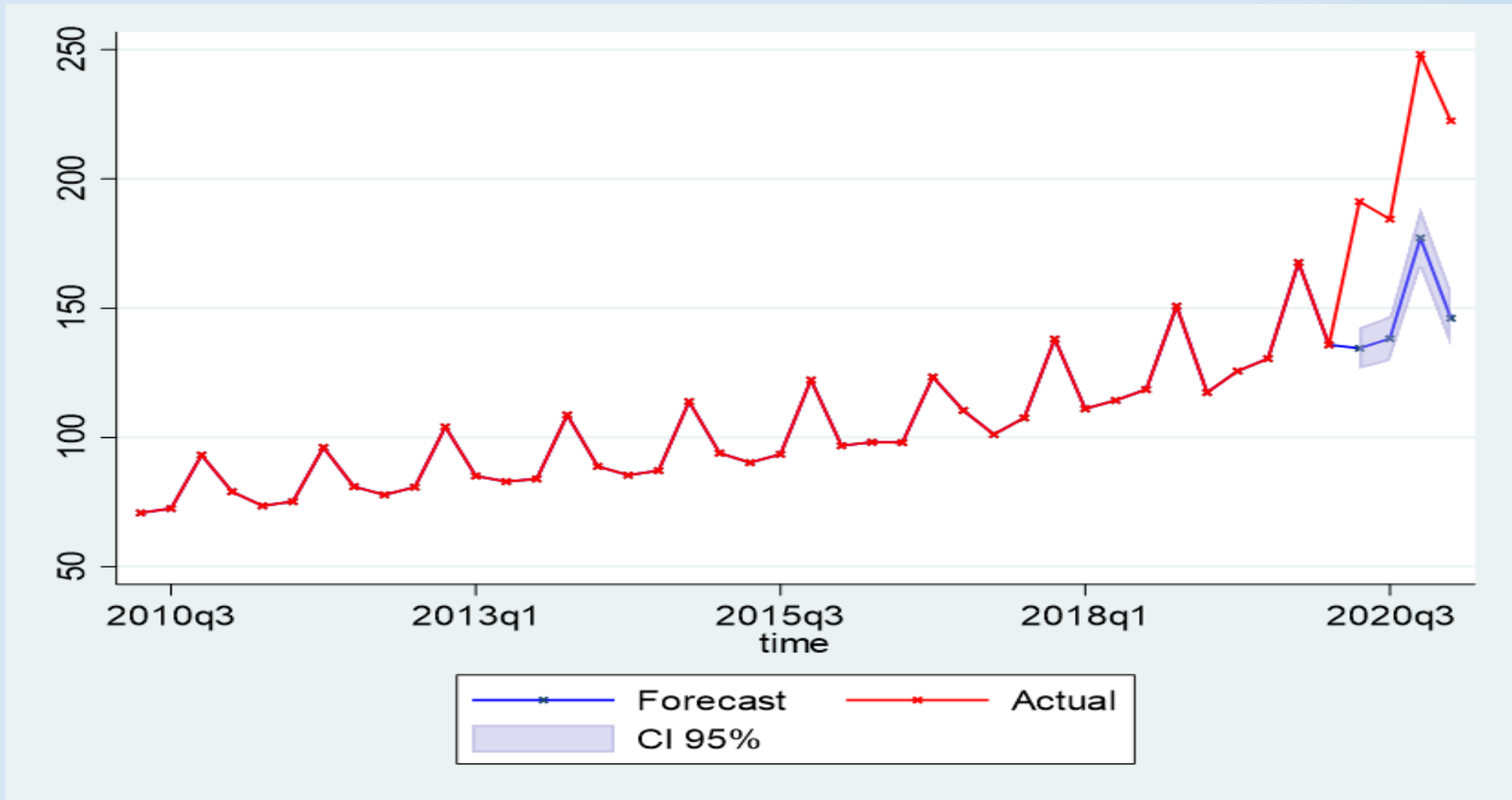
$$\Delta \text{Ln}P_t = \alpha_0 + \alpha_1 \Delta \text{Ln}P_{t-1} + \alpha_2 \Delta \text{Ln}P_{t-2} + \delta_1 Q_{1t} + \delta_2 Q_{2t} + \delta_3 Q_{3t} + \varepsilon_t$$

*Parcel volume index*

( $\Delta$ : difference operator)

*Dummies for quarters*

→ forecast from 2020q2 until 2021q1 : *counterfactual forecast of parcel volumes if no Covid.*



→ suggest volumes increased by around **40%** above pre-Covid trend, during the first year of Covid





## Long run relationship from ECM form

Dep var : Ln P <sub>t</sub>	Coefficient	Std. Error	t-Statistic	Prob.
D19Q2 <sub>t</sub> *Ln R <sub>t</sub>	<b>0.0171</b>	0.0032	5.4163	0.0000
DCOV <sub>t</sub> *Ln R <sub>t</sub>	<b>0.0128</b>	0.0065	1.9609	0.0584
Ln R <sub>t</sub>	<b>0.3812</b>	0.0188	20.2214	0.0000
RMR <sub>t</sub>	<b>-0.0046</b>	0.0009	-4.8648	0.0000
Const	<b>3.0610</b>	0.0904	33.8475	0.0000

*Before 2019q2* : elasticity of parcels with respect to e-retail sales = 0.38.

Structural breaks : *from 2019q2*, the elasticity increases to 0.398, and in the Covid period the elasticity increases again to 0.411.

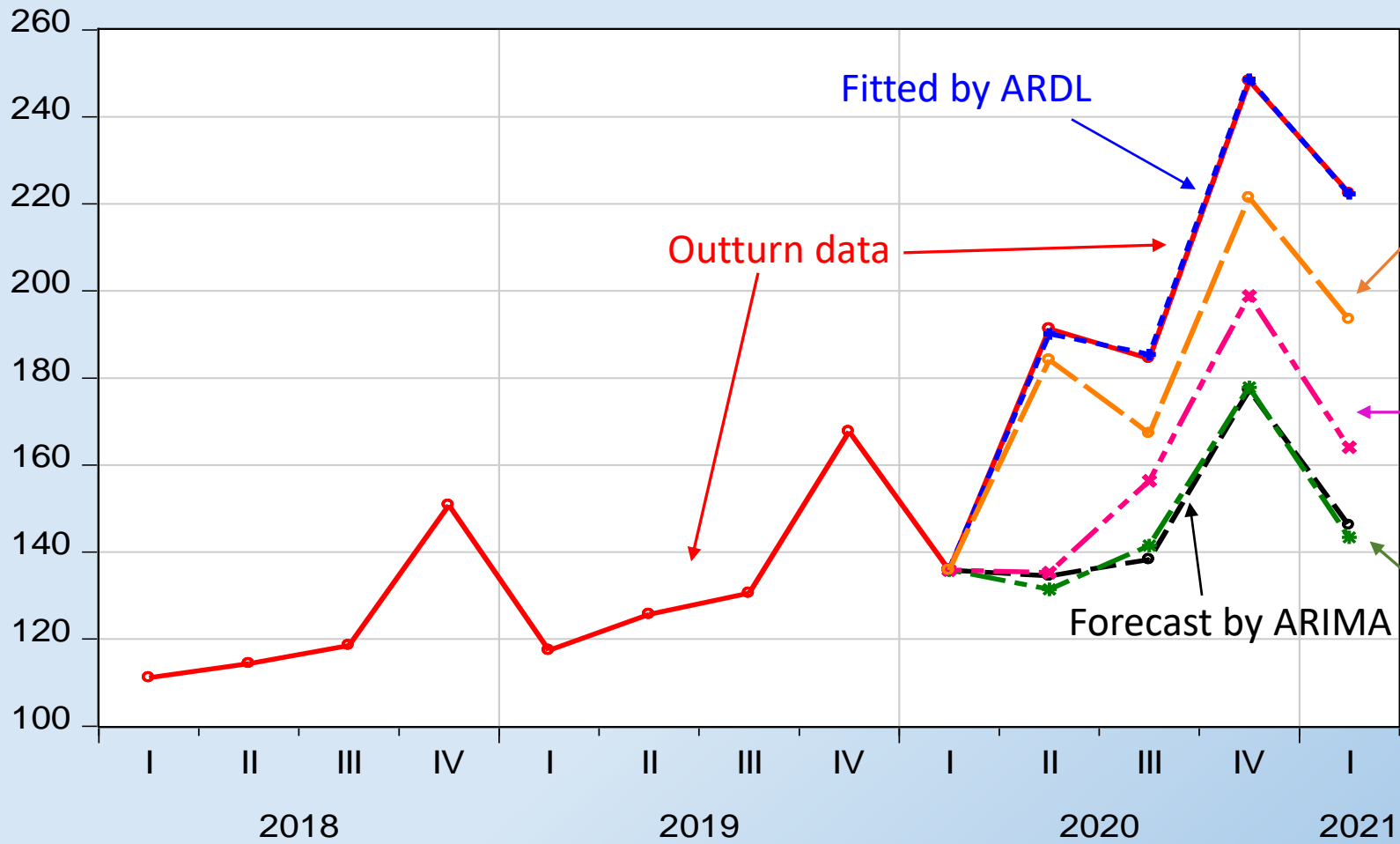
Each 1 percentage point reduction in mobility, holding others factors constant, increases the parcel volumes by 0.46% on average

## 4. Assessment of the impact of the pandemic

Use of the ARDL model to evaluate contributions of e-retail sales and changes in retail mobility rates in explaining the post-Covid uplift in parcel volumes.

Various scenarios:

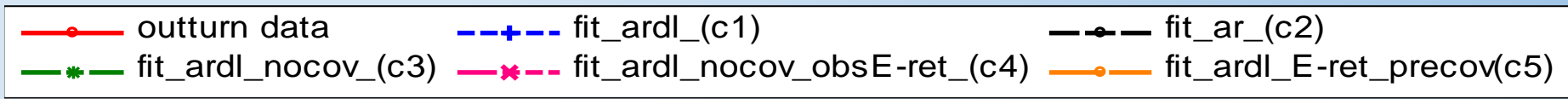
- No Covid ( $DCOV=RMR=0$ ) and e-retail = pre-Covid trend
- No Covid ( $DCOV=RMR=0$ ) and e-retail = outcome data
- Covid but e-retail = pre-Covid trend



Predicted by ARDL, with Covid, but evolution of e-retail sales same as pre-Covid year ( $\approx 60\%$  of uplift in 2021q1)

Predicted by ARDL, if no Covid, but observed e-retail ( $\approx 25\%$  of uplift in 2021q1)

Predicted by ARDL, if no Covid and evolution of e-retail sales same as pre-Covid year



## 5. Conclusion

Large increase of UK parcel volumes during the Covid crisis, mainly due to:

- implementation of sanitary restrictions that have led to a shift towards online shopping (explains  $\approx 25\%$  of uplift)
- changes in consumer behaviour in the post-Covid environment, as captured mainly by retail mobility rate changes (explains  $\approx 60\%$  of uplift)

And after the Covid pandemic: back to pre-crisis behaviour ?

Probably not, but the extent of the (permanent) changes is very uncertain

# Appendixes

## A. Estimated ARIMA(2,1,0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Cons	0.2629	0.0103	25.4138	0.0000
Q1	-0.2781	0.0438	-6.3446	0.0000
Q2	-0.3195	0.0445	-7.1774	0.0000
Q3	-0.3221	0.0362	-8.8931	0.0000
$\Delta \ln P_{t-1}$	-0.6741	0.1670	-4.0358	0.0003
$\Delta \ln P_{t-2}$	-0.3799	0.1670	-2.2748	0.0300
R <sup>2</sup>	0.975			

## B. Estimated ARDL

Dep var : Ln P <sub>t</sub>	Coefficient	Std. Error	t-Statistic	Prob.
Ln P <sub>t-1</sub>	0.0953	0.1131	0.8428	0.4054
Ln R <sub>t</sub>	0.0893	0.1372	0.6511	0.5195
Ln R <sub>t-1</sub>	0.2555	0.1604	1.5930	0.1207
D19Q2 <sub>t</sub> *Ln R <sub>t</sub>	0.0155	0.0039	3.9722	0.0004
DCOV <sub>t</sub> *Ln R <sub>t</sub>	0.0116	0.0068	1.6885	0.1007
Q1	-0.2872	0.0728	-3.9470	0.0004
Q2	-0.2279	0.0371	-6.1438	0.0000
Q3	-0.2090	0.0427	-4.8983	0.0000
RMR <sub>t</sub>	-0.0041	0.0008	-5.3212	0.0000
Const	2.7693	0.3918	7.0687	0.0000
R <sup>2</sup>	0.995			

### C. Estimated ARDL : ECM form

Dep var : $\Delta \ln P_t$	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta \ln R_{t-1}$	0.0893	0.0561	1.5906	0.1212
Q1	-0.2872	0.0259	-11.0750	0.0000
Q2	-0.2279	0.0167	-13.6647	0.0000
Q3	-0.2090	0.0183	-11.4007	0.0000
$EC_{t-1}^*$	-0.9047	0.0743	-12.1773	0.0000
Long run relation (error correction relationship)				
Dep var : $\ln P_t$	Coefficient	Std. Error	t-Statistic	Prob.
$D19Q2_t^* \ln R_t$	0.0171	0.0032	5.4163	0.0000
$DCOV_t^* \ln R_t$	0.0128	0.0065	1.9609	0.0584
$\ln R_t$	0.3812	0.0188	20.2214	0.0000
$RMR_t$	-0.0046	0.0009	-4.8648	0.0000
Const	3.0610	0.0904	33.8475	0.0000

## D. Predicted values of parcel volumes according to various scenarios for e-retail and Covid

	C1	C2	C3	C4	C5
	Fitted P by ARDL	Forecasted P by ARIMA	Predicted P by ARDL if e-retail=precovid trend and no Covid (RMR=DCOV=0)	Predicted P by ARDL if no Covid (RMR=DCOV=0) and e-retail sales equal outcome data	Predicted P by ARDL if e-retail=precovid and Covid
<b>2020Q2</b>	190.105	134.522	131.404	135.255	184.102
<b>2020Q3</b>	185.381	138.266	141.502	156.333	167.255
<b>2020Q4</b>	248.670	177.201	177.844	198.853	221.407
<b>2021Q1</b>	222.282	146.124	143.417	164.076	193.523