Letter Traffic Demand in the UK: A Product and Envelope Content Analysis

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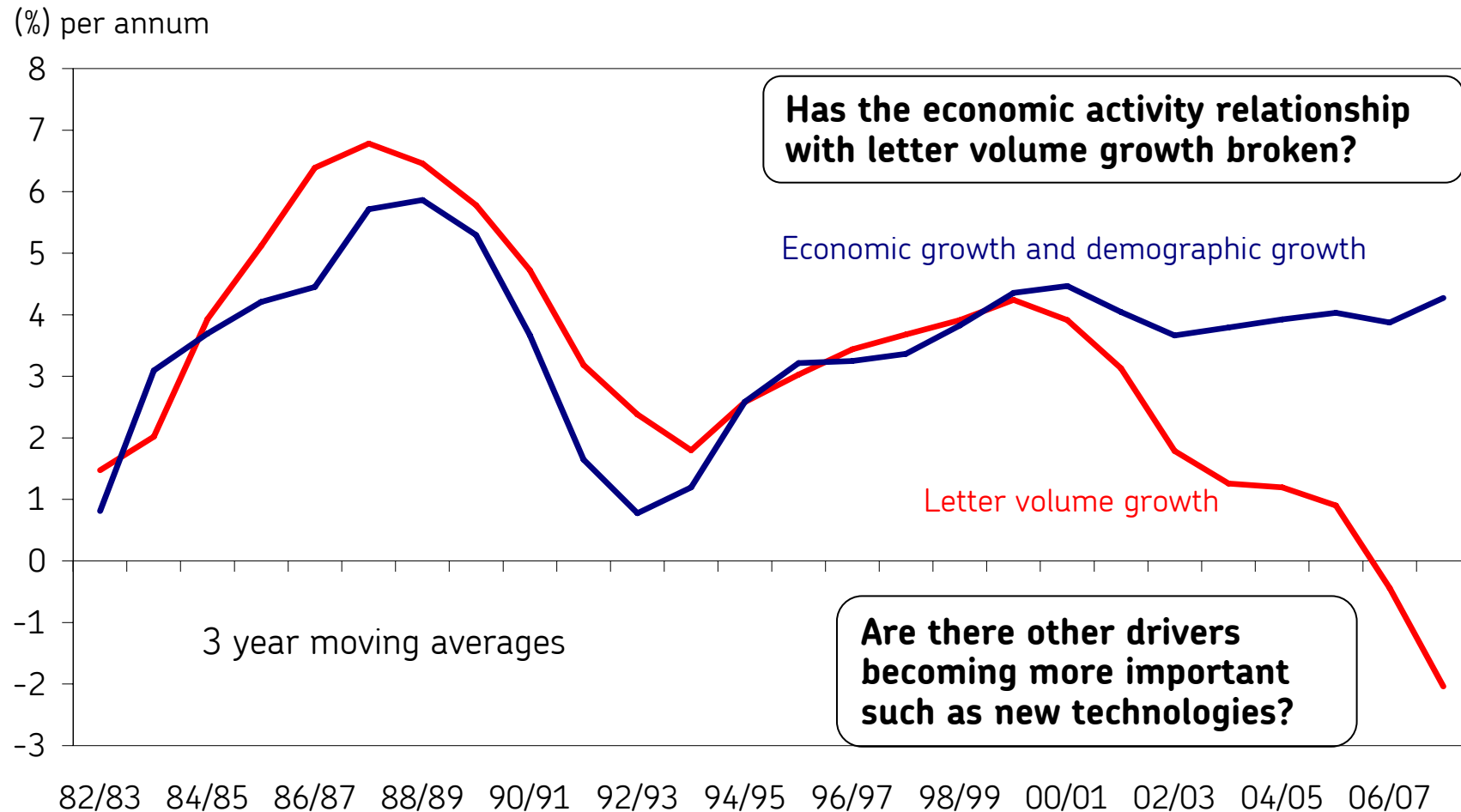*Royal Mail, Group Regulation, [1]University of Essex and [2]Oxera

Sixth Conference on "Regulation, Competition and Universal Service in the Postal Sector"
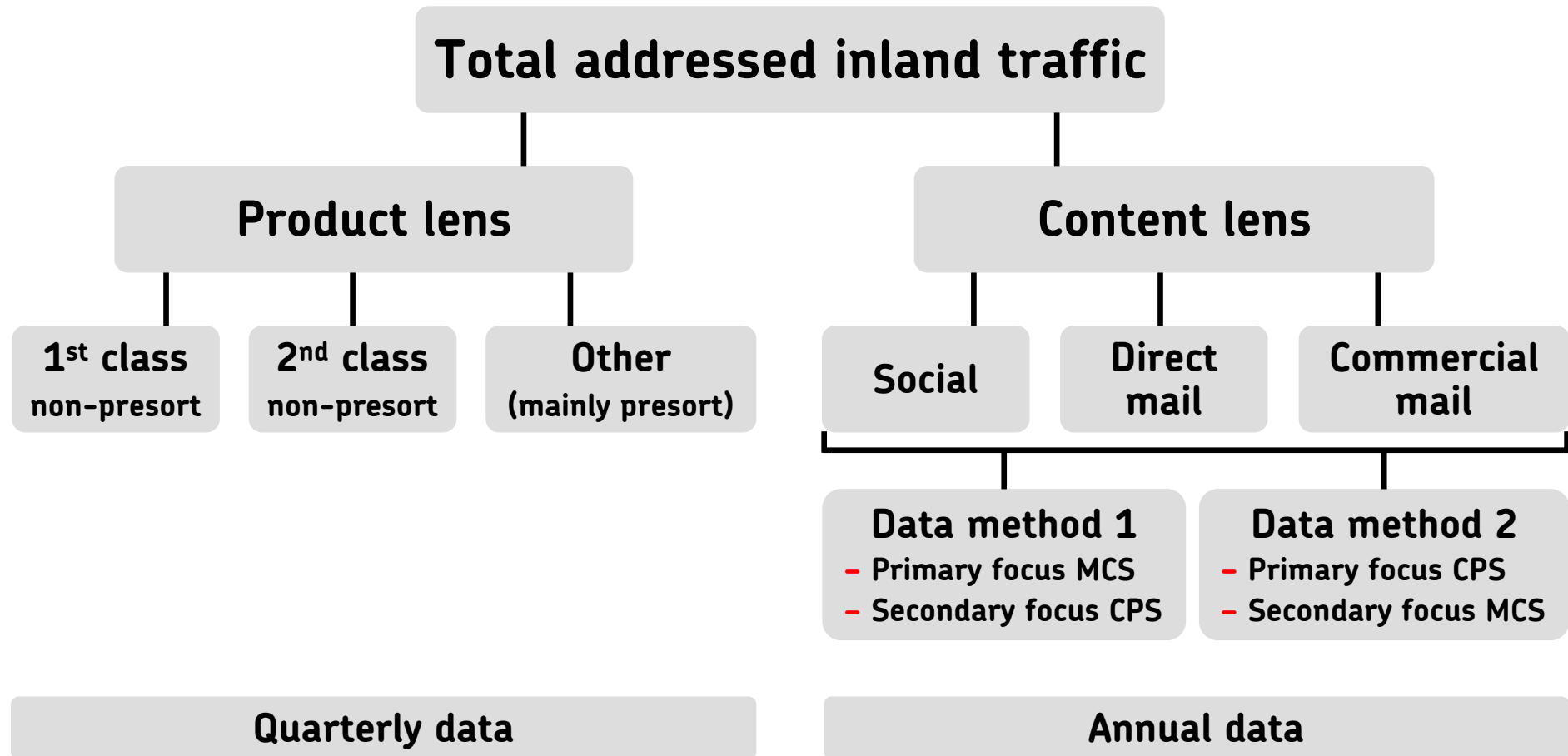Toulouse France, March 25–26, 2010

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UK Addressed inland mail traffic versus economic and demographic growth trends

(%) per annum

Has the economic activity relationship with letter volume growth broken?

Economic growth and demographic growth

Letter volume growth

3 year moving averages

Are there other drivers becoming more important such as new technologies?

82/83 84/85 86/87 88/89 90/91 92/93 94/95 96/97 98/99 00/01 02/03 04/05 06/07

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A dual lens approach for modelling letter traffic in the UK

Total addressed inland traffic

Product lens

Content lens

1st class non-presort

2nd class non-presort

Other (mainly presort)

Social

Direct mail

Commercial mail

Data method 1
- Primary focus MCS
- Secondary focus CPS

Data method 2
- Primary focus CPS
- Secondary focus MCS

Quarterly data

Annual data

Framework: Demand for mail equations

Estimated the product model using Dynamic OLS (DOLS) of the form (based on Nankervis et al. (2002):

$$(1) \quad q_{it} = A_i' D_{it} + \Pi_i' x_{it} + \sum_{k=-m_i}^{k=m_i} C_{ik}' \Delta x_{i,t-k}^I + \sum_{k=0}^{k=m_i} F_{ik}' x_{i,t-1-k}^0 + \eta_{it}$$

where:

D_{it} is a vector of deterministic variables: constant, seasonal dummies and time trends

Π_i' is a vector of long run coefficients associated with the different explanatory variables

X_{it} vector of the above explanatory variables corresponding to each traffic stream i

The individual product models were estimated using a general error correction model as follows:

$$(2) \quad \Delta q_{it} = \alpha_i' D_{it} + \theta_i (q_{i,t-1} - \hat{\Pi}_i' x_{i,t-1}^I) + \lambda_i x_{i,t-1}^0 + \sum_{k=1}^{n_i} \theta_{ik} \Delta q_{i,t-k} + \sum_{k=0}^{n_i} \varphi_{ik} \Delta x_{i,t-k} + \varepsilon_{it}$$
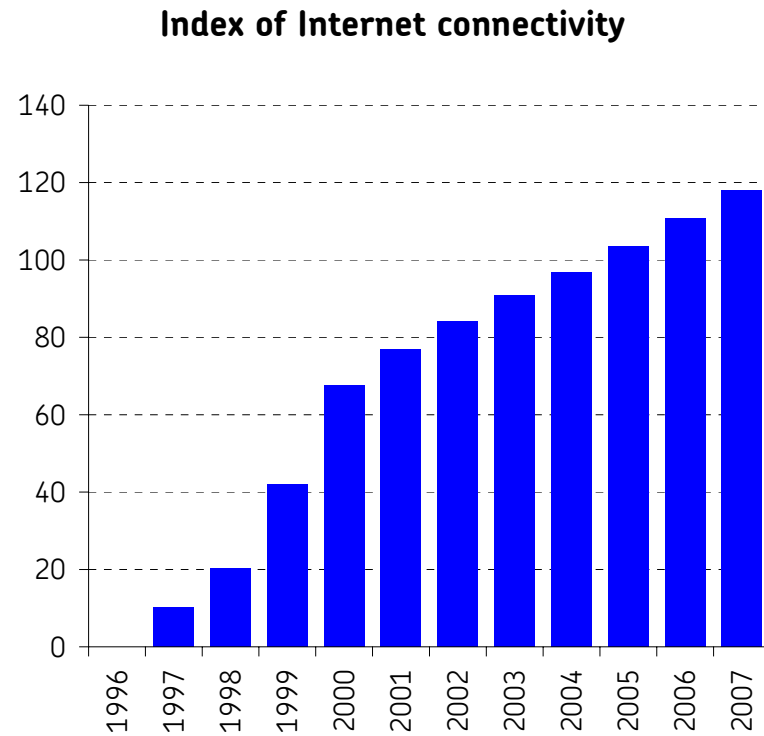
The contents model:

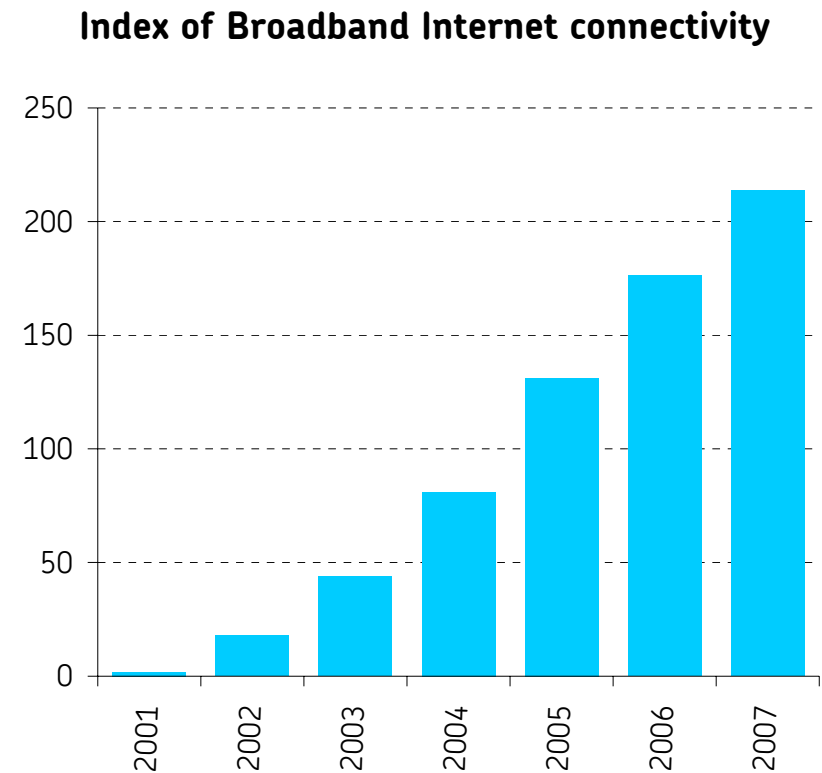$$(3) \quad q_{jt} = A_j' D_{jt} + \Pi_j' x_{jt} + \eta_{jt}$$

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Long run elasticities: products: quarterly model

Main drivers	Total traffic	First class non-presort	Second class non-presort	Other traffic (mainly presort)
Number of households (H)	1.00	1.00	1.00	1.00
Economic activity (Y)	1.09	1.65	0.65	1.10
First Class non-presort price (P1)	-0.07	-0.77	0.31	ns
Second Class non-presort price (P2)	-0.01	0.33	-0.31	ns
Other (mainly presort) price (P3)	-0.24	ns	ns	-0.44
Quality of service (QoS)	0.13	ns	0.52	Ns
Price of non-mail advertising in real terms (PA)	0.07	na	0.10	ns
Proportion of internet spending over total advertising spending (PIA)	-0.95	na	na	-1.75
Net impact of "unexplained" time trends (% per annum)	Pre 02 0.7% Post 02 -2.4%	87-02 -3.8% T 03 -10.9%	75-87 -5.4% Post 87 -2.5%	83-97 5.2% Post 97 0.7%

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We measured e-substitution

Index of Internet connectivity

Index of Broadband Internet connectivity

Source: Office for National Statistics (ONS)

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Long run elasticities: contents, financial year model

Method 1 Data set   **Method 2 Data set**

Main drivers	Total traffic	Social	Commercial	Direct		Total traffic	Social	Commercial	Direct
Number of households (H)	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Economic activity (Y')	1.07	ns	0.97	1.87		1.11	ns	0.96	2.04
Tariff index own price in real terms (P)	-0.44	-0.43	-0.19	-1.35		-0.31	-0.29	-0.19	-0.74
Quality of service (QoS)	0.28	0.43	0.34	ns		0.29	0.49	0.36	ns
Price of Telecommunication Index in real terms (TP)	0.07	na	0.10	ns		0.09	na	0.12	ns
Proportion of internet spending over total advertising spending (PIA)	-0.36	na	na	-1.79		-0.66	na	na	-3.31
Net impact of "unexplained" time trends (% per annum)	Pre 97 0.5% Post 03 -2.8%	ns T 03 -1.7%	ns T 02 -2.9%	Pre 97 2.5% T 97 -5.2%		Pre 97 0.3% Post 03 -1.6%	ns T 03 -2.8%	ns T 02 -1.7%	Pre 97 1.5% T 97 -2.5%

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Comparisons of long run elasticities for total letter traffic: products and contents

Main drivers	Product model	Contents model, data Method 1	Contents model, data Method 2
Number of households (H)	1.00	1.00	1.00
Economic activity (Y/Y')	1.09	1.07	1.11
Letter price index in real terms (P)	-0.33	-0.44	-0.31
Quality of service (QoS)	0.13	0.28	0.29
Price of non-mail advertising in real terms (PA)	0.24	ns	ns
Proportion of internet spending over total advertising spending (PIA)	-0.95	-0.36	-0.66
Price of Telecommunication Index in real terms (TP)	ns	0.07	0.09
Net impact of "unexplained" time trends post 2001 (% per annum)	-2.4	-2.7	-1.0

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Explaining the gap between letter volume and economic and demographics in the UK

(%) per annum

3 year moving averages

Economic growth and demographic growth

Letter volume growth

Other factors
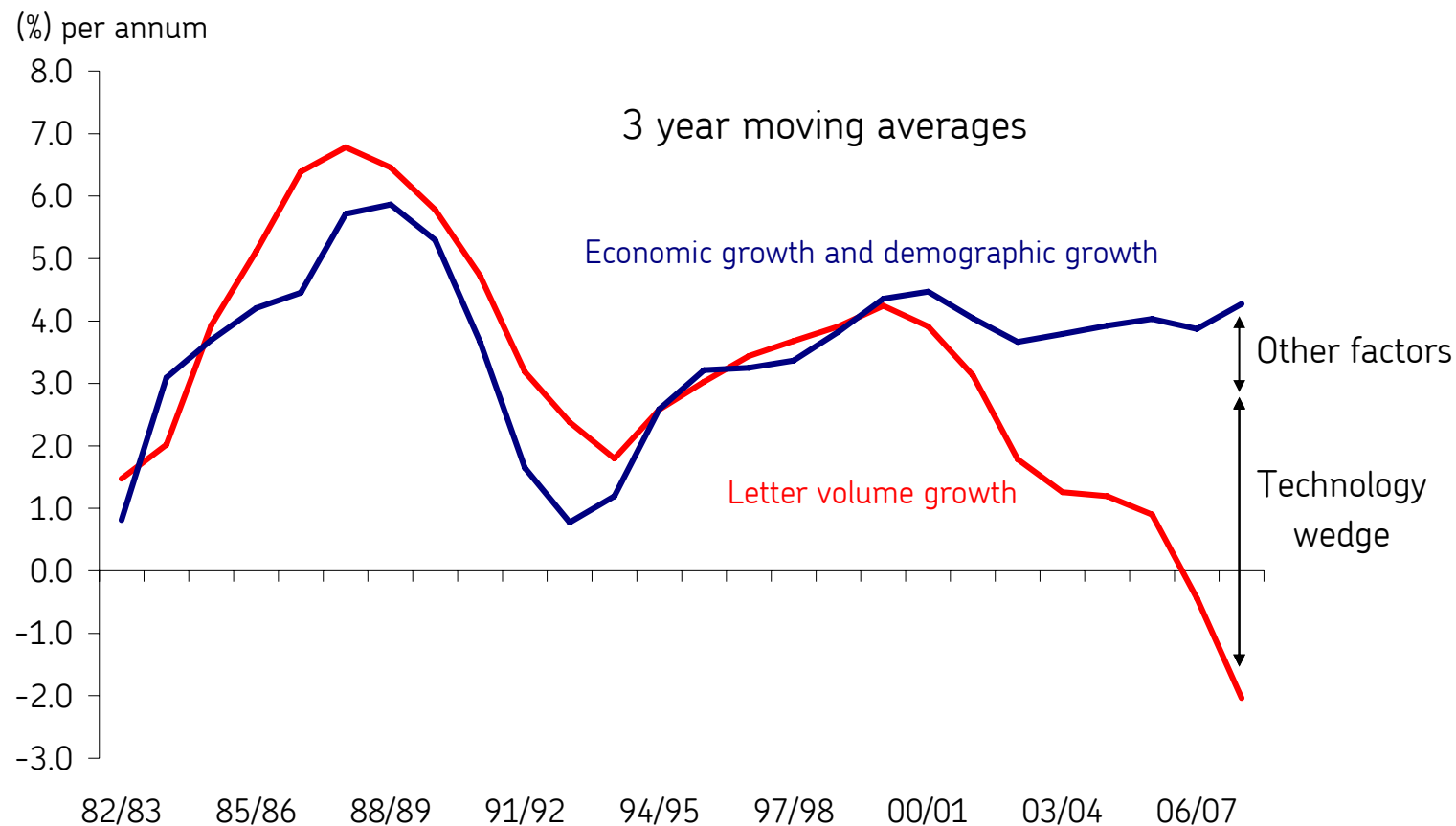
Technology wedge

Note: Technology wedge includes time trends and e–substitution effects (internet advertising). Other factors include price effects and quality of service.

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Conclusions

1. Applied econometric techniques to quantify the impact of key factors affecting UK letter traffic.

2. Especially, the effect of technology on the erosion of mail volumes was explored using the share of internet advertising variable and time trends. Highest (negative) impact on mail volumes.

3. Economic activity and household formation remain important drivers of mail volumes (unity elasticity) whether products or contents models.

4. Price elasticities by products broadly similar to those reported in Nankervis et al. (2002). Also different degrees of substitution in commercial, social and direct mail, (price elasticities around–0.2, around –0.3 to –0.4 and in the range–0.7 to–1.4).

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