ECONOMICS OF POSTAL SERVICES: FINAL REPORT: APPENDICES

A Report to the European Commission DG-MARKT

Prepared by NERA

June 2004
London

Project Team

John Dodgson
José Maria Rodriguez
Jan Peter van der Veer
Stephen Gibson
Juan Hernandez
Barbara Veronese

NERA
Economic Consulting

15 Stratford Place
London W1C 1BE
Tel: (+44) 20 7659 8500
Fax: (+44) 20 7659 8501
Web: http://www.nera.com

An MMC Company

TABLE OF CONTENTS

APPENDIX A. THE THEORY OF THE COST FUNCTION 1
A.1. General Description of Cost Function 1
A.2. Alternative Functional Forms 2
A.3. Economies of Scale, Density and Scope 3

APPENDIX B. PREVIOUS STUDIES ON THE ECONOMETRIC ESTIMATION OF THE COST FUNCTION FOR THE PROVISION OF POSTAL SERVICES 5

APPENDIX C. COUNTRY REPORTS 43
C.1. Austria 43
C.2. Belgium 48
C.3. Cyprus 51
C.4. Czech Republic 53
C.5. Denmark 59
C.6. Estonia 63
C.7. Finland 67
C.8. France 70
C.9. Germany 74
C.10. Greece 77
C.11. Hungary 82
C.12. Ireland 88
C.13. Italy 92
C.14. Latvia 96
C.15. Lithuania 99
C.16. Luxembourg 102
C.17. Malta 106
C.18. Netherlands 109
C.19. Poland 111
C.20. Portugal 113
C.21. Slovakia 117
C.22. Slovenia 124
C.23. Spain 130
C.24. Sweden 135
C.25. United Kingdom 139

APPENDIX D. TECHNICAL APPENDIX: DATA SOURCES AND ASSUMPTIONS 143
D.1. Common Variables 143
D.2. Data for Individual Member States 144

REFERENCES 169

LIST OF TABLES

Table B.1 Index of Average Cost for La Poste and USPS in 1999 7
Table B.2 Estimated Delivery Cost Model 11
Table B.3 Important Factors Determining Operational Efficiency (OE) at Mail Processing Centres 13
Table B.4 Global Elasticities of Labour Demand 15
Table B.5 Subadditivity Test 16
Table B.6 Cost Elasticities of Output (Mean) 17
Table B.7 Estimation of Partial Cost Elasticities (Means) 18
Table B.8 Cost Elasticity of Front Office Activity 19
Table B.9 Returns to Scale by the Different Models 20
Table B.10 Translog Cost Function Estimation 22
Table B.11 Means of Cost Elasticities with Respect to Output 22
Table B.12 Statistics for Estimated Ratios of Marginal Costs (1998) 23
Table B.13 Translog Cost Function Estimation 23
Table B.14 Means of Cost Elasticities with Respect to Output 24
Table B.15 Statistics for Estimated Ratios of Marginal Costs (1998) 24
Table B.16 Delivery Costs (Monopoly) 25
Table B.17 Break-Even Market Share for Competitors 26
Table B.18 US Fixed/Variable Cost by Major Function (1999) 27
Table B.19 Basics of the Cohen Model 28
Table B.20 Unit Cost with 10 per cent Decrease in Volume Assuming 25 per cent of Non-Delivery Fixed Costs are Long Run Variable 29
Table B.21 Fixed and Variable Costs of Postal Activities 29
Table B.22 Estimation Results of Total Cost Function 33
Table B.23 Output, Capital and Network Weights 35
Table B.24 Coefficients associated with Delivered Mail 36
Table B.25 Coefficients associated with Collected Mail 37
Table B.26 Coefficients associated with the Network 37
Table B.27 Coefficients associated with Capital Inputs 38
Table B.28 Wada et al Model Results 40
Table C.1 Österreichische Post: Total Costs 43
Table C.2 Österreichische Post: Cost Shares 44
Table C.3 Österreichische Post: Full Time Employee Numbers 45
Table C.4 Österreichische Post: Average Annual Wage and Salary Costs per FTE Employee 45
Table C.5 Österreichische Post: UPU Employee Numbers 46
Table C.6 Österreichische Post: Traffic Levels 46
Table C.7 Österreichische Post UPU Data : Mail and Parcels Traffic 46
Table C.8 Österreichische Post: Number of Post Offices and Service Centres 47
Table C.9 Österreichische Post: Number of Post Offices, Sorting Centres, Letter Boxes, Post Office Boxes 47
Table C.10 La Poste Belgium: Total Costs 48
Table C.11 La Poste Belgium: Cost Shares 49
Table C.12 La Poste Belgium: Full Time Equivalent Workers 49
Table C.13 La Poste Belgium: Average Staff Costs per Full Time Equivalent Employee 49
Table C.14 La Poste Belgium: Post Office Boxes, Letter Boxes, Post Offices, Delivery and Sorting Offices 50
Table C.15 La Poste Belgium: Quality Targets and Performance 50
Table C.16 Department of Postal Services of Cyprus: Total Operating Costs 51
Table C.17 Department of Postal Services of Cyprus: Number of Workers 51
Table C.18 Department of Postal Services of Cyprus: Mail Volumes for Letters and Parcels 52
Table C.19 Department of Postal Services of Cyprus: Postal Network Infrastructure 52
Table C.20 Česká Pošta: Total Operating Costs 53
Table C.21 Česká Pošta: Total Staff Costs 54
Table C.22 Česká Pošta: Operating Costs by Service Provided 54
Table C.23 Česká Pošta: Operating Costs by Class Of Product and Category of Cost 55
Table C.24 Česká Pošta: Percentage of Operating Costs by Function: Letters, Parcels And Express 56
Table C.25 Česká Pošta: Total Staff Costs 56
Table C.26 Česká Pošta: Unit Costs 57
Table C.27 Česká Pošta: Postal Network Information 57
Table C.28 Česká Pošta: Distribution of Types of Delivery Points for Letters 58

Table C.29 Danmark Post: Total Costs 59
Table C.30 Danmark Post: Cost Shares 60
Table C.31 Danmark Post: Full Time Employee Numbers 60
Table C.32 Danmark Post: Average Annual Wage and Salary Costs per FTE Employee 61
Table C.33 Danmark Post: Traffic Levels 61
Table C.34 Danmark Post: Number of Post Offices, Sorting Centres, Letter Boxes, Post Office Boxes 61
Table C.35 Danmark Post: Quality Targets and Performance 62
Table C.36 Eesti Post: Total Operating Costs 63
Table C.37 Eesti Post: Operating Costs and Volumes for Letters, Parcels and Express 63
Table C.38 Eesti Post: Operating Costs by Service Provided 64
Table C.39 Eesti Post: Operating Costs by Cost Type: 2003 64
Table C.40 Eesti Post: Percentage of Operating Costs by Function: 2003* 65
Table C.41 Eesti Post: Labour Costs 65
Table C.42 Eesti Post: Full Time Equivalent Postal Workers and Percentage of Members of Trade Union 65
Table C.43 Eesti Post: Mail Volumes Delivered by Type of Mail 66
Table C.44 Eesti Post: Postal Network Information 66
Table C.45 Posti: Total Costs 67
Table C.46 Posti: Cost Shares 67
Table C.47 Posti: Average Employee Numbers 68
Table C.48 Posti: Average Annual Wage and Salary Costs per Employee 68
Table C.49 Posti: Traffic Levels 69
Table C.50 Posti: Number of Post Offices and Delivery Points 69
Table C.51 Posti: Regulatory Targets on D+1 and Performance 69
Table C.52 La Poste: Total Costs, Universal Service and Other 70
Table C.53 La Poste: Cost Shares, Universal Service and Other 70
Table C.54 La Poste: Cost by Function in the USO Area 70
Table C.55 La Poste: Full Time Employee Numbers 71
Table C.56 La Poste: Total Costs 71
Table C.57 La Poste: Cost Shares 72
Table C.58 La Poste: Staff Costs per Full Time Employee 72
Table C.59 La Poste: Traffic Levels in the USO Area 72
Table C.60 La Poste: Post Offices, Sorting Offices, Specialized Centres, Delivery Offices and Post Boxes 73
Table C.61 La Poste: Domestic Letter Mail by Sender and Recipient 2002 73
Table C.62 Deutsche Post: Costs and Revenues 74
Table C.63 Deutsche Post: Cost Shares by Activity 75
Table C.64 Deutsche Post: Employment in FTE's 76
Table C.65 Deutsche Post: Average Personnel Cost per Employee 76
Table C.66 Deutsche Post: Traffic Levels 76
Table C.67 ELTA: Letter Mail Total Costs 77
Table C.68 ELTA: Parcels Total Costs 77
Table C.69 ELTA: Aggregate Total Costs 78
Table C.70 ELTA: Cost Shares 78
Table C.71 ELTA: Costs By Activity 78
Table C.72 ELTA: Letter Mail Costs by Function 79
Table C.73 ELTA: Parcels Costs by Function 79
Table C.74 ELTA: Full Time Employee Numbers 80
Table C.75 ELTA: Average Annual Wage per FTE Employee 80
Table C.76 ELTA: Traffic Levels 80
Table C.77 ELTA: Postal Network Information 81
Table C.78 ELTA: Quality of Service, Delivery, Performance 81
Table C.79 Magyar Posta: Total Operating Costs 82
Table C.80 Magyar Posta: Operating Costs by Activity 82
Table C.81 Magyar Posta: Volumes and Unit Operating Costs for Letters, Parcels and Express 83
Table C.82 Magyar Posta: Percentage of Staff Costs in Total Operating Costs for Letters and Parcels 83
Table C.83 Magyar Posta: Percentage of Operating Costs by Function 84
Table C.84 Magyar Posta: Staff Costs for Letters, Parcels and Express 85
Table C.85 Magyar Posta: Labour Force Employed and Average Wage Levels 85
Table C.86 Magyar Posta: Full Time Equivalent Postal Workers and Percentage of Full-Time vs. Part-Time Workers 86
Table C.87 Magyar Posta: Delivery Volumes by Type of Product 86
Table C.88 Magyar Posta: Postal Network Information 87
Table C.89 An Post: Total Costs 88

Table C.90 An Post: Cost Shares 88
Table C.91 An Post: Average Employee Numbers 89
Table C.92 An Post: Average Annual Wage and Salary Costs per Employee 89
Table C.93 An Post: Traffic Levels and Index (1997=100) 90
Table C.94 An Post: Tariffs 1998-2002 90
Table C.95 An Post: Parcels Traffic 90
Table C.96 An Post: Number of Post Offices and Delivery Points 91
Table C.97 An Post: Quality Targets and Performance 91
Table C.98 An Post: Letter Mail Traffic by Sender and Recipient 91
Table C.99 Poste Italiane: Total Cost 92
Table C.100 Poste Italiane: Cost Shares 93
Table C.101 Poste Italiane: Full Time Employee Numbers 93
Table C.102 Poste Italiane: Average Annual Wage per FTE 94
Table C.103 Poste Italiane: Traffic Levels 94
Table C.104 Poste Italiane: Postal Network Information 95
Table C.105 Poste Italiane: Quality of Service, Delivery Performance 95
Table C.106 Latvijas Pasts: Total Operating Costs 96
Table C.107 Latvijas Pasts: Operating Costs by Cost Type 96
Table C.108 Latvijas Pasts: Labour Costs 97
Table C.109 Latvijas Pasts: Delivery Volumes by Type of Product 97
Table C.110 Latvijas Pasts: Postal Network Information 98
Table C.111 Lietuvos Paštas: Total Operating Costs 99
Table C.112 Lietuvos Paštas: Number of Employees 99
Table C.113 Lietuvos Paštas: Total Work Force Employed 100
Table C.114 Lietuvos Paštas: Mail Volumes by Type of Product 100
Table C.115 Lietuvos Paštas : Postal Network Information 101
Table C.116 P&T: Operating Cost by Letter Mail, Parcels and Express in 2001 102
Table C.117 P&T: Cost Shares by Letter Mail, Parcels and Express in 2001 102
Table C.118 P&T: Total Operating Costs in 2001 103
Table C.119 P&T: Cost Shares by Activity in 2001 103
Table C.120 P&T: Full Time Equivalent Workers and Percentage of Civil Servants 103
Table C.121 P&T: Traffic Levels 104
Table C.122 P&T: Letter Mail Traffic by Sender and Recipient 104
Table C.123 P&T: Postal Network Information 105
Table C.124 Maltapost: Total Operating Costs 106
Table C.125 Maltapost: Staff Costs by Product Type 106
Table C.126 Maltapost: Total Work Force Employed 107
Table C.127 Maltapost: Delivery Volumes by Type of Product 107
Table C.128 Maltapost: Postal Network Information 108
Table C.129 Maltapost: Percentage of Mail Delivered to Different Delivery Points 108
Table C.130 TPG: Costs and Revenues 109
Table C.131 TPG: Employment in FTEs 110
Table C.132 TPG: Traffic Volumes 110
Table C.133 Poczta Polska : Total Operating Costs 111
Table C.134 Poczta Polska: Number of Employees 111
Table C.135 Poczta Polska: Mail Volumes Delivered by Type of Mail 112
Table C.136 Poczta Polska: Postal Network Infrastructure 112
Table C.137 CTT Correios: Total Costs 113
Table C.138 CTT Correios: Cost Shares 114
Table C.139 CTT Correios: Full Time Equivalent Workers 114
Table C.140 CTT Correios: Average Annual Wage and Salary Costs per FTE 115
Table C.141 CTT Correios: Traffic Levels, Post Offices and Delivery Centres 115
Table C.142 CTT Correios: Addressed Mail Traffic by Sender and Recipient 115
Table C.143 CTT Correios: Quality of Service, Targets and Performance 116
Table C.144 Slovenská Pošta: Total Operating Costs 117
Table C.145 Slovenská Pošta: Operating Costs by Mail Product 118
Table C.146 Slovenská Pošta: Operating Costs by Class of Product and Category of Cost 119
Table C.147 Slovenská Pošta: Percentage of Operating Costs by Function: Letters, Parcels and Express 120
Table C.148 Slovenská Pošta: Staff Costs 121
Table C.149 Slovenská Pošta: Mail Volumes Delivered by Type of Mail 122

Table C.150 Slovenská Pošta: Unit Costs 122
Table C.151 Slovenská Pošta: Postal Network Infrastructure 123
Table C.152 Pošta Slovenije: Total Operating Costs 124
Table C.153 Pošta Slovenije: Operating Costs by Activity 125
Table C.154 Pošta Slovenije : Operating Costs by Class of Product and Category of Cost 126
Table C.155 Pošta Slovenije : Percentage of Operating Costs by Function: Letters, Parcels and Express 127
Table C.156 Pošta Slovenije: Staff Costs 128
Table C.157 Pošta Slovenije: Mail Volumes Delivered by Type of Mail 128
Table C.158 Pošta Slovenije: Unit Costs 129
Table C.159 Pošta Slovenije: Postal Network Information 129
Table C.160 Correos: Total Costs 130
Table C.161 Correos: Operating Costs by Activity 130
Table C.162 Correos: Percentage of Operating Costs by Function: Letters, Parcels and Express 131
Table C.163 Correos: Mail Volumes Delivered by Type of Mail 132
Table C.164 Correos: Unit Costs 132
Table C.165 Correos: Staff Costs 133
Table C.166 Correos: Operating Costs by Class of Product and Category of Cost 134
Table C.167 Correos: Network 134
Table C.168 Posten: Total Costs 135
Table C.169 Posten: Cost Shares 136
Table C.170 Posten: Full Time Employee Numbers 136
Table C.171 Posten: Average Annual Wage and Salary Costs per FTE 136
Table C.172 Posten: Traffic Levels 137
Table C.173 Posten: Domestic Letter Mail Revenues by Sender and Recipient 137
Table C.174 Posten: Domestic Parcel Revenues by Sender and Recipient 137
Table C.175 Posten: Post Offices and Other Outlets 138
Table C.176 British Post Office: Total Costs 139
Table C.177 British Post Office: Cost Shares 140
Table C.178 British Post Office: Cost Shares by Activity 140
Table C.179 British Post Office: Full Time Equivalent Workers 141
Table C.180 British Post Office: Average Annual Wage and Salary Costs per Employee 141
Table C.181 British Post Office: Traffic Levels 142
Table C.182 British Post Office: Letter Mail Traffic by Sender and Recipient 142
Table D.1 Post & Telecom Austria AG: Available Data 144
Table D.2 La Poste Belgium: Available Data 145
Table D.3 Česká Pošta : Available Data 146
Table D.4 Danmark Post : Available Data 148
Table D.5 Eesti Post : Available Data 149
Table D.6 Suomen Posti Oy : Available Data 150
Table D.7 La Poste France: Available Data 151
Table D.8 Deutsche Post AG : Available Data 152
Table D.9 ELTA : Available Data 153
Table D.10 Magyar Posta: Available Data 154
Table D.11 Poste Italiane: Available Data 155
Table D.12 An Post : Available Data 156
Table D.13 Latvijas Pasts: Available Data 157
Table D.14 Lietuvos Paštas : Available Data 158
Table D.15 P & T Luxembourg : Available Data 159
Table D.16 Maltapost: Available Data 160
Table D.17 TPG : Available Data 161
Table D.18 CTT Correios: Available Data 162
Table D.19 Slovenská Pošta : Available Data 163
Table D.20 Pošta Slovenije: Available Data 164
Table D.21 Correos: Available Data 165
Table D.22 Posten: Available Data 166
Table D.23 British Post Office: Available Data 168

LIST OF FIGURES

Figure B.1 Model Estimates of Unit Costs 28
Figure B.2 Unit Costs in Different Countries 30
Figure D.1 Volume of Mail and Parcels from Posten Annual Report 2002 167

APPENDIX A. THE THEORY OF THE COST FUNCTION

A.1. General Description of Cost Function

In line with economic theory, we have modeled a general cost function where costs depend on mail volumes, network size, input prices and other factors reflecting country-specific, regulatory and quality variables. We have separated volumes from network size because we believe that an important characteristic of the postal sector, as of other network industries, is that costs of provision will vary significantly between operators depending not only on the volume of output (in terms of mail handled) but also on the characteristics of the network, in particular in terms of the number of points where service - both delivery and collection - is provided. This will allow us to distinguish between economies of scale and economies of density, which are defined in Section A.3. In this section we introduce some useful definitions and properties of the cost function.

Average costs are defined as the costs associated to a certain output (and input) divided by that output. As an example, let's think of the costs associated with the production of a quantity "q" using a single input, e.g. labour, "l", and the price of this input is "w".

If the cost associated with the optimal[1] production of q, for the given price w, is defined by:

$$C(w,q),$$

then the average cost is defined as the ratio between cost and total produced quantity:

$$\frac{C(w,q)}{q}.$$

Marginal costs are defined as the derivative of cost with respect to quantity:

$$\frac{\partial C(w,q)}{\partial q}.$$

The marginal cost shows the increase in costs associated with an increase in production of one unit. An important property of the cost function is the so called Shephard's lemma. Shephard's lemma states that the derivative of the cost function with respect to an input price defines the (cost-minimising) demand for that input:

$$\frac{\partial C(w,q)}{\partial w} = l.$$

[1] This is given by the input choice that allows the firm to produce a given quantity of output at minimum costs.

Note that our example above is based on a production function that involves the use of a single input. However Shephard's lemma applies to the case of multiple inputs as well. If both costs and input price are defined in logarithms, the derivative of the log of costs with respect to the log of an input price is equivalent to the share of this input in total costs.

$$\frac{\partial \ln C(w,q)}{\partial \ln w} = \frac{\partial C(w,q)}{\partial w} * \frac{w}{C(w,q)} = l * \frac{w}{C(w,q)} = \frac{w*l}{C(w,q)}$$

A.2. Alternative Functional Forms

In this study we have found that the best data fit can be obtained by using the Cobb-Douglas specification which, transformed in logarithms, is:

$$\ln C = \alpha_0 + \sum_{i=1}^{2} \alpha_i \ln Y_i + \sum_{i=1}^{2} \beta_i \ln W_i + \beta_0 P + \sum_{i=1}^{m} \lambda_i Z_1$$

Here Y represents mail volumes, W is the input prices, P represents the network size, and Z are control variables reflecting country-specific, regulatory and quality variables. More flexible cost function specifications are given by the transcendental logarithmic (translog) cost function and the hybrid approximation to the translog cost function.

The translog specification is defined as follows:

$$\ln C = \alpha_0 + \sum_{i=1}^{2} \alpha_i \ln Y_i + \sum_{i=1}^{2} \beta_i \ln W_i + \frac{1}{2} \sum_{i=1}^{2} \sum_{j=2}^{2} \delta_{ij} \ln Y_i \ln Y_j + \frac{1}{2} \sum_{i=1}^{2} \sum_{j=2}^{2} \varphi_{ij} \ln W_i \ln W_j + \sum_{i=1}^{2} \sum_{j=2}^{2} \gamma_{ij} \ln Y_i \ln W_j + \sum_{i=1}^{m} \lambda_i Z_1 .$$

The hybrid translog is a special case of the translog where the outputs are not transformed in logarithms. The empirical results with more flexile specifications (such as the transcendental logarithm cost function "*translog*" or the translog hybrid approximation) were not satisfactory[2] and we therefore had to reject the use of these specifications.

The Cobb-Douglas functional form assumes that the input shares in the cost equations are constant for any level of output and that the elasticity of substitution between each pair of inputs equals one. In our data set we find that the share of labour costs in the total operating costs of letters and parcels is statistically independent from the level of output.[3]

[2] In particular, many terms were highly correlated with the variables of volume and wages. In addition, the estimation of marginal costs (evaluated at the sample mean) performed poorly.

[3] When the labour share is regressed against a constant term and the letter mail volume, the latter coefficient is statistically equal to zero.

Consequently, the elasticity of substitution between the inputs indeed equals one[4] and the data set exhibits features consistent with the use of a Cobb-Douglas specification.

We have estimated the cost function along with its input cost shares by using seemingly unrelated regression methods proposed by Zellner (1962). We have considered two inputs, labour, and material rents and services.[5]

A.3. Economies of Scale, Density and Scope

In order to interpret evidence on costs in the postal sector it is important to appreciate the difference between economies of scale, economies of density and economies of scope. The distinction between economies of scale and economies of density is an important one to make in network industries, of which postal services are an example.

- Economies of scale relate to what happens to unit costs when traffic and size of network increase in the same proportion.
  - if unit costs fall when output and network size increase in the same proportion there are economies of scale;
  - if unit costs are unchanged when output and network size increase in the same proportion there are constant returns to scale; and
  - if unit costs increase when output and network size increase in the same proportion there are diseconomies of scale.
- Economies of density relate to what happens to unit costs when traffic increases on a fixed network:
  - if unit costs fall when traffic increases on a fixed network there are economies of density;
  - if unit costs are unchanged when traffic increases on a fixed network there are constant returns to density; and
  - if unit costs increase when traffic increases on a fixed network there are diseconomies of density.

[4] Note that given the information received from the questionnaire, we had to assume that there were two inputs only (labour and material rents and services) and exclude the input capital from the calculation. When this is the case, the two inputs are necessarily substitutes.

[5] Materials rents and services are usually defined as all those expenses apart from labour and depreciation.

The economies of density (and the economies of scale if we were to allow for changes in the network) can be expressed in terms of the elasticity of costs with respect to output. The elasticity of costs with respect to output is defined as

$$\frac{\partial \ln C(q,w)}{\partial \ln q} = \frac{\partial C(q,w)}{C(q,w)} \Big/ \frac{\partial q}{q} = \frac{\partial C(q,w)}{\partial q} * \frac{q}{C(q,w)} = \frac{\text{Marginal cost}}{\text{Average cost}}$$

If this elasticity is greater than one, it means that a one per cent change in output will be reflected in more than a one per cent change in costs. Hence, the inverse of this elasticity is a measure of the economies of density. If a one per cent change in output is translated into a smaller percentage change in cost (which is the case of economies of density), then the elasticity will be smaller than one and the inverse of the elasticity will be greater than one.

- Economies of scope relate to what happens to unit costs when a single firm produces two or more different types of output (e.g. letters and parcels):

  - if unit costs fall when the two or more types of output are provided by the same firm there are economies of scope;
  - if unit costs do not change when the two or more types of output are provided by the same firm there are neither economies nor diseconomies of scope; and
  - if unit costs increase when the two or more types of output are provided by the same firm there are diseconomies of scope.

The Cobb-Douglas cost function does not allow for the existence of economies of scope. Clearly one of the aims of the econometric estimation is to test for the existence of economies of scope in the mail business. Although we asked for a disaggregation of the letter mail volume, we did not receive much information from the questionnaires so we could not have tested the existence of economies of scope even with more flexible cost functions. Regarding parcels, the public empirical evidence (Bradley and Colvin, 1994) indicates that the degree of economies of scope between letters and parcels is one percentage point. Thus, it seems that the economies of scope between the letter and mail parcel business, if at all present, are quite low. Notwithstanding we included in the Cobb-Douglas specification a cross product term between parcels and letters and found it not significant, which is consistent with the non-existence of economies of scope between the letter and the parcel mail business.

APPENDIX B. PREVIOUS STUDIES ON THE ECONOMETRIC ESTIMATION OF THE COST FUNCTION FOR THE PROVISION OF POSTAL SERVICES

Bernard, S.; Cohen, R.; Robinson, M.; Roy, B.; Toledano, J.; Waller, J.; Xenakis, S. (2002) "Delivery cost heterogeneity and vulnerability to entry". Published in *Postal and Delivery Services, Delivering on Competition;* edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2002

The objective of this paper is: (i) to explore the reasons explaining the differences in delivery cost among different geographic areas. In this context, the authors compare the delivery costs in France and USA; (ii) to analyse the impact of cost heterogeneity on the potential of cream skimming practices; and (iii) to examine the impact of changes in postal density and mail volume per address on the average cost of France and USA.

The US average costs are derived by estimating the following specification:

$$ST = \beta_0 + \beta_1 ln Q + \beta_2 (ln Q)^2 + \beta_3 ln D + \beta_4 (ln D)^2 + \beta_5 ln B + \beta_6 (ln B)^2 + \beta_7 (ln Q)(ln D) + \beta_8 (ln Q)(ln B) + \beta_9 (ln D)(ln B)$$

Where:

- ST: Street time
- Q: Volume (pieces per address)
- D: Postal density. This is measured as the number of delivery points (addresses) that can be visited by the carrier in one hour of time. This definition of postal density includes the effects on delivery costs of exogenous variables such as geographic and population characteristics of the served areas and includes the effect of endogenous variables reflecting the quality of delivery services on delivery costs[6]
- B: Addresses

The authors used 1999 data from 39,737 rural routes and a stratified sample of 8,300 city routes.

For France, average costs are derived from an engineering cost model.

[6] Note that for example, if operators deliver mail in a mass delivery point, the postal density increases sharply. However if the mail is delivered house by house, postal density is reduced and quality increases.

Table B.1 includes the results reported by the authors. They show La Poste and USPS normalized street delivery costs for each combination of quartiles of low medium and high postal densities and volume per address.

Table B.1
Index of Average Cost for La Poste and USPS in 1999

La Poste USPS		Low Postal Density (PD) (78 Addresses/Hour) (67 Addresses/Hour)	Medium Postal Density (PD) (135 Addresses/Hour) (94 Addresses/Hour)	High Postal Density (PD) (256 Addresses/Hour) (140 Addresses/Hour)	% Change in AC (due to PD)
La Poste	Low Volume				
USPS	(673 Pieces/Address/Year)	1.81	1.09	0.62	-66%
	(1,090 Pieces/Address/Year)	1.76	1.28	0.92	-48%
La Poste	Medium Volume				
USPS	(767 Pieces/Address/Year)	1.64	1.00	0.58	-65%
	(1,448 Pieces/Address/Year)	1.35	1.00	0.73	-46%
La Poste	High Volume				
USPS	(946 Pieces/Address/Year)	1.40	0.87	0.52	-63%
	(1,919 Pieces/Address/Year)	1.04	0.79	0.59	-43%
La Poste	% Change in AC (due to Vol)	-23%	-20%	-16%	
USPS	% Change in AC (due to Vol)	-41%	-38%	-36%	

** Street Time only (Seconds per Piece)*

Note: Low = 25% Quartile; Medium = 50% Quartile or Median; and High = 75% Quartile

Source: Bernard, et al (2002)

Taking into account these results the authors conclude that:

- The importance of volume as a cost driver is higher when postal density is low. For instance when postal density is low, increments in volume lead to a reduction of average cost of 23 per cent[7] for La Poste and 41 per cent for USPS whilst when postal density is high, the same increases in volume reduces cost by 13 per cent for La Poste and 36 per cent for the USPS. The authors explain that this effect is because at low postal density the fixed costs are higher and the potential for scale economies is therefore greater.
- Postal density is a more important cost driver when volume is low. The authors explain that this effect is because at low volumes the savings in fixed costs realized from increased postal density are spread to fewer pieces.
- Postal density appears to be a more important cost driver of unit street delivery costs in France than in the USA.

Bradley M.D and Colvin J. (1994) "An Econometric Model of Postal Delivery" in Commercialization of Postal and Delivery Services: National and International Perspectives, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 1994: 137-53

The authors test the existence of cost subadditivity in the delivery cost function. To that end, they specify the following functional form:

$$As = \left(1 - e^{-\sum_{i=1}^{N} \beta_i \frac{v_i}{PS}}\right) * PS, \qquad (1)$$

Where:

- AS is the number of actual stops on a route,
- V_i is the volume of class i on the route and
- PS is the number of possible stops on the route. In this specification the β_i coefficients capture the likelihood that an increase in the volume of a particular class will generate additional actual stops.

It is important to note that costs are modelled as number of stops, not in monetary terms. However if we consider that the cost of a stop is constant, total cost can be derived by multiplying the number of stops by that constant.

[7] 23% = (1.4-1.81)/1.81

From this function the marginal cost of mail class k are[8]:

$$MC_k = \frac{\partial AS}{\partial v_k} = \beta_k * e^{-\sum_{i=1}^{N} \beta_i \frac{v_i}{PS}}$$

Marginal cost can be split into two components:

- β_k, that represents the density of the *i*th mail class. This means the likelihood that an increase in the volume of a particular class will generate and additional actual stop.
- The exponent term represents the total amount of mail delivered on a route, including all classes of mail. This means that a given type of mail will have a greater (lesser) propensity to cause a stop if less (more) mail of other classes is simultaneously delivered on the route.

As a result the sign of the marginal cost depends upon the sign of the estimated parameter (β). Marginal costs are decreasing with volume if $\beta \geq 0$.

The authors follow Baumol, Panzar and Willig (1986) to test subaditivity who states that "decreasing average incremental costs of each product, up to y, and economies of scope at y imply subadditivity at y"

By derivation of the conditions the authors conclude that if all of the estimates β's are nonnegative delivery cost are subadditive, and the Postal Service has a natural monopoly in the delivery mail. However they also recognize that the selected functional form (1) makes the existence of subadditivity more likely.

Apart from the evidence of subadditivity, the authors are also interested in the degree of scope economies among individual products in delivery. The general definition of the degree of economies of scope is:

$$SC_k = \frac{C(y_i) + C(y_{N-i}) - C(y)}{C(y)} = \frac{(1 - e^{-\beta_k \frac{v_k}{PS}})PS - IC_k}{1 - e^{-\beta_k \frac{v_k}{PS}} PS}$$

In the estimation the authors include two types of control variables, in order to account for heterogeneity across carrier routes:

[8] Given that (1) is not a true cost function, this is not a truly marginal cost

- RCAT: A dummy variable is included to control for the effects of the route type; i.e., to account for the fact that the distribution of mail across stops could be different for business routes and residential routes.
- Another dummy variable is included to control for the effects of the type of stop. Three classes of stop have been identified: single delivery residential stops (SDR stops), multiple delivery residential stops (MDR stops), and Business and Mixes stops (BAM stops).

After including this dummy variable the equation to be derived as:

$$As_j = \left(1 - e^{-\sum_{i=1}^{N}\beta_i \frac{v_{ij}}{PS_j} + \sum_{k=o}^{K}\gamma_k RCAT_k + \delta_1 S + \delta_2 M + \delta_3 B}\right) * PS_j + \varepsilon_j,$$

- S is the proportion of SDR stops;
- M is the proportion of MDR stops;
- B is the proportion of BAM stops;
- [eta] is the stochastic term; and
- j indexes for route.

This equation is estimated with non-linear least squares. The data used in this study is from a sample of routes from the roughly 150,000 city delivery routes maintained by the US Postal Service. Mail is counted by class mail on ten percent of the stops on each selected route.

The main results of the estimation are:

- All of the estimated β coefficients are non negative and most appear to be positive. This is indicating the presence of sub-additive delivery costs for the U.S Postal service
- The effect of the route category is relatively unimportant being small in both absolute magnitude and of uncertain statistical significance.
- The stop type proportion appears to be significant and appears to help explain the generation of access on a given route. These coefficients measure the response in accesses to a change in the mix of stops for a given level of volume and potential stops
- There are economies of scope and their degree are given in Table B.2.

Table B.2
Estimated Delivery Cost Model

Variable	Estimated coefficients	Asymptotic t-statistics
Mail classes		
First class single piece	0.4472	37.79
First class pre-sorted	0.6818	45.12
First class CAR-RT pre-sorted	1.2193	19.37
Second class	0.5986	18.09
Third class bulk regular	0.5294	35.77
Third class CAR-RT regular	0.9871	62.73
Third class bulk non-profit	0.5967	15.22
Third class CAR-RT non-profit	0.9446	13.68
Fourth class	0.3271	1.71
Other mail	0.7269	22.97
Route & stop characteristics		
% Business foot	0.5393	4.26
% Business motorised	0.0474	0.43
% Residential foot	-0.3475	-4.28
% Residential park & loop	-0.2825	-3.49
% Residential curb	-0.2588	-3.17
% Mixed foot	-0.3219	-3.6
% Mixed park & loop	-0.2618	-3.07
% SDR stops	0.5242	6.41
% MDR stops	0.3533	3.54
% BAM stops	-0.9192	-9.96
% Of observations	15660	

	Measure of scope economies
Mail classes	
First class single piece	54%
First class pre-sorted	51%
First class CAR-RT pre-sorted	11%
Second class	22%
Third class bulk regular	4%
Third class CAR-RT regular	67%
Third class bulk non-profit	19%
Third class CAR-RT non-profit	10%
Fourth class	1%
Other mail	24%

Baron D.M and Bradley M.D. (1993) "Measuring Performance in a Multiproduct Firm: an Application to the U.S. Postal Service". *Operations Research*. May-June 1993. Vol. 41, No 3: 450-58

The objective of this article is to present a method for measuring performance and efficiency at a multiproduct, multiplan firm. This method is applied to one hundred of the largest mail processing centres (MPC) [9] of the U.S. Postal Service.

Bradley and Baron define operation efficiency as aggregate output/aggregate resource use,

Where:

- Aggregate output is a weighted average of outputs, where weights (W_i) are marginal costs.[10] Therefore:

  Aggregate output=w_1* letters sorted to carrier route+w_2*zone sorted letter+w_3*flats+w_4*parcels+w_5*delivery volumes

- Aggregate resources use is the sum of all costs, including capital, energy, material and input rent.

After measuring the operating efficiency for each MPC, Bradley and Baron determine the factors that influence operational efficiency and quantify their effects by regressing operating efficiency against factors that influence operations efficiency. The results of this analysis is reported in Table B.3.

[9] The most important feature of a large MPC that differentiates it from traditional notions of a mail facility is that, like a small operating division, it typically comprises several physically separated facilities. An MPC typically has one large central facility and a network of smaller stations, branches and delivery units.

[10] Marginal costs are derived from the estimation of a total cost function. In particular:

$$TOTAL\ COST_K = \alpha + \sum_{i=1}^{n} \beta_i X_{ik} + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \beta_{ij} X_{ik} X_{jk} \ ,$$

where X is the amount of good i in plant k. Outputs selected were (i) letters sorted to carrier route; (ii) letters sorted to zone level; (ii) flats sorted; (iv) parcel sorted and (v) pieces of mail delivered

Table B.3
Important Factors Determining Operational Efficiency (OE) at Mail Processing Centres

Factor	Description	Effect on OE (*)
Degree of automation	Percentage of piece handling (sortations) performed on automated equipment	9.55
Volume of mail	Total piece handling	2.51
Age of facility	Age measured in years	-0.31
Degree of support costs	% of labour hours in human resources and training functions	1.03
Space utilization	# of pieces handling per square foot of mail processing space	0.65
Degree of flex labour	% of work force that is classified as part-time or casual	0.37
Delivery network	# of delivery points for a given volume	-2.25
Number of locations	# of locations in which mail processing takes place	-1.13

(*) Effect on OE is measured by the per cent response in a OE to a 10 per cent increase in the factor

Operating efficiency can be viewed as a measure of the cost of producing a given level of output. Viewed in this way, the operating efficiency approach can measure cost savings generated by a change in a specific operating strategy or condition, while controlling for the contributing impact of other changes. Thus, the effect of the degree of automation shown in Table A.3 indicates that a 10 per cent increase in the degree of automation would increase operating efficiency by 9.55 per cent, which means that the same output could be achieved with 9.55 per cent less costs.

Baron and Bradley point out that the calculated operating efficiencies and the factors explaining it can be used to analyse the firm. Typical analyses include:

- Forecasting effects of proposed management initiatives
- Measuring cost savings resulting from previous management initiatives
- Understanding why performance differs across the firm's plants or divisions or over time at any one location
- Developing individualized plans for both short and long term improvements in performance at each plant or division.

Cazals C., Rycke M., Florens J.P. and Rouzaud S. (1997) "Scale Economies and Natural Monopoly in the Postal Delivery: Comparison Between Parametric and Non Parametric Specifications". Published in *Managing Change in the Postal and Delivery Industries*, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 1997: 65-80

In this paper Cazals, Rycke, Florens and Rouzaud provide empirical evidence in favour of subadditivity of the delivery process in the French postal services. In order to check this premise, the authors estimate both a parametric and a non-parametric model. For the

purposes of the study we include only the specifications and results of the parametric model.

The objective of the parametric model is to estimate a disaggregated model of labour demand for the delivery activity of La Poste, and use it to obtain a measure of returns to scale and to run simulation scenarios to investigate sub-additivity.

The data used in this estimation consist of mail volumes, labour quantities and environmental characteristics for a cross section of 400 post offices in France in 1992. For each post office, the authors have information about the delivery activity and in particular about the types of delivery; i.e. on foot, by cycle, by moped and by car.

Also, for each post office, the authors have information on the minutes worked in 14 different activities during a week. The authors have aggregated these activities into two broad categories: outside work and inside work. The first category is the actual delivery activity. The second category consists in every tasks related to mail preparation which take place in the post office. These two labour categories are the inputs of the delivery production process

The output is defined as the delivery mail volume during the week of the survey, including four types of mail: standard size letters, non-standard size letters, parcels and others.

In order to estimate delivery costs the authors specify the following equation:

$$Ln\ C_i^{j,l} = \varphi^{jl}((\ln Q_i^{kl})_{K=s,n,p,o}, Ln\ D_i^l) + u_i^{jl}\text{, where,}$$

- I index represents the post office
- l index (=f,b,m,c) represents the delivery type (f: on foot, b: by cycle, m: by moped; and c: by car)
- J index represents the labour category (0 = outside, 1 inside)
- K index (k=s,n,p,o) represents output type (s=standard size letters, n=non-standard size letters, p=parcels and o=others.
- $C^{j,l}_{i:}$ represents the labour quantity of type j corresponding to the mode of delivery l
- Q_i^{kl} is the colume of mail k served by the delivery type. This variable is measures as the number of delivery points by hectometer.
- $Ln\ D_i^l$ is the density of the area of delivery type l.
- $\varphi^{jl}(.)$ is a translog specification.

The estimation method used is weighted least squares in order to correct the stratification bias.[11] Table B.4 reports the main results

Table B.4
Global Elasticities of Labour Demand

Inside labour with respect to		Outside labour with respect to		Total labour with respect to[12]	
SSL	0.1968	SSL	0.1575	SSL	0.1755
NSSL	0.4395	NSSL	0.6070	NSSL	0.5304
P	0.0913	P	0.1065	P	0.0995
O	0.2546	O	-0.0098	O	0.1111
Total	0.9823	Total	0.8612	Total	0.9165

SSL=standard size letters, NSSL=non-standard size letters, P=parcels and O=others.

As we can see in the table, the global elasticity of labour demand is 0.91, suggesting increasing returns to scale in the delivery activity.

With these data, and in order to test subadditivity, the authors run three different scenarios. In scenario 1 two firms share the existing volume of mail; in scenario 2 one firm (F1) takes all offices whose volume of mail is above the average and two firms (F2, F3) share the remaining post offices; and in scenario 3 one firm (F1) takes all post offices whose volume of mail is lower than the average and two firms (F2, F3) share the rest of post offices.

In each case, the model is used to compute an average amount of labour per post office. Then the authors compare these values with the value obtained for La Poste as a whole.

[11] The sample is issued from a stratified population of 9919 observations. It is constructed by a random draw of about 50 observations in each of the eight strata

[12] The total elasticity is derived by $\varepsilon^{jk} = \sum_{i=1}^{n} \frac{C_i^j}{\sum_i C_i^j} \varepsilon_i^{jk}$

The results are presented in Table B.5.

Table B.5
Subadditivity Test

Firm	Average amount of labour per post office (in minutes)	Differences with La Poste $(\sum_j F_j - LP)$
La Poste (LP)	15,223	
Scenario 1		
F1	8,014	
F2	8,014	2*8,014-15,223= 805
Scenario 2		
F1	11,081	
F2	2,149	
F3	2,149	156
Scenario 3		
F1	4,142	
F2	5,865	
F3	5,865	649

Taking into account the figures included in Table B.5, the authors conclude that the delivery cost function is subadditive.

Cazals C., Duchemin P., Florens J, Roy B. and Vialaneix O. (2001a) "An Econometric Study of Cost Elasticity in the Activities of Post Office Counters". Published in *Postal and Delivery Services: Pricing, Productivity, Regulation and Strategy*, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2001: 161-71

Gazzei D.S., Pace C. and Scarfinglieri G. (2002) "On the Output Elasticity of the Activities of Post Office Counters in Italy". Published in *Postal and Delivery Services: Delivering on Competition*; edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2002.

In their paper, Cazals, Duchemin, Florens, Roy and Vialaneix study, using econometrics, the cost function of French counters. The objective of this paper is to obtain an estimation of the cost elasticities for all activities performed at counters in the post office.

The output of postal counters can be measured by all operations or services than are offered to customers; i.e. postal services as sales, after-sales postal activities as conveying registered letters or parcels and non-postal services, as financial services.

By using data from 9,168 French post offices they estimate the following equation by OLS:

$$Ln(C_i)=\varphi(\ln(S_i),Ln(AS_i),Ln(FS_i)) + u_i \qquad i=1\ldots.9{,}168$$

as a third order polynomial in its arguments, in order to allow for a non-linear relation between cost elasticities and outputs, where

- C represents the total cost for counter activities and is measured in attendance minutes of employees at counters in the post office.
- S are sales measured as minutes calculated on the basis of standard operations[13]
- AS are after sales services measured as minutes calculated on the basis of standard operations
- FS are financial services measured as minutes calculated on the basis of standard operations

Table B.6 shows the results.

Table B.6
Cost Elasticities of Output (Mean)

Outputs	Small post offices	Medium-sized post offices	Large post offices	All post offices
S	0.18	0.27	0.44	0.29
AS	0.06	0.09	0.11	0.09
FS	0.38	0.42	0.46	0.42
Sum	**0.62**	**0.78**	**1.01**	**0.80**

From this table the authors conclude that:

- On average returns to scale are 1/0.8=1.25, therefore there are economies of scale in the counter activities.
- As long as post offices become larger, their returns to scale are reduced. Note that for small offices returns to scale are 1/0.62=1.61, while for larger offices, returns to scale are about 1.

[13] Each counter operation is counted and a "standard time" is allotted to each type of operation (for instance, a given standard time is associated to a stamp sale operation; another given standard time is associated to a money deposit operation, etc.). Although it is not explicitly included in the paper we interpret that the author are using standard time and the multiply it by the number of items

The authors' opinion is that increasing returns to scale arise from over capacity in the front office activity. To take into account this effect, the authors include back office activities (for example, accounting, support activity, cash operations, etc) that are necessary to provide front-office activities. Front and back-office activities are included in the econometric specification in the following way:

$$\begin{cases} LnBO = h(\ln S_i, \ln AS_i, \ln FS_i) + v_i \\ LnC = g(\ln S_i, \ln AS_i, \ln FS_i, \ln BO_i) = g(FO, h(\ln(FO)) + w_i \end{cases}$$

The authors specify a function h(.) and g(.) as a third order polynomial in its arguments, which is estimated by Ordinary Least Squares.

Table B.7 shows the partial cost elasticities of front office and back offices activities.[14]

Table B.7
Estimation of Partial Cost Elasticities (Means)

	Small post offices	Medium-sized post offices	Large post offices	All post offices
$\varepsilon_{C/FO}$	0.34	0.31	0.20	0.28
$\varepsilon_{C/BO}$	0.40	0.62	0.91	0.64

$\varepsilon_{C/FO}$, represents the percentage increase in cost induced by a 1 percent increase in front office activity. $\varepsilon_{C/BO}$, represents the percentage increase in cost induced by a 1 percent increase in back office activity

In order to measure the total effect; i.e to take into account the fact that an increase in front office activity inevitably implies an increase in back office activity, the following equation is used:

$$\varepsilon_{C/FO} + \varepsilon_{BO/FO} * \varepsilon_{C/BO}$$

where $\varepsilon_{BO/FO}$ represents the percentage increase in back office activities induced by 1 percent increase in front office activities.

[14] Mathematically this is calculated as $\partial \ln g(.)/\partial \ln(FO)$ and $\partial \ln g(.)/\partial \ln(BO)$

The results are included in Table B.8.

Table B.8
Cost Elasticity of Front Office Activity

Small office			Medium-sized post offices			Large post offices			All post offices		
$\varepsilon_{C/FO}$	$\varepsilon_{BO/FO}$	$\varepsilon_{C/BO}$	$\varepsilon_{C/FO}$	$\varepsilon_{BO/FO}$	$\varepsilon_{C/BO}$	$\varepsilon_{C/FO}$	$\varepsilon_{BO/FO}$	$\varepsilon_{C/BO}$	$\varepsilon_{C/FO}$	$\varepsilon_{BO/FO}$	$\varepsilon_{C/BO}$
0.34	0.60	0.40	0.31	0.72	0.62	0.2	0.9	0.91	0.28	0.74	0.64
0.34+0.60*0.40=0.58			**031+0.72*0.62=0.75**			**0.2+0.9*0.91=1.02**			**0.28+0.74*0.64=0.75**		

Thus the authors conclude that the large value obtained for cost elasticity of front-office activity in large post offices is mainly due to the effect of the back-office activities.

After analysing this paper Gazzei, Pace and Scarfinglieri state that higher levels of unsaturation[15] mean higher levels of unused costs, and so higher levels of potential economies of scale. However, if unsaturation derives from a regulatory constraint and not from an economic phenomenon the measurement of economies of scale will be biased by this exogenous factor. These authors, therefore, evaluate the importance of the regulatory constraints in the measurement of the economies of scale and show that when this factor is taken into account the magnitudes of returns to scale tend to be constant at all classes of post offices sizes.

Gazzei, Pace and Scarfinglieri used two different kind of analysis: Data Envelope Analysis (DEA) and a stochastic frontier analysis (SFA). In order to estimate the stochastic frontier the authors specify the following production function using a database of 11,415 counters in Italy and data for year 2000:

$$\ln y = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \, lnx + \frac{1}{2}\alpha_{11} \ln x_i \, \ln x_j \text{, where}$$

- Y, is the output and represents the standard amount of time necessary to deliver the services actually provided by the specific office.
- X is the input and is measured in terms of attendance time offered to the customer in all windows of the specific counter

[15] By unsaturation the authors refers to the amount of time spent by a worker at the counter not performing any specific task but waiting for the next customer to serve.

In order to estimate returns to scale the authors used 4 models:

- Model I: The production function is estimated by using OLS over the whole sample
- Model II: The production function is estimated by using OLS over a subset of observations filtered by a stochastic frontier
- Model IIa: The same as model II but including quadratic terms in x
- Model III The production function is estimated by using OLS over a subset of observations filtered with DEA model.

The results are presented in Table B.9.

Table B.9
Returns to Scale by the Different Models

	Model I	Model II	Model IIa	Model III
Small	1.2971	1.2034	1.2122	1.1060
Medium	1.1373	1.2034	1.2303	1.1060
Large	0.9849	1.2034	1.2477	1.1060
Total	1.2063	1.2034	1.2225	1.1060

After these results the authors conclude that the same level of returns to scale is found in all offices (between 10 per cent and 25 per cent) regardless of their size and that they are characterised by increasing returns to scale and had the analysis failed to filter offices so as to use only the saturated ones, it would have generated significantly different and misleading results.

Cazals C., Florens J., and Roy B. (2001b) "An Analysis of Some Specific Cost Drivers in the Delivery Activity". Published in *Future Directions in Postal Reform*, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2001.

The objective of this paper is to analyse possible cost drivers for outdoor postal delivery activities in France. Cazals, Florens and Roy are interested in the "size effect" of the delivered items on the cost of outdoor delivery.

In this article the authors use two different methods to estimate costs; (i) a translog cost function using cross section data for year 1998; and (ii) a translog cost function using panel data for period 1994-1998.

$$\ln C_i = \beta_0 + \sum_{j=1}^{p} \beta_j \ln Q_{ji} + \sum_{l=1}^{K} \delta_l \ln W_{li} + \frac{1}{2}\sum_{j=1}^{p} \beta_{jj} (\ln Q_{ji})^2 + \frac{1}{2}\sum_{j=1}^{p} \delta_{ll} (\ln W_{li})^2 + \sum_{j=1}^{p}\sum_{l=1}^{K} \theta_{jl} \ln Q_{ji} \ln W_{li} + u_i \quad (1)$$

Where:

- i is the index for the post office (1….n)
- j is the index for the different outputs
- Q is a 1xp vector of output quantities
- $W_i=(W_{1i}, W_{2i},….., W_{ki})$ are environmental variables

The variables used for this estimation are:

- C is the outdoor delivery cost, which is measured by the number of labour hours for a week
- Q is the vector of output quantities, using four types:
  - SSL: Standard size letters
  - NSSL: Non Standard size letters
  - PAR: Parcel
  - OTH other items (newspapers, publicity, etc)
- D is the density of the delivery area per post office, measured by the number of delivery points divided by the length of the route.

In order to measure the size effects, the authors define a ratio of marginal costs. This ratio measures the differences in marginal costs for different outputs with respect to the Standard size letters:

$$\hat{R}_{ji} = \frac{MC_j}{MC_{SSL,i}}, \quad j = NSSL, PAR, OTH \quad and\ i = 1,....n \quad (2)$$ [16]

Results for the cross sectional analysis are shown in Tables B.10 and B.11.

[16] I*th* represents the index for post office

Table B.10
Translog Cost Function Estimation

Variables (in Ln)	Coefficients	Std.error
NSSL	0.3812	0.0359
PAR	0.0880	0.0186
OTH	0.1077	0.0187
D	-0.3280	0.0316
SSL^2	0.0650	0.0117
NSSL^2	0.0792	0.0134
PAR^2	0.0193	0.0020
OTH^2	0.0140	0.0020
D^2	0.0279	0.0044
SSL*NSSL	-0.1271	0.0252
SSL*D	0.0682	0.1450
NSSL*D	-0.0884	0.0141
PAR*OTH	-0.0249	0.0022
Constant	3.7363	0.0951
R^2=0.95		

Table B.11
Means of Cost Elasticities with Respect to Output

	Mean
SSL	0.327
NSSL	0.274
PAR	0.155
OTH	0.129
OVERALL	**0.885**

We can see in Table B.11 that the overall cost elasticity is 0.885 so the value of the returns to scale is 1.13 (i.e. there are increasing returns to scale). The authors point out that a similar study has been made for the French postal service from a stratified sample of around 400 delivery post offices of the year 1992, where similar results where obtained for this elasticity.

Given these results, the values for the marginal cost ratio are as shown in Table B.12.

Table B.12
Statistics for Estimated Ratios of Marginal Costs (1998)

	Mean	Percentil 20	Percentil 40	Percentil 50	Percentil 60	Percentil 80
R_{NSSL}	2.73	1.57	2.17	2.46	2.82	3.79
R_{PAR}	21.59	13.62	17.63	19.84	22.25	28.46
R_{OTH}	17.8	11.74	15.03	16.53	18.2	22.9

The main problem when using cross section data is that they do not allow for the identification of the unobserved heterogeneity that is not captured by the explanatory variables introduced in the cost function. According to the authors this heterogeneity comes from the lack of information relative to the environmental characteristics of delivery. Thus the use of panel data reduce the estimation bias caused by unobservable variables.

The results obtained by using the fixed effect approach are reported in Tables B.13, B.14 and B.15.

Table B.13
Translog Cost Function Estimation

Variables	Coefficients	Std.error
PAR	0.1396	0.0117
D	-0.2488	0.0288
SSL^2	0.0208	0.0014
NSSL^2	0.0216	0.0014
PAR^2	0.0173	0.0011
D^2	0.0309	0.0052
SSL*NSSL	-0.0123	0.0020
SSL*PAR	-0.0350	0.0036
SSL*OTH	0.0281	0.0037
SSL*D	0.0205	0.0040
NSSL*PAR	0.0107	0.0034
NSSL*OTH	-0.0210	0.0043
PAR*D	0.0164	0.0036
OTH*D	0.0172	0.0047
T	0.0077	0.0340
T^2	-0.0020	0.0006
Constant	5.7646	0.0407
R^2=0.94		

Table B.14
Means of Cost Elasticities with Respect to Output

	Mean
SSL	0.224
NSSL	0.178
PAR	0.101
OTH	0.091
OVERALL	**0.594**

The overall cost elasticity is 0.594, which implies a value for returns to scale of 1.68. This value is higher than the estimation from cross section model (1.13).

Table B.15
Statistics for Estimated Ratios of Marginal Costs (1998)

	Mean	Percentil 20	Percentil 40	Percentil 50	Percentil 60	Percentil 80
R_{NSSL}	2.432	1.94	2.24	2.38	2.51	2.86
R_{PAR}	16.001	11.48	13.71	14.73	15.99	19.09
R_{OTH}	20.669	11.64	16.60	18.85	21.25	27.77

As we can see in Table B.15 the marginal cost ratios are lower in average than in the case of cross sectional data estimation because of the reduction in the estimation bias.

Finally the authors point out that the results have to be interpreted carefully, particularly for the marginal cost ratios relative to non-standard-size letters as this category of output is very heterogeneous (takes into account both newspapers and letters with large envelopes). Also the data used were based on unaudited declarations of each post office.

Cohen, R. H., and Edward H. Chu. (1997) "A Measure of Scale Economies for Postal Systems." Published in *Managing Change in the Postal and Delivery Industries*, edited by Michael A. Crew and Paul R. Kleindorfer. Boston, MA: Kluwer Academic Publishers, 1997.

The main purpose of the paper is to measure the returns to scale of the US delivery function. In order to measure the returns to scale, the authors compare the cost of providing delivery by a single firm with the cost of providing delivery by two firms. The authors assume that the two firms share the market equally and that each firm serve the entire country each delivery day.

In order to calculate the delivery costs, the authors specify the street delivery costs as summarised in Table B.16.

Table B.16
Delivery Costs (Monopoly)

$SC_m=RC_m+EC_m+f_m*AC_m+V_m*AC_m$

SC_m	Street delivery cost
RC_m	Route time cost[17]
EC_m	Elemental load cost[18]
AC_m	Access Cost[19]
V_m	Variable portion of access costs= exp(-b*PPS)*b*PPS/(1-exp(-b*PPS))
f_m	Fixed portion of access cost=(1-Vm)

(*) m index denotes monopoly

The authors consider that route time costs are essentially fixed, while access time is partly variable, and load time is 100 per cent variable with volume. The analysis of the variability of access time involves estimating the number of new accesses that would be caused by an increment of volume by using the following equation:

$$COV_i = 1 - e^{-b*PPS_i} \quad (1),$$

where:

- $COV_i=AS_i/PS_i$
- AS_i: Number of actual stops on route i
- PS_i: Number of possible stops in route i
- PPS_i: Number of pieces per possible stop on route i

Note that equation (1) reflects the variable part of access cost because it measures the probability of a new stop caused by increases in mail volumes. Parameter *b* can be interpreted as the probability that an increase in mail volume leads to an increase in the number of stops.

---

[17] Route time is the time it would take a carrier to walk or drive the route, passing, but not accessing, any delivery point.

[18] Load time is the time it takes a carrier to place the mail in a mail receptacle

[19] Access time is the time it takes a carrier to deviate from the route in order to make a delivery. This may mean departing from the basic line of travel and walking or driving to a delivery point and returning to the basic line of travel, or it may mean slowing down from normal driving speed, stopping to make a delivery to a curb side mail receptacle, and then resuming normal speed.

The authors use data from the Postal Service's City Carrier System (CCS) for 1993 to model the behaviour of access costs. The CCS data base contains a representative sample of street delivery costs, volumes and delivery point characteristics for city delivery carriers and from about 300 routes. The Postal Service sampled each route every two weeks over a one year period resulting in about 8,000 route-level observations. With these data estimation for parameter b is 0.6587. If b=06587 and PPS for USA is 3.66, we can obtain the value for V_m=0.20.[20] Given these values the authors estimate the value of returns to scale in approximately $6.1 billion.[21]

They also consider the extent to which returns to scale are a barrier to entry. They state that while in the presence of economies of scale a firm with a small share of total volume that competes with an incumbent in delivery finds its unit cost higher, that competitor can reduce its fixed costs by lowering quality.

Table B.17 shows the market share that a competitor would have to capture in order to have the same unit costs as the U.S. Postal Service.

Table B.17
Break-Even Market Share for Competitors

Competitor delivery Frequency	Delivery Combined Wage and Efficiency Advantage of the Competitor		
	0%	33%	50%
6 Days	50	40	35
5 Days	46	36	31
4 Days	41	32	8
3 Days	37	27	24
2 Days	31	23	19
1 Day	25	18	15

For example, if a competitor delivered six days a week and its combined wage and efficiency advantage is 50 per cent, the competitor would have to capture 35 per cent of the total market in order to have the same unit delivery cost as the Postal Service. With these results, the authors conclude that the effects of economies of scale in delivery present significant barriers to entry.

[20] We tried to replicate this value and with the article's data we obtain a value of 0.24.

[21] Street delivery cost for monopoly is $10.7 billion while in the case of duopoly is $16.2 billion. The difference is what authors report as return to scale.

Cohen, R, Pace, C, Robinson, M, Scarfiglieri, G, Scocchera, R, Visco Comandini, V, Waller, J, Xenakis, S (2002) "A comparison of the burden of universal service in Italy and the United States" Published in Crew, M A, Kleindorfer, P R *Postal and Delivery Services: Pricing, Productivity, Regulation and Strategy*, 2002.

Cohen R.. Pace C., Rato A., Robinson M., Santos R., Scarfiglieri G., Comandini V., Waller J., Xenakis S. (2003) "Towards a General Postal Service Cost Function". Available in http://www.prc.gov/tsp/103/Cost_Function.pdf (Accessed 27 January 2003) .

Although these articles do not contain any econometric analysis we include them in this summary as they show an application of the approach explained in Cohen et al. (1997)

The purpose of the study is to compare the USO costs in the US and Italy. To that end, the authors develop a model to determine the USO burden for posts with different per capita volumes. Applying the model they find that the burden of USO is very great for Poste Italiane and other posts with small per capita volumes.

The authors use data from the US postal service for 1999 that split postal costs into fixed and variable with volume components, since the authors maintain that the burden of the USO on a postal system lies within its fixed costs.

Table B.18
US Fixed/Variable Cost by Major Function (1999)

	Fixed (%)	Variable (%)	Total Cost	% of total costs
Delivery[22]	52	48	22.1	35%
Mail processing	4	96	21.4	34%
Transportation	8	92	4.3	7%
Window service	54	46	3.1	5%
Other	77	23	11.5	18%
Total	**37**	**63**	**62.4**	**100**

Source: Cohen et al (2002) taken from Postal Rate Commission Docket No. R2000-1

Given this cost split the authors note that as per capita volume increases the mail processing proportion of total costs will increase and the delivery portion will decrease. This is because mail-processing costs are almost all variable while delivery costs have a very large fixed component.

[22] Delivery includes in-office and out-of-office costs

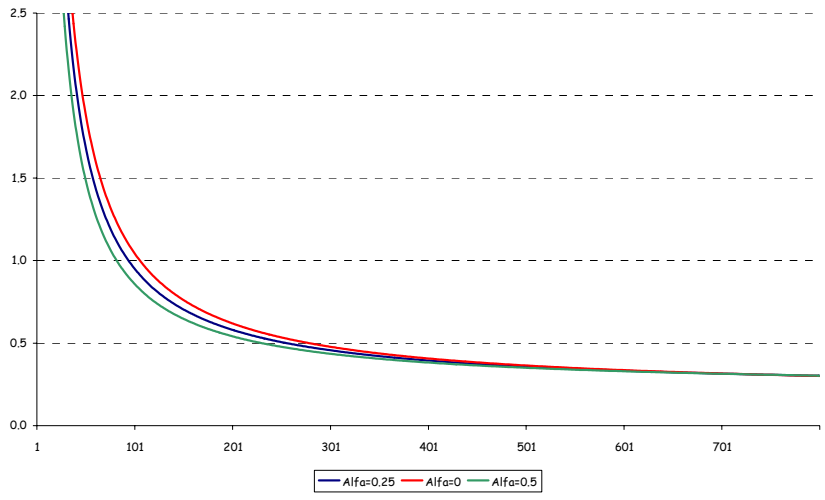
The basics of the model is as shown in Table B.19.

Table B.19
Basics of the Cohen Model

Cme=CT/(Q*P), where	
• CT= Delivery cost (CD)+Non delivery cost (CND) • Q = Quantity (volume) per capita • P = 1999 US Population	
$CD= CV_D*Q/Q_0$[23]$+CF_d$,	**$CND= Q/Q_0(CV_{ND} +E_V*F_{ND})+(1-E_v)*CF_{ND}$**
• **CV_D** = USPS variable costs for 1999 • **Q_0** = USPS volume per capita for 1999 • **CF_D** = USPS fixed costs for 1999	• **CV_{ND}** = Non delivery costs for USPS in1999 • **E_V**, = % of fixed costs that become variable in the long term. For the cost simulation values of 0.25 and 0.5 are assumed • **F_{ND}** = Non delivery fixed costs

By using the above specification and for different levels of volume per capita the authors simulate a downward sloping cost curve as depicted in Figure B.1.

Figure B.1
Model Estimates of Unit Costs



Given this model, the authors report different values for unit costs and the impact of changes in volume. They are included in Table B.20.

[23] Note that Q/Q_0 is an index. This means that variable costs changes with output in a linear fashion (i.e. if volume per capita is 80% of volume per capita in 1999, variable costs will decrease in the same proportion).

Table B.20
Unit Cost with 10 per cent Decrease in Volume
Assuming 25 per cent of Non-Delivery Fixed Costs are Long Run Variable

	700	600	500	400	300	200	100
Base unit costs	0.32	0.33	0.36	0.4	0.46	0.59	0.97
Unit costs with 10% volume loss	0.33	0.35	0.38	0.42	0.49	0.63	1.06

Having this information the authors conclude that the burden of the USO[24] is much greater for low per capita volume posts than for medium to high volume ones. Therefore the authors' opinion is that the burden of the universal service is highly dependent on per capita volume, so policies suitable for liberalizing medium and large per capita volume posts are likely not to be suitable for small per capita volume posts.[25]

Cohen et al. (2003) check whether the cost function used in Cohen et al. (2002) is suitable for other countries. To do this, the authors use the same information set and assume that the main determinant of variable costs is the volume per capita, and that network size is the main determinant of fixed costs (using population as a proxy). Thus the authors divide variable costs by volume, obtaining a proxy for marginal costs and the fixed costs by the US population obtaining a fixed network cost per person. The results of this approach are shown in Table B.21.

Table B.21
Fixed and Variable Costs of Postal Activities

		Variable		Fixed	
Delivery	=	0.0526	V +	42.14	P
Mail processing	=	0.1029	V +	2.35	P
Transportation	=	0.0200	V +	0.95	P
Window service	=	0.0091	V +	4.60	P
Other	=	0.0241	V +	24.35	P
Total	**=**	**0.2088**	**V +**	**74.40**	**P**

[24] It should be reminded that the authors define the USO burden as the cost of the services that would not be provided in a competitive market.

[25] In order to make the model more useful for Italy the authors adjust it to take into account known differences such as the lack of work sharing activities in Italy, hourly labour costs differences and the proportion of letters, flats and parcels in Italy.

Thus the cost function is expressed as follows:

$$Total\ Costs = 0.2088 * Volume + 74.74 * population,$$

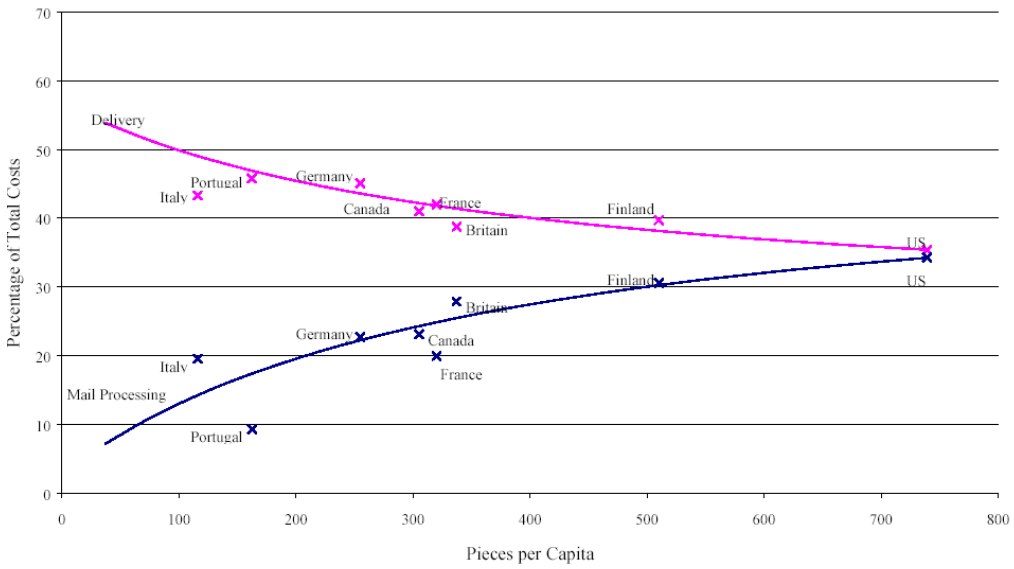
Which can be re-arranged as shown below:

$$Total\ Costs_i = 0.2089 * Population_i * Volume/Population_i + 74.74 * Population_i,$$

Where sub-index i represents a given country.

Thus by introducing data on volume per capita and population different unit costs are estimated for several countries at it is shown in Figure B.2, which leads the authors to conclude that volume and population explains the costs of postal operators. In fact, by using information for several countries the cost function assumed in the model fits very well to the data, especially for operators in high volume countries.

Figure B.2
Unit Costs in Different Countries



Mizutani, F. and Uranishi,S. (2003) "The Post Office vs. Parcel Delivery Companies: Competition Effects on Costs and Productivity". *Journal of Regulatory Economics*. May 2003; 23(3): 299-319.

One of the purposes of this paper is to evaluate how institutional changes (the introduction of competition and the announcement of policy reforms) affects the cost structure of the Post Office and private parcel operators in the Japanese markets.

The authors use data for 6 firms out of which 5 are private companies and the other one is the postal operator, of the parcel delivery market in Japan for years 1972-1998

The cost function is specified as a usual translog function where:

- Total costs (C) are the sum of labour, material and capital cost:
- Output (O) is defined as the total number of freight items transported. This measure consists of letters, cards, parcels and other business goods. It is important to note that while the Post Office transport letters and cards in addition to parcels, private companies transport parcels and other business goods but because of existing regulations deliver almost no cards or letters. Given that information on other business goods was not public, authors estimated volumes by dividing total revenues for other business goods by the standard price of business goods.
- Factor prices:
  - Labour price (w_l) is defined as the average annual salary per employee.
  - Material price (w_m) is obtained by dividing material expenditures by square meters of office space.
  - Capital price (w_k) is calculated as the sum of the depreciation rate and the average interest rate of both short term and long term debt. Depreciation rate is calculated by dividing depreciation expenditures by fixed assets. Interest rate of loans is obtained by dividing interest payments by the total amount of loan to be paid.
- Ratio of non-parcel service and the relative price of parcel service. The ratio of non-parcel service is defined as the ratio of non-parcel service revenues to total revenues, while the relative price of parcel service is defined by the ratio of the price of parcel service to the price of other business goods. The authors introduce these variables to control for differences in output characteristics.
- Environmental variables:
  - Technology (T) is measured by a time trend (year 1972 is equal to one). The authors considered others that would show technological progress such as the ratios related to the installation of parcel sorting machines and the ratio of less gasoline-consuming trucks to total trucks. However the time trend is finally used because of the lack of data availability.
  - Competition Factor (R_{COMP}) is defined as the inverse of the Herfindahl index in the number of parcels delivered.
  - Government announcement of policy reform (R_{GOV}) is defined as the time trend, in which year 1993 is equal to 1. In this year the government announced that it intended to reform the Post Office.

- The authors include a private company dummy variable (D_u) to take into account that the post office may respond differently to private companies

The authors specify three different models:

Model 1. Model 1 is a translog cost function where output is measured as a single output, but there are no output characteristics variables.

$$\ln C = \alpha_Q \ln Q + \sum_j \beta_j \ln W_j + \frac{1}{2}\alpha_{QQ} (\ln Q)^2 + \frac{1}{2}\sum_j \sum_k \beta_j \ln W_j \ln W_k + \sum_j \gamma_{Qj} \ln Q \ln W_j$$
$$+ (\zeta_c + \sum_V \zeta_{CV} D_V) \ln R_{COMP} + (\eta_g + \sum_v \eta_{gv} D_V) R_{gov} + \tau T + \sum_u \delta_u D_u$$

Model 2. Model 2 is a translog cost function where output characteristics variables are included as a control variables

$$\ln C = \alpha_Q \ln Q + \sum_j \beta_j \ln W_j + \frac{1}{2}\alpha_{QQ} (\ln Q)^2 + \frac{1}{2}\sum_j \sum_k \beta_j \ln W_j \ln W_k + \sum_j \gamma_{Qj} \ln Q \ln W_j$$
$$+ (\zeta_c + \sum_V \zeta_{CV} D_V) \ln R_{COMP} + (\eta_g + \sum_v \eta_{gv} D_V) R_{gov} + \tau T + \sum_f \theta_f \ln H_f + \sum_u \delta_u D_u$$

Model 3. Model 3 is a translog cost function where output is estimated taking into account control variables but using an hedonic specification for inputs.

$$\ln C = \alpha_Q \ln Y + \sum_j \beta_j \ln W_j + \frac{1}{2}\alpha_{QQ} (\ln Y)^2 + \frac{1}{2}\sum_j \sum_k \beta_j \ln W_j \ln W_k + \sum_j \gamma_{Qj} \ln Y \ln W_j$$
$$+ (\zeta_c + \sum_V \zeta_{CV} D_V) \ln R_{COMP} + (\eta_g + \sum_v \eta_{gv} D_V) R_{gov} + \tau T + \sum_u \delta_u D_u \text{ , and}$$
$$\ln Y = \ln Q + \sum_f \theta_f \ln H_f$$

The estimation method is SUR (seemingly unrelated regression) for all cost models with input share equation. In order to solve the serial correlation of data, the authors assume the first order autoregressive disturbance (A1) and perform the Two-step Prais-Winstein (2SPW) transformation before applying SUR.

Results for this estimation are summarized in Table B.22.

Table B.22
Estimation Results of Total Cost Function

Table 5. Estimation Results of Total Cost Function: Coefficients and Standard Error

Parameter	Model 1	Model 2	Model 3	Parameter	Model 1	Model 2	Model 3
α_Q	1.1109***	1.0593***	1.0557***	ζ_{c4}	−0.1074	−0.1306***	−0.1483***
	(0.0148)	(0.0126)	(0.0130)		(0.0821)	(0.0440)	(0.0414)
θ_{NPS}	—	−0.2058**	−0.1850**	ζ_{c5}	−0.2086**	−0.2470***	−0.2660***
	—	(0.0928)	(0.0829)		(0.0825)	(0.0432)	(0.0407)
θ_{PPS}	—	−0.3235***	−0.3128***	ζ_{c6}	−0.0374	−0.0548	−0.0729*
	—	(0.0393)	(0.0371)		(0.0824)	(0.0418)	(0.0392)
β_L	0.4798***	0.4793***	0.4794***	η_g	0.0073	0.0189**	0.0209**
	(0.0072)	(0.0062)	(0.0063)		(0.0100)	(0.0094)	(0.0092)
β_M	0.4636***	0.4624***	0.4624***	η_{g2}	0.0083	0.0107	0.0122
	(0.0081)	(0.0071)	(0.0072)		(0.0129)	(0.0120)	(0.0117)
β_K	0.0566***	0.0583***	0.0582***	η_{g3}	0.0209	0.0169	0.0160
	(0.0023)	(0.0016)	(0.0016)		(0.0128)	(0.0120)	(0.0119)
α_{QQ}	−0.0789***	−0.0610***	−0.0623***	η_{g4}	0.0143	0.0125	0.0112
	(0.0053)	(0.0050)	(0.0053)		(0.0128)	(0.0119)	(0.0118)
β_{LL}	−0.0822***	−0.0439***	−0.0392***	η_{g5}	0.0266**	0.0263**	0.0248**
	(0.0236)	(0.0121)	(0.0118)		(0.0128)	(0.0120)	(0.0119)
β_{MM}	−0.0721***	−0.0241*	−0.0192	η_{g6}	0.0311**	0.0457***	0.0453***
	(0.0233)	(0.0138)	(0.0136)		(0.0128)	(0.0115)	(0.0114)
β_{KK}	0.0365***	0.0179***	0.0159***	δ_1	3.9965***	7.5212***	7.8691***
	(0.0068)	(0.0040)	(0.0040)		(0.0308)	(0.0439)	(0.0448)
β_{LM}	0.0954***	0.0430***	0.0371***	δ_2	4.9513***	8.9289***	9.3279***
	(0.0214)	(0.0122)	(0.0120)		(0.0285)	(0.0415)	(0.0418)
β_{LK}	−0.0132	0.0010	0.0021	δ_3	5.1037***	9.3132***	9.7213***
	(0.0101)	(0.0049)	(0.0048)		(0.0271)	(0.0325)	(0.0319)
β_{MK}	−0.0233***	−0.0188***	−0.0180***	δ_4	5.1313***	9.3442***	9.7534***
	(0.0067)	(0.0031)	(0.0030)		(0.0284)	(0.0355)	(0.0351)
γ_{QL}	0.0761***	0.0541***	0.0511***	δ_5	5.2232***	9.5671***	9.9881***
	(0.0078)	(0.0045)	(0.0043)		(0.0288)	(0.0386)	(0.0383)
γ_{QM}	−0.0759***	−0.0531***	−0.0496***	δ_6	5.0553***	9.1979***	9.6000***
	(0.0087)	(0.0050)	(0.0048)		(0.0311)	(0.0431)	(0.0431)
γ_{QK}	−0.0002	−0.0011	−0.0015				
	(0.0025)	(0.0014)	(0.0014)	Log of	176.9601	206.1250	209.3464
τ	−0.0107***	−0.0247***	−0.0257***	Likelihood			
	(0.0018)	(0.0021)	(0.0021)	RSS	1.0677	0.7449	0.7158
ζ_c	0.0767	0.0529	0.0645*	*R*-squared	0.9924	0.9943	0.9946
	(0.0661)	(0.0385)	(0.0359)	*N*	162	162	162
ζ_{c2}	−0.0510	−0.1440*	−0.1505**				
	(0.0819)	(0.0793)	(0.0735)				
ζ_{c3}	−0.1952**	−0.2258***	−0.2396***				
	(0.0820)	(0.0453)	(0.0424)				

Notes. Numbers in parentheses represent standard error. ***Significant at 1%; **5%; *10%. RSS is residual sum of squares.

In the authors' words these results show that:

- The coefficient for the output measure α_Q is higher than one. This implies that scale economies around the mean do not exist in the goods delivery industry[26]

- The coefficient of the competition factor for the public company (ζ_c) is positive, but coefficients for private firms are negative. This implies that competition has an effect on the reduction of cost in private companies but does not affect the public firm. Notwithstanding this, the Post Office reacted by developing new strategic options from the demand side such as price discounts in parcels and the introduction of new services which led to productivity increases.

- The announcement by the government of policy changes has no effect on cost reduction in either public or private firms. The authors explain this result on the "vagueness of the announcement itself, which did not clearly state but implied that privatisation might be an option. The lack of response might also be a reflection of the perceived political power of those in whose interest it was for the Post Office to remain in the public sector."[27]

Norsworthy, J.R. ; Jang,-Show-Ling; Shi,-Wei-Ming. (1991) "Productivity and Cost Measurement for the United States Postal Service: Variations among Regions "Published in *Competition and the Regulation of Utilities;* edited by M.A. Crew and P.R. Kleindorfer Norwell, Mass. and Dordrecht: Kluwer Academic 1991; 141-68

The authors estimate the costs of 200 Management Sectional Centres (MSCs) in the US in 1984. MSCs have responsibility for mail collection, forwarding and delivering for geographic regions that completely cover all 50 states.

The authors use a translog variable cost function with eight output categories of delivered and collected mail, three descriptors of the network, five labour input categories, materials input and three quasi fixed capital inputs.

[26] Note that in a translog cost function there are cross terms, so the measure of economies of scale changes with the degree of coefficients of other exogenous variables. However, around the sample mean, the measure of scale economies is related to the coefficient of the first order output measure.

[27] Mizutani F. and Shuji U. (2003), page 318.

Originally, the translog cost function would take the following form:

$$\ln CV = a_0 + \sum_i a_i \ln P_i + \frac{1}{2}\sum_i \sum_j a_{ij} \ln P_i \ln P_j + \sum_m b_m \ln Y_m + \frac{1}{2}\sum_m \sum_n b_m \ln Y_m \ln Y_n$$

$$+ \sum_i \sum_m c_{im} \ln P_i \ln Y_m + \sum_k d_k \ln Q_k + \frac{1}{2}\sum_k \sum_t d_k \ln Q_k \ln Q_l + \sum_i \sum_k l_{im} \ln P_i \ln Q_k$$

$$+ \sum_n \sum_k f_{ik} \ln Y_m \ln Y_k \qquad (Eq\ 1)$$

The authors note that this model has an unmanageably large number of parameters given the number of outputs and quasi-fixed inputs variables that they want to present. For this reason, the mail outputs are grouped into delivered (D) and collected (C), and network characteristics and capital into two single groups (N and K). Second order interactions are also limited among components within these groups. Therefore the resulting model is as follows.

$$\ln CV = a_0 + \sum_i a_i \ln P_i + \frac{1}{2}\sum_i \sum_j a_{ij} \ln P_i \ln P_j + \sum_r y_r Z_r + \frac{1}{2}\sum_r \sum_s y_{rs} Z_r Z_s + \frac{1}{2}\sum_i \sum_r c_{ir} \ln P_i Z_r \quad (2)$$

where i and j-index are: c - input price for customer service worker; d - input price for mail carriers; t - input price for material; o - input price for other workers; p - input price for postmasters and supervisors; m - input price for mail handlers;

r - and s-index represents: d - delivered mail; c: collected mail n: network k: capital x: worker attitude. Z_d is the delivered mail; Z_c is the collected mail; Z_n is the network variable and Z_k is the capital variable.

Although the study shows many results we here report those that we find more related to the scope of the project and so which we find more useful.

Cost effect of delivered and collected mail, network and capital

Table B.23
Output, Capital and Network Weights

Parameter name	Estimated value	T-Statistic
y_d	0.1659	21.7006
y_c	0.3004	36.3328
y_n	0.4458	62.2487
y_k	-0.0001	8.5366

- For the system as a whole, the scale coefficient is 1.099, denoting returns to scale of about 10 per cent.[28]
- After adjustment for scale economies, delivery mail (y_d) contributes about 18 per cent of total variable cost. Alternatively, originated mail (y_c) contributes about 33 per cent of total variable cost. The network itself contributes about 49 per cent of total variable cost.[29]

Delivered mail

Table B.24
Coefficients associated with Delivered Mail

Parameter name	Estimated value	T-Statistic
Y_{dd}	-0.0113	-3.2245
y_{dc}	0.0869	28.8013
y_{dn}	-0.2613	-31.2761
y_{dk}	0.0871	10.9094

- Y_{dd} is small and negative, indicating that economies of scale are realized as the volume of delivered mail increases.
- Y_{dc}, the interaction between collected and delivered mail, is positive indicating diseconomies of scope.
- Y_{dn}, the interaction term between delivered mail and network is negative, indicating strong economies for expansion of the volume of delivered mail on a given network.
- Y_{dk} is small and positive (i.e. cost increasing). According to the authors this coefficient may simply reflect the requirement for more vehicles as the volume of delivered mail rises

28 Returns to scale for the restrictive variable cost function can be calculated from the following equation:

$$r = \frac{1 - y_k}{\sum_r y_r},$$

where r denotes (i) d: delivered mail; (ii) c: collected mail; (iii) n: network; (iv) k: capital; (v) x: worker attitude

29 The authors note that most of the network cost itself is probably associated with delivery mail.

Collected mail

Table B.25
Coefficients associated with Collected Mail

Parameter name	Estimated value	T-Statistic
Y_{cc}	-0.0855	-31.1182
y_{cd}	0.0870	28.8013
y_{cn}	0.1220	20.4932
y_{ck}	-0.0053	-0.9065

- Y_{cc} is negative and indicates economies of scale in processing collected mail
- Y_{cd} is positive and indicates cost-increasing interference between collection and delivery activity.
- Y_{cn} is positive and indicates congestion or interference effects between collection and delivery network.
- Y_{ck} is not significant.

Mail delivery and collection network

The network is described in terms of the number of delivery points, the population served by the network and the geographic area served (in square miles).

Table B.26
Coefficients associated with the Network

Parameter name	Estimated value	T-Statistic
y_{nn}	0.3450	36.2964
y_{dn}	-0.2613	-31.2761
y_{cn}	0.1220	20.9432
y_{nk}	-0.1001	-12.1401

- Y_{nn} is positive and large representing decreasing returns to scale in network expansion
- The interaction between network and delivery (Y_{dn}) is negative denoting economies of scale in delivery volume on a given network.
- The interaction between network and collection (Y_{cn}) is positive denoting increasing costs of rising mail collection volume on the network

- Capital input interacts with the network to reduce costs (Y_{nk}) with a value of –0.1. This cost reducing effect probably arises from the capability of vehicles and mail sorting machinery to accommodate larger loads as mail volume increases.

Capital inputs

Table B.27
Coefficients associated with Capital Inputs

Parameter name	Estimated value	T-Statistic
y_k	0.0001	8.5366
y_{kk}	-0.0149	-2.3615
y_{dk}	0.0891	10.9094
y_{ck}	-0.0053	-0.9065
y_{nk}	-0.1001	-12.1404

Capital expenditures in the USPS are a very small part of total costs, averaging less than 5 percent. The estimated coefficient in the restricted variable cost function is interpreted as a shadow price for the fixed input (in this case capital). It is the value of variable resources that would be saved by one additional unit of capital input. The shadow cost of capital y_k is quite small, -0.0001, but significant.

Wada T., Tsunoda, C. and Nemoto, J. (1997) "Empirical Analysis of Economies of Scale, Economies of Scope, and Cost Subadditivity in Japanese Mail Service" . ***IPTP Discussion paper series*****, August No.1997-08**

The objective of this working paper is to estimate two different multiproduct cost functions of the Japanese mail service in order to test properties such as product-specific economies of scale, overall economies of scale, economies of scope, and cost subadditivity.

The authors use two different specification: an usual translog cost function and a generalized translog cost function and use cross-sectional data covering 12 regional bureaus of postal services collected over a 15 year period from 1980 to 1994 to obtain a total of 180 observation points. The variables selected are as follows:

- **TOTAL COST (C):** Includes mail service operation and management costs; and the mail service share of personnel training and other indirect costs for all three postal services
- **Y_m:** number of letter mail items delivered in a year for each regional bureau of postal services

- **Y_p:** The number of parcels delivered in a year for each regional bureau of postal services
- **P_W:** Price of labour input, which has been calculated as the average labour cost using the actual cost data.
- **P_k:** Goods price input, which has been formulated as $P_k = P(r+\delta)$, where
  - P: capital goods price (based on the Price Indexes Annual, the Bank of Japan Research and Statistics Department);
  - *r*: is the government-guaranteed bond interest (based on the Economic Statistics Annual, the Bank of Japan Research and Statistics Department);
  - is calculated as depreciation cost/value of fixed assets
- **J**: Population per office

The authors specify a usual translog and a generalized translog cost function.

Translog cost function

$$\ln C = C_0 + \alpha_m \ln Y_m + \alpha_p \ln Y_p + \beta_w \ln P_w + \beta_k \ln P_K$$

$$+ \tfrac{1}{2}\gamma_{mm} \ln Y_m \ln Y_m + \tfrac{1}{2}\gamma_{pp} \ln Y_p \ln Y_p + \tfrac{1}{2}\lambda_{mp} \ln Y_m \ln Y_p + \tfrac{1}{2}\gamma_{pm} \ln Y_p \ln Y_m$$
$$+ \tfrac{1}{2}\delta_{ww} \ln P_w \ln P_w + \tfrac{1}{2}\delta_{kk} \ln P_k \ln P_k + \tfrac{1}{2}\delta_{wk} \ln P_w \ln P_k + \tfrac{1}{2}\delta_{kw} \ln P_k \ln P_w$$
$$+ \rho_{mw} \ln Y_m \ln P_w + \rho_{mk} \ln Y_m \ln P_k + \rho_{pw} \ln Y_p \ln P_w + \rho_{pk} \ln Y_p \ln P_k$$
$$+ j \log J$$

his equation is estimated jointly with the labour cost share (S_W) equation derived from Shephard's lemma:

$$S_w = \frac{\partial C}{\partial P_w}\frac{P_w}{C} = \frac{\partial \ln C}{\partial \ln P_w} = \beta_w + \delta_{ww} \ln P_w + 1/2\,\delta_{wk} \ln P_k + 1/2\,\delta_{kw} \ln P_k + \rho_{mw} \ln Y_m + \rho_{pw} \ln Y_p$$

Generalized translog function

$$\ln C = A + B1\frac{Y_m^{\theta} - 1}{\theta} + B2\frac{Y_p^{\theta} - 1}{\theta} + C1 \ln P_w + C2 \ln P_K$$

$$+ \tfrac{1}{2} D1 \frac{Y_m^{\theta} - 1}{\theta}\frac{Y_m^{\theta} - 1}{\theta} + \tfrac{1}{2} D2 \frac{Y_p^{\theta} - 1}{\theta}\frac{Y_p^{\theta} - 1}{\theta} + \tfrac{1}{2} D3 \frac{Y_m^{\theta} - 1}{\theta}\frac{Y_p^{\theta} - 1}{\theta} + \tfrac{1}{2} D4 \frac{Y_p^{\theta} - 1}{\theta}\frac{Y_m^{\theta} - 1}{\theta}$$

$$+ \tfrac{1}{2} E1 \ln P_w \ln P_w + \tfrac{1}{2} E2 \ln P_k \ln P_k + \tfrac{1}{2} E3 \ln P_w \ln P_k + \tfrac{1}{2} E4 \ln P_k \ln P_w$$

$$+F1\frac{Y_m^{\ \theta}-1}{\theta}\ln P_w + F2\frac{Y_m^{\ \theta}-1}{\theta}\ln P_k + F3\frac{Y_p^{\ \theta}-1}{\theta}\ln P_w + F4\frac{Y_p^{\ \theta}-1}{\theta}\ln P_k \ + j\log J$$

Table B.28 shows the results of the estimation

Table B.28
Wada et al Model Results

Translog model			Generalized translog model		
Parameter	**Estimated value**	**t value**	**Parameter**	**Estimated value**	**t value**
-	-	-	Θ	.172	3.72
C_0	25.4	1707	A	25.0	1330
α_m	.832	16.4	B1	.871	23.5
α_p	.114	3.50	B2	.101	3.40
β_w	.558	103	C1	.566	115
γ_{mm}	.327	2.72	D1	.116	.773
γ_{pp}	.383	2.99	D2	.429	3.39
γ_{mp}	-.379	-3.21	D3	-.409	-3.19
δ_{ww}	.257	1.92	E1	.184	1.29
ρ_{mw}	.132	9.23	F1	.133	8.71
ρ_{pw}	-.129	-8.93	F3	-.126	-8.62
J	-.289	-5.46	□	-.253	-4.81
COMPLEMENT	-.283 <0	-2.46	COMPLEMENT	-.321 <0	-2.44
-	-	-	SCOPE	759.0 >0	.238
-	-	-	MSCALE	1.09 >1	8.06
-	-	-	PSCALE	-7503.	-.236
ASCALE	.947 <1	33.4	ASCALE	.972 <1	46.7

These results are interpreted by the authors in the translog model as follows

- α_m, α_p and β_w are all positive, which implies that the cost function is not decreasing in costs and prices.
- Marginal cost is positive at all sample points for letter mail and positive at about 70 per cent of the observation points for parcels. This suggests that the global shape of the estimated translog function is appropriate.
- COMPLEMENT, takes a negative value at all observation points. This suggests the existence of economies of scope.[30]

[30] $$COMPLEMENT = \frac{\partial^2 C}{\partial Y_m \partial Y_p} = \frac{C}{Y_m Y_p}\left[\frac{\partial^2 \ln C}{\partial \ln Y_m \partial \ln Y_p} + \frac{\partial \ln C}{\partial \ln Y_m} \times \frac{\partial \ln C}{\partial \ln Y_p}\right]$$

- The existence of overall economies of scale is also confirmed by ASCALE<1.[31]

In the case of the generalized translog model, the interpretation is the following:

- As parameters B1, B2 and C1 are positive, which implies that the cost function is not decreasing in costs and prices. The marginal cost was found to be positive at almost all observation points for letter mail and positive at almost 70 per cent of the observation points for parcels.
- The SCOPE variable takes a positive value, but it was extremely large and accompanied by a small t value.[32] This abnormal values obtained are attributable, according to the authors "to the improper cost region" where this value is estimated.
- Significant product-specific economies of scale were observed to exist for letter mail from the results MSCALE[33]>1 and t=8.06. With parcels, however, the corresponding indicator was extremely small, accompanied by a small t value.
- ASCALE<1 confirm the existence of overall economies of scale.

---

31 $ASCALE = \frac{C(y)}{\sum y_i C_i(y)} = \alpha_m + \alpha_p$

32 $SCOPE = \frac{C(0, Y_p) + C(Y_m, 0) - C(Y_m, Y_p)}{C(Y_m, Y_p)}$

33 $MSCALE = \frac{AIC_m}{MC_m} = \frac{\exp(A) - \exp(A - B1/\theta + D1/2\theta^2)}{B1\exp(A)}$

APPENDIX C. COUNTRY REPORTS

C.1. Austria

C.1.1. Information on costs

Table C.1 shows published cost data for the Österreichische Post network for the years 1998 to 2002. These costs include costs for all activities and are split into personnel and non-personnel costs.

Table C.1
Österreichische Post: Total Costs

Cost category	1998	1999	2000 (€m)	2001 (€m)	2002 (€m)
Wages and salaries				790	762
Social security				215	214
Severance payments				8	9
Other employee benefits				8	8
Total staff costs		**1173**	**1032**	**1022**	**993**
Depreciation etc		113	87	98	102
Materials and services		236	199	184	180
Other operating expenses		316	300	250	259
Total costs from annual reports		**1838**	**1618**	**1553**	**1534**
Total costs from questionnaire	***1668***	***1826***	***1618***	***1553***	***1533***

Sources: Österreichische Post Annual Report 2002 and response to NERA questionnaire.
1999 figures from the website of Österreichische Post:
www.post.at/english/content/unternehmen/geschaeftsbericht/unternehmen_geschaeftsbericht01_68.htm

Table C.2 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for 65 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 5-7 per cent of total costs, materials and services for 12 per cent of total costs and other operating costs for 16-17 per cent of total costs.

Table C.2
Österreichische Post: Cost Shares

Cost category	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Wages and salaries			51	50
Social security			14	14
Severance payments			1	1
Other employee benefits			1	1
Total staff costs	**64**	**64**	**66**	**65**
Depreciation etc	6	5	6	7
Materials and services	13	12	12	12
Other operating expenses	17	19	16	17
Total costs	**100**	**100**	**100**	**100**

Sources: Österreichische Post Annual Report 2002.

Data on costs by activity are available separately for letters and parcels in NERA's 1998 report.[34]

C.1.2. Information on employment and wage levels

Information on the average number of workers is not published each year. However, we found total full time staff numbers in several press releases. These data are complemented with the information available in the 2002 Annual Report. The figures are shown in Table C.3. In 2000 60 per cent of the employees were civil servants, though the percentage fell by 5 points in 2002. The table also presents full time equivalent figures taken from the answer to the NERA questionnaire.

[34] NERA *Costing & Financing of Universal Services in the Postal Sector in the European Union* A Report to DGXIII, 1998, p.107.

Table C.3
Österreichische Post: Full Time Employee Numbers

Category of worker	1998	1999	2000	2001	2002
Civil servants share (per cent)	64.1	64.3	60.0	57.0	55.0
Total average employees			33644	31975	30795
Total employees full time equivalent		**35493**	**31775**	**30126**	**28974**
Total employees- questionnaire	***38133***	***37219***	***33421***	***31975***	***30795***

Sources: *The Österreichische Post Annual Report 2002, response to NERA questionnaire and operator website:*
www.post.at/english/content/presseservice/presseinformationen/presseservice_presseinformationen_1071.htm [35];
www.post.at/english/content/presseservice/presseinformationen/presseservice_presseinformationen_404.htm [36]

In 2002, 63.6 percent of the full-time employees were employed in the Letter Mail sector (including the Letter Mail Distribution Center and Freight Forwarding service units), 23.3 percent in the Branch Network sector, 8.6 percent in Courier Express Parcel and 4.8 percent in the central functions, and the Info-Mail and Media Post sectors.[37]

It is possible to divide the total wage and salary costs shown in Table C.2 by full time equivalent workers to derive average annual pay, average social security and average pensions costs per full time equivalent worker. These figures are shown in Table C.4.

Table C.4
Österreichische Post: Average Annual Wage and Salary Costs per FTE Employee

Cost category	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Wages and salaries			26223	26299
Social security			7137	7386
Severance payments			266	311
Other employee benefits			266	276
Total staff costs	**33049**	**32478**	**33924**	**34272**

Sources: NERA calculation.

Table C.5 shows UPU data on total number of staff.

[35] "Personnel costs were again reduced as against the previous year. On an annual average, the Österreichische Post AG Group employed 30,357 full-time employees, a reduction by 1,418 as against 2000."

[36] "Mean staffing at Österreichische Post AG was 33 644 in 2000, i.e. 31 775 full time staff."

[37] Österreichische Post Annual Report 2002.

Table C.5
Österreichische Post: UPU Employee Numbers

Category of worker	1998	1999	2000	2001	2002
Total number of staff	38271	33536	33421	30668	31669
Number of full-time staff	34515	29066	28957	26642	27549
Number of part-time staff	3756	4470	4464	4026	4120

Source: UPU statistics.

C.1.3. Traffic levels

Table C.6 shows a consistent traffic series from 1998 to 2000. Unfortunately more recent data are not available.

Table C.6
Österreichische Post: Traffic Levels

Type of traffic	1998 Million items	1999 Million items	2000 Million items
Letters	1113.5	1090.1	1130.9
Direct mail	2338.8	2476	2550.4
Newspapers	813.3	834.3	818.9
Total mail	**4265.6**	**4400.4**	**4500.2**
Parcels and EMS	44.5	42	40.7

Source: website of Österreichische Post
www.post.at/english/content/unternehmen/geschaeftsbericht/unternehmen_geschaeftsbericht01_68.htm

Table C.7 shows figures on volumes taken from the UPU statistics.

Table C.7
Österreichische Post UPU Data : Mail and Parcels Traffic

	1998	1999	2000	2001	2002
Parcels ('000s)	43.4	-	39.1	38.9	40.3
Mail (million)	3069.4	3222.6	3269.4	4186.0	4515.4

Source: UPU statistics.

C.1.4. Österreichische Post Network

Sales figures in the Branch Network division grew by eight percent from €163.1 million in 2001 to €175.4 million in 2002. The Post AG Network caters for Austria's 2.2 million postal addresses. In 2001 it comprised about 2300 post offices. A reduction in the number of branch offices from 2,300 to 1,669 was implemented in 2002. The network undertook restructuring in order to achieve savings of €11 million in 2002 and a further €11 million by 2003. The new types of branch offices, Post.at, Post-Box and Post-Partner, introduced for the first time in

2001, met with customer approval and were further developed in the course of 2002. At the end of 2002, 17 Post.at, 5 Post-Box, and 120 Post-Partner outlets were operational.

Table C.8
Österreichische Post: Number of Post Offices and Service Centres

	1998	1999	2000	2001	2002
Post offices	2342	2336	2327	2300	1669
Service centers	235	213	170		

Source: website of Österreichische Post.

Table C.9
Österreichische Post: Number of Post Offices, Sorting Centres, Letter Boxes, Post Office Boxes

	1998	1999	2000	2001	2002
Post offices	2436	2436	2497	2432	2072
Sorting centers	31	28	10	12	12
Letter boxes	25000	24000	23146	24720	22440
Post office boxes	92700	92700	88887	90000	90000

Source: UPU statistics.

The 2002 Ordinance of the Federal Minister for Transport, Innovation and Technology on the Postal Universal Service sets the next day delivery target to 95 per cent:

> *"§8 (1) Domestic letters posted for delivery up until closing time on a working day with the exception of Saturday must be delivered on an annual average of at least 95% on the first working day following the day they were posted with the exception of Saturday."*[38]

[38] http://www.bmvit.gv.at/sixcms_upload/media/125/postal_universal_service_ordinance.pdf

C.2. Belgium

C.1.5. Information on costs

Table C.10 shows published cost data for the Belgian postal network for the years 1998 to 2002. These costs include costs for all activities and provide information, among other items, on depreciation, staff costs and material costs.

Table C.10
La Poste Belgium: Total Costs

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Total staff costs	1286	1286	1308	1405	1450
Raw materials and goods for resale	10	9	12	15	13
Services and other goods	266	270	323	377	389
Depreciation etc	63	69	67	65	72
Other operating charges	24	11	9	10	12
Amounts written-off (appropriations +, draw-downs -)	10	8	7	-1	12
Provisions for liabilities and charges	-40	93	7	-45	-48
Total costs	**1618**	**1745**	**1733**	**1825**	**1900**

Sources: La Poste Annual Report 2002.
Note: exchange rate applied for 99 : 1BEF=0.02479€. Exchange rate applied for 98 1BEF=0.02480 €.

Table C.11 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for just 76 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 4 per cent of total costs in every year. Services and other goods accounts for 20 per cent of total costs in 2002.

Table C.11
La Poste Belgium: Cost Shares

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Total staff costs	79	74	75	77	76
Raw materials and goods for resale	1	1	1	1	1
Services and other goods	16	15	19	21	20
Depreciation etc	4	4	4	4	4
Other operating charges	1	1	1	1	1
Amounts written-off (appropriations +, draw-downs -)	1	0	0	0	1
Provisions for liabilities and charges	-2	5	0	-2	-3
Total costs	**100**	**100**	**100**	**100**	**100**

Source: Calculated by NERA from data in Table C.10.

C.1.6. Information on employment and wage levels

La Poste also publishes information on the number of full-time equivalent (FTE) workers since 1999. This information covers all the employees of the organisation, and a separate breakdown is not available for different activities. This information is shown in Table C.12 together with UPU statistics on staff numbers and annual report information on average employee numbers.

Table C.12
La Poste Belgium: Full Time Equivalent Workers

Category of worker	1998	1999	2000	2001	2002
UPU staff numbers	41637	41182	39933	39173	38656
Annual reports average employees	44034	43734			42000
Annual reports FTE	**40843****	**40411**	**40355**	**39957**	**39103**

Sources: UPU statistics and La Poste Annual Reports 1998-2002.
*Note: ** estimated using average "FTE employees:workers numbers" in 1999 and 2002 (coefficient applied*=0.927521)

It is possible to divide the total wage and salary costs shown in Table C.11 by total FTE workers to derive average annual pay, average social security and average pensions costs per full-time worker. These figures are shown in Table C.13.

Table C.13
La Poste Belgium: Average Staff Costs per Full Time Equivalent Employee

	1998 (€)	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Total staff cost per employee	31486	31823	32412	35163	37082

Sources: NERA calculation.

C.1.7. Network

Table C.14 shows information on the La Poste network. The answer to the NERA questionnaire contains information on the number of post offices and delivery offices. The table displays information on post boxes and sorting offices as well, which we have drawn from the UPU statistics.

Table C.14
La Poste Belgium: Post Office Boxes, Letter Boxes, Post Offices, Delivery and Sorting Offices

	1998	1999	2000	2001	2002	2003
Post office boxes	47253	47114	45454	45472	45472	
Number of letter-boxes	19655	20317	19296	19200	19200	
Post offices	1393	1393	1391	1352	1342	1328
Delivery office	573				567	557
Sorting office	6	5	5	5	5	

Source: UPU on post office boxes, letter boxes and sorting offices, response to NERA questionnaire for post offices and delivery offices.

C.1.8. Traffic levels and regulation

La Poste does not publish information on mail volumes. UPU data for 1998 show that the volume of letters amounted to 3614 million items, and the volume of parcels was 8 million items. In terms of regulatory requirements, the 2002 management contract foresees the following transit times targets: national letter mail 93 per cent in D+1 in 2004, 94 per cent in D+1 in 2005 and 95 per cent in D+1 in 2006. Table C.15 shows the delivery targets from 1998 to 2003. Belex data in 2002 recorded 82.7 per cent delivery on time in D+1.

Table C.15
La Poste Belgium: Quality Targets and Performance

	1998	1999	2000	2001	2002	2003
D+1 targets	90	90	90	90	91	92

Source: La Poste Annual Report 2000, Contrat de Gestion 1996 and Contrat de Gestion 2002.

C.3. Cyprus[39]

C.3.1. Information on costs

Table C.16 reports total operating expenses for the Department of Postal Services of Cyprus in current national currency for the years 1999 to 2002. These expenses have experienced a significant increase in this period, especially in the year 2002. The table also includes figures on the numbers of employees, which have risen by 30.7 per cent between 1998 and 2002.

Table C.16
Department of Postal Services of Cyprus: Total Operating Costs

Sources	1998	1999	2000	2001	2002
	m CYP	m CYP	m CYP	m CYP	m CYP
UPU (operating expenses)	-	7.951	8.697	8.956	10.430
Growth rate (%)	-	-	9.4	3.0	16.5
Number of employees	1362	1349	1661	1557	1780

Sources: UPU.

C.3.2. Information on employment

Table C.17 shows data on staff. The number of workers has grown substantially, from 1,362 workers in 1998 to 1,780 in 2002 (7 per cent compound average growth rate). It is noticeable that a large proportion of the staff are part-time workers (69 per cent in 2003).

Table C.17
Department of Postal Services of Cyprus: Number of Workers

	1998	1999	2000	2001	2002
Total number of staff	1362	1349	1661	1557	1780
% full time	35	35	30	33	31
% part time	65	65	70	67	69

Sources: UPU.

C.3.3. Traffic levels and postal network information

As Table C.18 shows, the increase in operating expenses seems to be explained by the increase in activity volumes. Even though parcels volume remained constant, letter volume grew by 24.5 per cent in the period between 1998 and 2002 (an average growth rate of 5.6 per cent per year).

[39] The USP in Cyprus did not respond to the questionnaire sent by NERA. Thus in this section we include information collected from the UPU.

Table C.18
Department of Postal Services of Cyprus: Mail Volumes for Letters and Parcels

Mail volumes	1998	1999	2000	2001	2002
Letters (million items)	65.165	67.321	75.473	84.035	81.119
Parcels (million items)	0.062	0.063	0.058	0.058	0.061

Sources: UPU.

Table C.19 reports some information on network infrastructure. The number of post offices has increased at a compound average growth rate of 9.3 per cent between 1998 and 2002. There were 1,108 post offices in Cyprus in 2002. The sorting centres were reduced to one in 2002, after being 4 between 1998 and 2002 and 5 in 2001. Finally, the number of letter boxes almost doubled from 1998 (414 letter boxes) to 2002 (800 letter boxes).

Table C.19
Department of Postal Services of Cyprus: Postal Network Infrastructure

	1998	1999	2000	2001	2002
Post offices	777	762	999	1081	1108
Sorting centres	4	4	4	5	1
Letter boxes	414	438	460	-	800

Sources: UPU.

C.4. Czech Republic

C.4.1. Information on costs

Total operating costs for Česká Pošta were close to 14,000 millions CZKs in 2002. This implies an accumulated growth with respect to the 1998 levels of 14-22 per cent depending on the data sources considered. This is shown in Table C.20, which contains figures from a variety of sources regarding total operating costs of Česká Pošta from 1998 to 2002.

Table C.20
Česká Pošta: Total Operating Costs

Sources	1998 m CZK	1999 m CZK	2000 m CZK	2001 m CZK	2002 m CZK
NERA questionnaire	-	-	13867	14096	14658
Annual reports[40]	10441	11531	12140	12441	12782
UPU (operating expenses)[41]	12402	13559	17886	13867	14193

Source: Response to NERA questionnaire ; Annual Reports and UPU.

Table C.21 shows that about 70 per cent of total operating costs for Česká Pošta are personnel costs. This proportion has been increasing slightly in the last few years.

[40] Total operating costs from the operator's annual reports have been derived by summing up the following components:

- Consumption from operation (material, energy and services);
- Personnel expenses;
- Taxes and fees.

[41] UPU data on operating expenses include the following concepts:

- Purchases of tangible assets (including transport equipment, IT equipment, other logistical postal service facilities (logistical equipment for offices of exchange, sorting centres, etc.), buildings, land);
- Purchase of intangible assets (licences, patents);
- Staff costs, wages, salaries, payroll taxes, etc;
- Depreciation of tangible assets (amortization);
- Domestic and international mail transport charges paid to third parties (e.g.: road, rail, sea or air carriers);
- Remuneration paid to public or private operators, including terminal dues and rates paid to other postal operators;
- Various subsidies paid (State, community, public or private institutions).

Table C.21
Česká Pošta: Total Staff Costs

Staff costs	1998	1999	2000	2001	2002
Million CZK	7103	7708	8093	8512	8982
% of total operating costs	68	67	67	68	70

Source :Annual reports.

As regards product categories, about half of total operating costs are accounted for by other non-mail services such as financial services, etc. (50.6 per cent in 2003, see Table C.22). As to mail services, letters constitute the largest proportion of total operating costs (about 41 per cent) far above parcels (5 per cent) and express (3 per cent).

Table C.22
Česká Pošta: Operating Costs by Service Provided

Product	2001		2002		2003	
	m CZK	%	m CZK	%	m CZK	%
Letter mail	5512	39.7	5922	42.0	6040	41.2
Parcels	693	5.0	697	4.9	732	5.0
Express	408	2.9	439	3.1	466	3.2
All others	7254	52.3	7038	49.9	7420	50.6
Total operating costs	**13867**	**100**	**14096**	**100**	**14658**	**100**

Source: Response to NERA questionnaire.

Table C.23 shows the different categories of operating costs for the different mail products (letters, parcels and express) and the percentages that each category represents with respect to the total operating cost for each product. The accumulated growth of operating costs between 2001 and 2003 has been larger for express (14 per cent) than for letters (9.6 per cent) and parcels (5.6 per cent).

The distribution of operating costs between their different components do not differ greatly across the different types of products, although this similarity has been reduced in the last years. The most remarkable differences concern the shares of staff costs and other operating costs. Labour costs are relatively more important for parcels (79.1 per cent in 2003) and express (75.9 per cent) than for letters (70.8 per cent). This is just the opposite case of other operating costs, which have a larger weight in letters than in express and parcels (22.2 per cent, 16.6 per cent and 13.8 per cent in 2003 respectively). These differences were not so marked in 2001.

The proportion of materials and depreciation in total operating costs has decreased as a consequence of the increase in the staff share.

Table C.23
Česká Pošta: Operating Costs by Class Of Product and Category of Cost

Product	Cost category	2001		2002		2003	
		m CZK	%	m CZK	%	m CZK	%
Letters	Materials	343	6.2	292	4.9	269	4.5
	Staff	3786	68.7	4150	70.1	4275	70.8
	Depreciation	191	3.5	160	2.7	158	2.6
	Others	1192	21.6	1320	22.3	1338	22.2
	Total op. costs	**5512**	**100**	**5922**	**100**	**6040**	**100**
Parcels	Materials	32	4.6	34	4.9	33	4.5
	Staff	488	70.4	546	78.2	579	79.1
	Depreciation	18	2.6	19	2.7	19	2.6
	Others	155	22.4	99	14.2	101	13.8
	Total op. costs	**693**	**100**	**698**	**100**	**732**	**100**
Express	Materials	22	5.4	22	5.0	22	4.7
	Staff	297	72.8	330	75.0	353	75.9
	Depreciation	12	2.9	13	3.0	13	2.8
	Others	77	18.9	75	17.0	77	16.6
	Total op. costs	**408**	**100**	**440**	**100**	**465**	**100**

Source: Response to NERA questionnaire

For each product, the proportion of the costs of the different activities (collection, transport, sorting, delivery and overhead) with respect to total operating costs are included in Table C.24. Delivery is clearly the activity which involves the highest costs (around 40 per cent of total operating costs), especially for parcels and express. Overheads are the second most important (about 23 per cent) for all products. However the importance of the other activities differs to a larger extent across products. Collection is more important for letters and parcels than for express, while the sorting cost share is less significant for parcels and express than for letters. The importance of transport is highest in express and lowest in letters.

Table C.24
Česká Pošta: Percentage of Operating Costs by Function: Letters, Parcels And Express

Product	Function	2001	2002	2003
		%	%	%
Letters	Collection	18	16	17
	Transport	8	9	9
	Sorting	11	13	12
	Delivery	41	39	39
	Overhead	22	23	23
	Total operating costs	**100**	**100**	**100**
Parcels	Collection	16	15	14
	Transport	12	13	12
	Sorting	5	6	7
	Delivery	44	43	45
	Overhead	23	23	22
	Total operating costs	**100**	**100**	**100**
Express	Collection	13	10	11
	Transport	17	17	16
	Sorting	7	8	8
	Delivery	40	41	42
	Overhead	23	24	23
	Total operating costs	**100**	**100**	**100**

Sources: Response to NERA questionnaire.

C.4.2. Information on employment and wage levels

Table C.25 contains information on the number of employees and average wage levels. Česká Pošta has undertaken a reduction in its staff, while average wages in 2003 were at a similar level as in 2001.

Table C.25
Česká Pošta: Total Staff Costs

Staff costs	1999	2000	2001
Number of employees	41202	40209	39629
Average wage (CZK)	187083	201276	214781

Sources: Annual reports.

C.4.3. Traffic levels and unit costs

Table C.26 combines data on annual volumes and total operating costs to derive unit costs for letters and parcels. Annual volume figures are sourced from the UPU web site. The huge apparent increase in letter volumes which occurred in 2001 is the most remarkable feature,

but UPU reports several changes in the calculation method over the sample period that may have introduced significant distortions into the series.

Table C.26
Česká Pošta: Unit Costs

Product		1998	1999	2000	2001	2002	2003
Letters	Operating costs (m CZK)	-	-	-	5512	5922	6040
	Annual volumes (million items)	1419.0	1147.2	1197.9	2047.6	2343.5	-
	Unit costs (CZK/item)	-	-	-	2.69	2.53	-
Parcels	Operating costs (m CZK)	-	-	-	693	697	732
	Annual volumes (million items)	19.2	17.9	15.6	13.0	11.5	-
	Unit costs (CZK/item)	-	-	-	53.51	60.78	-

Sources: NERA questionnaire and UPU.

C.4.4. Network information

According to Table C.27, there have not been large variations in the number of post offices operated by Česká Pošta between 1998 and 2003. There were 3,415 offices in 2003. However, the number of sorting offices has been reduced in the same period, to the extent that it was more than three times smaller in 2003 than in 1998. The number of delivery offices also decreased, from 2,597 in 2000 to 2,245 in 2003. Post boxes increased in 2001 and slightly decreased in 2002 and 2003.

Table C.27
Česká Pošta: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated by Česká Pošta	3409	3373	3374	3401	3407	3415
Post offices operated by others	0	0	0	0	0	0
Sorting offices (*)	52	35	34	24	17	16
Specialised bulk mail centres	-	-	-	-	-	-
Delivery offices	-	-	2597	2550	2485	2245
Pure delivery offices	-	-	-	-	-	-
Post boxes	-	-	24172	24311	24248	24207

(*) Regional sorting offices
Source: Response to NERA questionnaire.

Česká Pošta also submitted information on the types of delivery, which is reported in Table C.28.

Table C.28
Česká Pošta: Distribution of Types of Delivery Points for Letters

Percentage of letters delivered to:	**2003**
	%
Customers' door	97.27
Boxes in apartment blocks	1.17
End of drive boxes	0.13
Post office boxes	1.43
Other	0.00
Total	**100**

Sources: Response to NERA questionnaire

C.5. Denmark

C.5.1. Information on costs

Table C.29 shows published cost data for the Danmark Post network for the years 1998 to 2003. These costs include costs for all activities and are split into personnel and non-personnel costs.

Table C.29
Danmark Post: Total Costs

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)	2003 (€m)
Wages and salaries	759	796	804	812	817	786
Social security	7	6	4	5	5	5
Pension costs	70	92	92	94	71	74
Total staff costs	**836**	**894**	**899**	**912**	**893**	**865**
External expenses	364	393	404	380	373	358
Depreciation etc	97	66	67	68	71	79
Other operating expenses	2	2	2	2	2	3
Other operating income	-6	-2	-5	-3	-5	-6
Total costs	**1292**	**1352**	**1367**	**1358**	**1335**	**1299**
Applied exchange rate	*0.13436*	*0.13455*	*0.13421*	*0.13425*	*0.13463*	*0.13464*

Sources: Danmark Post Annual Reports 1999-2003.

Note: The exchange rates applied are based on annual averages of daily rates.

Danmark Post: Total Costs, DKKmillions

Cost category	1998 (DKKm)	1999 (DKKm)	2000 (DKKm)	2001 (DKKm)	2002 (DKKm)	2003 (DKKm)
Wages and salaries	5648	5915	5989	6052	6071	5839
Social security	51	45	28	36	35	34
Pension costs	522	684	685	702	530	548
Total staff costs	**6221**	**6644**	**6702**	**6790**	**6636**	**6421**
External expenses	2709	2920	3008	2834	2774	2658
Depreciation etc	721	488	496	504	525	586
Other operating expenses	14	14	15	16	17	24
Other operating income	-48	-17	-35	-25	-34	-43
Total costs	**9617**	**10049**	**10186**	**10119**	**9918**	**9646**

Sources: Danmark Post Annual Reports 1999-2003.

Table C.30 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for almost 67 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 6 per cent of total costs in 2003.

Table C.30
Danmark Post: Cost Shares

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)	2002 (%)	2003 (%)
Wages and salaries	58.7	58.9	58.8	59.8	61.2	60.5
Social security	0.5	0.4	0.3	0.4	0.4	0.4
Pension costs	5.4	6.8	6.7	6.9	5.3	5.7
Total staff costs	**64.7**	**66.1**	**65.8**	**67.1**	**66.9**	**66.6**
External expenses	28.2	29.1	29.5	28.0	28.0	27.6
Depreciation etc	7.5	4.9	4.9	5.0	5.3	6.1
Other operating expenses	0.1	0.1	0.1	0.2	0.2	0.2
Other operating income	-0.5	-0.2	-0.3	-0.2	-0.3	-0.4
Total costs	100	100	100	100	100	100

Sources: Danmark Post Annual Report 2002.

Data on costs by activity are available separately for letters and parcels in NERA's 1998 report.[42]

C.5.2. Information on employment and wage levels

Danmark Post publishes information on the FTE employees each year. The figures are shown in Table C.31. At the end of 2003, the number of people employed on terms similar to those of civil servants by Post Danmark was 9,938 (out of 27,682 employees). The number of staff who are civil servants or employed on similar terms is declining, reflecting the fact that about 3-4 per cent retire each year. Over the past five years, the proportion of staff employed as civil servants therefore declined from 52 per cent to 46 per cent at year-end 2003.

Table C.31
Danmark Post: Full Time Employee Numbers

	1998	1999	2000	2001	2002	2003
Total employees (FTEs)	25472	25714	24867	23895	23203	21847

Sources: Danmark Post Annual Report 2003, 2002.

It is possible to divide the total wage and salary costs shown in Table C.30 by full time equivalent workers to derive average annual pay, average social security and average pensions costs per full time equivalent worker. These figures are shown in Table C.32.

[42] NERA *Costing & Financing of Universal Services in the Postal Sector in the European Union* A Report to DGXIII, 1998, p.122.

Table C.32
Danmark Post: Average Annual Wage and Salary Costs per FTE Employee

Category of wage etc cost	1998 (€)	1999 (€)	2000 (€)	2001 (€)	2002 (€)	2003 (€)
Wages and salaries	29792	30951	32323	34002	35226	35985
Social security	269	235	151	202	203	210
Pension costs	2753	3579	3697	3944	3075	3377
Total staff costs	**32815**	**34765**	**36171**	**38148**	**38504**	**39572**

Sources: NERA calculation.

C.5.3. Traffic levels

Table C.33 shows a consistent series from 1998 to 2003 published by Post Danmark in the annual reports. Volumes are reported for letters, parcels, newspapers and unaddressed mail.

Table C.33
Danmark Post: Traffic Levels

Type of traffic –million items	1998	1999	2000	2001	2002	2003
Letters	1426	1458	1444	1415	1367	1309
Parcels	35.0	33.8	31.7	31.8	30.4	32.8
Newspapers	289.9	294.6	279.5	270.5	270.7	259.3
Unaddressed items	1043.7	1080	1071.4	1048.3	983.3	1027.6
Total items	**2794.6**	**2866.4**	**2826.6**	**2765.6**	**2651.4**	**2628.7**

Source: Danmark Post Annual Reports 1999 to 2003.

C.5.4. Danmark Post network

Table C.34
Danmark Post: Number of Post Offices, Sorting Centres, Letter Boxes, Post Office Boxes

	1998	1999	2000	2001	2002
Post offices	1169	1144	1116	1072	1083
Sorting centres	9	10	10	9	10
Letter boxes	9818	10289	9806	9837	9398
Post office boxes	43593	47114	45439	43687	42883

Source: UPU statistics.

Finally, Table C.35 shows information on the regulatory quality targets. The regulatory requirements state that 97 per cent of ordinary letters must reach the addressee the day after posting. In 2003, the quality level was 95.1 per cent for ordinary letters (93.6 per cent in 2002).

Table C.35
Danmark Post: Quality Targets and Performance

	1998	1999	2000	2001	2002	2003
D+1 targets	97	97	97	97	97	97
Performance	94.5	95.2	95	94.9	93.6	95.1

Source: Danmark Post Annual Reports 1999-2003.

C.6. Estonia

C.6.1. Information on costs

Table C.36 contains the total operating costs of Eesti Post between 1998 and 2003 reported from several sources. The trends in operating costs have not been uniform.

Table C.36
Eesti Post: Total Operating Costs

Sources	1998 m EEK	1999 m EEK	2000 Mill. EEK	2001 m EEK	2002 m EEK	2003 m EEK
NERA questionnaire	425.5	486.9	505.5	580.5	578.9	677.9
Annual reports[43]	452.8	517.2	495.2	583.7	590.6	-
UPU (operating expenses)[44]	653.8	556.6	527.0	572.6	578.9	-

Sources: Response to NERA questionnnaire, Annual Reports and UPU.

Table C.37 shows the operating costs for the different mail services in relation to mail volume. The rises in operating costs are outweighed by the growth in volume, causing a significant reduction in unit cost. This fact suggests the presence of significant economies of density in the postal sector.

Table C.37
Eesti Post: Operating Costs and Volumes for Letters, Parcels and Express

	Product	1998	1999	2000	2001	2002	2003
Operating costs (million EEK)	Letters	168.6	199.6	233.0	280.1	242.0	292.7
	Parcels	61.8	68.1	67.4	63.4	82.2	45.6
	Express	-	0.7	11.1	19.1	-	51.6
Volumes (million items)	Letters	43.9	56.2	56.8	115.2	142.0	172.1
	Parcels	2.0	2.1	1.8	2.3	2.7	2.5
	Express	0.0	0.1	0.1	0.1	0.2	0.5
Unit operating costs (EEK/item)	Letters	3.84	3.55	4.10	2.43	1.70	1.70
	Parcels	31.56	32.77	38.10	26.98	30.89	18.57
	Express	-	14.00 (*)	213.46	161.86	-	105.31

Sources: Response to NERA questionnaire.
(*) This value seems to be much too low.

[43] See footnote 40.

[44] See footnote 41.

Table C.38 shows the shares of total operating costs accounted for by the different services provided by Eesti Post. Letter service and other services represent the vast majority of operating costs, each generally lying above 40 per cent. Parcels and express represent a much smaller part of operating cost, but while parcels share is following a decreasing trend, express is experiencing a substantial growth.

Table C.38
Eesti Post: Operating Costs by Service Provided

Product	1998		1999		2000		2001		2002		2003	
	m EEK	%	m EEK	%	m EEK	%	m EEK	%	m EEK	%	m EEK	%
Letter mail	168.6	39.6	199.6	41.0	233.0	46.1	280.1	48.3	242.0	41.8	292.7	43.2
Parcels	61.8	14.5	68.1	14.0	67.4	13.3	63.4	10.9	82.2	14.2	45.6	6.7
Express	-	-	0.7	0.1	11.1	2.2	19.1	3.3	-	-	51.6	7.6
Other op. costs	195.1	45.9	218.5	44.9	194.0	38.4	217.9	37.5	254.7	44.0	288.0	42.5
Total op. costs	**425.5**	**100**	**486.9**	**100**	**505.5**	**100**	**580.5**	**100**	**578.9**	**100**	**677.9**	**100**

Source: Response to NERA questionnaire.

The different categories of operating costs are shown in Table C.39 broken down by mail service. These data are only available for 2003. The distribution of operating costs between categories is broadly similar across products. Labour is the main component of operating costs for all products, above 60 per cent. Materials and depreciation are much smaller components of operating costs.

Table C.39
Eesti Post: Operating Costs by Cost Type: 2003

Cost category	Letters		Parcels		Express	
	m EEK	%	m EEK	%	m EEK	%
Materials	5.7	2.0	0.4	0.8	0.1	0.1
Staff	185.2	63.3	29.0	63.7	32.2	62.3
Depreciation	15.0	5.1	2.4	5.3	3.9	7.6
Other op. costs	86.8	29.7	13.8	30.2	15.4	29.9
Total op. costs	**292.7**	**100**	**45.6**	**100**	**51.6**	**100**

Source: Response to NERA questionnaire.

Table C.40 shows the proportion of operating costs represented by the different activities for letters, parcels and express services. Delivery is the activity that involves the highest costs for letters and parcels but not for express, where collection is more costly.

Table C.40
Eesti Post: Percentage of Operating Costs by Function: 2003*

Function	Letters	Parcels	Express
	%	%	%
Collection	17	0	29
Transport	10	16	17
Sorting	12	1	12
Delivery	32	28	23
Overhead	5	8	6
Total	**76**	**53**	**87**

Source: Response to NERA questionnaire
(*) The percentages reported do not add up to 100.

C.6.2. Information on employment and wage levels

Despite the significant reduction that has taken place in the number of employees (see Table C.41), the proportion of staff costs with respect to total operating costs has increased in recent years, from 55 per cent in 1998 to 61 per cent in 2002. This has been due to an increase in the wage levels, at least in nominal terms.

Table C.41
Eesti Post: Labour Costs

Staff costs	1998	1999	2000	2001	2002
Total staff costs (million EEK)	250	291	293	343	361
% of total operating costs	55	56	59	59	61
Full time equivalent workers	4778	4706	4527	4281	4344
Average annual wage (EEK/FTE)	52263	61906	64731	80196	83059

Sources: Response to NERA questionnaire, annual reports.

Table C.42 shows that the number of full time equivalent postal workers has decreased during the period by about 11 per cent. The importance of trade unions within the company, although it seems low, has been maintained over the period.

Table C.42
Eesti Post: Full Time Equivalent Postal Workers and Percentage of Members of Trade Union

	1998	1999	2000	2001	2002	2003
Total full time equivalent postal workers	4778	4706	4527	4281	4344	4237
% member of trade union	35.5	35.5	39.3	33.4	33.8	34.1

Source: Response to NERA questionnaire.

C.6.3. Traffic levels and postal network information

Table C.43 shows information on the levels of mail volume and on the relative importance of each type of mail. More specifically, mail volumes, regardless of the type of mail, have increased over time (30 per cent compound average growth rate) and letter mail represents more than 95 per cent of total mail.

Table C.43
Eesti Post: Mail Volumes Delivered by Type of Mail

	1998		1999		2000		2001		2002		2003	
	m items	%	m items	%	m Items	%	m items	%	m items	%	m items	%
Letter mail	43.883	95.7	56.160	96.3	56.794	96.9	115.184	97.9	142.021	98.1	172.057	98.3
Parcels	1.958	4.3	2.078	3.6	1.769	3.0	2.350	2.0	2.661	1.8	2.456	1.4
Express	0.000	0.0	0.050	0.1	0.052	0.1	0.118	0.1	0.160	0.1	0.490	0.3
Total	**45.841**	**100**	**58.288**	**100**	**58.615**	**100**	**117.652**	**100**	**144.842**	**100**	**175.003**	**100**

Source: Response to NERA questionnaire

Table C.44 shows diverse information on the postal network infrastructure in Estonia. There has been a reduction in the number of post offices, both those operated by Eesti Post and those operated by third parties. The ratio of post offices operated by competitors to post offices operated by the universal service operator equalled 3.2 per cent in 2003. Throughout the period, only one sorting office and one specialised bulk mail centre have been operated. The number of delivery offices has been reduced progressively, while the number of post boxes has increased slightly from 3,606 in 1998 to 3,735 in 2003.

Table C.44
Eesti Post: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated by Eesti Post	583	577	548	537	539	536
Post offices operated by others	22	27	30	18	15	17
Sorting offices (*)	1	1	1	1	1	1
Specialised bulk mail centres	1	1	1	1	1	1
Delivery offices	605	604	578	555	554	553
Pure delivery offices	0	0	0	0	0	0
Post boxes	3606	3611	3485	3509	3680	3735

(*) Main sorting office
Source: Response to NERA questionnaire.

C.7. Finland

C.7.1. Information on costs

Table C.45 shows published cost data for the Finnish postal network for the years 1998 to 2003. These costs include costs for all activities and are split into personnel and non-personnel costs.

Table C.45
Posti: Total Costs

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)	2003 (€m)
Wages and salaries	473	489	481	465		
Social security	108	97	103	117		
of which pension costs	64	54	64	78		
Total staff costs	**580**	**586**	**584**	**582**		
Materials and services	106	107	138	158		
Depreciation	52	56	58	61		
Goodwill	0	0	0	11		
Other operating charges	215	200	211	222		
Total costs	**953**	**950**	**991**	**1033**	**1073**	**1089**

Source: Posti Annual Reports 1999 to 2002.

Notes: Data in 1998 and 1999 have been converted to euros adopting the exchange rate FIM/€ 0.16821 in 1998 and 0.1682 in 1999.

Table C.46 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for 56 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Labour costs in 2001 is 5 percentage points lower than in 1998. Depreciation accounts for 6 per cent of total costs in most years, while the cost of material and services accounts for 15 per cent of total costs in 2001 after growing significantly since 1998.

Table C.46
Posti: Cost Shares

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)
Wages and salaries	50	51	49	45
Social security	11	10	10	11
of which pension costs	7	6	6	8
Total staff costs	**61**	**62**	**59**	**56**
Materials and services	11	11	14	15
Depreciation	5	6	6	6
Goodwill	0	0	0	1
Other operating charges	23	21	21	21
Total costs	**100**	**100**	**100**	**100**

Source: NERA calculations on total staff costs from Posti Annual Reports 1999 to 2002.

Data on costs by activity are available separately for letters and parcels in NERA's 1998 report.[45]

C.7.2. Information on employment and wage levels

Posti also publishes information on the average number of workers each year. This information is shown in Table C.47 and it covers all employees of the Posti group.

Table C.47
Posti: Average Employee Numbers

Category of worker	1998	1999	2000	2001	2002	2003
Average employee numbers	26344	25347	24763	22809	23077	23592

Sources: Response to NERA questionnaire and Posti Annual Reports and highlights 1999 to 2003.

It is possible to divide the total wage and salary costs shown in Table C.45 by total average workers to derive average annual pay, average social security and average pensions costs per worker. These figures are shown in Table C.48. They underestimate personnel costs per full time equivalent worker because not all the workers shown in Table C.47 work full time.

Table C.48
Posti: Average Annual Wage and Salary Costs per Employee

Category of wage etc cost	1998 (€)	1999 (€)	2000 (€)	2001 (€)
Wages and salaries per employee	17936	19304	19424	20387
Social security per employee	4093	3829	4159	5130
of which pension costs per employee	2420	2123	2585	3420
Total staff cost per employee	**22029**	**23133**	**23583**	**25517**

Sources: NERA calculations on data taken from Posti Annual Reports 1999 to 2002.

C.7.3. Traffic levels

Table C.49 shows Posti information provided in the response to the NERA questionnaire and published in the annual reports on letter mail volumes each year from 1998 to 2003 and parcel volumes from 1998 to 2001.

[45] NERA *Costing & Financing of Universal Services in the Postal Sector in the European Union* A Report to DGXIII, 1998, p.129.

Table C.49
Posti: Traffic Levels

Type of traffic – million items	1998	1999	2000	2001	2002	2003
Letters volume	841	871	898	892	869	885
Parcels volume	25	25	25	22		

Source: Annual Reports and response to NERA questionnaire.

C.7.4. Information on the postal network

Posti provides information on the postal network disaggregated into three categories: post offices, delivery offices and sorting offices. These data are shown in Table C.50 together with the figure on letterboxes drawn from the annual reports. The post office branch network in 2003 comprised 1410 post offices, 650 delivery offices and 6 sorting offices. Posti maintains approximately 8,000 letterboxes around Finland.

Table C.50
Posti: Number of Post Offices and Delivery Points

	1998	1999	2000	2001	2002	2003
Post offices	1601	1555	1489	1410	1410	1410
Delivery office						650
Sorting office	7	7	7	7	7	7
Post boxes		8000	8000	8000		

Source: Response to NERA questionnaire and Posti Annual Report 1999- 2001.

Table C.51 presents the performance of Posti in D+1 delivery and the regulatory targets.

Table C.51
Posti: Regulatory Targets on D+1 and Performance

	1998	1999	2000	2001
Percentage performance D+1 delivery	94	95	95	95
Percentage target D+1	95	95	95	95

Source: Posti Annual Report 1999- 2001.

C.8. France

C.8.1. Information on costs

Table C.52 shows cost data for the services covered by the Universal Service Obligation in France taken from the answer to the NERA questionnaire.

Table C.52
La Poste: Total Costs, Universal Service and Other

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Universal service			9482	9675	9825
Other costs			4955	4721	5333
Total	**13562**	**13992**	**14437**	**14396**	**15158**

Source: Response to NERA questionnaire.

Table C.53 shows the same information converted into cost shares.

Table C.53
La Poste: Cost Shares, Universal Service and Other

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Universal service			66	67	65
Other costs			34	33	35
Total costs	**100**	**100**	**100**	**100**	**100**

Source: NERA calculations.

Cost by function data are shown in Table C.54. Delivery costs are the largest cost category, accounting for 46 per cent of total costs in 2002. Sorting cost and overheads account for a further 30 per cent of total costs.

Table C.54
La Poste: Cost by Function in the USO Area

Cost category Area covered by USO (parcels and letters)	2000 (%)	2001 (%)
Retail costs	*6*	*5*
Collection costs (collection & concentration)	8	8
Transport costs	5	5
Sorting costs	16	15
Delivery costs (incl. in-office works)	46	46
Other direct costs	*7*	*7*
Overhead costs	12	14
Total costs	**100**	**100**

Source: Response to NERA questionnaire.

C.8.2. Information on employment and wage levels

La Poste has provided us with information on the full time equivalent number of workers each year from 1998 to 2002. The figures are shown in Table C.55. We also report the number of full time workers in the letter mail and parcels areas.

Table C.55
La Poste: Full Time Employee Numbers

	1998	1999	2000	2001	2002
Full time employees – letter mail				143174	144809
Full time employees – parcels				5742	5316
Percentage member of trade union					20
Percentage of postal work force that are civil servants	84.8	80.5	76.8	73.4	71.8
Group La Poste FTE employees	279996	280281	288583	295814	292573

Source: La Poste Bilan Social and response to NERA questionnaire.

In the following tables we present more disaggregated cost information taken from La Poste annual reports in order to provide detailed cost shares and costs per employee. Table C.56 shows total costs, while Table C.57 shows figures on cost shares.

Table C.56
La Poste: Total Costs

Cost category	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Wages	6736	7074	7458	7537
Other costs	1274	1460	1528	1571
Pensions	1952	1998	2030	2066
Staff costs	**9962**	**10532**	**11016**	**11174**
Depreciation	670	758	608	780
Purchases	838	867	931	612
Other external costs	2509	2793	3477	3893
Taxes	905	954	973	941
Total	**14885**	**15904**	**17005**	**17400**

Source: La Poste Annual Reports 2000-2002. Exchange rate applied for 1999 FRF= 0.1524 EUR.

Labour costs account for 64 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 5 per cent of total costs in most years.

Table C.57
La Poste: Cost Shares

Cost category	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Wages	45	44	44	43
Other costs	9	9	9	9
Pensions	13	13	12	12
Staff costs	**67**	**66**	**65**	**64**
Depreciation	5	5	4	5
Purchases	6	5	5	4
Other external costs	17	18	20	22
Taxes	6	6	6	5
Total	**100**	**100**	**100**	**100**

Source: NERA calculation.

It is possible to divide the total wage and salary costs shown in Table C.56 by total FTE workers to derive average annual pay, average social security and average pensions costs per full-time worker. These figures are shown in Table C.58.

Table C.58
La Poste: Staff Costs per Full Time Employee

Cost category	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Wages	24033	24513	25212	25761
Other social security and staff costs	4545	5059	5165	5370
Pensions	6964	6923	6862	7061
Staff costs	**35543**	**36496**	**37240**	**38192**

Source: NERA calculation.

C.8.3. La Poste traffic levels

Table C.59 shows data on traffic volumes from 1999 to 2001. Aggregate data on mail and parcels have been provided in the answer to the NERA questionnaire. We show UPU data on parcels volumes and calculate the implicit letter mail volumes.

Table C.59
La Poste: Traffic Levels in the USO Area

Type of traffic –million items	1999	2000	2001
Mail and parcels	19972	19620	19319
Parcels – UPU statistics	278	290	282
Letters (estimated)	19694	19330	19037

Source: Response to NERA questionnaire and UPU statistics.

C.8.4. La Poste Network

The number of post offices has decreased slightly in the last 6 years, while the number of sorting offices and specialized bulk main centres remained virtually unaltered. In contrast, there has been a substantial reduction in the number of delivery offices. UPU data show a sharp decline in the number of post boxes. Data are shown in Table C.60.

Table C.60
La Poste: Post Offices, Sorting Offices, Specialized Centres, Delivery Offices and Post Boxes

	1998	1999	2000	2001	2002	2003
Post offices	17018	17080	17065	17125	17048	16955
Sorting offices	132	132	132	133	134	133
Specialized bulk mail centres	115	115	115	116	116	114
Delivery offices			5110	4950	4850	4750
Post boxes	145000	150373	134524	134500	100000	

Source: Response to NERA questionnaire and UPU statistics for numbers of post boxes in 1998,1999,2000 and 2002.

Table C.61 shows the split of letter traffic carried by La Poste between business and residential mailers and recipients. The table shows that 85 per cent of mail is sent by businesses and 15 per cent by residential customers. It also shows that 25 per cent of mail is received by business customers, and 75 by residential customers. In all 15 per cent of mail is business-to-business, 70 per cent is business-to-resident, 10 per cent is residential-to-business, and 5 per cent is residential-to-residential mail.

Table C.61
La Poste: Domestic Letter Mail by Sender and Recipient 2002

			Received by: Business customers	Residential customers	Total letters sent
			(%)	(%)	(%)
Sent by:	Business customers	(%)	15	70	**85**
	Residential customers	(%)	10	5	**15**
Total letters received		**(%)**	**25**	**75**	**100**

Source: Response to NERA questionnaire.

In 1997 no distinction between first and second-class mail existed, but 95 per cent of all letters were delivered in D+1. An independent survey in 2003 showed that the requirement of 93 per cent delivery of first class mail in D+1 had not been met (83 per cent arrived at destination after one day). 96 per cent of second-class mail reached destination in D+3 (the regulatory requirement is set at 92 per cent). The all letter comparison between 1997 and 2003 shows that the percentage of letters delivered in D+1 fell by 34 percentage points from 95.1 to 61.1 per cent.

C.9. Germany

C.9.1. Information on costs and revenues

Deutsche Post publishes limited information on costs in the company's annual reports.

The financial information that is published is split by business segment, namely mails, express, logistics and other. We report here the published results for the mails and express divisions.

Table C.62 shows revenue and cost data for DP mails and express divisions for the years between 1998 and 2003. There was a break in the series between 2002 and 2003, so results for 2002 are shown both as reported in the 2002 annual report and as reported in the 2003 annual report.

Total costs are calculated by subtracting profit (EBIT) from revenue. The only categories of cost reported in separate terms are "depreciation and amortisation" and "other non-cash payments".

Table C.62
Deutsche Post: Costs and Revenues

	1998	1999	2000	2001	2002 (2002 Report)	2002 (2003 Report)	2003
Mail division							
Costs							
Depreciation & amortisation	432	441	512	518	394	404	412
Other non-cash costs	304	241	117	115	216	126	143
Other costs (including labour)	9592	9981	9101	9116	9400	9461	9353
Total costs	**10328**	**10663**	**9730**	**9749**	**10010**	**9991**	**9908**
Revenue							
Mail		7371	7371	7367	7280	7100	6857
Direct mailing		2059	2083	2072	2066	2344	2403
Press distribution		822	848	841	823	823	799
Internal revenue		1419	1431	1427	1497	737	1054
Total revenue	**11272**	**11671**	**11733**	**11707**	**11666**	**12139**	**11934**
Express division							
Costs							
Depreciation & amortisation	236	240	266	288	833	933	797
Other non-cash costs	-93	163	11	45	168	202	153
Other costs (including labour)	3686	4341	5712	5962	11567	13581	15303
Total costs	**3829**	**4744**	**5989**	**6295**	**12568**	**14716**	**16253**
Total revenue	**3818**	**4775**	**6022**	**6421**	**12489**	**14637**	**16443**

Source: Deutsche Post Annual Reports, 1999 to 2003.

However a more detailed breakdown of DP costs for 2002 and 2003 has recently been published in a presentation by Dr Edgar Ernst, DP's Chief Financial Officer.[46] This shows that of the €9.9 billion of mails division costs in 2003, €0.4 billion was accounted for by depreciation (4 per cent), €5.6 billion (57 per cent) by personnel expenditure, €2.3 billion (23 per cent) by materials, and €1.6 billion (16 per cent) by other operating costs. For 2002 the equivalent mails figures were depreciation €0.4 billion (4 per cent), personnel €5.5 billion (55 per cent), materials €2.1 billion (21 per cent) and other operating costs €2.0 billion (20 per cent). DP express services were less labour intensive. In 2003 depreciation accounted for €0.6 billion (4 per cent), personnel for €4.6 billion (29 per cent), materials for €8.6 billion (54 per cent) and other operating costs for €2.2 billion (13 per cent) of total DP express costs. For 2002 equivalent express figures were depreciation €0.6 billion (4 per cent), personnel €4.3 billion (30 per cent), materials €7.4 billion (52 per cent) and other operating costs €2.0 billion (14 per cent).

Mails division costs have remained relatively constant before adjusting for inflation between 1998 and 2003, while express division costs record sharp increases between years, especially between 2001 and 2002, as a result of acquisitions.

There is limited information about the shares of different activities in total costs in mails services in Deutsche Post, though some information related to 1998 was published in an article by Kruse. This is shown in Table C.63.

Table C.63
Deutsche Post: Cost Shares by Activity

	(%)
Collection	13.2
Sorting	17.4
Delivery	69.4
Total	**100**

Source: J Kruse "Universaldienst etarblierter Postunternehmen" Zeitschrift fur Betriebswissenschaft, Erganzungsheft 3, pp.99-117.

C.9.2. Information on employment levels and personnel costs

Deutsche Post publish information on employment for both the mail and express division in full-time equivalents (FTEs). These figures are shown in Table C.64. Again there was a break in the series between 2002 and 2003, so results for 2002 are shown both as reported in the 2002 annual report and as reported in the 2003 annual report. There has been some decline in mail division employment, and sharp year-on-year increases in express division employment as a result of acquisitions.

[46] The English language version is at http://investorrelations.dpwn.de/english/home/index.jsp/NSID-investorrelations.dpwn.de-35e1%3A40866c48%3A1265cc16377bcd23)

Table C.64
Deutsche Post: Employment in FTE's

	2000	2001	2002 (2002 Report)	2002 (2003 Report)	2003
Mail division (FTEs)	146289	143847	137617	138895	135504
Express division (total)	45920	47774	121545		129458

Source: Deutsche Post Annual Reports, 2001 to 2003.

Labour costs per employee for Deutsche Post can be estimated as shown in Table C.65.

Table C.65
Deutsche Post: Average Personnel Cost per Employee

	2002 (€)	2003 (€)
Mail (per FTE)	39598	41327
Express (per employee)	35378	35533

Source: NERA calculation.

C.9.3. Traffic levels

Some information on letter volumes is available, and is combined in Table C.66. This shows broadly static letter mail volumes between 1998 and 2003. In terms of addressed mail, business customer letters accounted for 84 per cent of total addressed letters in 2001, 2002 and 2003.

Table C.66
Deutsche Post: Traffic Levels

	1998	1999	2000	2001	2002	2003
Business customer letters				7725	7785	7713
Private customer letters				1568	1472	1462
Total addressed letters				**9293**	**9257**	**9175**
Addressed mailings			10100		5451	6028
Unaddressed mailings					3593	3593
Press distribution				2300	2217	2162
Total letter mail	**20036**	**21037**	**21760**	**21593**	**20518**	**20958**

Source: Deutsche Post Annual Reports, 1999 to 2003. DP reported a slightly different figure for business customer letters in 2002 in their 2003 report, but we report here the figure shown in the 2002 report.

C.10. Greece

C.10.1. Information on costs

Table C.67 shows letter mail cost data for the ELTA Hellenic Post network for the years 1998 to 2003. These costs split into personnel costs, materials costs, depreciation and other operating charges.

Table C.67
ELTA: Letter Mail Total Costs

Cost category	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Total staff costs	**175**	**203**	**218**	**250**
Materials costs	2	3	2	2
Depreciation	4	5	7	11
Other operating costs	41	40	58	61
Total costs	**222**	**250**	**284**	**324**

Source: Response to NERA questionnaire.

Table C.68 shows parcels cost data for the ELTA Hellenic Post network for the years 1998 to 2003. These costs split into personnel costs, materials costs, depreciation and other operating charges. The aggregate cost information for letter mail and parcels is provided in Table C.69

Table C.68
ELTA: Parcels Total Costs

Cost category	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Total staff costs	**14**	**14**	**14**	**16**
Materials cost	0.1	0.1	0.2	0.2
Depreciation	0.4	0.4	0.5	0.5
Other operating costs	5	5	5	6
Total costs	**20**	**20**	**20**	**22**

Source: Response to NERA questionnaire.

Table C.69
ELTA: Aggregate Total Costs

Cost category	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Total staff costs	**189**	**217**	**232**	**266**
Materials cost	2	3	2	3
Depreciation	5	5	7	11
Other operating costs	50	45	63	67
Total costs	**242**	**270**	**304**	**346**

Source: NERA calculation.

Table C.70 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for 77 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 2-3 per cent of total costs and other operating costs account for 19-21 per cent of total costs.

Table C.70
ELTA: Cost Shares

Cost category	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Total staff costs	78	80	76	77
Materials cost	1	1	1	1
Depreciation	2	2	2	3
Other operating costs	20	17	21	19
Total costs	**100**	**100**	**100**	**100**

Source: NERA calculation.

In Table C.71 we show information that ELTA provided in the response to the NERA questionnaire on costs by activity. Letter mail related costs increased over time from 70 per cent of total costs to 78 per cent. Parcels related operating costs instead declined from 6 to 5 percentage points.

Table C.71
ELTA: Costs By Activity

Cost category	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Letter mail	222	250	284	324
Parcels	20	20	20	22
Other operating costs	76	76	70	67
Total costs	**318**	**345**	**375**	**413**

Source: Response to NERA questionnaire.

Table C.72 shows information on letter mail operating costs disaggregated by function. Delivery costs account for more than half of total mail letter operating sots. The second largest cost category is collection costs, which in 2002 represented 21.4 per cent of total costs. Table C.73 displays the same information for parcels operating costs. Delivery costs only account for 12 per cent of total costs. The largest cost category is transport costs, which accounts for 53.5 per cent of total parcels operating costs in 2002.

Table C.72
ELTA: Letter Mail Costs by Function

Cost category	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Collection costs	20.9	20.9	21.3	21.4
Transport costs	3.0	2.9	2.9	2.9
Sorting costs	14.4	14.5	14.5	14.3
Delivery costs	50.9	50.9	50.7	50.8
Overhead costs	10.8	10.9	10.6	10.7
Total costs	**100**	**100**	**100**	**100**

Source: Response to NERA questionnaire.

Table C.73
ELTA: Parcels Costs by Function

Cost category	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Collection costs	16.3	16.3	16.2	16.2
Transport costs	52.7	52.9	52.8	53.5
Sorting costs	7.9	7.9	7.9	7.8
Delivery costs	12.9	13.0	12.9	12.9
Overhead costs	10.2	9.9	10.2	9.7
Total costs	**100**	**100**	**100**	**100**

Source: Response to NERA questionnaire.

C.10.2. Information on employment and wage levels

ELTA provided us with information on their FTE employees each year. The figures are shown in Table C.74. In 2002, the number of FTE employees in the letter mail area was 8820 (out of 9360) . ELTA employed 265 part time workers and 8555 full time workers in 2002.

Table C.74
ELTA: Full Time Employee Numbers

	1999	2000	2001	2002
Full time workers – letter mail	7200	7550	7900	8555
Part time workers –letter mail	300	190	217	265
Total FTEs – letter mail	7500	7740	8117	8820
Total FTEs – parcels	600	550	530	540
Total FTE	**8100**	**8290**	**8647**	**9360**

Source: Response to NERA questionnaire.

It is possible to divide the total wage and salary costs shown in Table C.69 by full time equivalent workers to derive average annual pay. These figures are shown separately for parcels and letter mail in Table C.75.

Table C.75
ELTA: Average Annual Wage per FTE Employee

Category of wage etc cost	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Staff costs –letter mail	23333	26163	26857	28345
Staff costs- parcels	23667	25455	26887	28704
Total staff costs	**23358**	**26116**	**26859**	**28365**

Source: NERA calculation.

C.10.3. Traffic levels

Table C.76 shows a consistent series on traffic volumes from 1998 to 2003 provided by ELTA in their response to the NERA questionnaires. Volumes are reported for letter mail, transactional mail, advertising mail, unaddressed mail, social mail, and parcels.

Table C.76
ELTA: Traffic Levels

Type of traffic –million items	1999	2000	2001	2002	2003
Letter mail	**540**	**579**	**592**	**605**	**622**
- Transactional mail	451	473	509	565	544
- Advertising mail	82	98	72	8	42
- Unaddressed mail	8	8	11	32	7
- Social mail					30
Parcels	**3**	**3**	**3**	**3**	**3**

Source: Response to NERA questionnaire.

C.10.4. ELTA network

In Table C.77 we report detailed information on the number of post offices operated directly by ELTA and post offices operated by third parties in the ELTA postal network. We also show figures for letterboxes, customer premises from which mail is collected, specialised bulk mail centres, sorting offices and delivery offices.

Table C.77
ELTA: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated directly	973	967	902	893	877	865
Post-offices operated by others	240	637	800	1064	1188	1329
Total post offices	**1213**	**1604**	**1702**	**1957**	**2065**	**2194**
Letter boxes	13567	13459	12173	11910	12363	
Customer premises from which mail is collected	441	434	402	362	374	
Specialised bulk mail centres	985	988	923	914	896	883
Sorting offices	**27**	**27**	**27**	**27**	**25**	**23**
- of which pure sorting offices*	22	22	22	22	20	18
Delivery offices	**973**	**967**	**902**	**893**	**877**	**865**
-of which pure delivery offices*	9	9	58	67	78	84
Sorting centres for parcels	**22**	**22**	**22**	**22**	**20**	**18**

Source: Response to NERA questionnaire.

ELTA provides various kinds of priority mail.[47] A target of 100 per cent D+1 delivery is set for A priority mail. Unfortunately, further details on regulatory targets are not available. We show data on delivery performances published by the Greek postal regulator in Table C.78.

Table C.78
ELTA: Quality of Service, Delivery, Performance

	2000	2001	2002
Same day	8	7	8
In 1 day	**81**	**86**	**83**
In 2 days	5	5	6
In 3 days	6	2	3

Source: http://www.eett.gr/eng_pages/publications/Pepragmena/Pepragmena2002/postal_liberalisation.pdf.

[47] Source: CERP Compendium http://www.cept-cerp.org/compendium/index.html.

C.11. Hungary

C.11.1. Information on costs

Table C.79 reports the total operating costs incurred by Magyar Posta. These data come from two different sources, the response to the NERA questionnaire and the UPU report.

Table C.79
Magyar Posta: Total Operating Costs

Sources	1998 m HUF	1999 m HUF	2000 m HUF	2001 m HUF	2002 m HUF	2003 m HUF
NERA questionnaire	73856	84930	96477	115209	135085	137156
UPU (operating expenses)[48]	88734	-	114549	115142	136645	-

Sources: Response to NERA questionnnaire, and UPU.

Table C.80 breaks down the total operating costs by the different services provided. Other non-postal services account for the largest proportion of operating costs, followed by letters. However, the other non-postal services share of costs is decreasing while the letter share is increasing. The parcels share was below 10 per cent while express had hardly reached 1 per cent in 2003.

Table C.80
Magyar Posta: Operating Costs by Activity

Product	1998		1999		2000		2001		2002		2003	
	m HUF	%	m HUF	%	m HUF	%	m HUF	%	m HUF	%	m HUF	%
Letter mail	24838	33.6	28990	34.1	32199	33.4	44159	38.4	53069	39.2	59028	43.0
Parcels	5533	7.5	5424	6.4	8223	8.5	11190	9.7	10078	7.4	10648	7.8
Express	363	0.5	758	0.9	881	0.9	1422	1.2	1216	0.9	1399	1.0
Other op. costs	43229	58.4	49896	58.7	55018	57.1	58179	50.6	71051	52.5	66048	48.2
Total op. costs	**73963**	**100**	**85068**	**100**	**96320**	**100**	**114950**	**100**	**135414**	**100**	**137123**	**100**

Source: Response to NERA questionnaire.

The increase in operating costs has not been sufficiently compensated by volume growth, which has caused a significant increase in unit operating costs as shown in Table C.81.

[48] See footnote 41.

Table C.81
Magyar Posta: Volumes and Unit Operating Costs for Letters, Parcels and Express

	Product	1998	1999	2000	2001	2002	2003
Operating costs (million HUF)	Letters	24779	29068	32246	44134	52965	59071
	Parcels	5533	5308	8321	11290	9961	10648
	Express	481	758	780	1540	1215	1521
Volumes (million items)	Letters	533.411	757.763	784.439	850.118	888.008	-
	Parcels	122.629	165.97	152.642	153.288	141.702	-
	Express	0.194	0.216	0.265	0.293	0.314	-
Unit operating costs (HUF/item)	Letters	46	38	41	52	60	-
	Parcels	45	32	55	74	70	-
	Express	2480	3511	2944	5254	3869	-

Sources: Response to NERA questionnaire.

Table C.82 shows that the percentage of staff costs accounted for by letters has remained more or less constant with the exception of 2000, when there seemed to be a jump in the labour share in letters which corresponded to a large reduction in the labour share for parcels.

Table C.82
Magyar Posta: Percentage of Staff Costs in Total Operating Costs for Letters and Parcels

Product		1998	1999	2000	2001	2002	2003
Letters	Staff costs (m HUF)	16708	20072	25341	29623	36701	-
	Total operating costs (m HUF)	24779	29068	32246	44134	52965	59071
	% staff costs/total operating costs	67	69	79	67	69	
Parcels	Staff costs (m HUF)	2921	2975	3349	4401	3931	-
	Total operating costs (m HUF)	5533	5308	8321	11290	9961	10648
	% staff costs/total operating costs	53	56	40	39	39	

Sources: Response to NERA questionnaire.

Table C.83 shows the percentages of operating costs accounted for by the different activities (collection, transport, sorting, delivery and overheads). Delivery is the major component of costs for letters, but not for parcels and express. For these two services the increase in the cost share of sorting has been substantial.[49]

[49] The data for sorting in 2003 seem to be incorrect for parcels and express. We asked Magyar Posta who did not have an explanation for this.

Table C.83
Magyar Posta: Percentage of Operating Costs by Function

Product	Function	1999	2000	2001	2002	2003
Letters	Collection	8	11	12	11	13
	Transport	9	8	3	5	9
	Sorting	13	20	5	4	4
	Delivery	44	40	51	45	54
	Overhead	26	21	29	35	20
	Total	**100**	**100**	**100**	**100**	**100**
Parcels	Collection	8	8	19	14	14
	Transport	33	42	16	29	9
	Sorting	12	11	4	9	34
	Delivery	22	12	32	14	21
	Overhead	25	27	29	34	22
	Total	**100**	**100**	**100**	**100**	**100**
Express	Collection	7	21	18	9	9
	Transport	45	20	23	30	3
	Sorting	8	17	2	2	30
	Delivery	11	17	27	25	14
	Overhead	29	25	30	34	44
	Total	**100**	**100**	**100**	**100**	**100**

Source: Response to NERA questionnaire.

C.11.2. Information on employment and wage levels

Table C.84 shows that labour costs have increased substantially in recent years. This increase has been particularly intense in the case of letters, with a compound average growth rate of 21.7 per cent between 1998 and 2002.

Table C.84
Magyar Posta: Staff Costs for Letters, Parcels and Express

Product	Staff costs	1998 m HUF	1999 m HUF	2000 m HUF	2001 m HUF	2002 m HUF
Letters	Wages, salaries and compensation	10689	20072	25341	29623	23790
	Social security costs to company Pension costs to company	4763				9330
	Other staff-related costs to company	1256				3581
	Total staff costs	**16708**	**20072**	**25341**	**29623**	**36701**
Parcels	Wages, salaries and compensation	1869	2975	3349	4401	2549
	Social security costs to company Pension costs to company	832				999
	Other staff-related costs to company	219				384
	Total staff costs	**2921**	**2975**	**3349**	**4401**	**3931**
Express	Wages, salaries and compensation	536	864	1035	1188	848
	Social security costs to company Pension costs to company	241				333
	Other staff-related costs to company	63				126
	Total staff costs	**840**	**864**	**1035**	**1188**	**1307**

Source: Response to NERA questionnaire.

In Table C.85 we observe that even though reductions in the labour force have been made for parcels and express, the number of employees has increased in letters and thus in total. However, the main reason for the increase in staff costs has been the increase in wage levels.

Table C.85
Magyar Posta: Labour Force Employed and Average Wage Levels

Product		1998	1999	2000	2001	2002
Letters	Full time equivalent workers	14895	11702	15780	15442	18940
	Average wage (HUF/FTEW)	1121719	1715262	1605894	1918340	1937751
Parcels	Full time equivalent workers	2620	2076	2327	2294	2029
	Average wage (HUF/FTEW)	1114885	1433044	1439192	1918483	1937408
Express	Full time equivalent workers	753	604	649	619	676
	Average wage (HUF/FTEW)	1115538	1430464	1594761	1919225	1933432
Total	Full time equivalent workers	18268	14382	18756	18355	21645
	Average wage (HUF/FTEW)	1120484	1662564	1584826	1918387	1937584

Sources: Response to NERA questionnaire.

Magyar Posta explained that the sharp reduction in workers in 1999 and the sudden increase in 2002, was a consequence of a significant organisational change and of an investment plan that allowed it to reduce its headcount.

Table C.86 shows that the share of part time workers has decreased over the period

Table C.86
Magyar Posta: Full Time Equivalent Postal Workers and Percentage of Full-Time vs. Part-Time Workers

		1998	1999	2000	2001	2002
Full time equivalent postal workers	Letters	14895	11702	15780	15442	18940
	Parcels	2620	2076	2327	2294	2029
	Express	753	604	649	619	676
% full-time workers (letters, parcels and express)		78.8	81.1	86.7	86.3	87.1
% part-time workers (letters, parcels and express)		21.2	18.9	13.2	13.7	12.9

Source: Response to NERA questionnaire.

C.11.3. Traffic levels and postal network information

Table C.87 shows the development of mail volumes for Magyar Posta, in which letter mail and express items have experienced significant increases (13 per cent and 12 per cent compound average growth rate respectively) in comparison with parcels (3.6 per cent compound average growth rate).

Table C.87
Magyar Posta: Delivery Volumes by Type of Product

Product	1998 m items	1999 m items	2000 m items	2001 m items	2002 m items
Letters	533.411	757.763	784.439	850.118	888.008
Parcels	122.629	165.970	152.642	153.288	141.702
Express	0.194	0.216	0.265	0.293	0.314
Total	**656.234**	**923.949**	**937.346**	**1003.699**	**1030.024**

Source: Response to NERA questionnaire.

As shown in Table C.88, the number of post offices has declined. While Magyar Posta operated 2,922 post offices in 1998 this figure has fallen to 2,666 in 2003. The number of post offices operated by third parties increased up to 432 in 2002 but started to fall in 2003, the year in which they accounted for almost 16 per cent of Magyar Posta operated post offices. Both the number of post offices and specialised bulk mail centres remained unchanged in the period from 1998 to 2003, with 34 sorting offices and 1 specialised bulk mail centre. In 2003, 8.2 per cent of delivery offices were closed down (in net terms) and they amounted to

2,506 in 2003, none of which is a pure delivery office. The post box network has been reinforced in the period considered, especially in 2001. In 2003, there were 18,400 post boxes all over Hungary.

Table C.88
Magyar Posta: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated by Magyar Posta	2922	2923	2860	2832	2822	2666
Post offices operated by others	310	314	380	413	432	419
Sorting offices ¨(*)	1	1	1	1	1	1
Specialised bulk mail centres	1	1	1	1	1	1
Delivery offices	2728	2731	2725	2732	2729	2506
Pure delivery offices	0	0	0	0	0	0
Post boxes	16972	16695	16719	18409	18409	18400

(*) Main sorting office
Source: Response to NERA questionnaire.

C.12. Ireland

C.12.1. Information on costs

Table C.89 shows published cost data for the Irish postal network for the years 1998 to 2002. These costs include costs for all activities and are split into personnel and non-personnel costs.

Table C.89
An Post: Total Costs

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Wages and salaries	287.8	316.2	337.5	379.5	412.9
Social security	13.6	15.6	18.3	22.3	25.3
Pension costs	34.5	31.6	31.9	38.1	41.4
Total staff costs	**335.9**	**363.4**	**387.9**	**439.9**	**479.6**
Depreciation etc	18.7	19.4	23.3	27.1	32.6
Distribution	23.7	24.5	30.6	37.7	49.1
Accommodation	13.6	15.6	16.8	17.7	20.7
Operational	51.1	61.7	63.6	69.1	75.9
Administration	40.9	40.3	40.9	39.3	41.3
Total costs	**483.9**	**524.9**	**563.1**	**630.8**	**699.2**

Source: An Post Annual Reports 1998 to 2002.

Notes: Data in 1998 and 1999 have been converted to euros adopting the exchange rate IR£/€ =1.27.

Table C.90 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for just under 70 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 4-5 per cent of total costs in most years.

Table C.90
An Post: Cost Shares

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Wages and salaries	59.5	60.2	60.0	60.2	59.1
Social security	2.8	3.0	3.2	3.5	3.6
Pension costs	7.1	6.0	5.7	6.0	5.9
Total staff costs	**69.4**	**69.2**	**68.9**	**69.7**	**68.6**
Depreciation etc	3.9	3.7	4.1	4.3	4.7
Distribution	4.9	4.7	5.4	6.0	7.0
Accommodation	2.8	3.0	3.0	2.8	3.0
Operational	10.6	11.8	11.3	11.0	10.9
Administration	8.5	7.7	7.3	6.2	5.9
Total costs	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Total staff costs from An Post Annual Reports 1998 to 2002.

Data on costs by activity are available separately for letters and parcels in NERA's 1998 report.[50]

C.12.2. Information on employment and wage levels

An Post also publishes information on the average number of workers each year. Again this information covers all employees of the group and provides information on the subsidiaries employee aggregate numbers. The data are published according to a breakdown which only partially reflects our categorization of activities in the postal value chain. This information is shown in Table C.91.

Table C.91
An Post: Average Employee Numbers

Category of worker	1998	1999	2000	2001	2002
Headquarters	560	576	611	626	618
Savings/remittance services	300	355	351	357	356
Inspection	65	64	63	51	49
Postmen/postwomen	4160	4327	4486	4427	4547
Postal sorters	926	1066	1137	1104	1189
Post office clerks	1201	1230	1204	1136	1097
Other grades	728	737	734	744	793
Temporary	635	677	635	1,085	864
Subsidiary companies	192	108	235	309	577
Total Group employees	**8767**	**9140**	**9456**	**9839**	**10090**
Postmasters: Engaged as agents	1814	1816	1751	1687	1584

Source: An Post Annual Report 2002

It is possible to divide the total wage and salary costs shown in Table C.90 by total workers to derive average annual pay, average social security and average pensions costs per worker. These figures are shown in Table C.92.

Table C.92
An Post: Average Annual Wage and Salary Costs per Employee

Category of wage etc cost	1998 (€)	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Wages and salaries per employee	32828	34595	35713	38571	40922
Social security per employee	1551	1707	1935	2266	2507
Pension costs per employee	3935	3457	3374	3872	4103
Total staff cost per employee	**38314**	**39759**	**41022**	**44710**	**47532**

Sources: NERA calculations on data taken from An Post Annual Reports 1998 to 2002.

[50] NERA *Costing & Financing of Universal Services in the Postal Sector in the European Union* A Report to DGXIII, 1998, p.158.

C.12.3. Traffic levels

An Post publishes information on letter mail volumes each year. Table C.93 shows a consistent series from 1998 to 2002. An Post also publishes data on tariffs, which are shown in Table C.94.

Table C.93
An Post: Traffic Levels and Index (1997=100)

Type of traffic	1998	1999	2000	2001	2002
Traffic index 1997=100	108.4	117.5	126.6	132.8	135.3
Letter Post items delivered (millions)	669.8	705.4	733.6	779.8	790.6
Letter Post items per capita	180.8	188.4	193.7	203.1	201.8

Source: An Post Annual Report 2002.

Table C.94
An Post: Tariffs 1998-2002

	1998	1999	2000	2001	2002
Tariff index	100	100	100	100	103.4
Tariff index inflation adjusted	97.7	96.5	91.6	88.2	87.2

Source: An Post Annual Report 2002.

Table C.95 shows figures on parcels volumes taken from the UPU statistics

Table C.95
An Post: Parcels Traffic

	1998	1999	2000	2001	2002
Parcels items delivered	9.12	9.23	11.27	9.12	9.78**

*Source: UPU statistics. Note:** does not include data on domestic insured parcels.*

An Post publishes information on the postal network disaggregated into three categories: company post offices, sub-post offices and agents. These data are shown in Table C.96 together with the figures on delivery points. In 2002 the programme to restructure the post office branch network commenced with the conversion of 86 sub-post office contracts to postal agencies. These postal agencies provide welfare payments and postage stamp sales together with posting facilities in areas where the traditional sub-post office service cannot be sustained. The post office branch network in 2002 comprised 1,584 sub-post offices, 96 company-staffed post offices and 86 postal agencies.

Table C.96
An Post: Number of Post Offices and Delivery Points

	1998	1999	2000	2001	2002
Delivery points (millions)	1313	1341	1410	1482	1598
Post offices					
Company post offices	97	97	97	96	96
Sub- post offices	1814	1816	1817	1687	1584
Agents		-	-	-	86
Total post offices	**1911**	**1913**	**1914**	**1783**	**1766**

Source: An Post Annual Report 2002.

Finally, Table C.97 shows information on the regulatory quality targets and the effective performance of An Post.

Table C.97
An Post: Quality Targets and Performance

	1998	1999	2000	2001	2002	2003
D+1 targets	89%	90%	90%	90%	92%	94%
Performance	81%	87%	88%	87%	90%	

Source: The Irish Regulator website and An Post Annual Repots 1998 to 2002.

Table C.98 shows the split of letter traffic carried by An Post between business and residential mailers and recipients. The table shows that 87 per cent of mail is sent by businesses and 13 per cent by residential customers. It also shows that 37 per cent of mail is received by business customers, and 63 by residential customers. In all 31 per cent of mail is business-to-business, 56 per cent is business-to-resident, 6 per cent is residential-to-business, and 7 per cent is residential-to-residential mail.

Table C.98
An Post: Letter Mail Traffic by Sender and Recipient

			Received by:		
			Business customers	**Residential customers**	**Total letters sent**
			(%)	**(%)**	**(%)**
Sent by:	Business customers	(%)	31	56	**87**
	Residential customers	(%)	6	7	**13**
Total letters received		**(%)**	**37**	**63**	**100**

Source: Response to NERA questionnaire

C.13. Italy

C.13.1. Information on costs

Table C.99 shows published cost data for the Italian postal network for the years 1998 to 2002. These costs include costs for all activities in the Poste Italiane Group, including mail and parcels, counter services and some other activities.

Table C.99
Poste Italiane: Total Cost

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Wages and salaries			3854	3707	3631
Social security			932	901	906
Severance payments			267	273	255
Other personnel costs			73	78	86
Total staff costs	**5352**	**5226**	**5126**	**4959**	**4878**
Depreciation	192	247	306	449	494
Risk provisions	102	85	66	25	58
Other operating costs	1243	1382	1681	2073	2327
Total costs	**6889**	**6940**	**7179**	**7506**	**7756**

Source: Poste Italiane Relazione Annuale 1999-2000-2001, Poste Italiane Bilancio 2002, Corte dei Conti "Relazione sul risultato del controllo eseguito sulla gestione finanziaria di Poste Italiane S.P.A per l'esercizio 2000"

Note: 1998-1999-2000 data have been converted from Lira to Euro using the exchange rate of 1936.27EUR/Lira. Disaggregate staff costs for the Poste group in 2000 has been estimated using information on Poste SPA staff costs components.

Table C.100 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for 78 per cent of total costs in 1998 and 63 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 3 to 6 per cent of total costs.

Table C.100
Poste Italiane: Cost Shares

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Wages and salaries			54	49	47
Social security			13	12	12
Severance payments			4	4	3
Other personnel costs			1	1	1
Total staff costs	**78**	**75**	**71**	**66**	**63**
Depreciation	3	4	4	6	6
Risk provisions	1	1	1	0	1
Other operating costs	18	20	23	28	30
Total costs	**100**	**100**	**100**	**100**	**100**

Source: NERA calculation.

Information on costs by activity are available separately for letters and parcels in NERA's 1998 report.[51]

C.13.2. Information on employment and wage levels

Poste Italiane publishes information on the average number of employees in the annual report and financial accounts. The figures are shown in Table C.101. In 2002, the number of employees was 161,403.

Table C.101
Poste Italiane: Full Time Employee Numbers

	1998	1999	2000	2001	2002
Average employee number	183178	178597	172.115	168049	161403

Source: Poste Italiane Relazione Annuale 2002 and Bilancio 2002.

It is possible to divide the total wage and salary costs shown in Table C.67 by average workers to derive average annual pay per FTE worker. These figures are shown in Table C.75.

[51] NERA *Costing & Financing of Universal Services in the Postal Sector in the European Union* A Report to DGXIII, 1998, p.172.

Table C.102
Poste Italiane: Average Annual Wage per FTE

Cost category	1998 (€)	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Wages and salaries			22392	22059	22496
Social security			5415	5362	5613
Severance payments			1551	1625	1580
Other personnel costs			424	464	533
Total staff costs	**29217**	**29259**	**29784**	**29509**	**30222**

Source: NERA calculation.

C.13.3. Traffic levels

Table C.76 shows a on traffic volumes from 1999 to 2002 published by Poste Italiane in the annual report and financial account. Volumes are reported for letter mail and parcels.

Table C.103
Poste Italiane: Traffic Levels

Type of traffic –million items	1999	2000	2001	2002
Letter mail	6565	6634	6895	6505
Parcels	41	38	33	36

Source: Poste Italiane Relazione Annuale 1999-2000-2001, Poste Italiane Bilancio 2002, Corte dei Conti "Relazione sul risultato del controllo eseguito sulla gestione finanziaria di Poste Italiane S.P.A per l'esercizio 2000"

C.13.4. Poste Italiane network

In Table C.77 we report detailed information on the number of post offices operated directly by Poste Italiane. We also show figures for letterboxes, and delivery offices provided by Poste Italiane in the response to NERA questionnaire. The number of sorting offices is drawn from UPU statistics.

Table C.104
Poste Italiane: Postal Network Information

	1998	1999	2000	2001	2002	2003
Number of delivery offices	**8558**	**8558**	**8498**	**7124**	**6769**	**6405**
- Pure delivery offices				172	247	250
- Other delivery offices	8558	8558	8498	6952	6522	6155
Post boxes	70000	80000	80800	66000	66800	67200
Post offices	13987	13980	13831	13860	13747	13748
Sorting offices UPU	119	1121	112	110	106*	

Source: Response to NERA questionnaire on delivery offices, post boxes and post offices. UPU statistics on sorting offices.

*Notes. * Of which 24 pure sorting centres (source Poste Italiane 2002 Annual Review).*

Poste Italiane publishes information on the quality of service in the annual report and financial account. We show data on delivery performances and targets for priority mail (introduced in 1999) in Table C.78.

Table C.105
Poste Italiane: Quality of Service, Delivery Performance

	1999	2000	2001	2002
Target D+1	70	85	80	80
Performance	81	83	83	84

Source: Poste Italiane Relazione Annuale 1999-2000-2001, Poste Italiane Bilancio 2002.

C.14. Latvia

C.14.1. Information on costs

Table C.106 shows the total operating costs of Latvijas Pasts between 1998 and 2002 from two different sources. These costs have exhibited continuous growth, with the exception of 2001, according to UPU data. UPU figures on Latvijas Pasts operating expenses are systematically higher than those on operating costs reported by the operator. According to Latvijas Pasts the important increment in operating costs reported in the questionnaire in year 2003 was due to salary increases.

Table C.106
Latvijas Pasts: Total Operating Costs

Sources	1998 Mill. LVL	1999 m LVL	2000 m LVL	2001 m LVL	2002 m LVL
NERA questionnaire	-	14.21	14.23	14.67	16.12
UPU (operating expenses)[52]	15.86	18.96	19.22	18.06	19.75

Sources: Response to NERA questionnaire and UPU.

Table C.107 shows the split of operating costs between the different categories of cost (materials, staff, depreciation and others). Staff costs are the main category of cost, followed by other costs, whose importance is decreasing. Materials costs increased substantially in 2001, but returned to normal levels in 2002. Depreciation costs did not exceed 5 per cent of total operating costs in the period between 1999 and 2002.

Table C.107
Latvijas Pasts: Operating Costs by Cost Type

Operating costs	1999		2000		2001		2002	
	m LVL	%	m LVL	%	m LVL	%	m LVL	%
Materials	1.20	8.4	1.43	10.0	3.53	24.1	2.10	13.0
Staff	6.94	48.8	7.22	50.7	8.02	54.7	9.10	56.5
Depreciation	0.54	3.8	0.58	4.1	0.74	5.0	0.69	4.3
Others	5.53	38.9	5.00	35.1	2.38	16.2	4.23	26.2
Total operating costs	**14.21**	**100**	**14.23**	**100**	**14.67**	**100**	**16.12**	**100**

Source: Response to NERA questionnaire.

[52] See footnote 41.

C.14.2. Information on employment and wage levels

The importance of labour costs in total operating costs has increased since 1999 (up to 56 per cent in 2002), despite the reduction in the number of employees. This has been caused by the increase in the average wage level, as shown in Table C.108.

Table C.108
Latvijas Pasts: Labour Costs

Staff costs	1998	1999	2000	2001	2002
Total staff costs (million LVL)	-	6.94	7.22	8.02	9.10
% of total operating costs	-	49	51	55	56
Number of employees	7565	7495	7378	7229	7160
Average annual wage (LVL)	-	926	979	1109	1271

Sources: Response to NERA questionnaire and UPU.

C.14.3. Traffic levels and postal network information

There have been important increases in mail volumes as shown in Table C.109. However, a downturn occurred in 2003. When consulted, Latvijas Pasts informed us that the increase in operating costs despite the reduction in volumes was caused by an increase in staff costs.

Table C.109
Latvijas Pasts: Delivery Volumes by Type of Product

Product	1998 m items	1999 m items	2000 m items	2001 m items	2002 m items	2003 m items
Letters	39	36	78	88	90	62
Parcels	0.080	0.324	0.460	-	1	1
Express	-	-	-	-	-	-

Source: Response to NERA questionnaire.

As Table C.110 shows, Latvijas Pasts operated 968 post offices in 2003, a reduction by 2.1 per cent since 1998. There is one sorting centre for the entire country, while there has been a net reduction in the number of post boxes, from 2,666 in 1998 to 2,464 in 2002.

Table C.110
Latvijas Pasts: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated by Latvijas Pasts	989	989	970	967	964	968
Post offices operated by others	0	0	0	0	0	0
Sorting offices (*)	1	1	1	1	1	1
Specialised bulk mail centres	0	0	0	0	0	0
Delivery offices	989	989	970	967	964	968
Pure delivery offices	0	0	0	0	0	0
Post boxes	2666	2501	2465	2441	2464	-

(*) Main sorting offices
Source: Response to NERA questionnaire.

C.15. Lithuania

C.15.1. Information on costs

Table C.111 shows total operating costs for Lietuvos Paštas for the years from 1998 to 2003 from two sources. Operating costs grew continuously in nominal terms, except in 2002. According to Lietuvos Paštas, in that year there were significant reductions in the enterprise's management costs as a result of the elimination of some management levels.

Table C.111
Lietuvos Paštas: Total Operating Costs

Sources	1998 m LTL	1999 m LTL	2000 m LTL	2001 m LTL	2002 m LTL	2003 m LTL
NERA questionnaire	123.03	125.85	129.71	138.95	135.73	141.32
UPU (operating expenses)[53]	134.35	133.09	135.85	138.95	135.73	-

Sources: Response to NERA questionnaire and UPU.

C.15.2. Information on employment and wage levels

Lietuvos Paštas has slightly reduced the number of staff, which was 8,117 in 2002, down from 8,625 in 1998.

Table C.112
Lietuvos Paštas: Number of Employees

	1998	1999	2000	2001	2002	2003
Number of employees (UPU)	8625	8511	8591	8303	8117	-
Total full time equivalent postal workers	7285	7217	7099	6872	6686	6674

Source: UPU and response to NERA questionnaire.

The percentage of members of trade unions is more than 50 per cent and has remained more or less constant over the period. The percentage of civil servants is only 0.6 per cent

[53] See footnote 41.

Table C.113
Lietuvos Paštas: Total Work Force Employed

	1998	1999	2000	2001	2002	2003
Total full time equivalent postal workers	7285	7217	7099	6872	6686	6674
% civil servants	0.6	0.6	0.6	0.6	0.6	0.6
% member of trade union	51.8	55.8	54.8	54.6	53.9	52.0

Source: Response to NERA questionnaire.

C.15.3. Traffic levels and postal network information

The letter mail volume for Lietuvos Paštas has increased over the period at a 3.9 per cent compound average growth rate, whilst the express and parcels mail volumes have decreased significantly (-7.3 per cent and -2.1 per cent compound average growth rate respectively). Lietuvos Paštas reported that this volume reduction was caused by competition in these two market segments.

Table C.114
Lietuvos Paštas: Mail Volumes by Type of Product

Product	1998 m items	1999 m items	2000 m items	2001 m items	2002 m items	2003 m items
Letters	37.43	37.76	38.03	40.91	45.27	45.39
Parcels	0.10	0.14	0.20	0.20	0.11	0.09
Express	0.89	0.75	0.62	0.59	0.52	0.61

Source: Response to NERA questionnaire.

In Lithuania, practically all the post offices operated by Lietuvos Paštas are also used for sorting and delivery purposes. Consequently, there is a large similarity in the number of post offices, sorting offices and delivery offices, and the changes in the numbers have been in parallel (see Table C.115). These offices have been reduced continuously between 1998 and 2003. For example, the number of post offices changed from 967 in 1998 to 945 in 2003. The reduction in the network infrastructure has also affected the post boxes, which were reduced by 6 per cent between 1998 and 2003 (accumulated rate) down to 4,290.

Table C.115
Lietuvos Paštas : Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated by Lietuvos Paštas	967	965	959	944	944	945
Post offices operated by others	0	0	0	0	0	0
Sorting offices (*)	5	1	1	1	1	1
Specialised bulk mail centres	-	-	-	-	-	-
Delivery offices	967	965	959	944	944	944
Pure delivery offices	-	-	-	-	-	-
Post boxes	4564	4656	4498	4385	4311	4290

(*) Main sorting offices

Source: Response to NERA questionnaire.

C.16. Luxembourg

C.16.1. Information on costs

Table C.67 shows cost data for the Luxembourg P&T postal network in 2001. These costs include costs for letter mail, parcels and express separately. The same information is converted into cost shares and shown in Table C.117. Labour is the largest single category of costs, accounting for 45 per cent of total costs in letter mail, 39 per cent of total costs in parcels and 65 per cent of total costs in express. Depreciation accounts for 5 per cent of total costs in letter mail and 9 per cent of total costs in parcels and express.

Table C.116
P&T: Operating Cost by Letter Mail, Parcels and Express in 2001

Cost category	Letter mail (€m)	Parcels (€m)	Express (€m)
Materials cost	2.90	0.12	0.39
Staff costs	40.89	1.09	4.21
Depreciation	4.89	0.24	0.59
Other operating costs	41.40	1.31	1.32
Total	**90.09**	**2.77**	**6.50**

Sources: Response to the NERA questionnaire.

Table C.117
P&T: Cost Shares by Letter Mail, Parcels and Express in 2001

Cost category	Letter mail (%)	Parcels (%)	Express (%)
Materials cost	3	4	6
Staff costs	45	39	65
Depreciation	5	9	9
Other operating costs	46	47	20
Total	**100**	**100**	**100**

Sources: NERA calculation.

Table C.118 shows total cost information in 2001 in €million and converted into cost shares.

Table C.118
P&T: Total Operating Costs in 2001

Cost category	2001 (€m)	2001 (%)
Letter mail	90.1	75
Parcels	2.8	2
Express	6.5	5
All other operating costs	21.0	17
Total costs	**120.3**	**100**

Source: Response to NERA questionnaire and NERA calculation (for cost shares).

Table C.119 shows costs by activity in letter mail, parcels and express. This split was provided in the response to the NERA questionnaire for 2001 only.

Table C.119
P&T: Cost Shares by Activity in 2001

	Letter mail (%)	Parcels (%)	Express (%)
Collection costs	9.3	8.6	32.9
Transport costs	7.0	7.6	2.8
Sorting costs	20.8	10.1	11.0
Delivery costs	51.4	72.7	39.8
Overhead costs	11.5	1.0	13.5
Total	**100**	**100**	**100**

Source: Response to NERA questionnaire.

Delivery costs account for 51 per cent of costs in letter mail, 73 per cent of total costs in parcels and 40 per cent of total costs in express mail.

C.16.2. Information on employment and wage levels

The P&T also provided us with information on the number of full-time equivalent (FTE) workers each year. This information covers all employees of the organisation, and a separate breakdown is not available for different activities. This information is shown in Table C.120.

Table C.120
P&T: Full Time Equivalent Workers and Percentage of Civil Servants

Category of worker	1998	1999	2000	2001	2002	2003
Total FTE employees	**1559**	**1573**	**1588**	**1588**	**1581**	**1581**
% of postal work force that are civil servants	1.00	1.00	1.50	1.50	1.75	1.75

Source: Response to NERA questionnaire.

It is possible to divide the aggregate letter mail, parcels and express personnel costs shown in Table C.116 by total FTE workers to derive an estimated average staff costs per full-time worker. The average staff costs per employee in 2001 was €29,087.

C.16.3. Traffic levels

The P&T provided us with detailed information on traffic volumes. The data are shown in Table C.121.

Table C.121
P&T: Traffic Levels

Type of traffic	1998 (m)	1999 (m)	2000 (m)	2001 (m)	2002 (m)	2003 (m)
Letter mail	**237**	**242**	**248**	**248**	**244**	**245**
- of which transactional mail	168	170	181	181	178	178
- of which unaddressed mail	69	72	67	67	66	67
Parcels	0.2	0.2	0.3	0.3	0.4	0.4
Express	0.07	0.08	0.08	0.05	0.04	0.04

Sources: Response to NERA questionnaire.

Table C.122 shows the split of letter traffic carried by the P&T between business and residential mailers and recipients. The table shows that 84 per cent of mail is sent by businesses and 16 per cent by residential customers. It also shows that 48 per cent of mail is received by business customers, and 52 by residential customers. In all 39 per cent of mail is business-to-business, 44 per cent is business-to-resident, 9 per cent is residential-to-business, and 8 per cent is residential-to-residential mail.

Table C.122
P&T: Letter Mail Traffic by Sender and Recipient

			Received by: Business customers (%)	Residential customers (%)	Total letters sent (%)
Sent by:	Business customers	(%)	39	44	**84**
	Residential customers	(%)	9	8	**16**
Total letters received		**(%)**	**48**	**52**	**100**

Source: Response to NERA questionnaire.

C.16.4. P&T postal network

In Table C.123 we report detailed information on the number of post offices operated directly by P&T and post offices operated by third parties in the P&T postal network. We

also show figures for letterboxes, customer premises from which mail is collected, specialized bulk mail centres, sorting offices and delivery offices.

Table C.123
P&T: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated directly	106	106	105	105	105	105
Post-offices operated by others	0	0	3	3	3	3
Total post offices	**106**	**106**	**108**	**108**	**108**	**108**
Letter boxes	1181	1181	1171	1164	1164	1166
Customer premises from which mail is collected	n.a.	321	323	349	379	379
Specialised bulk mail centres	1	1	1	1	1	1
Sorting offices	1	1	1	1	1	1
Delivery offices	**38**	**38**	**38**	**38**	**38**	**38**
-of which pure delivery offices	0	0	0	1	1	1
Sorting centres for parcels	1	1	1	1	1	1

Source: Response to NERA questionnaire.

C.17. Malta

C.17.1. Information on costs

Table C.124 shows data on total operating expenses for Maltapost. After the cost reduction in 1999, cost levels have increased.

Table C.124
Maltapost: Total Operating Costs

Operating expenses	1998	1999	2000	2001	2002
Operating expenses (m LTL)[54]	6.100	5.608	5.995	6.641	6.990
Growth rate (%)	-	-8.1	6.9	10.8	5.3

Source: UPU

C.17.2. Information on employment and wage levels

Staff costs have evolved in a dissimilar way across products. As shown in Table C.125, while labour costs have increased for letters, they have decreased for parcels and express.

Table C.125
Maltapost: Staff Costs by Product Type

Product	2001 m MTL	2002 m MTL	2003 m MTL
Letters	3.19	3.31	3.46
Parcels	0.13	0.11	0.07
Express	0.09	0.09	0.07
Total	**3.41**	**3.51**	**3.60**

Source: Response to NERA questionnaire.

For the overall activities, the number of workers is decreasing (Table C.126). Following Maltapost's privatisation, there are currently no civil servants on their staff. The average wage level has risen since 2001.

[54] See footnote 41.

Table C.126
Maltapost: Total Work Force Employed

	1998	1999	2000	2001	2002	2003
Number of workers	864	847	853	840	803	-
Total full time equivalent postal workers	-	872	867	836	830	817
% civil servants	-	10	10	0	0	0
% member of trade union	-	65	63	63	63	63
Average wage (MTL/worker)	-	-	-	4060	4371	-
Average wage (MTL/TFTEPW)	-	-	-	4079	4229	4406

Source: Response to NERA questionnaire and UPU.

C.17.3. Traffic levels and postal network information

The increase in operating costs seems to have been caused mainly by the rise in mail volumes shown in Table C.127 for the years 2001 to 2003. Express volumes have been declining.

Table C.127
Maltapost: Delivery Volumes by Type of Product

Product	2001	2002	2003
	thousand items	thousand items	thousand items
Letters	54625	54395	65976
Parcels	4231	5931	16906
Express	30506	24100	22128

Source: Response to NERA questionnaire.

There have not been large variations in the number of post offices operated in Malta, as shown in Table C.128. In total 51 post offices have been open between 1998 and 2003, out of which 59-61 per cent were operated by Maltapost. The number of delivery offices has followed a parallel evolution to the post offices operated by Maltapost. Maltapost operated 30-31 post offices, and 27-28 delivery offices in 1998-2002. Post boxes decreased from 599 in 1998 to 525 in 2003.

Table C.128
Maltapost: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated by Maltapost	30	30	30	31	31	31
Post offices operated by others	21	21	21	20	20	20
Sorting offices (*)	1	1	1	1	1	1
Specialised bulk mail centres	-	-	-	-	1	1
Delivery offices	27	27	27	28	28	9
Pure delivery offices	0	0	0	0	0	5
Post boxes	599	599	587	588	526	525

(*) Main sorting offices
Source: Response to NERA questionnaire.

Table C.129 shows that almost all mail is delivered at the customers' door and that this percentage has remained constant over the period.

Table C.129
Maltapost: Percentage of Mail Delivered to Different Delivery Points

	1998	1999	2000	2001	2002	2003
Percentage of mail delivered to:						
Customers' door	95	95	95	95	95	95
Boxes in apartment blocks	4	4	4	4	4	4
End of drive boxes						
Post office boxes	1	1	1	1	1	1
Other						
Total	100	100	100	100	100	100

Source: Response to NERA questionnaire.

C.18. Netherlands

C.18.1. Information on costs and revenues

TPG publishes limited information on costs in the company's annual reports and on its website.

The financial information that is published is split by business segment, namely letter mail (which includes parcels), express, and other. We report here the published results for all three sectors. Costs have been calculated by subtracting costs (EBIT) from revenue.

Table C.130 shows revenue and cost data for TPG mails, express and other businesses, and all three combined, for the years between 1998 and 2002. Both letter mail costs and express costs have been rising over time.

Costs for each of the businesses are not broken down into individual categories such as labour or materials costs.

Table C.130
TPG: Costs and Revenues

	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Letter mail					
Costs		2910	3017	3134	3231
Revenue	3523	3651	3706	3896	4005
Express					
Costs		3387	4044	4029	4204
Revenue	2953	3538	4145	4139	4398
Other					
Costs		1505	2054	3038	3289
Revenue	933	1347	2085	3183	3379
TPG total					
Costs	6747	7802	9115	10201	10724
Revenue	7409	8536	9936	11218	11782

Source: TPG Annual Reports.

C.18.2. Information on employment levels

TPG publish information on employment for both the mail and express division, but these numbers include many part-time employees. However, it is possible to calculate mail employees in terms of FTEs from the series on labour productivity that TPG have published. The implied figures, but only for the three years 2000, 2001 and 2002 are shown in Table C.131.

Table C.131
TPG: Employment in FTEs

	2000	2001	2002
Mail Netherlands Employment (FTEs)	36441	37310	36131

Source: Calculated by NERA from mail productivity statistics in TPG 2002 Annual Report

Given that we do not have total labour cost figures, we are unable to calculate labour costs per employee for TPG.

C.18.3. Traffic levels

Some information on TPG traffic volumes is published, and is summarised in Table C.132.

Table C.132
TPG: Traffic Volumes

	1997	1998	1999	2000	2001	2002
Mail volumes (million items)	6629	7009	7063	7022	7119	6871
Mail delivery addresses (thousands)	7096	7195	7212	7278	7349	7388
Express consignments (thousands)	107.24	111.05	167.91	192.94	186.65	187.21
Express consignments (m tonnes)	2.47	2.68	2.90	3.21	3.23	3.32
International mail (thousand kgs)		85116	91246	89141	86063	90691

Source: TPG Annual Reports.

C.19. Poland

C.19.1. Information on costs

Poczta Polska's total operating expenses are reported in Table C.133. These expenses increased between 1998 and 2001 but not in 2002.

Table C.133
Poczta Polska : Total Operating Costs

Operating expenses	1998	1999	2000	2001	2002
Operating expenses (m PLN)[55]	4283	4292	4810	5412	5409
Growth rate (%)	-	0.21	12.09	12.51	-0.05

Source: UPU.

C.19.2. Information on employment and wage levels

Mail volumes have decreased in recent years and the activity downturn has been accompanied by a reduction in the number of workers, though the percentage reduction in workers has been smaller than the percentage reduction in output. Changes in the labour force employed are shown in Table C.134.

Table C.134
Poczta Polska: Number of Employees

	1998	1999	2000	2001	2002	2003
Number of employees	103110	102030	102213	100060	102036	-
Total full time equivalent postal workers	97701	97000	97081	97260	96963	96110

Source: UPU and response to NERA questionnaire.

C.19.3. Tariff levels and postal network infrastructure

The increase in operating expenses is somewhat surprising given that mail volumes have decreased from 1998 to 2002, as shown in Table C.135.[56] Letter volumes represent nearly 99 per cent of total mail units. Parcels hardly exceed 1 per cent and the express share has kept constant at 0.05 per cent.

[55] See footnote 41.

[56] This may be because data are taken from different sources.

Table C.135
Poczta Polska: Mail Volumes Delivered by Type of Mail

Product		1998	1999	2000	2001	2002	2003
Letters	m items	2391.55	2480.35	2091.35	2157.17	2137.00	-
	%	98.90	99.00	98.80	98.89	98.93	-
Parcels	m items	25.49	23.75	24.15	23.08	22.13	19.93
	%	1.05	0.95	1.14	1.06	1.02	-
Express	m items	1.19	1.35	1.15	1.07	1.07	1.07
	%	0.05	0.05	0.05	0.05	0.05	
Total	m Items	2418.23	2505.45	2116.7	2181.33	2160.20	-
	%	100	100	100	100	100	100

Sources: Response to NERA questionnaire.

A progressive increase in the total number of post offices in Poland has occurred between 1998 and 2003. This has been accompanied by an increase in the number of post offices operated by third parties. Poczta Polska operated 1,433 fewer post offices in 2003 than in 1998, when it operated 7,391. Delivery offices fell from 5,694 in 1998 to 4,775 in 2003. These changes in postal infrastructure are shown in Table C.136.

Table C.136
Poczta Polska: Postal Network Infrastructure

	1998	1999	2000	2001	2002	2003
Post offices operated by Poczta Polska	7391	6995	6663	6330	6132	5958
Post offices operated by others	445	892	1400	1892	2113	2346
Sorting offices (*)	-	-	-	-	-	52
Specialised bulk mail centres	-	-	-	-	-	-
Delivery offices	5694	5191	4899	4551	4671	4775
Pure delivery offices	-	-	-	-	-	7
Post boxes	-	-	-	-	57000	56906

(*) Regional Sorting offices
Source: Response to NERA questionnaire.

C.20. Portugal

C.20.1. Information on costs

Table C.137 shows published cost data for the Portuguese postal network for the years 1998 to 2002. These costs include costs for all activities. Information is provided on detailed staff costs, depreciation and other operating costs such as goods and materials and purchases of external services.

Table C.137
CTT Correios: Total Costs

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)
Wages and salaries	246	269	280	299	315
Social security	33	41	44	49	74
Pension costs	86	78	89	112	121
Total staff costs	**365**	**389**	**412**	**460**	**510**
Cost of goods sold and materials	10	10	10	12	12
Purchases and external services	108	124	134	151	164
Depreciation etc.	32	34	37	41	45
Provisions	3	2	2	3	3
Other operating charges	2	2	4	8	7
Total costs	**520**	**562**	**599**	**675**	**741**

Source: CTT Correios Annual Reports 1999-2002.

Notes: To convert into euros 1998, 1999 and part of 2000 figures the following exchange rate has been applied 1EUR=200.482PTE. The total cost figures in this table are taken from Correios' Consolidated Statement (page 84 in the company's 2002 accounts). Figures of total costs in Table 5.3 in the main report are based on figures from page 11 of the company's 2002 accounts, which are about 5 per cent lower.

Table C.138 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for just under 70 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation accounts for 6 per cent of total costs every year and external expenses account for 22 per cent of total costs.

Table C.138
CTT Correios: Cost Shares

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)	2002 (%)
Wages and salaries	47	48	47	44	43
Social security	6	7	7	7	10
Pension costs	17	14	15	17	16
Total staff costs	**70**	**69**	**69**	**68**	**69**
Cost of goods sold and materials	2	2	2	2	2
Purchases and external services	21	22	22	22	22
Depreciation etc.	6	6	6	6	6
Provisions	1	0	0	0	0
Other operating charges	0	0	1	1	1
Total costs	**100**	**100**	**100**	**100**	**100**

Source: Calculated by NERA from data in Table 1.

There is no information available on cost shares by activity.

C.20.2. Information on employment and wage levels

CTT Correios provided us with information on the number of full-time equivalent (FTE) workers each year. This information covers all employees of the organisation and a separate breakdown is not available for different activities. Full time equivalent workers figures are shown in Table C.139. In the same table, we also show the percentage of employees that are members of trade unions.

Table C.139
CTT Correios: Full Time Equivalent Workers

	1998	1999	2000	2001	2002	2003
Total full time equivalent postal workers	17512	18081	17950	17927	17790	16521
Percentage members of trade union	85.0	85.1	85.3	86.4	87.4	88.5

Source: Response to NERA questionnaire.

It is possible to divide the total wage and salary costs shown in Table C.137 by total FTE workers to derive average annual pay, average social security and average pensions costs per full-time worker. These figures are shown in Table C.140.

Table C.140
CTT Correios: Average Annual Wage and Salary Costs per FTE

Category of wage etc cost	1998 (€)	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Wages and salaries per employee	14054	14872	15578	16679	17707
Social security per employee	1899	2281	2445	2733	4160
Pension costs per employee	4905	4341	4941	6248	6802
Total staff cost per employee	**20859**	**21495**	**22963**	**25660**	**28668**

Source: NERA calculation.

C.20.3. Traffic levels and postal network information

CTT Correios has published information on addressed mail volumes and number of post offices and delivery centres regularly in the annual report. Table C.141 shows data from 1998 to 2002 on postal traffic, post offices and numbers of mail delivery centres.

Table C.141
CTT Correios: Traffic Levels, Post Offices and Delivery Centres

Type of traffic	1998	1999	2000	2001	2002
Postal traffic, excl. unaddressed (m)	1178	1286	1322	1372	1324
Postal traffic, incl. unaddressed (m)			1629	1714	1660
Post offices	1059	1075	1073	1079	1090
Mail delivery centres	430	428	426	418	413

Source: CTT Correios Annual Reports 1998-2002.

Table C.142 shows the split of addressed mail traffic carried by CTT Correios between business and residential mailers and recipients. The table shows that 88 per cent of mail is sent by businesses and 12 per cent by residential customers. It also shows that 32 per cent of mail is received by business customers, and 68 by residential customers. In all 27 per cent of mail is business-to-business, 61 per cent is business-to-resident, 5 per cent is residential-to-business, and 7 per cent is residential-to-residential mail.

Table C.142
CTT Correios: Addressed Mail Traffic by Sender and Recipient

			Received by: Business customers (%)	Residential customers (%)	Total letters sent (%)
Sent by:	Business customers	(%)	27	61	**88**
	Residential customers	(%)	5	7	**12**
Total letters received		**(%)**	**32**	**68**	**100**

Source: Response to NERA questionnaire.

Finally, Table C.143 shows figures on quality of service and regulatory performance from 1998 to 2002. CCT Correios performance always exceeded the regulatory requirements.

Table C.143
CTT Correios: Quality of Service, Targets and Performance

	1998	1999	2000	2001	2002
National priority mail performance	96.6	96.6	96.4	93.7	93.1
National priority mail target D+1	96.2	96.2	96.2	93	93.1

Source: CTT Correios Annual Report 1998-2002.

Note: Postal traffic does not include unaddressed mail. In 2001 the system of performance assessment changed.

C.21. Slovakia

C.21.1. Information on costs

Table C.144 shows total operating costs for Slovenská Pošta in recent years from two sources. Only data for the first half of 2003 are available.

Table C.144
Slovenská Pošta: Total Operating Costs

Sources	1998	1999	2000	2001	2002	2003 (Jan.-Jun.)
	m SKK	m SKK	m SKK	m SKK	m SKK	m SKK
NERA questionnaire	-	-	5139	5676	5804	2960
UPU (operating expenses)[57]	4131	5330	5139	5336	5641	-

Sources: Response to NERA questionnaire and UPU.

From Table C.145 we can see that more than half of costs are accounted for by the provision of services other than letters, parcels and express, and the importance of these other services in total operating costs has increased in the last three years. Letter operating costs experienced a substantial fall in 2002 and currently account for somewhat more than 30 per cent of total operating costs, while the parcels share is around 4-5 per cent.[58] The share of express services is rising but is barely above 1 per cent.

[57] See footnote 41.

[58] We asked for further clarifications on this pattern but received no response.

Table C.145
Slovenská Pošta: Operating Costs by Mail Product

Product	Op. costs	2000	2001	2002	2003 (Jan.-Jun.)
Letters	m SKK	2272	2467	1799	999
	%	44.2	43.5	31.0	33.8
Parcels	m SKK	271	275	298	130
	%	5.3	4.8	5.1	4.4
Express	m SKK	29	42	68	36
	%	0.6	0.7	1.2	1.2
Others	m SKK	2567	2892	3640	1794
	%	50.0	51.0	62.7	60.6
Total	m SKK	5139	5676	5804	2960
	%	100	100	100	100

Sources: Response to NERA questionnaire.

Table C.146 shows, for each type of product, the split of total operating costs between the different categories of costs. The share of staff costs in total costs is higher for letters and lower for express services.

Table C.146
Slovenská Pošta: Operating Costs by Class of Product and Category of Cost

Product	Cost category	2000		2001		2002		2003 (Jan.-Jun.)	
		m SKK	%	m SKK	%	m SKK	%	m SKK	%
Letters	Materials	136.71	6.0	138.88	5.6	118.01	6.6	68.22	6.8
	Staff	1309.53	57.6	1449.97	58.8	1197.51	66.5	635.06	63.6
	Depreciation	178.14	7.8	191.25	7.8	153.08	8.5	95.60	9.6
	Others	647.76	28.5	686.97	27.8	330.83	18.4	200.42	20.1
	Total op. costs	**2272.15**	**100**	**2467.06**	**100**	**1799.44**	**100**	**999.30**	**100**
Parcels	Materials	26.00	9.6	24.79	9.0	27.40	9.2	13.11	10.1
	Staff	157.30	58.1	167.77	61.1	183.42	61.6	80.93	62.1
	Depreciation	23.98	8.9	24.77	9.0	24.60	8.3	8.79	6.7
	Others	63.60	23.5	57.34	20.9	62.11	20.9	27.41	21.0
	Total op. costs	**270.87**	**100**	**274.67**	**100**	**297.54**	**100**	**130.23**	**100**
Express	Materials	3.40	11.7	3.41	8.1	11.93	17.6	8.01	22.0
	Staff	11.07	38.1	19.81	46.9	33.22	49.0	16.13	44.4
	Depreciation	2.26	7.8	7.21	17.1	4.69	6.9	1.75	4.8
	Others	12.30	42.4	11.84	28.0	17.92	26.4	10.46	28.8
	Total op. costs	**29.02**	**100**	**42.27**	**100**	**67.76**	**100**	**36.35**	**100**
Total	Materials	166.10	6.5	167.08	6.0	157.34	7.3	89.34	7.7
	Staff	1477.90	57.5	1637.55	58.8	1414.16	65.3	732.12	62.8
	Depreciation	204.38	7.9	223.23	8.0	182.38	8.4	106.14	9.1
	Others	723.66	28.1	756.15	27.2	410.86	19.0	238.28	20.4
	Total op. costs	**2572.04**	**100**	**2784.00**	**100**	**2164.74**	**100**	**1165.88**	**100**

Source: Response to NERA questionnaire.

Table C.147 shows for each product the total operating costs by functions (collection, transport, sorting, delivery and overheads). This latter category, overheads, is that which accounts for the largest share (except for express in the first half of 2003). Delivery costs are also important, with shares around 30 per cent for letters and 20 per cent for parcels. However, a substantial decrease in the delivery cost share for express has taken place. The transport share has grown for all product categories, amounting to 9.7 per cent for letters, 17.9 per cent for parcels and 43.1 per cent for express in the first half of 2003.

Table C.147
Slovenská Pošta: Percentage of Operating Costs by Function: Letters, Parcels and Express

Product	Function	2000	2001	2002	2003 (Jan.-Jun.)
		%	%	%	%
Letters	Collection	9.05	9.27	8.10	8.82
	Transport	7.07	7.21	9.40	9.70
	Sorting	9.40	8.94	11.24	10.13
	Delivery	30.53	29.50	27.39	31.10
	Overhead	43.96	45.08	43.87	40.26
	Total operating costs	**100**	**100**	**100**	**100**
Parcels	Collection	14.13	14.88	12.45	18.40
	Transport	17.73	17.79	19.59	17.92
	Sorting	14.64	14.58	13.67	9.02
	Delivery	17.30	17.91	19.45	22.10
	Overhead	36.21	34.84	34.84	32.57
	Total operating costs	**100**	**100**	**100**	**100**
Express	Collection	2.62	2.39	12.79	13.08
	Transport	13.19	10.61	25.09	43.11
	Sorting	3.34	3.12	6.62	1.16
	Delivery	55.98	62.38	22.98	15.51
	Overhead	24.88	21.50	32.52	27.15
	Total operating costs	**100**	**100**	**100**	**100**

Sources: Response to NERA questionnaire.

C.21.2. Information on employment and wage levels

As Table C.148 shows, there have not been large variations in the labour force employed, except in express items because of traffic increases in this product. Average wages have followed an irregular pattern, decreasing in 2002. Labour's share in total operating costs has increased up to 65 per cent in 2002.

Table C.148
Slovenská Pošta: Staff Costs

Product		2000	2001	2002	2003 (Jan.-Jun.)
Letters	Full time equivalent workers	5180	5188	5132	5081
	Staff costs (m SKK)	1310	1450	1198	635
	% staff costs on operating costs	58	59	67	64
	Average wage (SKK/FTE)	252806	279484	233342	249974
Parcels	Full time equivalent workers	175	172	165	169
	Staff costs (m SKK)	157	168	183	81
	% staff costs on operating costs	58	61	62	62
	Average wage (SKK/FTE)	898830	975397	1111653	957737
Express	Full time equivalent workers	12	41	49	57
	Staff costs (m SKK)	11	20	33	16
	% staff costs on operating costs	38	47	49	44
	Average wage (SKK/FTE)	922498	483232	678034	566040
Total	Full time equivalent workers	5367	5401	5346	5307
	Staff costs (m SKK)	1478	1638	1414	732
	% staff costs on operating costs	57	59	65	63
	Average wage (SKK/FTE)	275368	303193	264526	275908

Sources: Response to NERA questionnaire questionnaire.

C.21.3. Traffic levels and postal network information

Table C.149 shows traffic statistics. Apparently there was a change in the method used to estimate letter mail volumes in 2002. Parcel volumes are also falling and only express – whose share in total traffic is rather small– is increasing.

Table C.149
Slovenská Pošta: Mail Volumes Delivered by Type of Mail

Product	Volumes	2000	2001	2002	2003 (Jan.-Jun.)
Letters	m items	312.41	337.65	247.97	136.87
	%	98.22	98.43	97.91	98.09
Parcels	m items	5.60	5.33	5.12	2.60
	%	1.76	1.55	2.02	1.86
Express	m items	0.06	0.07	0.18	0.07
	%	0.02	0.02	0.07	0.05
Total	m items	318.07	343.05	253.27	139.54
	%	100	100	100	100

Sources: Response to NERA questionnaire.

Table C.150 shows unit operating costs resulting from dividing the operating costs reported in Table C.145 by the mail volumes included in Table C.149. The cost of the service for a letter is about 7 times cheaper than for a parcel, and one express item is on average 71 times more costly than a letter. It is not possible to draw any conclusion indicating a sustained tendency regarding efficiency, as increases and reductions in unit costs are observed for each product over the time period observed.

Table C.150
Slovenská Pošta: Unit Costs

Product	2000	2001	2002	2003 (Jan.-Jun.)
	SKK/item	SKK/item	SKK/item	SKK/item
Letters	7.27	7.31	7.26	7.30
Parcels	48.37	51.53	58.11	50.09
Express	483.75	603.91	376.45	519.30

Sources: Response to NERA questionnaire.

The number of post offices operated by Slovenská Pošta was broadly stable between 1998 and 2002, with a slight decrease in 2003, when they totalled 1,610. In 2003, 7 post offices started to be operated by third parties. This is shown Table C.151. There were 7 sorting offices and specialised bulk mail centres in 1998-1999, and 4 in 2000-2003. The number of delivery offices experienced similar variations to the number of post offices. There were around 1,496 in 1998-2002 and this decreased to 1,470 in 2003. In 2003 there were 21,000 post boxes in the whole country.

Table C.151
Slovenská Pošta: Postal Network Infrastructure

	1998	1999	2000	2001	2002	2003
Post offices operated by Slovenská Pošta	1624	1623	1626	1627	1626	1610
Post offices operated by others	0	0	0	0	0	7
Sorting offices	7	7	4	4	4	4
Specialised bulk mail centres	7	7	4	4	4	4
Delivery offices	1496	1498	1497	1496	1496	1470
Pure delivery offices	0	0	0	0	0	0
Post boxes	-	-	-	-	-	21000

Source: Response to NERA questionnaire.

C.22. Slovenia

C.22.1. Information on costs

Pošta Slovenije's total operating costs are reported in Table C.152. As usual, there is a certain divergence between the data reported by Pošta Slovenije and those provided by the UPU. According to the Pošta Slovenije data, total operating costs increased in a sustained way from 1999 through to 2002, with a slight reduction in 2003.

Table C.152
Pošta Slovenije: Total Operating Costs

Sources	1998 m SIT	1999 m SIT	2000 m SIT	2001 m SIT	2002 m SIT	2003 m SIT
NERA questionnaire	23846	26868	29531	33760	36214	35778
Growth rate	-	12.7	9.9	14.3	7.3	-1.2
UPU (operating expenses)[59]	29093	30987	33477	32585	35559	-
Growth rate	-	6.5	8.0	-2.7	9.1	-

Sources: Response to NERA questionnaire and UPU.

As to services provided by the universal service operator, letters account for the majority of operating costs, with a share that has grown up to 63 per cent in recent years (see Table C.153). The parcels share is currently nearly 10 per cent, while express represent only 0.5 per cent of total operating costs. The share of other services is decreasing and was 27 per cent by 2003.

[59] See footnote 41.

Table C.153
Pošta Slovenije: Operating Costs by Activity

Product	Op. costs	1998	1999	2000	2001	2002	2003
Letters	m SIT	13680	15008	16405	21025	22496	22581
	%	57.4	55.9	55.6	62.3	62.1	63.1
Parcels	m SIT	1419	2080	2214	3356	3591	3504
	%	6.0	7.7	7.5	9.9	9.9	9.8
Express	m SIT	136	138	142	151	189	190
	%	0.6	0.5	0.5	0.4	0.5	0.5
Others	m SIT	8747	9780	10912	9379	9937	9504
	%	36.7	36.4	37.0	27.8	27.4	26.6
Total	m SIT	23982	27006	29673	33911	36214	35778
	%	100	100	100	100	100	100

Source: Response to NERA questionnaire.

Table C.156 shows, for each product, total operating costs broken down by cost category (materials, staff and others).[60] A trend is the increase in the staff cost share. In contrast, the share of the category "other operating costs" has reduced considerably in letters and to a lesser extent also in parcels. The materials cost share has remained stable in the time period considered, slightly above 1 per cent for each of the three products. But no figures were included in the operator's costs for depreciation.

[60] Data for depreciation are not available.

Table C.154
Pošta Slovenije : Operating Costs by Class of Product and Category of Cost

Product	Cost category	1998		1999		2000		2001		2002		2003	
		m SIT	%	m SIT	%	m SIT	%	m SIT	%	m SIT	%	m SIT	%
Letters	Materials	147	1.1	175	1.2	208	1.3	247	1.2	294	1.3	267	1.2
	Staff	9366	68.5	10458	69.7	11901	72.5	15954	75.9	17137	76.2	17238	76.3
	Depreciation	-	-	-	-	-	-	-	-	-	-	-	-
	Others	4167	30.5	4375	29.2	4296	26.2	4824	22.9	5065	22.5	5076	22.5
	Total op. costs	13680	100	15008	100	16405	100	21025	100	22496	100	22581	100
Parcels	Materials	34	2.4	36	1.8	39	1.8	42	1.2	45	1.2	40	1.2
	Staff	737	52.0	1342	64.5	1535	69.4	2106	62.8	2194	61.1	2253	64.3
	Depreciation	-	-	-	-	-	-	-	-	-	-	-	-
	Others	647	45.6	702	33.7	640	28.9	1208	36.0	1353	37.7	1211	34.6
	Total op. costs	1419	100	2080	100	2214	100	3356	100	3591	100	3504	100
Express	Materials	2	1.3	2	1.3	2	1.4	2	1.4	2	1.2	2	1.1
	Staff	100	73.8	100	72.7	102	72.0	109	72.2	145	76.6	146	76.8
	Depreciation	-	-	-	-	-	-	-	-	-	-	-	-
	Others	34	25.0	36	25.9	38	26.6	40	26.4	42	22.2	42	22.1
	Total op. costs	**136**	**100**	**138**	**100**	**142**	**100**	**151**	**100**	**189**	**100**	**190**	**100**

Source: Response to NERA questionnaire.

The split of operating costs between the different postal activities (collection, transport, sorting, delivery and overheads) is contained in Table C.155. The different cost shares are relatively similar across products (letters, parcels and express) and have remained quite stable in the period considered. Most of the costs are devoted to delivery, with proportions around 75 per cent. At around 12 per cent, overheads are the second most costly category, followed by transport, sorting (both between 4-5 per cent) and collection (between 1 and 2 per cent).

Table C.155
Pošta Slovenije : Percentage of Operating Costs by Function: Letters, Parcels and Express

Product	Function	1998	1999	2000	2001	2002	2003
		%	%	%	%	%	%
Letters	Collection	1.5	1.5	1.5	1.5	1.5	1.4
	Transport	4.9	5.0	5.0	4.9	5.1	4.5
	Sorting	4.8	4.5	4.8	4.5	4.5	4.5
	Delivery	77.5	78.1	77.5	78.2	77.0	77.0
	Overhead	11.3	11.0	11.3	11.0	11.9	12.6
	Total operating costs	**100**	**100**	**100**	**100**	**100**	**100**
Parcels	Collection	1.5	1.9	1.5	1.5	1.9	1.9
	Transport	4.9	4.5	5.1	5.0	4.5	5.0
	Sorting	4.5	5.1	4.5	4.8	5.1	4.1
	Delivery	78.2	75.9	77.0	77.4	75.9	75.0
	Overhead	11.0	12.6	11.9	11.3	12.6	14.0
	Total operating costs	**100**	**100**	**100**	**100**	**100**	**100**
Express	Collection	1.4	1.5	1.4	1.5	1.5	2.2
	Transport	4.5	5.0	4.5	4.9	4.8	7.6
	Sorting	4.5	4.8	4.6	4.5	4.3	4.7
	Delivery	78.3	77.5	77.0	78.2	78.5	73.7
	Overhead	11.3	11.3	12.6	11.0	11.0	11.8
	Total operating costs	**100**	**100**	**100**	**100**	**100**	**100**

Source: Response to NERA questionnaire.

C.22.2. Information on employment and wage levels

From Table C.156 we can see that the labour force constitutes a major factor in explaining the increase in total operating costs. Staff costs have almost doubled in the period between 1998 to 2003 and currently represent about 75 per cent of total operating costs. During this period an increase in the labour force has occurred. Full time equivalent postal workers have grown by 16.4 per cent in 2003 with respect to 1998 (compound average growth rate of 3.1 per cent). However, the main reason for the increase in labour costs is the substantial increase in wages, which have risen by 69 per cent between 1998 and 2003. Currently, parcels are the product for which labour costs constitute the smallest proportion of total operating costs, as compared to letters and express. However we should note that the information in Table C.156 shows sharp differences in wage levels between different mail products, so these figures should be treated with caution.

Table C.156
Pošta Slovenije: Staff Costs

Product		1998	1999	2000	2001	2002	2003
Letters	Full time equivalent workers	3997	4105	4200	4463	4405	4394
	Staff costs (m SIT)	9366	10458	11901	15954	17137	17238
	% staff costs on operating costs	68.5%	69.7%	72.5%	75.9%	76.2%	76.3%
	Average wage (SIT/FTE)	2343353	2547664	2833529	3574640	3890390	3922995
Parcels	Full time equivalent workers	200	317	358	385	405	466
	Staff costs (m SIT)	737	1342	1535	2106	2194	2253
	% staff costs on operating costs	52.0%	64.5%	69.4%	62.8%	61.1%	64.3%
	Average wage (SIT/FTE)	3687450	4232618	4288994	5471351	5416123	4833863
Express	Full time equivalent workers	10	13	15	25	36	37
	Staff costs (m SIT)	100	100	102	109	145	146
	% staff costs on operating costs	73.8%	72.7%	72.0%	72.2%	76.6%	76.8%
	Average wage (SIT/FTE)	10045000	7709231	6822667	4350400	4026944	3947838
Total	Full time equivalent workers	4207	4435	4573	4873	4846	4897
	Staff costs (m SIT)	10204	11900	13539	18169	19476	19636
	% staff costs on operating costs	67.0%	69.1%	72.2%	74.1%	74.1%	74.7%
	Average wage (SIT/FTE)	2425557	2683229	2960555	3728473	4018917	4009861

Source: NERA questionnaire.

C.22.3. Traffic levels and postal network information

Table C.157 shows statistics on traffic volumes between 1998 and 2003. The increase in volumes has been substantial for all products, especially for parcels and express items, although overall statistics are dominated by letters, which account for over 99 per cent of all items handled.

Table C.157
Pošta Slovenije: Mail Volumes Delivered by Type of Mail

Product	Volumes	1998	1999	2000	2001	2002	2003
Letters	m items	384.574	433.577	488.877	542.767	607.566	681.971
	%	99.66	99.52	99.47	99.47	99.42	99.38
Parcels	m items	0.037	0.059	0.078	0.125	0.185	0.206
	%	0.01	0.01	0.02	0.02	0.03	0.03
Express	m items	1.29	2.028	2.528	2.776	3.353	4.033
	%	0.33	0.47	0.51	0.51	0.55	0.59
Total	m items	385.901	435.664	491.483	545.668	611.104	686.21
	%	100	100	100	100	100	100

Sources: Response to NERA questionnaire.

The increase in volumes has made possible a more efficient use by Pošta Slovenije of its postal network, which has resulted in a reduction in unit costs that has been particularly intense for parcels and express. But the very high value of unit costs for parcels means that we think that these figures should be treated with some caution.

Table C.158
Pošta Slovenije: Unit Costs

Product	1998 SIT/item	1999 SIT/item	2000 SIT/item	2001 SIT/item	2002 SIT/item	2003 SIT/item
Letters	35.57	34.61	33.56	38.74	37.03	33.11
Parcels	38351.35	35254.24	28384.62	26848.88	19411.03	17007.86
Express	105.57	67.93	56.23	54.25	56.47	47.14

Source: Response to NERA questionnaire.

Table C.159 shows that the number of post offices in Slovenia has remained almost the same between 1998 and 2003 (547-552 post offices, only three operated by third parties). There have been two sorting offices and specialised bulk mail centres operated in the period considered. The number of delivery offices has increased from 473 in 1998 to 490 in 2003. Post boxes grew by a compound average growth rate of 1.3 per cent and totalled 18,291 in 2003.

Table C.159
Pošta Slovenije: Postal Network Information

	1998	1999	2000	2001	2002	2003
Post offices operated by Pošta Slovenije	547	550	548	548	550	549
Post offices operated by others	0	0	0	0	0	0
Sorting offices (*)	2	2	2	2	2	2
Specialised bulk mail centres	2	2	2	2	2	2
Delivery offices	473	480	480	483	488	490
Pure delivery offices	0	0	0	0	0	0
Post boxes	17145	17392	18025	18613	17919	18291

(*) Main sorting offices
Source : Response to NERA questionnaire.

C.23. Spain

C.23.1. Information on costs

Table C.160 includes total operating costs for the Spanish UPO, Correos y Telégrafos, from 1999 to 2003. These costs have increased in a continuous fashion.

Table C.160
Correos: Total Costs

Sources	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)	2003 (€m)
Total costs	1224	1280	1410	1454	1535
Growth rate	-	4.6	10.2	3.1	5.6

Source: Response to NERA questionnaire.

Table C.161 shows how total operating costs are distributed between the different services provided by the UPO (excluding express). Letter service represents the largest proportion of total operating costs, with a share that has risen from 72.6 per cent in 2001 to 76.5 per cent in 2003. In contrast, parcel costs have dropped in the same time period with a share of 5.4 per cent in 2003. Other service's share is currently around 18 per cent.

Table C.161
Correos: Operating Costs by Activity

Product	Op. costs	2001	2002	2003
Letters	(€m)	1023	1082	1174
	%	72.6	74.4	76.5
Parcels	(€m)	109	104	82
	%	7.8	7.1	5.4
Express	(€m)	-	-	-
	%	-	-	-
Others	(€m)	278	268	279
	%	19.7	18.5	18.1
Total	(€m)	1410	1454	1535
	%	100	100	100

Source: Response to NERA questionnaire.

Table C.162 shows for each product the total operating costs by functions (collection, transport, sorting, delivery and overhead). Delivery accounts for the largest share of costs (52 per cent for letters and 45 per cent for parcels in 2003). Transport costs are significantly more important for parcels than for letters, in contrast to collection costs. Sorting costs share was about 15 per cent in 2003.

Table C.162
Correos: Percentage of Operating Costs by Function: Letters, Parcels and Express

Product	Function	2001 %	2002 %	2003 %
Letters	Collection	9.7	9.8	9.1
	Transport	7.0	7.9	5.9
	Sorting	12.9	13.6	14.3
	Delivery	49.1	50.5	52.2
	Overhead	21.3	18.3	18.5
	Total operating costs	100	100	100
Parcels	Collection	5.1	5.4	6.7
	Transport	18.0	20.2	16.1
	Sorting	15.7	14.8	16.6
	Delivery	41.4	42.2	45.3
	Overhead	19.9	17.4	15.4
	Total operating costs	100	100	100

Source: Response to NERA questionnaire.

C.23.2. Traffic volumes and unit costs

As Table C.163 shows, the volume of letters has increased significantly between 1998 and 2003, with an accumulated growth rate of 27.6 per cent (compound annual growth rate of 5 per cent). Parcels have exhibited a more modest growth (accumulated 8.9 per cent, compound annual growth rate 1.7 per cent), while express has experienced a reduction in volumes (accumulated –11.3 per cent, compound annual growth rate –2.4 per cent). In 2003 the volume shares were 98.9 per cent for letters, 0.5 per cent for parcels and 0.6 per cent for express.

Table C.163
Correos: Mail Volumes Delivered by Type of Mail

Product	Volumes	1998	1999	2000	2001	2002	2003	Growth rate 1998-2003 (%)	compound annual growth rate (%)
Letters	(m)	3292.4	3479.2	3663.5	3816.9	4057.0	4200.8	27.6	5.0
	%	98.5	98.6	98.7	98.8	98.8	98.9	-	-
Parcels	(m)	19.9	19.9	19.0	19.8	20.6	21.6	8.9	1.7
	%	0.6	0.6	0.5	0.5	0.5	0.5	-	-
Express	(m)	30.6	30.9	29.5	28.1	27.5	27.1	-11.3	-2.4
	%	0.9	0.9	0.8	0.7	0.7	0.6	-	-
Total	(m)	3342.8	3530.1	3712.0	3864.8	4105.1	4249.5	27.1	4.9
	%	100	100	100	100	100	100	-	-

Source: Response to NERA questionnaire.

Table C.164 shows unit operating costs resulting from dividing the operating costs reported in Table C.161 by the mail volumes included in Table C.163. Important efficiency gains have been achieved for parcel service, whose unit operating costs have dropped from €5.52 to €3.81 in only two years. However, letter unit costs increased by one cent between 2001 and 2003. While one parcel was in average 20.4 times more costly than a letter in 2001, this relation became 13.6 letters/1 parcel in 2003.

Table C.164
Correos: Unit Costs

Product	2001 €/item	2002 €/item	2003 €/item
Letters	0.27	0.27	0.28
Parcels	5.52	5.05	3.81

Source: Response to NERA questionnaire.

C.23.3. Information on employment and wage levels

Table C.165 shows that labour costs are more important in letters than in parcels (76 per cent vs. 52 per cent in total operating costs in 2003), even though this percentage has increased for parcels from the levels prevailing in 2001. Both the labour force employed and average wages have grown moderately in letter service. In parcels, the work force employed decreased drastically in 2003, following a sharp increase in average wages in 2002.

Table C.165
Correos: Staff Costs

Product		2001	2002	2003
Letters	Full time equivalent workers	42719	44923	45479
	Staff costs (€m)	725	795	849
	% staff costs on operating costs	76	76	76
	Average wage (€/FTE)	16965	17689	18672
Parcels	Full time equivalent workers	4843	4308	3191
	Staff costs (€m)	82	76	60
	% staff costs on operating costs	28	52	52
	Average wage (€/FTE)	16965	17690	18669
Express	Full time equivalent workers	-	-	-
	Staff costs (€m)	-	-	-
	% staff costs on operating costs	-	-	-
	Average wage (€/FTE)	-	-	-
Total	Full time equivalent workers	47562	49231	48670
	Staff costs(€m)	807	871	909
	% staff costs on operating costs	71	74	74
	Average wage (€/FTE)	16965	17689	18672

Source: Response to NERA questionnaire.

Table C.166 shows, for each type of product, the split of total operating costs between the different categories of costs. Staff costs are clearly the most important component of operating costs. Other operating cost is the second largest category and is especially high for parcels (34.3 per cent in 2003). The depreciation cost share is around 6 per cent and materials cost share was 2.7 per cent in 2003.

Table C.166
Correos: Operating Costs by Class of Product and Category of Cost

Product	Cost category	2001		2002		2003	
		(€m)	%	(€m)	%	(€m)	%
Letters	Materials	21.7	2.2	29.2	2.8	31.0	2.7
	Staff	725.0	74.7	795.0	75.4	849.0	74.8
	Depreciation	45.5	4.7	47.4	4.5	75.1	6.6
	Others	178.0	18.3	182.1	17.3	180.1	15.9
	Total op. costs	**970.2**	**100**	**1053.7**	**100**	**1135.2**	**100**
Parcels	Materials	1.2	0.7	2.4	1.9	2.0	2.0
	Staff	82.0	51.0	76.0	60.2	60.0	60.3
	Depreciation	1.6	1.0	3.4	2.7	3.2	3.2
	Others	76.0	47.3	44.4	35.2	34.3	34.5
	Total op. costs	**160.8**	**100**	**126.2**	**100**	**99.5**	**100**
Total	Materials	22.9	2.0	31.7	2.7	33.0	2.7
	Staff	807.0	71.4	871.0	73.8	909.0	73.6
	Depreciation	47.1	4.2	50.8	4.3	78.3	6.3
	Others	254.0	22.5	226.5	19.2	214.4	17.4
	Total op. costs	**1131**	**100**	**1180**	**100**	**1234.7**	**100**

Source: Response to NERA questionnaire.

C.23.4. Network

Table C.167 shows the main elements of Correos network. As can be seen, the number of post offices and delivery offices has remained more or less constant, whilst the number of post boxes has increased.

Table C.167
Correos: Network

	1998	1999	2000	2001	2002	2003
Post offices	10515	10386	10183	10158	10101	10021
Sorting offices						52
Specialised bulk mail centres						56
Delivery offices	1557	1567	1576	1590	1613	1647
Pure delivery offices	490	496	500	510	528	549
Post boxes	34715	37490	37812	37962	40564	

Source: Response to NERA questionnaire.

In terms of transport, road has 65 per cent of total mail and rail has 30 per cent.

C.24. Sweden

C.24.1. Information on costs

Table C.168 shows published cost data for the Posten network for the years 1998 to 2003. These costs include costs for all activities and are split into personnel and non-personnel costs.

Table C.168
Posten: Total Costs

Cost category	1998 (€m)	1999 (€m)	2000 (€m)	2001 (€m)	2002 (€m)	2003 (€m)
Wages and salaries	973	1036	1071	964	965	
Social security	426	488	491	449	406	
Of which pension costs	*93*	*134*	*136*	*126*	*89*	
Other social costs	48	49	52	65	45	
Total staff costs	**1447**	**1573**	**1614**	**1478**	**1416**	**1406**
Depreciation etc	108	119	126	109	107	118
Other costs	809	904	980	985	1069	1208
Total costs	**2364**	**2596**	**2720**	**2572**	**2592**	**2732**
Applied exchange rate	*0.10613*	*0.11359*	*0.11845*	*0.10823*	*0.10922*	*0.10964*

Sources: Posten Annual Reports 1998 to 2002 and Posten end of year results 2003.

Note: The exchange rates applied are based on annual averages of daily rates.

Posten: Total Costs, SEK millions

Cost category	1998 (SEKm)	1999 (SEKm)	2000 (SEKm)	2001 (SEKm)	2002 (SEKm)	2003 (SEKm)
Wages and salaries	9167	9121	9042	8909	8839	
Social security	4016	4298	4148	4144	3717	
Of which pension costs	*875*	*1176*	*1146*	*1160*	*816*	
Other social costs	452	427	437	601	409	
Total staff costs	**13635**	**3846**	**13627**	**13654**	**12965**	**12821**
Depreciation etc	1020	1045	1064	1010	984	1076
Other costs	7624	7964	8274	9101	9784	11022
Total costs	**22279**	**22855**	**22965**	**23765**	**23733**	**24919**

Sources: Posten Annual Reports 1999 to 2002 and Posten end of year results 2003.

Table C.169 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for more than half of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Personnel costs were higher by 10 per cent points in 1998. Depreciation only accounts for 4 per cent of total costs in 2003.

Table C.169
Posten: Cost Shares

Cost category	1998 (%)	1999 (%)	2000 (%)	2001 (%)	2002 (%)	2003 (%)
Wages and salaries	41	40	39	37	37	
Social security	18	19	18	17	16	
Of which pension costs	4	5	5	5	3	
Other social costs	2	2	2	3	2	
Total staff costs	**61**	**61**	**59**	**57**	**55**	**51**
Depreciation etc	5	5	5	4	4	4
Other costs	34	35	36	38	41	44
Total costs	100	100	100	100	100	100

Sources: Posten Annual Report 2002.

There is no data on costs by activity.

C.24.2. Information on employment and wage levels

Posten publishes information on the average number of workers each year. The figures are shown in Table C.170. We also report the share of full time workers.

Table C.170
Posten: Full Time Employee Numbers

	1998	1999	2000	2001	2002
Posten group (AR 2002- 2000)	**42108**	**41825**	**41522**	**41669**	**39554**
Per cent full time	71	71	72	73	75

Sources: Posten Annual Report 2000, 2002.

It is possible to divide the total wage and salary costs shown in Table C.168 by average workers numbers to derive average annual pay, average social security and average pensions costs per worker. These figures are shown in Table C.171.

Table C.171
Posten: Average Annual Wage and Salary Costs per FTE

Category of wage etc cost	1998 (€)	1999 (€)	2000 (€)	2001 (€)	2002 (€)
Wages and salaries	23105	24771	25794	23140	24407
Social security	10122	11673	11833	10764	10264
Of which pension costs	2205	3194	3269	3013	2253
Other social costs	1139	1160	1247	1561	1129
Total staff costs	**34366**	**37604**	**38874**	**35465**	**35800**

Source: NERA calculation.

C.24.3. Posten Traffic Levels

Table C.172 shows data on traffic volumes from 1998 to 2003 published by Posten in the Annual Reports. Data are shown for mail and parcels.

Table C.172
Posten: Traffic Levels

Type of traffic –million items	1998	1999	2000	2001	2002	2003
Mail	5566	5607	5717	5590*	5418*	5283*
Parcels – rough approximation		44**	43**	46.5**	58.5**	62**

Source: Posten Annual Report 2002.

*Note: * estimate from percentage changes reported in Annual Report 2002. ** Estimate from Annual Report 2002.*

Tables A.104 and A.105 show respectively the split of postal revenue in Sweden by business and residential customer for letter mail and parcels traffic.

Table C.173
Posten: Domestic Letter Mail Revenues by Sender and Recipient

			Received by: Business customers	Residential customers	Total letters sent
			(%)	(%)	(%)
Sent by:	Business customers	(%)	25	65	**90**
	Residential customers	(%)	5	5	**10**
Total letters received		**(%)**	**30**	**70**	**100**

Source: Posten Annual Report 2002.

Table C.174
Posten: Domestic Parcel Revenues by Sender and Recipient

			Received by: Business customers	Residential customers	Total letters sent
			(%)	(%)	(%)
Sent by:	Business customers	(%)	68	27	**93**
	Residential customers	(%)	3	2	**7**
Total letters received		**(%)**	**71**	**29**	**100**

Source: Posten Annual Report 2002.

C.24.4.Posten Network

Table C.175
Posten: Post Offices and Other Outlets

	1998	1999	2000	2001	2002
Post offices	1091	922	851		
Other service outlets	781	853	890		

Source: Posten Annual Report 2000.

The Posten service network changed radically in 2002. Nowadays there are some 2,800 partner-operated service outlets across the country. These points of service are generally open seven days a week. The service network also includes 400 postal centers, where Posten employees serve primarily businesses, and rural carriers.

We have no data on quality regulation and performance. The annual reports present quality indexes, however these are based on the percentage of mail delivered "on time".

C.25. United Kingdom

C.25.1. Information on costs

Table C.176 shows published cost data for the British postal network for the years 1997/98 to 2002/03. These costs include costs for all activities, including mail and parcels, counter services and some other activities.

Table C.176
British Post Office: Total Costs

Cost category	1997/98 (€m)	1998/99 (€m)	1999/00 (€m)	2000/01 (€m)	2001/02 (€m)	2002/03 (€m)
Wages and salaries	5066	5736	6603	6895	7605	6693
Social security	391	442	488	517	514	438
Pension costs	97	41	54	105	441	383
Total staff costs	**5554**	**6219**	**7145**	**7516**	**8560**	**7514**
Depreciation etc	352	383	1460	460	1141	477
Other operating charges	3018	3448	4202	5184	5599	4991
Other operating income	0	0	0	-24	-30	0
Total costs	**8924**	**10050**	**12807**	**13136**	**15270**	**12982**

Sources: The Post Office Accounts 1998/99
The Post Office Accounts 1999/00
Consignia Annual Report of the Post Office for 2000/01
Consignia Accounts 2001/02
Royal Mail Holdings plc Accounts 2002-2003

British Post Office: Total Costs, £ millions

Cost category	1997/98 (£m)	1998/99 (£m)	1999/00 (£m)	2000/01 (£m)	2001/02 (£m)	2002/03 (£m)
Wages and salaries	3537	3776	4020	4285	4778	4628
Social security	273	291	297	321	323	303
Pension costs	68	27	33	65	277	265
Total staff costs	**3878**	**4094**	**4350**	**4671**	**5378**	**5196**
Depreciation etc	246	252	889	286	717	330
Other operating charges	2107	2270	2558	3222	3518	3451
Other operating income	0	0	0	-15	-19	0
Total costs	**6231**	**6616**	**7797**	**8164**	**9594**	**8977**

Sources: The Post Office Accounts 1998/99
The Post Office Accounts 1999/00
Consignia Annual Report of the Post Office for 2000/01
Consignia Accounts 2001/02
Royal Mail Holdings plc Accounts 2002-2003

Table C.177 shows the same information converted into cost shares. Labour is the largest single category of costs, accounting for just under 60 per cent of total costs in the most recent year once labour costs in the form of social security payments and pension costs are included. Depreciation only accounts for 3-4 per cent of total costs in most years.

Table C.177
British Post Office: Cost Shares

Cost category	1997/98 (%)	1998/99 (%)	1999/00 (%)	2000/01 (%)	2001/02 (%)	2002/03 (%)
Wages and salaries	56.8	57.1	51.6	52.5	49.8	51.6
Social security	4.4	4.4	3.8	3.9	3.4	3.4
Pension costs	1.1	0.4	0.4	0.8	2.9	3.0
Total staff costs	**62.2**	**61.9**	**55.8**	**57.2**	**56.1**	**57.9**
Depreciaton etc	3.9	3.8	11.4	3.5	7.5	3.7
Other operating charges	33.8	34.3	32.8	39.5	36.7	38.4
Other operating income	0.0	0.0	0.0	-0.2	-0.2	0.0
Total costs	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Calculated by NERA from data in Table 1.

While Table C.177 shows costs split by type of cost, Table C.178 shows costs by activity. This split was published by the British postal regulator Postcomm in 2001. Delivery accounted for 43 per cent of costs, sorting (both inward and outward) for 26 per cent, transportation for 14 per cent, collection only 5 per cent, and overhead costs 12 per cent.

Table C.178
British Post Office: Cost Shares by Activity

	(%)
Collection	5
Outward sorting	12
Transportation	14
Inward sorting	14
Delivery	43
Overhead	12
Total	**100**

Source: Postcomm Promoting Effective Competition in UK Postal Services: a Consultation Document, 2001.

Figures reported for 1996/97 in NERA's 1998 report to the European Commission show similar percentages, but with a higher proportions in overheads, collection and sorting, and lower proportions in delivery and transportation.[61] The NERA 1998 report also reports cost

[61] NERA *Costing & Financing of Universal Services in the Postal Sector in the European Union* A Report to DGXIII, 1998, p.220.

shares for parcels in 1996/97 (though these may have changed since then because of reorganisation of the business). These are as follows: collection (19.7 per cent), outward sorting (8.1 per cent), transportation (7.6 per cent), inward sorting (3.8 per cent), delivery (47.5 per cent), and overhead costs (13.3 per cent).

C.25.2. Information on employment and wage levels

The British Post Office also publishes information on the number of full-time equivalent (FTE) workers each year. Again this information covers all employees of the organisation, and a separate breakdown is not available for different activities. This information is shown in Table C.179.

Table C.179
British Post Office: Full Time Equivalent Workers

Category of worker	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
Mails and distribution	183414	183105	180724	188297	190107	185968
Counter services	12177	12044	12004	11815	14564	13893
Other	2121	2709	14573	17852	17139	15706
Total	**197712**	**197858**	**207301**	**217964**	**221810**	**215567**

Sources: *The Post Office Accounts 1998/99*
The Post Office Accounts 1999/00
Consignia Annual Report of the Post Office for 2000/01
Consignia Accounts 2001/02
Royal Mail Holdings plc Accounts 2002-2003

Notes: *"Mails and distribution" in 1997/98 is the sum of Royal Mail and Parcelforce figures*
"Mails and distribution" in 2002/03 is the sum of "Mails and UK parcels" and "European parcels" figures

It is possible to divide the total wage and salary costs shown in Table C.177 by total FTE workers to derive average annual pay, average social security and average pensions costs per full-time worker. These figures are shown in Table C.180.

Table C.180
British Post Office: Average Annual Wage and Salary Costs per Employee

Category of wage etc cost	1997/98 (€)	1998/99 (€)	1999/00 (€)	2000/01 (€)	2001/02 (€)	2002/03 (€)
Wages and salaries per employee	25620	28990	31852	31631	34285	3148
Social security per employee	1978	2235	2354	2370	2317	2033
Pension costs per employee	493	207	261	480	1988	1777
Total staff cost per employee	**28091**	**31432**	**34467**	**34481**	**38590**	**34858**

Sources: *The Post Office Accounts 1998/99*
The Post Office Accounts 1999/00
Consignia Annual Report of the Post Office for 2000/01
Consignia Accounts 2001/02
Royal Mail Holdings plc Accounts 2002-2003

C.25.3. Traffic levels

The Post Office used to publish information on mail volumes each year, but no longer do so. The series were frequently revised, but Table C.181 shows a consistent series from 1996/97 to 2000/01.

Table C.181
British Post Office: Traffic Levels

Type of traffic	1996/97 (m)	1997/98 (m)	1998/99 (m)	1999/00 (m)	2000/01 (m)	2001/02 (m)	2002/03 (m)
Inland first class letters	5767	5893	5878	5922	5902		
Inland second class letters	10484	11530	12056	12816	13190		
Total inland letters	**16251**	**17423**	**17934**	**18738**	**19092**		
International letters posted in UK	785	815	830	839	772		
Total letters	**17036**	**18238**	**18764**	**19577**	**19864**		

Source: Consignia Annual Report of the Post Office for 2000/01

Table C.182 shows the split of letter traffic carried by the British Post Office between business and residential mailers and recipients. The table shows that 87 per cent of mail is sent by businesses and 13 per cent by residential customers. It also shows that 32 per cent of mail is received by business customers, and 68 by residential customers. In all 29 per cent of mail is business-to-business, 58 per cent is business-to-resident, 3 per cent is residential-to-business, and 10 per cent is residential-to-residential mail.

Table C.182
British Post Office: Letter Mail Traffic by Sender and Recipient

			Received by: Business customers	Residential customers	Total letters sent
			(%)	(%)	(%)
Sent by:	Business customers	(%)	29	58	**87**
	Residential customers	(%)	3	10	**13**
Total letters received		**(%)**	**32**	**68**	**100**

Source: Response to NERA questionnaire

APPENDIX D. TECHNICAL APPENDIX: DATA SOURCES AND ASSUMPTIONS

D.1. Common Variables

In this Technical Appendix we include a table specifying, for each national operator, the data sources consulted and the assumptions made to construct the data set used in the econometric estimation. This data set covers the years from 1998 to 2003.

In this first section we report information on those variables whose source is common to all countries included in the study:

- ***Population***. We obtained this data from *Eurostat*. The information was available for the whole of the study period.
- ***Km2***. We obtained this data from *Eurostat*. The information was also available for the whole of the study period
- **Households.** The source for this variable was the database model of the Statistical Division (UNECE/STAT) and maintained by the Environment and Human Settlements Division.[62] We use the variable "dwelling stock" which *includes only conventional (permanent) dwellings, whether occupied or not. The simple term "dwelling" is generally used instead of "conventional dwelling". The dwelling stock does not include rustic (semi-permanent) and improvised housing units (e.g. huts, cabins, shanties), mobile housing units (e.g. trailers, caravans, tents, wagons, boats) and housing units not intended for human habitation but in use for the purpose (e.g. stables, barns, mills, garages, warehouses).*

  For some countries we did not have values for the whole period. In these cases, for countries for which there are more than four year of data, we used the compound annual growth rate to estimate values for other years. For the rest of the countries, we estimated the average number of people per households and applied that number to the population.
- **Urban population.** The source for this variable was *World Urbanization Prospects The 2001 Revision Data Tables and Highlights*, Population Division, Department of Economic and Social Affairs United Nations Secretariat, March 2002.[63] In this document we found information for the percentage of urban population in years 1995 and 2000 and a forecast value for 2005. Given that we needed values for each year, we took the compound annual growth rate for the period 1995-2000, and for the period 2000-2005, and applied it to each year within the period.

---

62 http://w3.unece.org/stat/HumanSettlements.asp

63 http://www.un.org/esa/population/publications/wup2001/wup2001dh.pdf

D.2. Data for Individual Member States

D.2.1. Austria

Table D.1
Post & Telecom Austria AG: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual reports and questionnaire[64]			1999-2002
OC letters & parcel	NERA estimates	1999-2002	EU annual average	1999-2002
OC per activity	NERA USO report[65]	1998-2003	Same percentage 1998-2003	1998-2003
Personnel	NERA questionnaire			1998-2002
Staff costs	Annual reports	1999	% annual report	1999-2002
Wages (*)	Annual reports and NERA questionnaire			1999-2002
Volume letters	Operator website	2000-2002	Growth UPU	1998-2002
Volume parcels	Operator website	2000-2002	Growth UPU	1998-2002
Labour share	Annual reports			1999-2002
Post boxes	NERA questionnaire	1998-1999	Growth UPU	1998-2003
Post offices	Operator website			1998-2002
Delivery offices	UPU questionnaire			1998-2003
Sorting offices	UPU database			1998-2002

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs for letters and parcels.** Post & Telecom Austria AG did not report data on costs for letters and parcels separately. We computed the percentage that letters and parcels represents over total operating costs for other EU countries that submitted this information, and applied its annual average to Austria.

- **Operating costs by activity.** We used information included in NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to* DGXIII. We assumed the same percentages for the whole period.

- **Staff costs.** For the period 2000-2002, the data provided by the operator was similar to that included in the annual reports. For 1999, as the data was different, we applied the percentage that staff costs represents over total operating costs obtained in the annual reports to the total operating costs provided by the operator.

---

[64] For period 2000-2002 figures included in the Annual Reports were similar to those provided by the operator in its questionnaires. However for year 1999 there were some differences. For this year we have use data provided by the operator.

[65] NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to DGXIII.*

- **Volume for parcels and letters.** We found data on mail volumes for the period 1998-2000 in the operator's web page. To complete the time series we applied the growth rate estimated with UPU volume figures to the figures reported by the operator in its web page.

- **Post boxes.** Post & Telecom Austria AG provided figures for the period 2000-2003. We applied the growth calculated from the UPU database figures to the data provided by the operator to complete the time series.

D.2.2. Belgium

Table D.2
La Poste Belgium: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1998-2002
OC letters & parcel	NERA estimates	1998-2002	EU annual average	1998-2003
OC per activity	NERA estimates	1998-2003	EU average	1998-2003
Personnel	UPU database			1998-2002
Staff costs	Annual reports			1998-2002
Wages (*)	Annual reports and UPU database			1998-2002
Volume letters	NERA questionnaire			1998[66]
Volume parcels	NERA questionnaire			1998
Labour share	Annual reports			1998-2001
Post boxes	UPU database			1998-2002
Post offices	NERA questionnaire			1998-2003
Delivery offices	UPU questionnaire			1998 ; 2002/03
Sorting offices	UPU questionnaire			1998-2002

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- ***Operating costs for letters and parcels***. We computed the percentage that letters and parcels represents over total operating costs for other EU countries and applied the annual average for other EU countries over La Poste's total operating costs.

- ***Operating costs per activity***. We assumed the same percentage for the whole period. This percentage was the EU average.

[66] Belgium reports data on volumes for year 1998. Figures from UPU database were not available.

D.2.3. Cyprus

We did not receive a response to the NERA questionnaire and annual reports were not available. Therefore this country was excluded from the econometric estimation

D.2.4. Czech Republic

Table D.3
Česká Pošta : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire & annual reports			1998-2003
OC letters & parcel	UPO questionnaire & annual reports	1998-2000	Average % 2001-2003	1998-2003
OC per activity	NERA questionnaire & NERA estimates	1998-2000	Average for CZ	1998-2002
Personnel	Annual reports	1998 2002	Same growth UPU	1998-2002
Staff costs	Annual reports			1998-2002
Wages (*)	Annual reports & NERA estimation	2003	CAGR	1998-2002
Volume letters	Web page and UPU database	1998-2001;2003	UPU growth; CAGR	1998-2003
Volume parcels	UPO questionnaire and UPU database	1998-2001	UPU growth	1998-2003
Labour share	Annual reports & UPU questionnaire			1998-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			2000-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Total operating costs:** Česká Pošta reports data for 2001-2003. The data for 1998-2000 were collected from published annual accounts.
- **Total operating costs for letters and parcels.** Česká Pošta does not include operating costs for letters and parcels for the period 1998-2000. In order to estimate parcels and letters operating costs, we used the average percentage that letters and parcels represent over total operating costs[67] and applied it to the operating costs of period 1998-2000 obtained from the annual reports.

[67] We checked that the total operating costs included in the questionnaire were equal to those calculated with annual report figures.

- **Operating costs per activity**. Česká Pošta reports this information for the period 2000-2003. We computed the average for this period and applied it to the operating costs for letters and parcels for years 1998 and 1999.

- **Personnel.** Česká Pošta did not include data on full time equivalent postal workers. We obtained this information for the period 1999-2001 from published Annual reports. In order to obtain figures for 1998 and 2002, we took the change of postal workers obtained from UPU figures, and applied it to the annual report values.

- **Wages.** Česká Pošta reported data on staff costs for the period 2001-2003 in the questionnaire. However, as we do not have information on full time equivalent postal workers we cannot compute a postal wage. As noted above we collected information about staff costs and workers from the annual reports. However, note that UPU labour force or annual reports figures include the staff in the whole company. Therefore we cannot compute a wage by dividing staff costs included in the questionnaire by the UPU or AR labour force. Then for 1999-2001 we estimated the wage as the ratio between staff costs and full time equivalent workers collected from annual reports. Thus, we are assuming that wages are constant across the company. For the years 1998 and 2002 we obtained the salaries by dividing staff costs included in annual reports and the number of workers estimated as explained in the bullet point above. For the year 2003 we applied the compound annual growth rate.

- **Volume for letters and parcels**. Česká Pošta did not include information on volumes. For the period 1998-2002 we used the volumes included in the UPU database. Volumes for 2003 were estimated by applying the compound annual growth rate.

- **Labour share.** For the period 1998-2000 we used data collected from annual reports. For the remaining period we used the response to the NERA questionnaire.[68]

[68] We checked that figures were comparable and consistent. In fact the questionnaire labour shares were nearly identical to those computed with annual report data.

D.2.5. Denmark

Table D.4
Danmark Post : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual Reports[69]			1998-2003
OC letters & parcel	NERA Estimations	1998-2002	EU annual average	1998-2003
OC per activity	NERA USO report[70]	1998-2003	Same percentage 1998-2003	1998-2003
Personnel	Annual reports			1998-2003
Staff costs	Annual reports			1998-2003
Wages (*)	Annual reports			1998-2003
Volume letters	Annual reports			1998-2003
Volume parcels	Annual reports			1998-2003
Labour share	Annual reports			1998-2003
Post Boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	Not available			-
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

[69] Denmark post reported data on total operating costs in its questionnaire. These values were equal to those found in the Annual reports.

[70] NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to DGXIII.*

D.2.6. Estonia

Table D.5
Eesti Post : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1998-2003
OC letters & parcel	NERA questionnaire			1998-2003
OC per activity	NERA questionnaire & NERA estimation	1998-2002	Same percentage as in 2003	1998-2003
Personnel	NERA questionnaire			1998-2003
Staff costs	Annual reports & NERA questionnaire			1998-2002
Wages (*)	Annual reports & NERA estimation	2003	CAGR	1998-2002
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	Annual reports & UPU questionnaire			1998-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs per activity.** Eesti Post includes costs by activity only for the year 2003. We used this percentage to complete the time series.
- **Staff costs.** We collected data for 1998-2002 from annual reports. Figures for 2003 correspond to those included in the questionnaire.
- **Wages.** As noted before, we computed wages as the ratio between staff costs and full time equivalent postal workers. For the period 1998-2002 we used staff costs obtained from annual reports and the information of postal workers was taken from the questionnaire. Finally to obtain values for year 2003 we used the compound annual growth for the period.
- **Labour share.** For 1998 we used the labour share obtained from annual reports data. Data for 2003 were calculated with values obtained from the response to the NERA questionnaire.

D.2.7. Finland

Table D.6
Suomen Posti Oy : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual reports[71]			1998-2003
OC letters & parcel	NERA estimates	1998-2003	EU annual average	1998-2003
OC per activity	NERA USO report[72]	1998-2003	Same percentage 1998-2003	1998-2003
Personnel	NERA questionnaire[73]			1998-2003
Staff costs	Annual reports[74]	2002-2003		1998-2001
Wages (*)	Annual reports	2002-2003	dW=dTOC-dPersonnel	1998-2001
Volume letters	Annual reports[75] & NERA questionnaire			1998-2003
Volume parcels	UPU database and Press Notes	2001/2003	Linear interpolation	1998-2003
Labour share	Annual reports	2002-2003	Wage*personnel	1998-2001
Post boxes	UPU database	2001/2003	CAGR+linear interpolation	1998-2002
Post offices	NERA questionnaire			1998-2003
Delivery offices	UPU questionnaire			2003
Sorting offices	UPU questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Wages.** We have figures for total operating costs and staff for the period 1998-2001. In order to estimate wages for the years 2002 and 2003 we used the following relationship: %TOC=%W+%Employees.[76]

- **Volumes.** We use UPU figures for the years 1998-2002. However data for 2001 were not available so we estimated this figure by using a linear interpolation. For the year 2003 we use a press note in which the postal operator reported data on the growth in parcel volumes.[77]

---

71 Total operating costs for year 2002 and 2003 were obtained from the web page.

72 NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to DGXIII.*

73 These figures seem to be comparable with those included in the annual reports

74 Note that figures on total operating costs for year 2002 and 2003 come from Finnish web page. However in the web page staff costs were not included.

75 Data for year 1998 and 1999. The figures are comparable with those reported in the questionnaires

76 This relationship states that the percentage change in total operating costs is equal to the sum of the percentage change in wages and the percentage change in staff. This equation assumes that staff costs represent 100 per cent of total operating costs.

77 http://www.posti.fi/vanhat/finlandpost/annualreports/ann2003/interimreport2_2003.html

- **Labour share:** In order to obtain data for the labour share for year 2002 and 2003 we used estimated wages and personnel. Basically we multiplied the average wage by full time equivalent postal workers reported in the questionnaires

- **Letters post boxes.** We used figures from UPU for the period 1998-2002. Given that the UPU does not report figures for year 2001 we used linear interpolation. In addition, the data for 2003 was estimated with the compound annual growth rate between 1998 and 2002.

D.2.8. France

Table D.7
La Poste France: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1998-2002
OC letters & parcel	NERA estimates	1998-2002	EU annual average	1998-2002
OC per activity	NERA USO report[78]	1998-2002	Same percentage 1998-2003	1998-2002
Personnel	NERA questionnaire			1998-2002
Staff costs	NERA estimates and questionnaire	1998-2002	EU average	1998-2002
Wages (*)	NERA estimates and questionnaire	1998-2002		1998-2002
Volume letters	NERA estimates and questionnaire	2000-2002	EU average	2000-2002[79]
Volume parcels	NERA estimates and questionnaire	2000-2002	EU average	2000-2002
Labour share	NERA estimates	1998-2003	EU average	1998-2003
Post boxes	UPU database[80]			1998-2002
Post offices	NERA questionnaire			1998-2003
Delivery offices	UPU questionnaire			2000-2003
Sorting offices	UPU questionnaire			2000-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

[78] NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to DGXIII.*

[79] We have tried to enlarge the series by using the growth obtained with UPU data. However for the period where we have data available, growth re very different, so we decline to use UPU growth.

[80] French operator reported data for year 2001. This figure was very similar to those provided by UPU. Therefore we decided to use UPU series.

- **Staff costs.** We had total operating costs, but we did not have it split into cost categories. In order to estimate staff costs we have used the annual percentage[81] that staff costs represents over total costs for the rest of the EU countries and applied this percentage to the total operating costs of La Poste.
- **Volume for letters and parcels.** La Poste did not report separate volume information for parcels and letters. In order to split this volume we have used the European annual percentage that parcel items represents over the sum of parcels and letters.
- **Labour share:** We could not collect data in order to estimate labour share for La Poste. For this reason we used the average labour share for the EU countries. With this labour share we estimated the staff costs and wages in France.

D.2.9. Germany

Table D.8
Deutsche Post AG : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual reports of DP mail division			1998-2003
OC letters & parcel	Annual reports of DP mail Division[82]			1998-2003
OC per activity	NERA estimates	1998-2003	EU average	1998-2003
Personnel	Annual reports			2000-2003[83]
Staff costs	Annual reports and NERA estimation	1998-2003	EU average	1998-2003
Wages (*)	Annual reports			2000-2003
Volume letters	Annual reports			1998-2003
Volume parcels	*Mail division do not provide parcel services*		EU average	
Labour share	NERA estimates	1998-2003	EU average	1998-2003
Post boxes	UPU database	2003	CAGR	1998-2003
Post offices	UPU database	2003	CAGR	1998-2003
Delivery offices	*Not available*			-
Sorting offices	UPU database	2003	CAGR	1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

81 We have obtained an average for each year.

82 Note that in this case Total Operating costs are equal to operating costs for letters and parcels.

83 We have tried to enlarge the series using the growth obtained with UPU figures. However, when we do such estimation results were not consistent. In fact, we used personnel in order to estimate wages for period 1998-1999, and with this calculation wages reduced by 17 per cent during the year 1999, which seems to be an incorrect approximation.

- ***Operating costs per activity***. As in the case of La Poste in Belgium, we assumed the same percentage for the whole period. This percentage was the EU average.

- **Staff costs.** We had total operating costs, but we did not have it split into cost categories. In order to estimate staff costs we have used the annual percentage[84] that staff costs represents over total costs for the rest of the EU countries and apply this percentage to the total operating costs of Deutsche Post AG.

D.2.10. Greece

Table D.9
ELTA : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1999-2002
OC letters & parcel	NERA questionnaire			1999-2002
OC per activity	NERA questionnaire			1999-2002
Personnel	NERA questionnaire			1999-2002
Staff costs	NERA questionnaire			1999-2002
Wages (*)	NERA questionnaire			1999-2003
Volume letters	NERA questionnaire			1999-2003
Volume parcels	NERA questionnaire			1999-2002
Labour share	NERA questionnaire			1998-2002
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1999-2002

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

[84] We have obtained an average for each year.

D.2.11. Hungary

Table D.10
Magyar Posta: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1998-2003
OC letters & parcel	NERA questionnaire			1998-2003
OC per activity	NERA questionnaire	1998	Average 1999-2003	1998-2003
Personnel	NERA questionnaire			1998-2003
Staff costs	NERA questionnaire			1998-2002
Wages (*)	UPU questionnaire			1998-2002
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire			1998-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

Operating costs by activities. The Hungarian operator did not report data for 1998. We applied the average value obtained for the period 1999-2003.

D.2.12. Italy

Table D.11
Poste Italiane: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire and annual reports	1998-1999	Growth annual reports	1998-2002
OC letters & parcel	NERA questionnaire	1998-1999	Growth annual reports	1998-2002
OC per activity	NERA USO report[85]	1998-2002	Same percentage 1998-2003	1998-2002
Personnel[86]	NERA questionnaire and annual reports			2000-2002
Staff costs	NERA questionnaire & annual reports			1998-2002
Wages (*)	NERA questionnaire & annual reports			1998-2002
Volume letters	Annual reports	1998	Growth UPU statistics	1998-2002
Volume parcels	Annual reports	1998	Growth UPU statistics	1998-2002
Labour share	NERA questionnaire and annual reports			1998-2002
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs**. Poste Italiane reported in the questionnaire figures for both universal service operating costs and non-universal service operating costs for period 2000-2002. The figures included in the questionnaire were not comparable with those included in the annual reports. To complete the time series we assumed that the operating costs reported in the questionnaire had grown at the same rate than the costs included in the annual reports.

- **Operating costs for letters and parcels.** The same as for operating costs.

- **Volume for letters and parcels**. We found data for the volume of letters and parcels in the annual reports. However figures for 1998 were not available. We estimate this value by applying the average growth rate for year 1998-1999 obtained from the UPU database to the 1999 annual report figures.

[85] NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to DGXIII.*

[86] Personnel and staff costs reported by Italy refers only to universal services.

- **Wages**. For the period 2000-2003 we obtained wages as the ratio between the figures of staff costs and personnel included in the questionnaire sent by NERA. For 1998-1999 we used both staff costs and full time equivalent postal workers included in annual reports.

- **Labour share.** Italy reported data on staff costs for universal services. For the period 1998-1999 we have used figures included in the annual report. For the period 2000-2002 we have calculated the labour share as the ratio between staff costs and total operating costs for universal services.

D.2.13. Ireland

Table D.12
An Post : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual reports			1998-2002
OC letters & parcel	NERA estimates	1998-2002	EU annual average	1998-2002
OC per activity	NERA USO report[87]	1998-2002	Same percentage 1998-2002	1998-2002
Personnel	Annual report[88]			1998-2002
Staff costs	Annual report			1998-2002
Wages (*)	Annual report			1998-2002
Volume letters	NERA questionnaire			1998-2002
Volume parcels	NERA questionnaire			1998-2002
Labour share	Annual report			1998-2002
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

[87] NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to DGXIII.*

[88] An Post reported data on full time equivalent postal workers. However An Post did not include labour cost data in the questionnaire. Thus, in order to obtain a salary variable, we need to include labour costs from the annual reports and a comparable measure of the personnel. This measure is workers of the whole company rather than postal workers, which is the data included in the questionnaire.

D.2.14. Latvia

Table D.13
Latvijas Pasts: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1999-2003
OC letters & parcel	NERA estimation	1999-2003	AC average	1998-2003
OC per activity	NERA estimation	1999-2003	AC average	1998-2003
Personnel	UPU database			1998-2002
Staff costs	NERA questionnaire			1999-2003
Wages (*)	UPU questionnaire & UPU database	2003	CAGR	1998-2003
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire			1999-2003
Post boxes	NERA questionnaire			1998-2002
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs for letters and parcels.** Latvijas Pasts did not report data for operating costs for letters and parcels. We applied the percentage that operating costs for letters and parcels represents over the total operating costs for the operators in the new Member States that reported this information.

- **Operating costs per activity.** We assumed the same percentage for the whole period. This percentage was the average in the new Member States.

- **Wages.** Latvijas Pasts reported data for total staff costs for the period 1999-2003, but it did not include figures for total employees. Therefore we compute wages as the ratio between total staff costs included in the questionnaire and UPU employees. Wages in 2003 have been estimated by using the compound annual growth rate.

D.2.15. Lithuania

Table D.14
Lietuvos Paštas : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1998-2003
OC letters & parcel	NERA estimation	1998-2003	Same as in Estonia	1998-2003
OC per activity	NERA estimation	1998-2003	New Member State average	1998-2003
Personnel	UPU database			1998-2002
Staff costs	NERA estimation	1998-2003	New Member State average	1998-2003
Wages (*)	UPU questionnaire & UPU database	2003	CAGR	1998-2003
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire	1998-2003	New Member State average	1999-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs for letters and parcels**. We estimated the operating cost for letters and parcels applying the percentage that the operating cost of letters and parcels represents over total operating costs for Eesti Post. We made this assumption because (i) Lietuvos Pasts is very similar in costs and volumes to Eesti Post, and (ii) Eesti Post is not far from the average of the new Member States, and reported data for the period 1998-2003.

- **Operating costs by activity.** We assumed the same percentage for the whole period. This percentage was the new Member State average. We did not use Eesti Post data because this operator reported data only for year 2003.

- **Staff costs.** Lietuvos Paštas did not report data on staff costs. We calculated total staff costs by multiplying total operating costs by the proportion that staff costs represent over total operating costs for letters in those new Member States where this information was available.

- **Wages.** We divided the estimated labour costs by the full time equivalent postal workers obtained from UPU. The figure for 2003 was obtained using the compound average growth rate.

- **Labour share.** We assumed the new Member State average

D.2.16. Luxembourg

Table D.15
P & T Luxembourg : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			2001
OC letters & parcel	NERA questionnaire			2001
OC per activity	NERA questionnaire			2001
Personnel	NERA questionnaire			1998-2003
Staff costs	NERA questionnaire			2001
Wages (*)	NERA questionnaire			2001
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire			2001
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

D.2.17. Malta

Table D.16
Maltapost: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1999-2003
OC letters & parcel	NERA estimate	1999-2003	New Member State average	1998-2003
OC per activity	NERA estimate	1999-2003	New Member State average	1998-2003
Personnel	UPU questionnaire			1998-2003
Staff costs	NERA questionnaire			2000-2003
Wages (*)	UPU questionnaire			2000-2003
Volume letters	NERA questionnaire			2000-2003[89]
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire			2000-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs for parcels and letters:** Malatapost did not report data for operating costs for letters and parcels. We applied the percentage that operating costs for letters and parcels represents over the total operating costs in the new Member States.
- **Operating costs per activities:** We assumed the same percentage for the whole period. This percentage was the new Member State average

[89] We tried to enlarge the series using UPU database values or growth. However for comparable year, values for volume of letters and growth were different.

D.2.18. Netherlands

Table D.17
TPG : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual reports			1998-2002
OC letters & parcel	Annual reports			1998-2002
OC per activity	NERA estimates	1998-2002	Same percentage 1998-2002	1998-2002
Personnel	Annual reports			1998-2002
Staff costs	Annual reports			1998-2002
Wages (*)	Annual reports[90]			1998-2002
Volume letters	Annual reports and NERA estimation	1998-2002	European average	1998-2002
Volume parcels	Annual reports and NERA estimation	1998-2002	European average	1998-2002
Labour share	Annual reports[91]	1998-2002	Idem staff costs	1998-2002
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	*Not available*			-
Sorting offices	UPU database			1998-2002

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs for letters and parcels.** We used the operating costs included in the annual reports of the TPG's Mail Division as it includes operating costs for letters and parcels.

- **Personnel**. NERA has estimated the personnel for period 2000-2002 from mail productivity statistics in the TGP 2002 annual report. In order to complete the time series we applied the growth for year 1999 and 1998 obtained in the UPU.

- **Staff costs.** We had total operating costs, but we did not have it split into cost categories. In order to estimate staff costs we have used the annual percentage.[92] that staff costs represents over total costs for the rest of the EU countries and applied this percentage to the total operating costs of TPG.

[90] We estimated the salary for TGP with the data included in the annual accounts for the total group rather than using figures included in the TGP's mail division accounts.

[91] As in the case for wages, we obtained the labour share from the total group.

[92] We have obtained and average for each year.

- **Volume for letters and parcels.** TPG reported aggregated data for letters and parcels. In order to split this volume we used the European annual percentage that parcel items represents over the sum of parcels and letters.

D.2.19. Poland

Poland was not included in the econometric estimation because Poczta Polska did not report data on operating costs. We tried to look for annual reports, but did not find any information.

D.2.20. Portugal

Table D.18
CTT Correios: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire	2003	CAGR	1998-2003[93]
OC letters & parcel	NERA questionnaire	2003	Percentage Q3*TOC(2003)	1998-2003
OC per activity	NERA questionnaire			1999-2003
Personnel	NERA questionnaire			1998-2003
Staff costs	NERA questionnaire			1998-2003[94]
Wages (*)	NERA questionnaire	2003	CAGR	1998-2003[95]
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire			1998-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs.** For the year 2003 we had data for the third quarter. In order to obtain a figure for the whole year, we multiplied this number by 4, but the resulting number was not comparable with the 2002 data. For this reason we decided to apply the compound average growth rate to the 2002 data.
- **Operating costs for letters and parcels**. We had information for the third quarter of 2003. We obtained the value for 2003 by multiplying total operating costs by the

[93] Data for 2003 refers to third quarter of 2003.

[94] Data for 2003 refers to third quarter of 2003.

[95] Data for 2003 refers to third quarter of 2003.

ratio between the costs for letters and parcel and total operating costs in the third quarter of 2003.

- **Wages**. The same as for operating costs

D.2.21. Slovakia

Table D.19
Slovenská Pošta : Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			2000-2003
OC letters & parcel	NERA questionnaire			2000-2003
OC per activity	NERA questionnaire			2000-2003
Personnel	NERA questionnaire			2000-2003
Staff costs	NERA questionnaire			2000-2003
Wages (*)	UPU questionnaire			2000-2003
Volume letters	NERA questionnaire			2000-2003
Volume parcels	NERA questionnaire			2000-2003
Labour share	NERA questionnaire			2000-2003
Post boxes	UPU database	2003	CAGR	1998-2002
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

D.2.22. Slovenia

Table D.20
Pošta Slovenije: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1998-2003
OC letters & parcel	NERA questionnaire			1998-2003
OC per activity	NERA questionnaire			1998-2003
Personnel	NERA questionnaire			1998-2003
Staff costs	NERA questionnaire			1998-2003
Wages (*)	UPU questionnaire			1998-2003
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire			1998-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

D.2.23. Spain

Table D.21
Correos: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	NERA questionnaire			1999-2003
OC letters & parcel	NERA questionnaire			2000-2003
OC per activity	NERA questionnaire			2000-2003
Personnel	NERA questionnaire[96]			2000-2003
Staff costs	NERA questionnaire[97]			2000-2003
Wages (*)	NERA questionnaire			2000-2003
Volume letters	NERA questionnaire			1998-2003
Volume parcels	NERA questionnaire			1998-2003
Labour share	NERA questionnaire			2000-2003
Post boxes	NERA questionnaire			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			1998-2003
Sorting offices	NERA questionnaire and UPU database	2003	CAGR	1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Wages**. In order to estimate wages we have divided staff costs related with letters and parcel services by full time equivalent postal workers dedicated to letter and parcel services. In addition, we have tried to complete the time series by using the growth of the total operating costs and number of employees provided by the Ministerio de Hacienda for the period 1998-2002. However the resulting wage was not comparable with figures provided by the Spanish operator.

- **Sorting Offices.** Correos did not report data on sorting offices for year 2003. We have used UPU statistics to complete the series.

[96] Personnel data refers to letter and parcel services employees. This is not inconsistent with data for other countries because personnel data are only used to compute average wages.

[97] Staff costs refers to letters and parcel services employees.

D.2.24. Sweden

Table D.22
Posten: Available Data

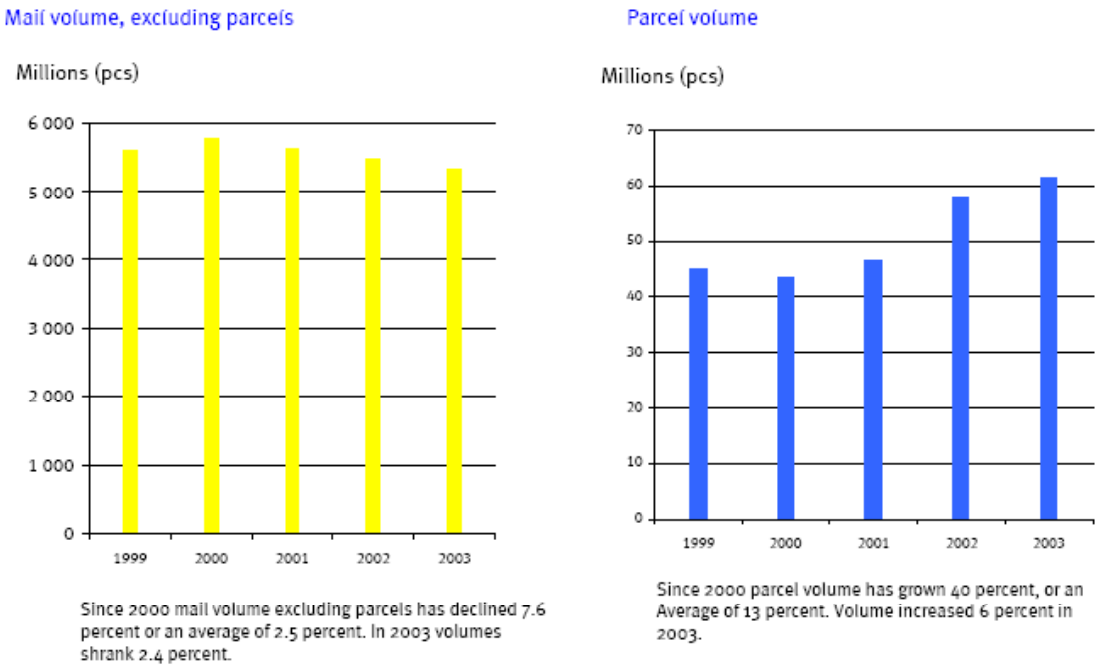
Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual reports			1998-2003
OC letters & parcel	NERA estimates	1998-2003	EU annual average	1998-2003
OC per activity	NERA estimates	1998-2003	EU average	1998-2003
Personnel	Annual reports	2003	CAGR	1998-2003
Staff costs	Annual reports			1998-2003
Wages (*)	Annual reports	2003		1998-2003
Volume letters	Annual reports	2001-2003	Growth rate	1998-2003
Volume parcels	Annual reports	1999-2003	Graphical estimation	1999-2003
Labour share	Annual reports			1998-2003
Post boxes	Annual reports			1999-2000
Post offices	*Not available*[98]			-
Delivery offices	*Not available*			-
Sorting offices	*Not available*			-

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Operating costs by activity**. We assumed the same percentage for the whole period. This percentage was the EU average.
- **Volume for letters.** Posten reported data for the volume of letters in 2000. In the 2003 Annual Report, Posten included data on the growth for the period 2000-2003 and for period 2002-2003 (see Figure B.1). In order to calculate the data for 2003 we have multiplied 2000 data by the growth rate. Once we have data for 2003, figures for 2002 were estimated in the same way. Figures for 2001 were obtained from Figure D.1.
- **Volume for parcels.** Taken from Figure B.1

[98] Sweden is not included in the UPU database.

Figure D.1
Volume of Mail and Parcels from Posten Annual Report 2002



D.2.25. United Kingdom

Table D.23
British Post Office: Available Data

Variable	Source	Estimated observations	Assumptions	Available after assumptions
Operating costs	Annual reports			1998-2002
OC letters & parcel	NERA estimates	1998-2002	EU annual average	1998-2002
OC per activity	NERA USO report[99]	1998-2002	Same percentage 1998-2002	1998-2002
Personnel	Annual reports			1998-2003
Staff costs	Annual reports			1998-2002
Wages (*)	Annual reports			1998-2002
Volume letters	NERA questionnaire	2002-2002	UPU Growth	1998-2000
Volume parcels	UPU database			1999
Labour share	Annual reports			1998-2002
Post boxes	NERA questionnaire and UPU database			1998-2003
Post offices	NERA questionnaire			1998-2003
Delivery offices	NERA questionnaire			2003
Sorting offices	NERA questionnaire and UPU database			1998-2003

(*) Wage=staff costs/personnel
(*) Labour share= Staff costs/Total operating costs

- **Volume of letters**. We have estimated the volume of letters for the year 2001 and 2002 by multiplying the growth rate from the UPU by the volume of letters reported by the British Post office.
- **Volume for parcels**. We looked for information on the UPU database. However the data for years other than 1999 did not include ordinary domestic parcels, so we did not include it

[99] NERA (1998) *Costing & Financing of Universal Services in the Postal Sector in the European Union, a Report to DGXIII.*

REFERENCES

Baron, D.M., and Bradley, M.D. (1993) "Measuring performance in a multiproduct firm: an application to the U.S. Postal Service", *Operations Research*, May-June 1993, vol. 41, no 3, 450-58.

Bernard, S., Cohen, R., Robinson, M., Roy, B., Toledano, J., Waller, J., Xenakis, S. (2002) "Delivery cost heterogeneity and vulnerability to entry". Published in *Postal and Delivery Services, Delivering on Competition;* edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2002.

Bradley, M.D., and Colvin, J. (1994) "An econometric model of postal delivery" in *Commercialization of Postal and Delivery Services: National and International Perspectives*, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 1994: 137-53.

Caves, D.W., Christensen, L.R., and Tretheway, M.W. (1984) "Economies of density versus economies of scale: why trunk and local service airline costs differ" *RAND Journal of Economics*, Winter, 15.

Cazals, C., Duchemin, P., Florens, J., Roy, B., and Vialaneix, O. (2001a) "An econometric study of cost elasticity in the activities of post office counters". Published in *Postal and Delivery Services: Pricing, Productivity, Regulation and Strategy*, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2001, 161-71.

Cazals C., Florens J., and Roy, B. (2001b) "An analysis of some specific cost drivers in the delivery activity". Published in *Future Directions in Postal Reform*, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2001.

Cazals, C., Rycke, M., Florens, J.P., and Rouzaud, S. (1997) "Scale economies and natural monopoly in the postal delivery: comparison between parametric and non parametric specifications". Published in *Managing Change in the Postal and Delivery Industries*, edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 1997, 65-80.

Christensen, D., Christensen, L., Guy, C., and O'Hara, D. (1993) "US postal service productivity: measurement and performance". Published in *The Regulation and the Nature of Postal and Delivery Services*, edited by M.A. Crew and Kleindorfer. Boston, Kluwer Academic Publishers, 1993, 237-60.

Cohen, R. H., and Edward H. Chu. (1997) "A measure of scale economies for postal systems." Published in *Managing Change in the Postal and Delivery Industries*, edited by Michael A. Crew and Paul R. Kleindorfer. Boston, MA: Kluwer Academic Publishers, 1997.

Cohen, R., Pace, C., Robinson, M., Scarfiglieri, G., Scocchera, R., Visco Comandini, V., Waller, J., Xenakis, S. (2002) "A comparison of the burden of universal service in Italy and

the United States", in Crew, M A., and Kleindorfer, P R *Postal and Delivery Services: Pricing, Productivity, Regulation and Strategy*, 2002.

Cohen R., Pace, C., Rato, A., Robinson, M., Santos R., Scarfiglieri, G., Comandini, V., Waller J., Xenakis, S. (2003) "Towards a General Postal Service Cost Function". Available in **http://www.prc.gov/tsp/103/Cost_Function.pdf** (Accessed 27 January 2003).

Doganis, Rigas and Associates, The Aviation and Travel Consultancy Ltd, and York Consulting Ltd (1999) *The Importance and Impact of the Express Industry in Europe: a Report for the EEA*, October.

Gazzei, D.S., Pace, C., and Scarfinglieri, G. (2002) "On the output elasticity of the activities of post office counters in Italy". ,Published in *Postal and Delivery Services: Delivering on Competition*; edited by M.A. Crew and P.R. Kleindorfer, Kluwer Academic Publishers, 2002.

Haldi, J., and Schmidt, J.T. (2002) "Controlling postal retail transaction costs and improving customer access to postal products" in Crew, M A., and Kleindorfer, P. R. *Current Directions in Postal Reform*, 2002 , pp.395-412.

Mizutani, F., and Uranishi, S. (2003) "The post office vs. parcel delivery companies: competition effects on costs and productivity" *Journal of Regulatory Economics*, May 2003; 23(3), 299-319.

NERA *Costing and Financing of Universal Services in the Postal Sector in the European Union* A Report to DGXIII, NERA, London.

Norsworthy, J.R., Jang,-Show-Ling, Shi,-Wei-Ming. (1991) "Productivity and cost measurement for the United States Postal Service: variations among regions " Published in *Competition and the Regulation of Utilities;* edited by M.A. Crew and P.R. Kleindorfer Norwell, Mass. and Dordrecht: Kluwer Academic 1991; 141-68.

PMS Ramboll (2002) *Employment Trends in the EU Postal Sector. Final Report.* A report for the European Commission.

Postcomm (2001) *An Assessment of the Costs and Benefits of Consignia's Current Universal Service Provision: a Discussion Document*, June 2001.

Postcomm (2003) *Post Office Networks Abroad*, December 2003.

Postcomm (2004) *Royal Mail's Proposal to Introduce Size Based Pricing: a Consultation Document*, April 2004.

Postwatch (2004) *The UK Letter Market 2000-2003: a Market Report*, Postwatch, London, January.

Rogerson, and Takis (1993) "Economies of scale and scope and competition in postal services" in Crew and Kleindorfer, eds, *Regulation and the Nature of Postal Delivery Services*, Kluwer.

Roy B. (1999) "Technico-economic analysis of the costs of outside work in postal delivery" in Crew and Kleindorfer, eds, *Emerging Competition in Postal and Delivery Services,* Kluwer.

Wada, T., Tsunoda, C., and Nemoto, J. (1997) "Empirical analysis of economies of scale, economies of scope, and cost subadditivity in Japanese mail service". *IPTP Discussion paper series,* August No.1997-08.

WIK (2003) *Survey on Some Main Aspects of Postal Networks in EU Adhesion Countries Part II: Country Reports*. Study for the European Commission, DG Internal Market.

Zellner, A. (1962) "An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias" *Journal of the American Statistical Association.*