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# Efficiency Metrics for Royal Mail

FTI Consulting response to the  
Fundamental Regulatory Review

*Public version*

Confidential information which has been redacted from this document is indicated by: [X]

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### Glossary

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## Glossary

ACAS	Advisory, Conciliation and Arbitration Service
BCT	Basic Cost Threshold
BT	British Telecommunications group
CAA	Civil Aviation Authority
CEPA	Cambridge Economics Policy Associates
CMA	Communications Managers Association
COLS	Corrected Ordinary Least Squares
CPI	Consumer Price Index
CWU	Communications Worker's Union
DEA	Data Envelope Analysis
DFA	Deterministic Frontier Analysis
EIP	Efficiency and Improvement Project
EU	European Union
FRR	Fundamental Review of Regulation
FTE	Full-Time Employee
FTI Consulting	FTI Consulting LLP
GDP	Gross Domestic Product
GLS	General Logistics Systems
GLS-RE	Generalized Least Squares – Random Effects
GVA	Gross Value Added
HMRC	HM Revenues and Customs
JV	Joint Venture
KLEMS	Capital, Labour, Materials and Services
LEMS	Labour, Energy, Materials and Services

LLCC	Leased Lines Charge Control
MEA	Modern Equivalent Asset
MFP	Multi Factor Productivity
NCR	No Compulsory Redundancies Agreement
NERA	NERA Economic Consulting
NI	Northern Ireland
NIESR	National Institute of Economic and Social Research
NOS	Network Operating Strategy
OBR	Office of Budget Responsibility
ONS	Office for National Statistics
ORR	Office of Rail and Road
P&L	Profit and Loss Accounts
POL	Post Office Limited
PVEO	Price, Volume, Efficiency and Other
RDC	Regional Distribution Centre
RIIO	Revenue, Incentives, Innovation and Outputs
RMT	The National Union of Rail, Maritime and Transport Workers
ROMEFC FM	Romec Facilities Management
RPE	Real Price Effects
RPI	Retail Price Index
RUOC	Real Unit Operating Cost
RUOE	Real Unit Operating Expenditure
SFA	Stochastic Frontier Analysis
TFP	Total Factor Productivity
TI	Traditional Interface
Totex	Total Expenditure
TSSA	Transport Salaried Staffs' Association

USO	Universal Service Obligation
VAT	Value Added Taxation

## 1. Executive summary

### **Efficiency gains are essential for the long term sustainability of the USO**

- 1.1 The Hooper report recognised that the sustainability of the universal postal service depended upon modernising Royal Mail. The pursuit of progressive efficiency improvements remains central to this objective. Given competitive constraints over pricing, driving efficiency improvements is currently the key way in which Royal Mail can improve its profitability. Analyst commentary on Royal Mail reflects this fact, and is likely to provide additional oversight over management's efforts.
- 1.2 However, the pursuit of efficiency in a declining market, prone to accelerated decline, is a different proposition to the pursuit of efficiency in a growing market where efficiency can be achieved by not putting cost in, as opposed to needing to remove costs. This is compounded by the fact that volumes and efficiency do not have a direct relationship; a cost reduction programme put in place based on one set of volume reductions may turn out to be inappropriate or unwarranted should the volume reduction turn out to be different from that which was forecasted.
- 1.3 The labour intensity of Royal Mail's business, combined with the unionisation of its workforce, means that the speed of transformation is constrained by the threat of industrial action. To date, Royal Mail has opted to work within this constraint and continues to believe that its labour strategy is appropriate to deliver change.

### **There is no single metric for assessing efficiency, rather a number of metrics are usually considered**

- 1.4 There is not one single definition of efficiency or a single metric that can be used to calculate it. Efficiency may be thought of as allocative, productive and dynamic with regulatory authorities typically seeking to incentivise all three. It may be calculated on a rate of change basis, over a number of years, or a comparator basis where one firm's efficiency is compared to that of other firms or economic sectors.
- 1.5 Metrics may focus on changes to costs, inputs, volumes or a combination of these, usually controlling for variables outside the company's control. One efficiency metric is therefore not necessarily comparable to another efficiency metric.
- 1.6 We note that most regulatory authorities look at a range of metrics for assessing efficiency, usually involving a combination of bottom-up and top-down studies. We have

not found evidence of any regulator relying on a single form of efficiency estimate.

- 1.7 The regulated entity is often benchmarked against other regulated entities, either within the same sector or outside the sector, or to productivity measures, e.g. those published by the Office for National Statistics (the “ONS”).
- 1.8 Given the range of efficiency metrics that can be calculated it is important that consideration is given to the proposed use of the metric, its calculability on a robust basis, comparability and consistency to other metrics.

**If appropriately defined, Ofcom’s PVEO metric provides useful information on Royal Mail’s historical and forecast efficiency levels**

- 1.9 Price, volume, efficiency, other (PVEO) is a measure that Ofcom has developed in an attempt to measure efficiency for Royal Mail for the first time as part of its Annual Monitoring Update for the postal market 2013/14. We are aware that Ofcom have used this approach to estimate efficiency for British Telecom (“BT”) price controls and have requested Royal Mail to submit its own forecasted PVEO (or cost matrix) calculations as part of its business plans. If appropriately defined and interpreted, Ofcom’s (“PVEO”) approach could provide a useful basis for reviewing efficiency
- 1.10 Royal Mail’s management have begun to integrate PVEO in business planning and to build on the approach used for the Ofcom submission. Royal Mail has made a number of methodological changes that seek to more accurately distinguish cost changes being controllable (related to E) and non-controllable (related to P,V and O).
- 1.11 Specific asset price inflation figures have been applied to cost categories where available, as opposed to the use of Consumer Price Index (“CPI”) across the board. This is consistent with a Total Factor Productivity (“TFP”) style of calculation.
- 1.12 In particular, wage inflation has been set equal to Retail Price Index (“RPI”), consistent with previous wage deals negotiated between Royal Mail and the Communications Worker’s Union (“CWU”) and with evidence from the OBR that suggests that wages are expected to move in line with RPI, rather than CPI. This is also evident from Network Rail’s recent experiences with CPI deal negotiations.<sup>1</sup> Fin
- 1.13 [X]
- 1.14 As the allocation of costs into demand drivers will have a direct implication on the perceived level of efficiency (E), caution must be exercised to identify these drivers based on robust evidence. The iteration of the PVEO analysis and its integration into business planning is an ongoing process. It requires judgement as to whether cost changes should be attributed to efficiency or exogenous factors (i.e. P, V and O).

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<sup>1</sup> Please refer to Appendix 2 of this document for this case study.

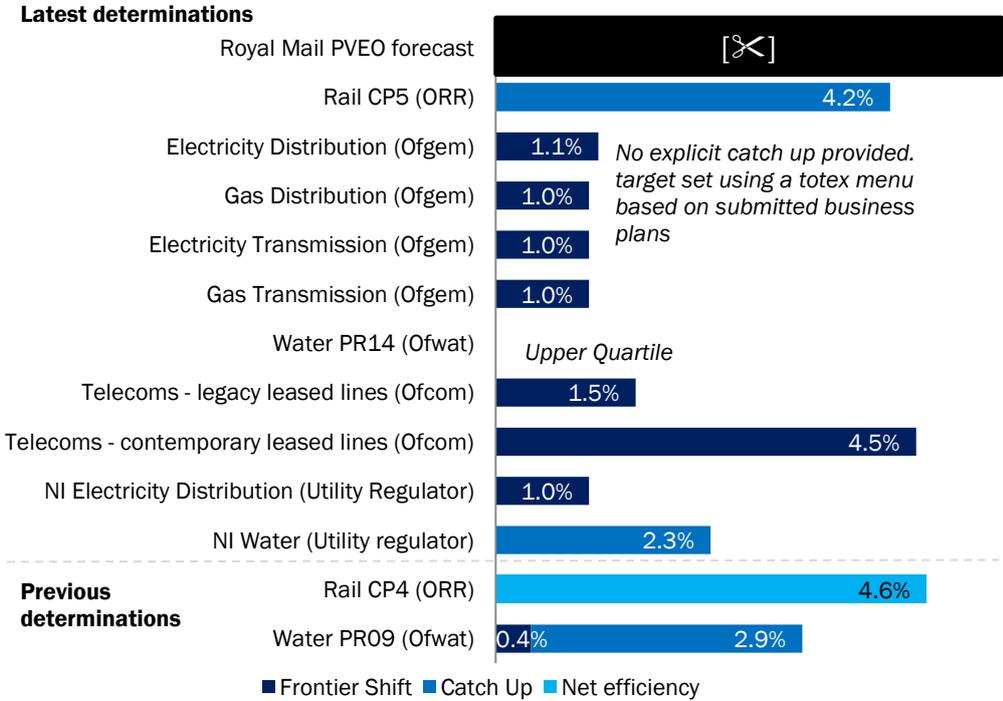
- 1.15 Similarly, demand drivers have been allowed for in the analysis - given reasonable justification - so that costs beyond management control are not captured as inefficiency. Royal Mail incorporated individual business units' assumptions as to volume effects or demand drivers for the forecasted PVEO analysis on the basis that many costs are incurred for sound commercial reasons. For example Royal Mail has undertaken significant IT expenditure, and this does not necessarily have a direct relationship with volumes but was incurred due to changing business needs. As before, it requires judgement to make an appropriate allocation in the PVEO analysis.
- 1.16 Setting annual targets based on this metric might encourage management to focus on annual changes to meet the target, rather than on longer term initiatives to drive dynamic efficiency. In the extreme, management may hold back efficiencies in one year in order to meet the following year's target.

### **Royal Mail's efficiency forecasts are in line with targets set by other regulators**

#### ***PVEO approach***

- 1.17 [✂]Table 1.1  
[✂]
- 1.18 Efficiency targets set by regulators across the UK in recent price controls range from 1% to 4.5%, with the higher targets being set for industries where there is benefit of rapid technological progression, such as telecoms. [✂]

Figure 1.2 [redacted]



Source: FChapter 4 of this document.

1.19 Furthermore, Royal Mail’s performance has been better than the UK economy historically.

[redacted] Figure 1.2

[redacted]

Source: ONS data, Royal Mail analysis  
 Note: The ONS numbers are for the calendar year during which the financial year begins (i.e. for 2011/12 comparison, 2011 ONS numbers have been used)

**RUOE approach**

1.20 Under a RUOE approach, Royal Mail’s average calculated efficiency of [redacted] per annum over the period 2010/11 to 2014/15 is within the range of that achieved by other UK regulated industries of (1.2%) to 5.3% per annum. The table below shows Royal Mail’s calculated efficiency on a historical and forward looking basis in comparison to other UK regulated industries.

**Table 1.2: RUOE estimates in a number of industries**

Industry	Period	Average RUOE efficiency % p.a.
Airports - UK designated	1997/98 - 2011/12	(1.20%)
Airports - non-UK	2000/01 - 2011/12	0.00%
Sewerage - England and Wales	1992/93 - 2010/11	0.20%
Airports - UK other	2000/01 - 2011/12	0.30%
Water -England and Wales	1992/93 - 2010/11	1.30%
Water Scotland	2002/03 - 2010/11	2.10%
Gas distribution	2006/07 - 2009/10	2.10%
Electricity distribution	1992/93 - 2009/10	2.50%
Gas transmission	2002/03 - 2009/10	2.90%
Rail	2002/03 - 2009/10	3.10%
Electricity transmission	1992/93 - 2010/11	4.90%
Sewerage - Scotland	2002/03 - 2009/10	5.30%
Range		(1.2)% to 5.3%
[<]	[<]	[<]
[<]	[<]	[<]

Source: Tables in chapter 5 of this document.

- 1.21 In respect of where Royal Mail's efficiency could be expected to lie in comparison to the other industries, we consider that Royal Mail's efficiency will be constrained to the lower end of the ranges that each of these analyses provides. The reasons for this include declining volumes, the unionised nature of Royal Mail's labour force, a high proportion of labour costs, and the Universal Service Obligation ("USO").

- 1.22 [<]

**Royal Mail is sufficiently incentivised to make efficiency savings and regulatory intervention would not be appropriate in this regard**

- 1.23 As noted previously, Royal Mail is operating in a declining and volatile market, where efficiency savings are harder to achieve but are nonetheless essential for sustaining the USO. This places Royal Mail in a different position to other regulated entities. Standard regulatory approaches to incentivising efficiency, for example price controls, will not work in these market conditions – as the need to reopen the previous Postcomm price control highlighted. Furthermore, the application of a standalone efficiency target associated with financial penalties would only seek to worsen financeability concerns.

- 1.24 There are a number of theoretical and academic studies which provides support for the

observation that efficiency is enhanced following privatisation, and further evidence that this comes due to capital market pressures.<sup>2</sup> The pressure on Royal Mail's management is to reduce costs and without these cost reductions the USO will become unsustainable in the long term. This is therefore not just a question of increasing profitability, but of the sustainability and longevity of the business, while ensuring that it makes a reasonable rate of return.

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<sup>2</sup> Please refer to Appendix 3 to this paper – Literature review of effect of public listing and privatisation for an overview of available studies

## **2. Introduction**

- 2.1 This report has been prepared by FTI Consulting LLP (“FTI Consulting”) for Royal Mail in connection with the Fundamental Review of Regulation (“FRR”). We have been asked to provide Royal Mail with an assessment of metrics used to measure efficiency.
- 2.2 This report considers the nature of the efficiency challenge currently being faced by Royal Mail. This is followed by a review of metrics that could be used to measure the rate of efficiency that has been achieved historically or Royal Mail’s business plan forecasts for future periods. In this report, Royal Mail’s historical and forecast efficiency levels are benchmarked against performance by other regulated entities under a range of metrics and provides commentary on Royal Mail’s relative performance levels.

### **Restrictions**

- 2.3 This report has been prepared solely for the benefit of Royal Mail for use for the purpose described in this introduction. In all other respects, this report is confidential. It should not be used by any other party for any purpose or reproduced or circulated, in whole or in part, by any party without the prior written consent of FTI Consulting. We have agreed with Royal Mail that they may submit this document to Ofcom as part of their FRR submissions.
- 2.4 FTI Consulting accepts no liability or duty of care to any person other than Royal Mail for the content of the report and disclaims all responsibility for the consequences of any person other than Royal Mail acting or refraining to act in reliance on the report or for any decisions made or not made which are based upon the report.

### **Limitations to the scope of our work**

- 2.5 This report contains information obtained or derived from a variety of sources. FTI Consulting has not sought to establish the reliability of those sources or verified the information provided. No representation or warranty of any kind (whether express or implied) is given by FTI Consulting to any person (except to Royal Mail under the relevant terms of our engagement) as to the accuracy or completeness of this report.

This report is based on information available to FTI Consulting at the time of writing of the report and does not take into account any new information which becomes known to us after the date of the report. We accept no responsibility for updating the report or informing any recipient of the report of any such new information.

### 3. The efficiency challenge faced by Royal Mail

#### Background

- 3.1 The report by Richard Hooper, *Modernise or Decline (2008)* recognised that modernisation is critical to the sustainability of the USO and the focus should be on transforming the national network. The pursuit of progressive efficiency improvements remains a key objective of Royal Mail's management. Given competitive constraints over pricing, driving efficiency improvements are the main method by which Royal Mail can improve its profitability. Analyst commentary on Royal Mail reflects this fact, and is likely to provide additional oversight over management's efforts.
- 3.2 Efficiency can be thought of as a company's ability to minimise costs for a given level of output, taking into account the challenges and opportunities it faces in its business environment. Efficiency can be defined as:
- (a) Allocative efficiency: choosing the least costly combination of inputs to produce a given level of output.
  - (b) Technical, or productive, efficiency: producing the maximum possible level of output, using a given set of inputs and technology.
  - (c) Cost, or economic, efficiency: producing the optimal level of output at the minimum cost, for a given technology. Cost efficiency can only be achieved by firms that are both allocative and technically efficient, and it is a pre-requisite to profit maximisation.
  - (d) Dynamic efficiency: which refers to the introduction of new technology to either reduce a firm's costs over time, or to achieve innovation that increases the efficiency of an economic system. Achieving dynamic efficiency requires taking a longer term view of investment.
- 3.3 There is not one single metric that defines "efficiency". Furthermore, it may be expressed as a rate of efficiency improvement over time, as an efficiency gap compared to other firms or best practice or as a specific set of opportunities for improvement.

#### Why does Royal Mail face an efficiency challenge?

- 3.4 The pursuit of efficiency in a declining market, prone to accelerated decline, is a

different proposition to the pursuit of efficiency in a growing market where efficiency can be achieved by not putting cost in, as opposed to needing to remove costs. This is compounded by the non-linearity of efficiency – a cost reduction programme put in place based on one set of volume reductions may turn out to be inappropriate or unwarranted should the volume reduction turn out to be different from that which was forecast. The labour intensity of Royal Mail's business, combined with the unionisation of its workforce, means that the speed of transformation is constrained by limited ability of the labour force to absorb change and the threat of potential industrial action. Management's capacity to manage change is limited further by the need to maintain its high quality of service targets while fulfilling Royal Mail's USO duties. These are detailed below.

#### ***Declining volumes in the letter market***

- 3.5 The major driver behind declining volumes in the letters market is e-substitution. Transactional mail – the largest content segment - is being hit as banks, utility companies and local government are introducing systems and incentives to migrate consumers from paper-based communication to online alternatives. For example, energy companies Eon energy and Southern Electric now offer an annual discount of between £5-6 for each service (gas/electricity) for which a customer opts for paperless billing<sup>3</sup>. Water companies such as South West Water, Severn Trent Water and Untied Utilities offer prize draws for paperless customers. Phone operators such as Virgin Media and Talk Talk offer cash discounts. Barclays have set 'online statements only' as the default, and Lloyds and RBS are offering quarterly instead of monthly paper statements as the default. Government departments are also encouraging online communication through e.g. differential pricing (ordering copies from the Land Registry), later submission dates (tax self-assessment) and level of assistance (Companies House pre-populated digital forms).
- 3.6 When there are high fixed costs, it is more difficult to make efficiency gains in the face of declining volumes. A practical example of this is the fact that a delivery office will always require managerial staff regardless of the amount of workload. The fixed costs can be spread over a higher workload implying lower unit costs and higher efficiency. In contrast, cost reduction in the face of declining volumes would typically take the form of reduction in labour hours which require expensive and time consuming redundancy programs. Furthermore, the measures undertaken to re-optimize the network require time to plan, and to deploy.
- 3.7 There is therefore, necessarily, a lag effect between falling volumes and costs. The rate of efficiency progression is slower, as a result, compared to a growing volume business.

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<sup>3</sup> This is per service, so a dual fuel customer may receive a discount of £10 to £12 per year.

- 3.8 The nature of the Royal Mail business and its network means that the relationship between volumes and costs is not linear. This is demonstrated by the high level of fixed and common costs; for instance, Royal Mail estimates [8<] of its workload in processing and delivery is represented by fixed costs. These represent, for example, the fixed costs of walking each street to access all the delivery addresses. Volumes tend to be volatile on a day-to-day basis in post, and it cannot be judged accurately what quantity of resources must be deployed to process the traffic. A cost reduction programme put in place based on one set of volume reduction assumptions may turn out to be inappropriate or unwarranted should the volume reduction turn out to be different from that which was forecasted. In such a scenario, Royal Mail will not have achieved all the efficiencies that could have been achieved had volumes moved as predicted. Even worse, Royal Mail may have incurred transformation costs in implementing a programme which has not delivered any efficiency gains.

#### ***Factor intensity***

- 3.9 Royal Mail does not depend on technology as critically as other capital intensive regulated industries such as telecoms, energy, water or rail. Gains in efficiency due to substantial investments in new technologies would therefore be limited in comparison to these industries. Royal Mail has undertaken a modernisation program since 2007/08 in Mail Centres and Delivery Offices which has resulted in significant automation of processes, and it is looking to introduce automation for parcels in the future.
- 3.10 Royal Mail is a labour intensive business with 68%<sup>4</sup> of all operating costs being people costs, and there is a limit to the pace of change which the workforce can be subjected to. Staff behaviour cannot be predicted in comparison to capital equipment. The introduction of new initiatives to enhance productive efficiency is guaranteed more for a capital-intensive business but it takes longer to assess how appropriate or effective a new measure aimed at staff is. Management may also need to respond with other changes to an initiative or perhaps repeal it based on experience. The rate of efficiency gains will therefore be slower for a labour intensive business like Royal Mail.

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<sup>4</sup> This figure is for the Reported Business, based on Royal Mail regulatory accounts. This is 68% for UKPIL and 61% for the Royal Mail Group, as per latest financial statements.

**Industrial relations**

- 3.11 C. 80% of all operational grade workers belong to the Communications Workers Union (“CWU”).<sup>5</sup> Any changes to working practices that encourage greater efficiencies will take longer to enforce because there is a great deal of negotiation that must precede these. In particular, Royal Mail faces the risk of industrial action if agreements with unions are not reached, which can cause significant and permanent damage.

**Case Study 3.1: Deutsche Post (DHL) Strikes in Germany, 2015**

Richard Hooper points out in his report *Modernise or Decline*, that a constructive and trusting relationship with the unions, keeping them actively engaged in all decisions and a collective agreement on staff-related matters were key factors for success of the transformation programs.<sup>6</sup> In contrast, country wide strikes were called during the first half of 2015, following claims that Deutsche Post had breached its collective bargaining agreement regarding outsourcing.<sup>7</sup> It caused a significant negative impact on Deutsche Post’s volumes, resulting in the earnings guidance for the company being revised from at least EUR 1.3bn to EUR 1.2bn for the financial year 2015.<sup>8</sup>

- 3.12 One method by which Royal Mail could reduce both total and unit costs is by reducing pay. However, this is challenging as in the past, unions have sought, and received, pay increases in line with, and sometimes in excess, of RPI.

**Case Study 3.2: Network Rail Strikes in the UK, 2015**<sup>9</sup>

Network Rail sought to introduce CPI linked pay increases as an efficiency enhancing initiative. The unions rejected the notion that pay increases should be linked to the introduction of productivity-enhancing measures and the CPI and were consequently proposed an RPI deal (with other terms), which would imply their pay rise for 2015 would be 0%.<sup>10</sup> Multiple strikes were planned following this, with the dispute lasting nearly six months. On 24 June, with Network Rail and the trade union finally agreed on a deal. The pay would rise by 2% for 2015, and then by RPI in the following year.<sup>11</sup>

<sup>5</sup> [The Privatisation of Royal Mail](#), National Audit Office, March 2014, p 21

<sup>6</sup> [Modernise or Decline, Richard Hooper](#), December 2008, p. 76

<sup>7</sup> [Post & Parcel article](#), June 2015

<sup>8</sup> [DHL group investor relations presentation](#), August 2015

<sup>9</sup> Appendix 2 – Network rail case study of wage negotiations

<sup>10</sup> [Letter from RMT](#) regarding rates of pay and conditions of service, January 2015

<sup>11</sup> [Pay deal averts rail strike](#), BBC, June 2014

The experience of Network Rail shows that even when the regulator does not provide any allowance for wage inflation, trade unions can successfully resist CPI pay settlements.

### **USO obligations**

- 3.13 As the Universal Service Provider, Royal Mail uses the same network to provide USO and non-USO services, while also ensuring that its high quality standards are met. The downstream network, which includes Inward Mail Centres, local distribution and delivery, is used to deliver USO mail, access bulk mail, retail bulk mail and parcels. Even though volumes may be volatile on a day-to-day basis, Royal Mail must always retain capacity to deal with the maximum potential volumes. Therefore the single network must be maintained at all times, leading to high fixed costs, such as the need to walk down a given street every day. Furthermore, the number of delivery points to which mail must be delivered has been increasing year on year (0.8% in 2013, 0.6% in 2014)<sup>12</sup>, making efficiency more difficult to achieve.

### **Royal Mail's incentives around efficiency**

- 3.14 Ofcom recognises, as does Royal Mail, that progressive efficiency gains are an important component of the long run sustainability of the USO. In particular, Ofcom wishes to understand Royal Mail's historical rate of efficiency improvement and what a reasonable rate of efficiency could be. Ofcom recognises that it is important to identify changes in cost drivers, such as the impact of volume decline or changing product mix, which are critical to Royal Mail's efficiency.
- 3.15 The relationship between private sector discipline and efficiency has been studied, and there are a number of theoretical and empirical studies which cover the point. Some of these are detailed in Appendix 3 of this report. In particular we highlight the results of one important such study, as follows.

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<sup>12</sup> Measured by Royal Mail using the Zonal Costing Model

**Determinants of performance improvement in privatized firms - D'Souza, Megginson and Nash (2001)**

This study examines why privatized firms exhibit efficiency gains using a sample of 118 firms in 29 countries privatized through 1961-95. One of the findings was that efficiency gains are stronger when the capital markets in which the firm operates are large (relative to its own size). They argue that in larger and more sophisticated capital markets, shareholder rights are protected by a country's legal system and there is greater capital markets pressure and scrutiny.<sup>13</sup>

- 3.16 We also note that bonuses are linked to efficiency targets based on the UKPIL people and non-people costs as per the Royal Mail Corporate Balanced Scorecard. For the financial year 2014/15, the Royal Mail annual report shows that the total UK costs were £159m lower than the Corporate Balanced Scorecard bonus targets.<sup>14</sup>
- 3.17 Efficiency metrics are valuable both for incentivising Royal Mail's management but also for monitoring the performance of Royal Mail and ensuring its management are working to a challenging business plan.

**Consideration of dynamic efficiency**

- 3.18 Royal Mail currently has a long term view on efficiency gains, undertaking transformation programmes for which the benefit stream occurs over a number of years. This is consistent with the concept of dynamic efficiency.
- 3.19 However, when viewed on a short-term or static basis, this has the potential for Royal Mail to appear inefficient. For instance, Royal Mail seeks to undertake significant IT upgrade expenditure, which will increase their operational costs, and effectively make them seem 'inefficient' in the year the costs are incurred as the benefits of these initiatives are realised in later years.
- 3.20 Therefore, when assessing the efficiency gains being made at Royal Mail it is important that consideration is given to the timing of transformation costs versus the benefits realisation.

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<sup>13</sup> [Determinants of performance improvement in privatized firms](#), D'Souza, Megginson and Nash (2001)

<sup>14</sup> [Royal Mail Annual Report 2014-15](#), p70.

## 4. Price, Volume, Efficiency and Other (“PVEO”) Analysis

### Background

- 4.1 PVEO is a measure by which year-on-year changes in costs are disaggregated into input price (inflation), volume effects (variability in costs due to volume), an efficiency residual and ‘other factors’ (one-off costs).
- 4.2 Royal Mail has started to prepare PVEO analysis only recently upon Ofcom’s request. PVEO aims to measure efficiency gains made in Royal Mail’s operational costs and does not include capital expenditure. We detail the calculations performed by Royal Mail in its PVEO analysis later in this section.
- 4.3 The analysis is prepared based on budgets and business plans set by different business units – Operations, Technology, Property, Commercial and Central. The budgets are used as the basis for the change in costs from one period to the other, and therefore the PVEO analysis.

### Theoretical framework for PVEO

- 4.4 PVEO seeks to capture efficiency gains (E) over a given period of time when change in costs are adjusted for factors such as input price inflation (P), the marginal impact of changing volumes on costs (V) and one-off ‘above-the-line’ costs (O).
- 4.5 Correctly applied, the PVEO should separate change in costs into those which are within and outside of management control. P, V and O capture exogenous factors where management does not have control, and are essentially ‘allowed’ costs when assessing efficiency initiatives. The balancing E figure denotes the level of cost change which is within management’s control.

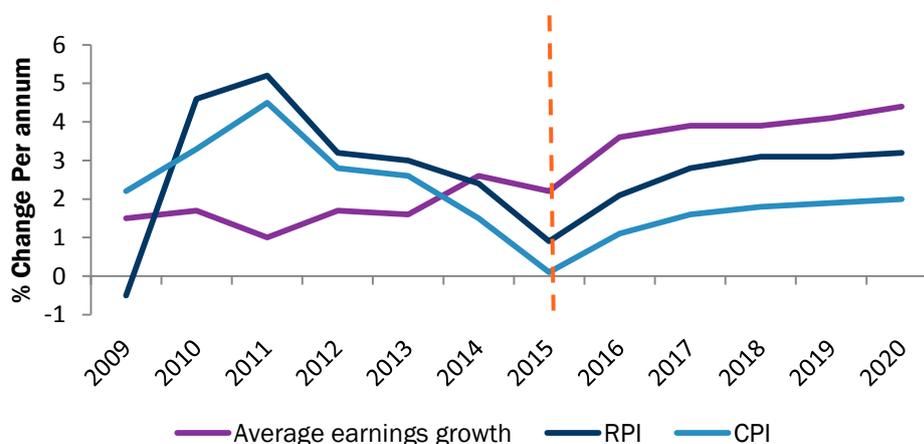
### Input Price Inflation (P)

- 4.6 For input price inflation (P), one could, in theory, apply a general inflation index such as the RPI or CPI – both of which account for a general increase in price levels in the UK.

- 4.7 Both the Consumer Price Index (“CPI”) and Retail Price Index (“RPI”) are composed of the weighted average of the prices of a basket of consumer goods and services. RPI is a long standing measure of inflation in the UK and is used for indexation on pensions and index-linked financial products such as gilts. The differences in RPI and CPI arise from differences in the form of calculation and in the basket of goods that is used. Caution must be exercised over the choice of index to ensure it reflects a fair level of price rises faced by management.
- 4.8 We have reviewed Ofcom’s price inflation assumptions in relation to BT’s PVEO analysis.<sup>15</sup> Ofcom state that one of the benefits of using PVEO is that it provides expected historical inflation and forecast inflation, and these are BT-specific, and reflect management’s knowledge of the labour markets in which BT operates (para A.8.253). Ofcom also concludes that the appropriate forecast payroll inflation should be 2-3% (A.8.270), and this range is consistent with the pay deal agreement BT has made with the trade unions. The view that there is use of specific price inflation forecasts rather a single generic one is also supported in para A.8.205 where Ofcom discusses a specific property inflation factor. Finally, Ofcom use a Modern Equivalent Asset (“MEA”) approach for capital price assumptions which involves the use of asset specific price assumptions, rather than applying a generic measure of inflation.
- 4.9 Precedent therefore appears to support the use of price inflation figures that are specific to the particular cost type. This would also be theoretically correct, since the E term should reflect those costs that are within a firm’s control and to the extent that price inflation rates differ over cost types, it is important that the cost type is accurately matched to the appropriate price inflation rate so that the E term is not inadvertently capturing price effects.
- Labour costs*
- 4.10 Theoretically, RPI can be argued to be a more appropriate measure for wage increments for labour. While both CPI and RPI measure inflation, the CPI excludes the costs of housing from the basket and therefore rises in mortgage payments, rents, and council tax are not reflected in it. RPI includes those costs and is therefore a more relevant benchmark for pay negotiations as employees are concerned about their living costs.
- 4.11 Wages in the UK are broadly linked to the state of the labour market. Data from the Office of Budget Responsibility (“OBR”) in the figure below shows how earnings are expected to grow at a rate closer to RPI than CPI.

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<sup>15</sup> [Business Connectivity Market Review: Leased Lines Charge Control and Dark Fibre Pricing, Annexes, Ofcom 2015](#)

**Figure 4.1: Projections for average earnings growth, RPI and CPI**

Source: Data from OBR

#### Non-labour costs

- 4.12 Where characteristics of a particular cost category allow for a specific rate of inflation, the PVEO should incorporate that rate as opposed to an inflation index. For example, if we take the example of fuel costs, the price rise for these will be driven by the world commodity markets. A projected fuel price rise should therefore be used in PVEO, as opposed to RPI or CPI.<sup>16</sup>
- 4.13 Recent regulatory assumptions around input costs have been to allow for RPI where specific the input price inflation cannot be determined. Examples of these regulators include Competition Commission and the water regulator for Northern Ireland.

**Table 4.1: Competition Commission's estimates of input price inflation for NIE, 2014**

	<b>13/14</b>	<b>14/15</b>	<b>15/16</b>	<b>16/17</b>
Labour	2.0%	2.8%	3.7%	4.3%
Materials-general	4.2%	4.2%	4.2%	4.2%
Materials-specialist	3.3%	3.3%	3.3%	3.3%
Plant and equipment	2.4%	2.4%	2.4%	2.4%
Other – RPI	2.6%	3.0%	3.5%	3.6%

Source: First Economics report for Royal Mail, Competition Commission (2014), Northern Ireland Electricity Limited price determination, section 11

<sup>16</sup> Royal Mail undertakes hedging on fuel costs and it is the hedged price that is included in Royal Mail's business plan and as an inflation driver in the PVEO analysis.

**Table 4.2: Northern Ireland Utility Regulator’s estimates of input price inflation for NI Water, 2014**

	15/16	16/17	17/18	18/19	19/20	20/21
Labour	2.5%	3.7%	3.7%	3.9%	4.0%	4.0%
Equipment	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Chemicals	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Power	6.6%	6.6%	6.6%	6.6%	6.6%	6.6%
Rates	2.4%	3.2%	3.4%	3.2%	3.2%	3.2%
Bad debt	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
EA charges	2.4%	3.2%	3.4%	3.2%	3.2%	3.2%
Other – RPI	2.4%	3.2%	3.4%	3.2%	3.2%	3.2%

Source: First Economics report for Royal Mail, Utility Regulator (2014), Water and sewerage services price control 2015-21, annex S.

- 4.14 A review from February 2015 by Oxera of existing regulatory approaches noted that:
- ‘...only Ofcom has switched to using CPI rather than RPI to index prices. Other regulators have retained RPI for price indexation but made adjustments to the calculation of the cost of capital and other aspects of the price control calculation.’<sup>17</sup>*
- 4.15 As part of the Revenue, Incentives, Innovation and Outputs (“RIIO”) determinations, Ofgem has also used an RPI indexation for allowed revenues in order for the regulated firms to receive protection from ‘economy-wide inflation’ in their costs.<sup>18</sup> In the price control up to 2019 by the Civil Aviation Authority (“CAA”), the airports regulator has also set the price cap for Heathrow at RPI-1.5%, indicating that the costs faced by Heathrow will be increasing in line with RPI.<sup>19</sup>
- 4.16 We conclude based on the evidence and discussions above that it is more appropriate to use specific input price inflation where possible as opposed to using a generic index, and using RPI as the generic index in absence of a specific input price inflation

#### **Volume Effects (V)**

- 4.17 Volume effects (V) should capture the cost variability due to changes to volumes supplied by the firm to the market. This can be seen as the ‘marginal cost’ to the firm of changing volumes.

<sup>17</sup> [Is the end nigh for RPI? Oxera, February 2015](#)

<sup>18</sup> [RIIO-ED1 Uncertainty Mechanisms, p31, March 2013](#)

<sup>19</sup> [Economic Regulation at Heathrow, Gatwick and Stansted, January 2014, CAA](#)

- 4.18 It is important to recognise, however, that not all costs are necessarily related to sales volumes, but may be beyond the firm's control. There may be other operational factors which cause a firm to incur certain expenses. This can be upgrade expenditures to an IT infrastructure for example, which are required due to a changing business environment but is not directly related to volumes.
- 4.19 Regardless of whether marginality can be established or not, the V in PVEO relies very heavily on judgement, and the assumptions need to be as accurate as possible for the analysis to provide meaningful results. Under or over allocation of costs in V can over or under estimate the efficiency residual respectively.

#### **Other (O)**

- 4.20 The O in PVEO should capture any items which are exceptional and one-off in nature, and also beyond management control. If O is defined too narrowly, which we discuss later, this can lead to costs being inappropriately captured in E, the efficiency residual.

#### **Ofcom's use of PVEO**

- 4.21 Ofcom state in their Annual Monitoring Update on the Postal Market for 2013/14 that the PVEO approach is something that was developed as part of its ongoing work to measure efficiency for Royal Mail.
- 4.22 Ofcom described the merits of PVEO as follows:
- (a) It applies marginality at a more granular level than unit costs adjusted for CPI; and
  - (b) It adjusts for one-off items, therefore isolating a truer indicator of efficiency.
- 4.23 Ofcom recognises that efficiency is an important part of its monitoring regime since it is essential to the long run sustainability of the USO. In particular, Ofcom wishes to understand Royal Mail's historical rate of efficiency improvement and what a reasonable rate of efficiency could be. Ofcom recognises that it is important to identify changes in cost such as impact of volume decline or changing product mix, which are critical to Royal Mail's efficiency. Efficiency was being considered using unit cost and the workload productivity<sup>20</sup> metrics until the 2012-13 monitoring update.<sup>21</sup> PVEO has only been added recently as a new measure for Royal Mail efficiency in the 2013-14 monitoring update.

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<sup>20</sup> Workload productivity is a non-financial metric which measures how much workload is processed per unit time.

<sup>21</sup> Annual monitoring Update on the Postal Market 2012-13, Ofcom

- 4.24 Ofcom has also commissioned NERA Economic Consulting (“NERA”) to examine the different methods in which efficiency can be measured for postal operators.<sup>22</sup> NERA recommended that Royal Mail’s business plan can be used to monitor efficiency improvements, and comparing forecast vs outturns. This would imply that as per NERA’s recommendations to Ofcom, the PVEO is suitable for monitoring purposes.
- 4.25 In its latest consultation document for setting charge controls on BT leased lines, Ofcom has placed significant reliance on PVEO as a measure for establishing potential efficiency targets.<sup>23</sup> BT has historically used PVEO for its own management decisions. Ofcom used BT’s management accounting information and PVEO analysis on both forecast and historical data to estimate potential efficiency gains. The results from this analysis contributed to Ofcom’s consideration of setting efficiency targets for the charge control.
- 4.26 In contrast, Royal Mail has been asked to adopt this by Ofcom very recently and it is a new measure for them. Therefore, it is to be expected that the methodology and assumptions will require refinement.

#### **PVEO and incentives**

- 4.27 Currently PVEO does not play a large role in day-to-day management decisions because more time is required for it to become fully integrated in the business. However, the PVEO is constructed from cost targets set out in Royal Mail’s business plans and budget, which are linked to bonuses. Bonuses are linked to efficiency targets based on the UKPIL people and non-people costs as per the Royal Mail Corporate Balanced Scorecard. For the financial year 2014/15, Royal Mail annual report shows that the total UK costs were £159m lower than the target set by management for the purposes of the Corporate Balanced Scorecard bonus.<sup>24</sup>

#### **Royal Mail calculation of PVEO**

- 4.28 We received the forecasted and historical PVEO analyses for the Reported Business.<sup>25</sup>

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<sup>22</sup> [Approaches to measuring the efficiency of postal operators, NERA, August 2013 \(final report for Ofcom\)](#)

<sup>23</sup> [Business Connectivity Market Review: Leased Lines Control Charges and Dark Fibre Pricing, Ofcom, June 2015](#)

<sup>24</sup> Royal Mail Annual Report 2014-15, p70

<sup>25</sup> The Reported Business is part of the UK Parcels, International and Letters (UKPIL) business unit of the Royal Mail Group, excluding Parcelforce and the Royal Mail Property Unit.

[X]

**Table 4.3** [X]

*Source: Royal Mail.*

*Note: The ‘underlying’ cost base reflects the cash pension charge, adjustments for VAT credits and transformation costs. For 2012/13, a 53<sup>rd</sup> week adjustment is also included.<sup>26</sup>*

4.29 [X]

**Table 4.4** [X]

[X]

*Source: Royal Mail.*

*Note: The ‘underlying’ cost base reflects the cash pension charge and transformation costs*

4.30 The PVEO analysis applies to operating expenditures only and does not extend to capital expenditure. The operating expenditure consists of a mix of people costs and non-people costs (such as infrastructure, distribution and conveyance) across the different business units namely Operations, Technology, Property, Commercial and Central functions. Transformation costs are included when considering total change of costs in the PVEO Bridge. The inclusion of transformation costs implies that the efficiency gains calculated from PVEO are net of the transformation costs incurred to achieve them.

**Royal Mail PVEO - Underlying Assumptions**

4.31 [X]

4.32 [X]

**Table 4.5** [X]

[X]

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<sup>26</sup> Reconciliation from Reported Business costs to underlying costs is provided in tables A4.1 and A4.2 in Appendix 4.

- 4.33 Volume effects (V) capture the changes in costs attributable to the changes in total volumes, volume mix or introduction of new products. Royal Mail uses a ‘workload’<sup>27</sup> measure to obtain an estimate of how much of their resources would be utilised based on volume projections. Volume effects or demand drivers are allocated based on changes in workload from the previous year for some pipelines such as Processing Frontline, Delivery Frontline and RDCs, where it can be assumed that a direct relationship between those costs and the amount of workload exists.
- 4.34 In case of RDCs, the workload marginality is applied for forecasts only and not historical PVEO due to limited availability of data.
- 4.35 The assumptions on volume drivers are summarised in the table below. It is worth noting that a number of the allocations for forecasted PVEO are based on 2015 Business Plans.

[X]

**Table 4.6** [X]

- 4.36 Royal Mail and Ofcom have agreed the ‘Other’ (O) in the PVEO analysis as one of costs or incomes. Royal Mail propose to include only those expenses in ‘Other’ for the purposes of this analysis if the expense is something that was significant enough to announce to the markets, and had a distortionary effect on perceptions of efficiency.
- 4.37 Currently, the only example of this in Royal Mail PVEO analyses is the value added tax (“VAT”) credits received from HM Revenues and Customs (‘HMRC’) due to prior period overpayments. Changing legislation resulted in these refunds, which had a distortionary effect on financial statements for the year. While a £35m refund for 2013/14 and £5 in 2014/15 were announced, they were not announced for other years. However, the adjustment has been made in all years for consistency.<sup>28</sup> The VAT credits have been stripped out to effectively increase the cost base for the years in which they were received to calculate the underlying costs.
- 4.38 Royal Mail has also included adjustments to the bottom line costs in the PVEO analysis to reflect the difference in the profit and loss accounts (“P&L”) and cash pension costs. Where the cash cost is lower than the P&L cost for the year, this is captured as efficiency, which is in line with Ofcom’s approach. The bottom line efficiency figures are net of transformation costs.

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<sup>27</sup> The workload measure represents the number of hours required by a hypothetical operator to service a given volume and mix of mail. It assumes conformance to standard level of performance, a steady state at the volume and mix of mail and the current network design

<sup>28</sup> The adjustment has been made to all years historically only. There are no assumptions regarding VAT credits in Royal Mail forecasts.

4.39 Finally, the efficiency (E) is then calculated as a residual by deducting the prior year’s budgeted costs, inflation allowance and volume effects. To use the E as a benchmark, the percentage over the prior year underlying cost base can be calculated. This effectively shows the net efficiency gain in a given year, compared to the previous.

4.40 Royal Mail have provided us with a disaggregation of the bottom line efficiency as follows:

**Table 4.7** [X]

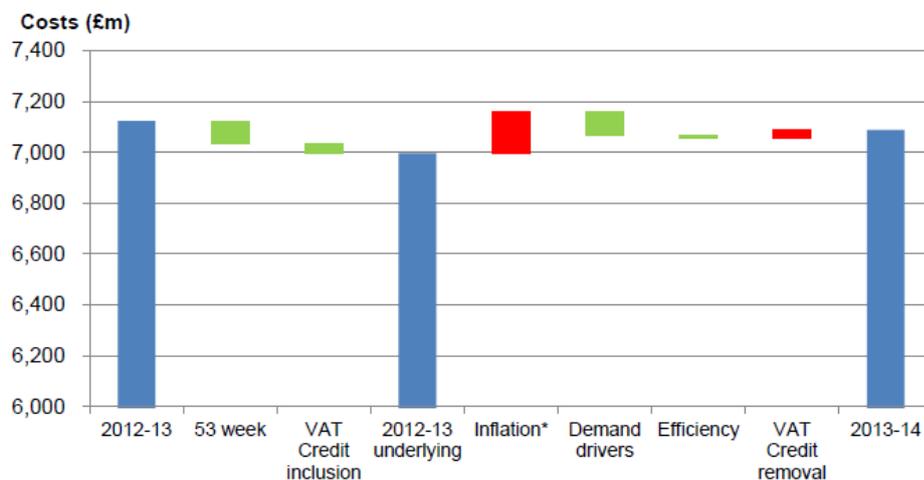
4.41 [X]

4.42 [X]

**Ofcom calculation of PVEO for 2013/14**

4.43 The figure below shows the PVEO Bridge from 2012/13 to 2013/14 for Royal Mail based on Ofcom’s calculations. It breaks down changes in total costs from 2012/13 to 2013/14 broken into price (CPI inflation), volume (demand drivers), efficiency and one-off costs (VAT credit), with the figure showing the aforementioned 0.2% improvement in efficiency (bar labelled Efficiency).

**Figure 4.2: PVEO bridge from 2012-13 to 2013-14**



Source: Annual Monitoring Update on the Postal Market for 2013-14, Ofcom, p.32

4.44 The calculation assumptions are summarised below.

- (a) CPI inflation allowance is set at 2.3% based on the 12 month rolling average as at March 2014 for all costs;

- (b) Demand drivers have been calculated only for Delivery Frontline, Processing Frontline, Terminal Dues and Post Office Ltd. ("POL") costs. For POL, any cost above inflation has been fully allocated to demand drivers, i.e. there is no efficiency residual;
- (c) Demand driver for Delivery Frontline and Processing Frontline has been calculated as the percentage change in workload for the particular cost pipeline times the same prior year cost (adjusted for CPI inflation);
- (d) Terminal Dues Demand Driver has been calculated as the percentage change in export weight times the prior year terminal due costs;
- (e) All P&L pension costs have been adjusted to reflect cash pension costs; and
- (f) The 53<sup>rd</sup> week adjustment (for 2012/13) has not been made for certain items such as IT, Central Unit functions and others where there is no reason to believe costs are highly variable with time.

#### **Appropriateness of PVEO**

- 4.45 Royal Mail has historically found it difficult to find a single metric for efficiency, and management feel that PVEO could be a useful way of quantifying it. In particular, Royal Mail feels this could allow them to potentially have a common language of measuring efficiency with Ofcom.
- 4.46 Compared to other measures used by Royal Mail and Ofcom for measuring and monitoring Royal Mail efficiency, the merits of PVEO include:
- (a) Compared to the workload productivity measure<sup>29</sup> used historically by Royal Mail, PVEO helps look at efficiency gains from a monetary perspective while productivity is a strictly non-financial measure.
  - (b) Because the PVEO is calculated out of Royal Mail's own budget and business plans, it has the advantage of incorporating the realities and constraints the business faces. It provides a detailed snapshot of how budgeted costs change due to different given factors and helps determine efficiency at a functional level. This can be useful to identify areas of improvement when examined retrospectively and also for planning purposes when using forecasts.

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<sup>29</sup> A physical productivity measure which calculates workload processed per unit time.

- (c) PVEO can isolate one-off exceptional costs or incomes which might distort the view on efficiency. For instance, Royal Mail had significant VAT credit for 2013/14 which effectively reduced total costs. As part of the PVEO, this would be accounted for when measuring overall efficiency gains, but this would be seen as an efficiency gain when considering other cost based metrics such as unit costs (based on total costs), where such an adjustment would not necessarily be considered.
- (d) PVEO can be used a monitoring tool both internally and by Ofcom to assess budgets and efficiency gains. In cases where efficiency gains are higher or lower than expected in the budget, the PVEO set up can be used to perform sensitivity checks based on different assumptions to assess the driving factors behind this.

4.47 While there are merits of using PVEO as a monitoring tool for year on year comparisons, we have the following reservations about its use and reliability in context of setting regulatory targets and price controls:

- (a) Ofcom has stated that it would use CPI inflation on all costs in its PVEO analysis. Ofcom state in their update that the:

*“To the extent that pay rises outweigh CPI, the PVEO classifies this as an inefficiency (i.e. it reduces efficiency).”*<sup>30</sup>

[X]

We discuss this in greater detail in the Critique of Input Price Inflation section below.

- (b) There is an inherent difficulty in measuring the marginal cost effects of workload changes due to the nature of how the Royal Mail network works. Currently, a linear relationship between marginal costs and workload is assumed for Delivery Frontline and Processing Frontline costs historically and additionally for RDCs in Royal Mail forecasts. This is problematic because this linear relationship cannot be assumed without testing how sensitive actual operating costs are to workload in practice. Data to test how costs actually move with workload practically is limited to the Delivery Frontline pipeline only, and therefore there is very limited scope to make PVEO a robust piece of analysis that can be relied upon.

We also note that very few costs have been allocated to demand drivers in Ofcom’s monitoring update based on the limited information available. This problematic because a number of costs can be argued to be incurred due to changing workload or other business conditions over which Royal Mail has very

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<sup>30</sup> Annual Monitoring Update on the Postal Market for 2013-14, Ofcom, p.31

limited control. This is exacerbated by the restrictive nature of the 'Other' category, which only allows for costs that are significant enough to be announced to markets. This causes the costs to be captured in E as inefficiency. Because PVEO is a new measure for Royal Mail, there is also difficulty in estimating how much should be allocated to volume effects, creating a robustness issue.

We discuss the difficulty with measuring the volume effects of PVEO in more detail in the Critique of Volume Effects section below.

- (c) 'Other' has a very restrictive definition, as it only allows for one-offs that have a significant distortionary effect on income and need to be announced to markets. Therefore, many costs are automatically calculated as inefficiencies. This is discussed as part of 'Critique of Other' section.
- (d) The PVEO disaggregation is based on a static set of forecasts, and is dependent on volume and inflation assumptions at one point in time. By nature of design the efficiency figure for a cost item is the calculated residual based on the cost profile of that given year. Initiatives undertaken that do not generate immediate results will not be captured within PVEO, since the benefits would materialise in future years. Furthermore, some of these costs are captured as inefficiency because they are not allocated to P, V or O. We discuss this with examples later in this report and elaborate further in FTI's 'Regulatory Interventions' report.
- (e) PVEO has very limited predictive power. Furthermore, it has only recently been used by Royal Mail management and the model used requires greater fine tuning to reflect how costs flow through the business before it can be used as a reliable predictor of efficiency. Upon comparing PVEO projections for 2014/15 against actuals, Royal Mail management have found that it is not a strong predictor of efficiency gains.

Royal Mail findings are discussed in greater detail in the Predictive Properties of PVEO section.

- 4.48 Given the current lack of robustness in volume assumptions, we believe there is scope to refine the PVEO analysis for Royal Mail. It has limitations in its predictive capacity as the split of the actual PVEO Bridge can be very different from the projected figures due to a wide range of factors beyond management's control. Therefore, it is not useful in the context of setting efficiency targets in a price control. It is also worth noting that Ofcom's advisor, NERA has stated that Ofcom's analysis will have a direct effect on a price control should it proceed to impose one, and the analysis would require a greater degree of accuracy and robustness.<sup>31</sup> This supports our argument of the PVEO being unsuitable for setting an outright efficiency target or a price control at present.
- 4.49 However, it is worth noting that when PVEO is considered historically, it can provide useful information when a year on year analysis is performed. This is useful for management's own high level planning purposes, identifying potential areas of improvement and for monitoring efficiency.
- 4.50 PVEO is a useful tool when its users recognise how it is constructed, and that efficiency is in effect a residual which is dependent on estimated specific assumptions around volume effects and inflation. These underlying assumptions, therefore, need to be considered with care when drawing insight from the efficiency residual. It also needs to be recognised that PVEO has many limitations, and requires further refinements.
- 4.51 Therefore, PVEO is best used in conjunction with a range of other efficiency metrics, as the results of PVEO alone may not be enough to assess Royal Mail efficiency appropriately. The PVEO results can also conflict with calculations using other efficiency metrics because of the differences in underlying assumptions and approaches. This can be best explained by examining the findings of Ofcom's Annual Monitoring Update on the Postal Market 2013/14. For this update, PVEO indicated a small increase in efficiency; cost per unit adjusted for CPI indicated a small increase in real costs (decline in efficiency). The physical productivity metric also indicated an improvement in efficiency. Given that different metrics produce opposite results for the same year, we believe that any assessment of efficiency should be based on multiple metrics. We also note that Ofcom's advisor, NERA, has pointed out that all regulators have combined a number of different approaches to efficiency assessment.<sup>32</sup>
- 4.52 Finally, it should also be recognised that PVEO cannot capture dynamic efficiency, and also setting an efficiency target sets up perverse incentives. Were an explicit efficiency target to be put in place with penalties or rewards around this target then management may become overly focussed on meeting that target. The incentive would be to meet the efficiency target as defined in regulation, rather than to necessarily make Royal Mail more efficient.

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<sup>31</sup> NERA Report: Approaches to measuring efficiency for postal operators, Ofcom website, 43

<sup>32</sup> NERA Report: Approaches to measuring efficiency for postal operators, Ofcom website, p.30

### Critique of 'Input Price Inflation'

- 4.53 Ofcom has used CPI for the purposes of the PVEO analysis in its Annual Monitoring Update on the Postal Market, 2013/14. Ofcom outlines explicitly in the document that any increases in costs, including pay costs, above CPI would be classified as an inefficiency as per PVEO.<sup>33</sup> Arguably, this is the most significant difference in assumptions. Ofcom's CPI allowance will underestimate efficiency.
- 4.54 We therefore have the following concerns with the CPI approach adopted by Ofcom:
- (a) [X]
  - (b) [X]
  - (c) [X]
  - (d) Furthermore, Ofcom's current approach does not distinguish between people and non-people costs by imposing a strict CPI allowance. However, certain costs have particular characteristics which warrant a unique inflation allowance to be set for them. An example of this is the cost for fuel, which would be driven by the world commodity market and is beyond Royal Mail's control. The same holds true for property costs, which are driven by the commercial real estate market.<sup>34</sup>
  - (e) For costs where a particular allowance cannot be concluded, an RPI allowance should be set. Most economic regulators use RPI as the benchmark for price caps as the expectation is that the input costs of the firm are expected to increase with RPI. Therefore price caps are set on an RPI basis to ensure the allowable prices charged by the regulated firm are sufficient to cover the costs they face. [X]
- 4.55 In March 2015, Royal Mail confirmed a 2.8% increase for frontline staff for the financial year 2015/16, which is the final year of a three-year pay deal.<sup>35</sup> We note that the current pay deal for frontline staff provides pay at 2.8%, which is higher than Royal Mail's own RPI assumption of 1.4%. [X]
- 4.56 [X]

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<sup>33</sup> Annual Monitoring Update on the Postal Market for 2013-14, Ofcom, p.31

<sup>34</sup> While specific fuel is present in the current version of Royal Mail's PVEO, the adjustment has not yet been made for property. An RPI inflation rate is currently assumed. Royal Mail do not expect this to have a material impact on the final efficiency calculations.

<sup>35</sup> [Royal Mail Annual report 2014/15](#), p.11

**Table 4.8** [✕]

[✕]

*Source: Royal Mail*

4.57 [✕]

4.58 In relation to non-people costs, we concur with Royal Mail's view that the cost allowance in absence of any specific inflation assumptions should be based on the RPI based on the arguments identified earlier in this chapter.

**Critique of 'Volume effects'**

4.59 Volume effects represent the changes in costs due to changes in volume of traffic handled by Royal Mail.

4.60 As part of its business, Royal Mail delivers a variety of items including letters, large letters and parcels. Royal Mail uses a 'workload' measure to obtain an estimate of how much of their resources would be utilised based on volume projections. The workload measure represents the number of hours required by a hypothetical operator to service a given volume and mix of mail. It assumes conformance to standard level of performance, a steady state at the volume and mix of mail and the current network design. To establish workload, Royal Mail applies 'planning values' to their projected volume data. The planning values were developed by a group of industrial engineers back in 2012 and they have been recently updated in 2015 based on current operational design.

4.61 Currently, both Royal Mail and Ofcom (as per the latest Annual Monitoring report) assume a one-for-one change in people costs due to change in workload for certain pipelines such as Delivery Frontline, Processing Frontline and RDCs (Royal Mail only for RDCs). For example, if it is projected that workload for Processing will reduce by 1%, the number of hours and therefore, the money costs (base year cost adjusted for inflation) associated with this cost will also decline by 1%.

4.62 However, for many other costs a direct relationship between workload and costs is harder to establish. Other than Processing Frontline and Delivery Frontline, Ofcom allocate costs to demand drivers only for POL costs and terminal dues. All costs above inflation in POL are allocated to demand drivers and the estimated increment in terminal dues is calculated based on the change in export weight. Royal Mail has internally debated the allocation of many such costs under demand drivers in its attempts to fine tune the PVEO analysis. Currently, the forecasted allocation into demand drivers is based on individual business units' assumptions and their business plans.

- 4.63 Based on a review of the assumptions and calculations underlying volume effects, we have a number of concerns:
- (a) There is an inherent difficulty in determining which cost changes are driven by demand, since not all costs may have a direct link with volumes, for example those needed to support new products and services. For instance, certain IT upgrade costs are required to support the introduction of newer products to the market require a more advanced IT system.<sup>36</sup> However, this investment does not have a direct relationship with workload and could erroneously be captured as inefficiency. The fact that the 'Other' category has a stringent definition exacerbates the problem and the PVEO may therefore produce misleading results.
  - (b) Even if more cost categories had a volume effect allocation applied to them, the difficult question of how to make that allocation would still remain. For example, currently export weight data is used for international terminal dues and while this is a reasonable approach, the PVEO would require a greater understanding the operational design of other functions, and also the appropriate data to make an informed judgement about what is a reasonable cost allocation to Demand Drivers. Royal Mail analysis calculated this allocation based on assumptions by each business unit. While this is useful to the extent that business units recognise their own budgets best, the current state of the data availability does not allow for this robustness to be incorporated in an objective and theoretically sound manner.
  - (c) In relation to functions where cost variability is dependent on workload; a one-for-one relationship between costs and workload is assumed. Changes in workload are assumed based on a combination of volume forecasts and planning values determined by study of the operational design. If the predicted workload matches the actual, then the resources deployed can be used efficiently as planned. Theoretically, if workload is different, a different set of resources can be used and lower costs can be achieved. However, this is not always possible practically since there may be instances where predicted and actual workload is different, and there may not be enough time to re-adjust resources to allow an efficient allocation. Therefore the extent to which the workload measure can accurately predict cost variability in PVEO forecasts is not certain.
  - (d) The marginality assumption of a one-for-one change in certain costs with workload is unlikely to bear complete accuracy. While econometric studies can

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<sup>36</sup> This cost is included as a business-as-usual operating expense as Royal Mail outsourced the task work to external parties.

be undertaken using Royal Mail's delivery office cost data such robust data and analysis are not available across other cost pipelines to be able to predict the practical relationship between the two variables in practice.

- (e) Efficiency will be underestimated if a one-for-one relationship is assumed as opposed to a less than one-for one relationship for a given cost. Conversely, it is also true that if a less than one-for-one marginal effect is considered for PVEO, the efficiency residual does not reflect any efficiency gained through economies of scale.

- 4.64 All of the factors discussed above may have significant impact on the actual volume effects, and consequently efficiency residual calculated from PVEOs.

#### **Critique of 'Other'**

- 4.65 Royal Mail and Ofcom have agreed the 'Other' in the PVEO analysis as one off costs that have been announced to the market. Therefore, O is relevant only for historical costs and not forecasts. This highlights the limitations of PVEO as some non controllable costs could be captured as an inefficiency if they do not fit into the P or V.
- 4.66 Royal Mail have informed us that the current model does not capture all historical one-off costs which meet the above definition, and the model required further fine tuning to produce a more accurate result. This highlights a completeness issue with the model, and therefore there is a lot of scope to fine tune and incorporate more data into it to make it a more reliable source of drawing conclusions on efficiency.

#### **Issues of Dynamic efficiency**

- 4.67 One important limitation of PVEO analysis is its inability to match transformation costs with the resulting benefits stream which will occur over a number of future years. Transformation costs are entered into the PVEO model in the year in which they are incurred, whereas the benefits that arise in the form of lower costs occur in later years. This results in an artificial dip in efficiency during the transformation period.
- (a) For example, one reason for a low efficiency estimate in 2013/14 is due to the costs of the privatisation, management reorganisation and modernisation. However, the benefits of these were observable later in 2014/15, where efficiency as per PVEO was higher.
  - (b) [X].

- 4.68 By nature of design, PVEO provides a static assessment. This could produce perverse incentives for management not to focus on dynamic efficiency. One way to smooth the impact of transformation costs is to consider pre-transformation costs efficiency. However, this would not reflect the costs required to make efficiency gains and would result in cumulative efficiency gains being overstated. Therefore efficiency should be considered over a long enough period so that both transformation costs and realised benefits are captured. Otherwise the PVEO may produce a misleading view on efficiency, when looked at over a short period of time.

#### **Predictive properties of PVEO**

- 4.69 PVEO is reliant on accurate forecasts of assumptions over time. For example, an assumed inflation rate will dictate not only an agreed pay deal but also the efficiency gain when forecasted. However, in reality, inflation might be very different but the pay deal set cannot be changed. This would imply that the predicted efficiency is not achieved. Furthermore there may be costs which cannot be foreseen that management would have to undertake, or perhaps the volume assumptions do not follow as planned.
- 4.70 [X]

#### **Usefulness of PVEO**

- 4.71 PVEO may provide a useful common language between Royal Mail and Ofcom. However, it is important to note that it is constructed based on a number of assumptions and the efficiency residual is dependent on these. For an accurate representation of efficiency, the assumptions need to be robust. Furthermore PVEO estimates are volatile due to the mismatching of transformation costs and benefits.
- Therefore, PVEO may provide useful insight when used for measuring efficiency historically and as a forward looking monitoring tool as it provides information on management targets and the extent to which management are stretching themselves in this area. However, forecast PVEO analysis is unlikely to be accurate enough to regulate against.

#### **Royal Mail's PVEO performance**

- 4.72 [X]

#### **Table 4.9 [X]**

Source: Royal Mail

4.73 [X]

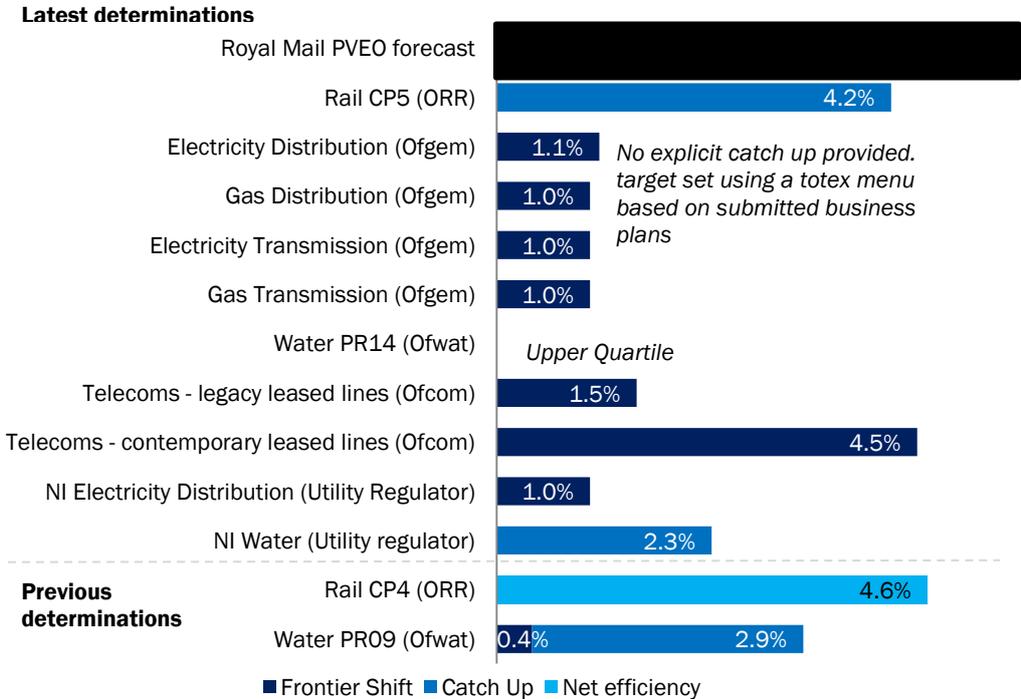
Figure 4.3 [X]

[X]

Source: ONS data, Royal Mail analysis  
 Note: The ONS numbers are for the calendar year during which the financial year begins (i.e. for 2011/12 comparison, we have used 2011 ONS numbers)

- 4.74 We have also compared Royal Mail’s PVEO performance to efficiency factors calculated by other regulatory authorities. These are useful in two respects:
- (a) They provide an indication of the speed at which regulated entities are being required to close any efficiency gap; and
  - (b) The E in PVEO should be broadly comparable to these efficiency rates of change, since they exclude volume and input price inflation effects.

Figure 4.4 [X]



Source: Regulatory final determinations, external consultant reports, FTI analysis. Refer to appendix 1, table A1.2- Summary of Regulatory Determinations, for details on which costs are covered and references to all sources.

Notes:

- (i) The ORR PR13 target is the weighted average of targets for different cost categories of operations, support, maintenance and renewals and is 19.4% over the control period. There was no frontier shift or input price inflation allowance in the target. The annual equivalent is 4.22%. The frontier shift associated with enhancement costs was 0.4% p.a.
- (ii) The ORR PR08 target is the weighted average of net efficiency targets for different cost categories of operations, support, maintenance and renewals and is 21% over the control period. Net efficiency is based on the gross catch up and frontier shift less input price effects. The frontier shift was 0.7% p.a. except for operations where this was 0.2%.
- (iii) The Ofgem frontier shift assumptions are for opex only.
- (iv) In the recent reviews, Ofgem does not report a per-annum efficiency reduction in costs but offer a total expenditure (“totex”) menu which is different method of regulation that does not specify a catch up.
- (v) Ofwat also uses a menu regulation where the target is set at the industry upper quartile level of efficiency.
- (vi) The upper end has been used for the target range with regard to Water PR09 and Electricity distribution.
- (vii) For Northern Ireland Water, the target shown is for opex. A frontier shift for opex was not provided. For capex, the frontier shift was 0.6% and catch up was 1.44%.

4.75 [X]

#### **Characteristics that allow higher efficiency gains**

4.76 There are two important characteristics that allow higher efficiency gains in an industry: technological change and industry growth. For example, the highest productivity rates in the UK are associated with the IT sector<sup>37</sup> and the rationale for BT’s efficiency targets being higher than for many other regulated industries is that they are more akin to the IT sector.

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<sup>37</sup> This is based on average historical TFP growth across different industries in the UK based on ONS data on multi factor productivity by industry (historical average from 1998-2013).

**Increasing volumes**

- 4.77 Ofcom forecast volumes for both TI and Ethernet connections. While the number of TI circuits is expected to fall (by approximately 20% a year)<sup>38</sup> during the charge control period, this is offset by an increase in Ethernet circuits of approximately 10% per year. When measured by network capacity, volumes are expected to grow significantly.
- 4.78 Increasing volumes make stringent efficiency targets easier to achieve. Most obviously, if efficiency targets are set on a unit cost basis, higher volumes reduce the fixed cost per unit. In addition, volume growth makes it easier to redeploy resources, and reduces the need to pursue costly redundancy programmes.

**Scope for introduction of new technology**

- 4.79 Telecommunications is a digital and relatively immature industry. It benefits from rapidly falling equipment costs, which leads to a large fall in total cost as marginal cost is very low. This is particularly true for newly introduced products. Ofcom previously accounted for this by setting differential targets for traditional interfaces and Ethernet.
- 4.80 As over time newly introduced, faster products would be expected to gain market share, high efficiency gains for these can be expected to lead to high gains for the industry as a whole.
- 4.81 Rail is not an immature industry, but it has significant scope to be transformed by new technology. Network Rail recognise this, and their business plan for CP5 included two programmes to achieve this aim (in addition to the introduction of advanced networks such as the High Speed network and Crossrail):
- The Network Operating Strategy (“NOS”), aimed to roll out remotely controlled signals across the network, and centralise signalling and electrical control to 14 control centres; and
  - The Intelligent Infrastructure programme aimed to increase the proportion of assets monitored remotely. This minimises costly site visits, and can be used to ensure assets are not replaced until the end of their useful life, rather than at a previously determined date.<sup>39</sup>
- 4.82 Mail a mature industry with declining demand in letters, and deliveries cannot be performed remotely. New technology will lead to opportunities for efficiencies, but not on the scale of in either telecoms or rail. We note that Royal Mail has made substantial investments in rationalising and automating its sorting and delivery networks, but

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<sup>38</sup> [Business Connectivity Market Review – Annexes: Leased lines charge controls and dark fibre pricing](#). Traditional Interfaces, para 8.35 – Ethernet, para 8.70.

<sup>39</sup> Network Rail PR13 Draft Determinations p173-174

delivery activities still rely on a substantial amount of labour effort, which cannot be automated.

- 4.83 The table below demonstrates that Royal Mail, in comparison to other UK utilities, has a higher proportion of labour costs.

**Table 4.10: Labour intensity: People costs as a proportion of operating costs**

<b>Company</b>	<b>Industry</b>	<b>People costs/Opex ratio</b>
Royal Mail Group	Post	61%
Royal Mail UKPIL*	Post	68%
Royal Mail Reported Business**	Post	68%
Severn Trent	Water	26%*
Bristol Water	Water	13%
Thames Water	Water	10%
Network Rail	Rail	27%
National Grid	Energy	38%
SSE	Energy	55%
BT	Telecoms	27%

*Source: 2015 Annual reports of individual companies and Royal Mail Reported Business Cost Matrix. All figures are pre transformation.*

*\* UKPIL is the letter and parcel business of Royal Mail in the UK*

*\*\* Reported Business represents UKPIL excluding PFWW*

- 4.84 [✂]

- 4.85 We expect Royal Mail to achieve lower levels of efficiency in comparison to some other regulated firms as Royal is more labour intensive and less technologically driven than many other regulated industries.

## 5. Other Efficiency Metrics

### Introduction

- 5.1 Efficiency can be assessed on either a top-down or bottom up approach:
- (a) Top down approaches typically compare final cost numbers against another comparable companies or within a company, adjusted for output, size and other operational factors where possible.
  - (b) A bottom up approach involves a more detailed review of outlined costs and making an assessment of whether this is efficient given the circumstances the company faces. Comparisons may be made to other firms in the same industry provided that they can be shown to be comparable.
- 5.2 A number of techniques may be used to assess efficiency, although these usually fall into three broad categories:
- (a) Rate of change analysis: This is a time series analysis which examines the trend in efficiency for a particular firm or for a particular firm in relation to a set of comparators. It requires the calculation of efficiency over a number of years.
  - (b) Cross section analysis: usually a top down comparison of the efficiency of one firm relative to an internal efficiency frontier or other comparator firms.
  - (c) Bottom-up expert review: usually involves a review of the firm's business plan to identify opportunities for improvement.
- 5.3 A number of methodologies that have been employed by regulatory authorities are described below. Comparisons can be carried out within a firm or across firms:
- (a) Internal benchmarking: Comparison of the performance of individual units within a firm, which undertake the same task, for example delivery offices or mail centres. Internal benchmarking assesses the degree to which units within a firm are efficient, as compared to the best unit. It cannot assess whether that best unit is efficient.
  - (b) External benchmarking: Comparison between firms. When comparing across firms, the choice of comparators is fundamental.
- 5.4 Various techniques are available to perform efficiency benchmarking:
- (a) Simple unit cost benchmarking: One of the simplest methodologies, involving

the calculation of simple unit cost ratios, e.g. cost per unit of volume or per employee. These are compared with those of other companies or over time. This is a strictly monetary measure, and does not account for the effect of non-controllable factors and it can be difficult to identify comparable firms.

- (b) Adjusted unit cost benchmarking: Adjustments are made to the unit cost estimators to control for factors outside the firms' control and to make the unit costs between firms more comparable. However, it is often difficult to identify and control for these factors. RUOE aims to control for volume and price effects.
- (c) Parametric frontier studies: These is internal or external benchmarking using econometric techniques, based on either a single year or multiple years data and accounting for the effect of non-controllable factors on costs.
- (d) Non-parametric frontier studies: These include techniques such as data envelope analysis and do not impose a functional form on the relationship between costs and their drivers, and they are non-stochastic techniques.
- (e) TFP analysis: Various methodologies, including simple year on year comparisons, indexation or econometric models. The PVEO approach seeks to estimate an efficiency factor that is broadly equivalent to TFP.
- (f) Process or functional benchmarking: assessing the efficiency of particular functions or processes against comparators to identify specific improvements. Unit cost metrics are used for these comparisons.

### **The importance of considering a range of efficiency metrics**

5.5 No single efficiency metric is likely to be robust enough to rely on in isolation. It is usual for regulatory authorities to consider a range of metrics for efficiency assessment. However, given the number of metrics available, it would not be possible for any regulatory authority to consider the full suite of metrics. It is therefore necessary for a regulator to choose an appropriate set of metrics, based on the data available and the purpose for which the metric is being calculated.

5.6 The case studies below demonstrate this.<sup>40</sup>

#### **Case Study 5.1: Ofcom and the leased line charge control**

The leased line charge control covers two products – traditional leased lines (TI) which are based on legacy technology and contemporary leased lines (CI) which are based on more modern Ethernet technology.

<sup>40</sup> Appendix 1 includes an overview of current regulatory precedent around efficiency

In the current charge control (due to expire in 2016), efficiency was set at 1.5% pa for TI and 4.5% p.a. for CI. This recognised that efficiency gains were likely to be lower for end-of life products and higher where technological advances were more applicable.

In developing the target, Ofcom relied upon various sources of information, as the table below extracted from the final determination shows. It should be noted that it did look at other sources of information such as unit costs from regulated accounts, annual reports and analysts' reports; however these were not considered in the final determination. As a result of this analysis, Ofcom concluded that BT was relatively efficient and therefore the efficiency challenge was predominantly related to the frontier shift.

**Table 5.1: Evidence on TI efficiency assumption used by Ofcom in BCMR 2013**

	<b>TI specific historical trend analysis</b>	<b>BT wholesale internal efficiency targets</b>	<b>2012 Deloitte study (SFA and TFP)</b>	<b>Statistical analysis (NERA, Deloitte using SFA and TFP)</b>
Efficiency %	~1.5%	Not published	2.25%	~2%
Comment (from Ofcom)	Ofcom's analysis of BT wholesale's historical TI data	Relates only to SG&A costs, which account for only a small proportion of total BT wholesale costs	Benchmark against 5 other European operators	Benchmark against US LECs

Source: Figure A12.22, Evidence on TI efficiency assumption, page 304 of BCMR final statement, 2013. Ofcom noted that "other sources of information were considered. However for the reasons set out below we did not factor these into our final range".

**Table 5.2: Evidence on Ethernet efficiency assumption used by Ofcom in BCMR 2013**

	<b>Openreach specific trend analysis</b>	<b>Openreach internal efficiency targets</b>	<b>2012 Deloitte study (SFA and TFP)</b>	<b>Statistical analysis (Deloitte, NERA using SFA and TFP)</b>	<b>KPMG study</b>
Efficiency %	~5%	Not published	2.25%	~2%	~2.3%-2.6%
Comment (from Ofcom)	Ofcom analysis of Openreach's historical cost data	Internal targets set for the subsequent 3 years	Benchmark against 5 other European operators	Benchmark against US LECs	Excludes fault rates and task times

Source: Figure A12.23, Evidence for Ethernet efficiency assumption, page 308 of BCMR final statement, 2013.

**Case Study 5.2: ORR and Network Rail** <sup>41</sup>

In the latest periodic review for Network Rail, Control Period 5 (“CP5”), the Office of Rail and Road (“ORR”) measures efficiency for costs around support, operations, maintenance and renewals. This was done through a thorough combination of bottom up and top down analysis. ORR refers to this as a hybrid approach, emphasizing the use of multiple sources for setting plausible realistic targets. With regard to support costs, where these were robustly outlined in business plans, ORR has relied on them for use in their bottom-up assessment. When not robust enough, ORR has relied on studies produced by external consultants such as Cambridge Economics Policy Associates (“CEPA”).

In particular, CEPA has performed a top down analysis of potential efficiency gains achievable by Network Rail based on historical performance of other UK network industries and different sectors’ productivity. Variables considered were Real Unit Operating Expenditure (RUOE), TFP and a Labour, Energy, Materials and Services (“LEMS”) cost measure.

ORR has also used some econometric analysis on international peers of Network Rail as a sense check for the efficiency estimates of maintenance and renewal costs.

**Case Study 5.3: Ofwat and water companies**

Ofwat uses menu regulation, not RPI-X for its price controls. In the 2014 price controls for water companies by Ofwat, there is a heavy reliance on econometric modelling for assessing efficiency due to availability of large sets of panel data. This has allowed Ofwat to develop a reliable view of which firms are the most efficient, and then conclude the upper quartile efficiency achievable based on which firms have the lowest cost base. For each individual firm, Ofwat’s approach is to triangulate results obtained from multiple model specifications such as random effects and corrected OLS to forecast a basic cost threshold (“BCT”), which is different from the firms’ actual cost case, and it then adjusts the BCT to reflect upper quartile level of efficiency.<sup>42</sup> The BCT is then adjusted to make allowance for ‘Policy Items’ (such as pension deficit recovery costs) and ‘Special Cost Factors’ (estimates of special cost claims made by the business stakeholders) to set the final determination cost threshold.<sup>43</sup> It is this cost threshold that goes into Ofwat’s incentives menu.

<sup>41</sup> [ORR Final Determinations for CP5 \(pages 153, 160 161 and 332\)](#)

<sup>42</sup> [Basic Cost Threshold Model](#), Ofwat PR13

<sup>43</sup> [Ofwat Final Determinations](#) PR14, p. 35

Ofwat is able to perform this level of benchmarking because of the relatively large number of firms in the industry and the availability of data. Ofwat's approach demonstrates the need to be thorough and robust by applying different econometric specifications to obtain its results.

#### **Case Study 5.4: Ofgem and energy companies**

Like Ofwat, Ofgem uses menu regulation. For transmission, Ofgem assesses the expenditure proposed by each company at an 'activity' level. Rather than attempt to derive efficient costs, Ofgem and their industry consultants examine the business plan they were provided to assess if it contained inefficiencies. Additionally, some quantitative and qualitative techniques were used, including:

- Unit cost benchmarking;
- Trend analysis; and
- Sample scheme review. This involved Ofgem and consultants performing a detailed analysis of a number of planned projects.<sup>44</sup>

For distribution, Ofgem use both top down econometric modelling as well as bottom up modelling in addition to bottom-up cost analyses.<sup>45</sup>

One important point to note under Ofgem's approach is that it recognizes that firms are affected by input price inflation as opposed to a general price inflation indicated by indices such as CPI/RPI. In particular, it notes that the prices of several inputs (notably labour) do not change in line with the RPI. The forecasts are therefore adjusted for real price effects exceeding general inflation.<sup>46</sup>

- 5.7 In context of Royal Mail whilst the PVEO approach provides information on historical and forecast performance, it is subject to a degree of judgement and should be cross-checked against alternative metrics. If different measures suggest different efficiency trends then further analysis is required to understand the variation and care must be taken in interpreting or acting on the results. As an example of this potential variation, Ofcom's latest annual monitoring report states that PVEO analysis showed an improvement in efficiency of 0.2% over the year, but unit cost analysis indicated that efficiency had declined by 0.2%.<sup>47</sup> If different analyses give outputs that are directionally different, this is indicative of inherent limitations in the use of any single metric (or even group of metrics).

<sup>44</sup> [RIIO- T1 proposals](#), para 1.8, p4

<sup>45</sup> [RIIO-ED1 final determination overview](#), para 4.9, p23

<sup>46</sup> [RIIO - T1/ED1 - Real price effects and ongoing efficiency. chapter 2](#)

<sup>47</sup> Ofcom, Annual Monitoring Report, 2013-14, paragraph 4.22 and 4.26.

- 5.8 If analysis using multiple efficiency metrics yields at least directionally consistent results, then greater confidence can be placed in those results.
- 5.9 We note that considering a number of metrics appears to be consistent with Ofcom’s general approach as demonstrated in case studies 5.1 to 5.4. Also, in its latest annual monitoring report, Ofcom considers several metrics.<sup>48</sup> Additionally, a report commissioned by Ofcom to NERA in 2013 on assessing postal efficiency states that: <sup>49</sup>
- “All regulators have combined a number of different approaches to efficiency assessment in the context of price control reviews...”*
- 5.10 NERA goes on to explain that, in industries where there are a limited number of comparable domestic firms to use for cross-sectional studies (such as postal services):<sup>50</sup>
- “... regulators have typically commissioned a range of different studies to assess the scope for efficiency improvements, and the overall efficiency target has been based on a judgement that reflects both the findings across all of the studies and the perceived robustness of individual pieces of evidence.”*
- 5.11 Whilst we consider that the PVEO provides useful information on Royal Mail’s historic and forecast efficiency, we consider that it is only one source of efficiency information. As such, we recommend that other metrics are also considered.

### Selecting the “right” efficiency metrics

- 5.12 There is no single “right” metric with which to measure efficiency and that a number of factors should be taken into account when choosing the metrics. These include:
- Is the metric intended to analyse the company’s performance overtime or to be used as a target?
  - Does the metric allow for meaningful comparisons either within a company or between companies and / or over time?
  - Does the metric robustly separate efficiency from other exogenous factors including shocks?
  - How “data heavy” is the metric?

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<sup>48</sup> Ofcom, (2014), Annual monitoring report on the postal market.

<sup>49</sup> Nera (August 2013), Approaches to Measuring the Efficiency of Postal Operators: Final Report for Ofcom, 3.4

<sup>50</sup> Nera (August 2013), Approaches to Measuring the Efficiency of Postal Operators: Final Report for Ofcom, 3.4

- Can the metric easily be updated?
- Is the metric easy to understand and communicate?

5.13 Below we summarise a number of other efficiency metrics that Ofcom could consider, namely:

- Unit costs;
- RUOE;
- TFP;
- Workload productivity; and
- Econometric frontier approaches.

5.14 We note that other national postal operators have previously disclosed specific operational efficiency metrics, which they use for managing their businesses, for example at a conference in 2009 on “Best Practice on Productivity Measures”.<sup>51</sup> We have given consideration as to whether these could be used to assess Royal Mail’s efficiency. However, there does not appear to be consistency in the metrics used between these operators and nor do these firms regularly disclose how they measure efficiency. For example, Deutsche Post appears to have used a methodology similar to Royal Mail’s workload measure, and other operators used a variety of operational KPIs based on man hours taken to perform specific task. It does not appear that these operators disclose whether they consider any specific cost related efficiency metrics. Therefore, the usefulness of this analysis and approach is limited.

5.15 Below, we provide additional detail on the five metrics that we have listed.

### **Unit cost measures**

#### ***What are unit cost measures?***

5.16 Unit cost measures typically take the cost of the business, or a part of the business, and divide it over a measure of quantity. Revenue may be used as the numerator, as opposed to a measure of cost, although changes in this metric may be less indicative of efficiency.

5.17 Ofcom has considered a “people cost per FTE”<sup>52</sup> metric, which has then been

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<sup>51</sup> See for example, the presentations given at the “Best Practice Seminar on Productivity Measures”, organised by the International Postal Corporation in 2009.

<sup>52</sup> FTE stands for full time employee

compared to a “revenue per FTE” metric.<sup>53</sup>

#### ***Limitations of unit cost measures***

- 5.18 As with other measures, it is more appropriate to consider costs on a real basis. It is possible to look at the trend in each metric or compare the metrics to those by comparator companies. While such metrics can be used as a “first level indicator”, they are not sufficiently robust to provide any reliable real indication of efficiency.
- 5.19 When looking at revenue per FTE metric or a cost per FTE metric, there are significant problems with interpretation. For example, revenue per FTE metric that is increasing might simply be a result of higher prices, and not any efficiency improvement. Similarly increases in cost per FTE might not be due to inefficiency, but instead arise from multi-year pay deals negotiated by unions that cannot be altered without the risk of industrial action, or as a result of cost increases outside of Royal Mail’s control.
- 5.20 These measures fail to account for a number of potential issues with comparability. For example, there is no control for changes in volumes, product mix, differences in USO specification, accounting rules or operating structures and environment between Royal Mail and any comparator firms. Consequently, we consider that such metrics provide only very limited indicators of efficiency.

### **RUOE**

#### ***What is RUOE?***

- 5.21 RUOE is a conceptually straightforward measure of the change of the real cost per unit of production or output over time. It expresses operating efficiency in terms of the relationship between the value of a given set of inputs and the volume of outputs. Decreasing unit costs may therefore indicate increasing efficiency and vice versa.<sup>54</sup>
- 5.22 RUOE is typically calculated as total accounting costs before depreciation, adjusted for the effects of inflation and divided by a relevant measure of output. Alternatively either depreciation or capital expenditure can be included (i.e. to take account of accounting operating costs and the capital costs required within the business). This measure is referred to as real unit operating cost (“RUOC”). Often output is measured as recorded volumes.
- 5.23 In principle, RUOE analysis has many similarities with PVEO analysis and the two techniques should yield similar results, but RUOE analysis is performed at a much

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<sup>53</sup> Annual Monitoring update for the postal market 2013/14, Ofcom

<sup>54</sup> Although, as discussed below, care needs to be taken that decreases or increases in volume are not misinterpreted as efficiency losses or gains.

higher level, with no disaggregation of costs and with one input inflation assumption used. This makes it more useful for benchmarking between industries as less data is required; however its relative simplicity reduces its accuracy.

- 5.24 There is regulatory precedent for using RUOE. Ofcom assesses unit costs in real terms, using workload as the denominator of its calculation.<sup>55</sup> The Office of Road and Rail (“ORR”) commissioned a study in 2008, in which RUOE was used to assess the scope of cost efficiency gains for Network Rail over the next two control periods and the ORR again considered RUOE in 2012.<sup>56</sup> RUOE was considered by National Grid as part of its submissions in the recent RII0 price reviews,<sup>57</sup> as have the CAA,<sup>58</sup> and Ofwat.<sup>59</sup> This means that regulators have expressed views as to what an appropriate level of efficiency should or could be.

***Limitations to be considered in the use of RUOE***

- 5.25 The results of RUOE analysis will depend upon the measure of output used and typically this is a volume measure. However, where outputs are not homogenous (i.e. a different mix of products each year), then this risks distorting the RUOE analysis. This is because total volume comprises multiple different product types that have different costs and the mix of these products may change over time, affecting the cost base.
- 5.26 This is the case in mail delivery services, where there is a change in product mix due to declining volumes of letters and an increasing volume of parcel deliveries. Letters and parcels have different sizes and weights and this means that the time to process and deliver each differs. Consequently there are differences in the associated unit cost for each type of product. A change in product mix, therefore affects costs and this is not properly captured if a simple volume figure is used as the output measure.
- 5.27 RUOE can be adjusted to reflect changing product mix; such an adjustment is particularly important in an industry where there is a long-term trend of changing product mix such as post. There is regulatory precedent for making such adjustments

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<sup>55</sup> Ofcom, Annual Monitoring Report, 2013-14, paragraph 4.26.

<sup>56</sup> Oxera, Network Rail’s scope for efficiency gains in CP4, April 2008, Section 4. See also CEPA, “Scope for improvement in the efficiency of Network Rail’s expenditure on support and operations”, March 2012.

<sup>57</sup> CEPA, 2003, “Productivity improvements in distribution network operators” and Reckon, 2007, “Gas distribution price control review: Update of analysis of productivity improvement trends” [RIIO-T1: Initial Proposals consultation response, National Grid, September 2012](#). Productivity, Efficiency and Growth, Oxera, 2012. Note that National Grid and Oxera did not present the full results of any RUOE analysis performed.

<sup>58</sup> CEPA, 2013, “Scope for efficiency gains at Heathrow, Gatwick and Stansted Airports”.

<sup>59</sup> Reckon, 2008, “PR09 Scope for efficiency studies”.

for changes in product mix. We consider that Royal Mail's "workload" (discussed in chapter 4) measure may control for the impact of product mix on expected costs.

- 5.28 In performing RUOE analysis it is important to understand that the relationship between volumes and changes to costs is typically not linear, due to the presence of economies of scale and fixed costs. Therefore, it is important to control for the expected impact on costs for a change in volumes, this is often referred to as "marginality".
- 5.29 Marginality can have a material impact on an assessment of efficiency, particularly where there is a long-term declining trend in volumes. Failure to properly assess marginality creates a risk that an assessment of efficiency may be misstated. There is regulatory precedent for adjusting RUOE measures of efficiency for marginality, although simplifying assumptions are typically needed, for example the marginality coefficient is typically assumed to be constant and applicable to the entire pipeline of costs.<sup>60</sup> These simplifying assumptions reduce the robustness and reliability of such a measure.
- 5.30 In theory, one could begin to break down costs and apply different marginality assumptions, etc. However, this analysis will then become more akin to PVEO or TFP analyses, where costs are split out by function and the advantage of the simplicity of the measure is lost.
- 5.31 The time period over which costs change is an important issue to consider, particularly when volumes are declining. NERA recognise this principle:
- "There is also evidence that, in the postal industry, costs are less responsive to volumes when demand is falling than when it is rising, at least in the short term."*<sup>61</sup>
- 5.32 These lags in the ability to remove costs with declining volumes can arise for a number of reasons, for example, the degree of labour intensity and the influence of trade unions could make it more difficult to remove cost (e.g. labour hours) on a timely basis. These issues limit the ability of a business to take out costs in response to declines in volume, at least in the short run. This creates the risk that these lags are wrongly interpreted as inefficiency. The impact of this may be material in a market such as post with declining volumes and significant short-run fixed costs.
- 5.33 RUOE analysis is also sensitive to the inflation index that is used to convert nominal

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<sup>60</sup> For example, see CEPA, 2012, "Scope for improvement in the efficiency of Network Rail's expenditure on support and operations", prepared for the ORR and Reckon, 2007, "Update of analysis of productivity improvement trends", for Ofgem.

<sup>61</sup> "Approaches to Measuring the Efficiency of Postal Operators: Final report for Ofcom", NERA, August 2013.

operating expenditure into real terms and the base year and the type of indexation approach used.

- 5.34 RUOE analysis is sensitive to accounting treatment and care must be taken to ensure that RUOE ratios are calculated on a comparable basis. For example, the choice of useful economic life and depreciation profile may affect the calculation of RUOE ratios if depreciation is used as a proxy for capital expenditure.
- 5.35 Finally, as discussed previously Royal Mail faces unique challenges compared to regulated businesses in other sectors, arising from its USO, changing product mix, volume decline, labour relations and other issues. Therefore, it would not be appropriate to define RUOE improvement targets based simply on unit cost improvements that have been achieved by businesses in other sectors, which may not be truly comparable. Comparisons to other national postal operators would also face a number of challenges, as there would be differences in the stage of service modernisation, market liberalisation and labour relations.
- 5.36 How these challenges should be considered in assessing efficiency is subjective and a matter of judgment. Care must also be taken in the interpretation of results derived from comparator sets as a range of values will be calculated covering a wide range of industries and the application of a simple average may not be appropriate.

#### ***Royal Mail's performance on RUOE basis***

- 5.37 Over the period 2010/11 to 2014/15, Royal Mail has achieved RUOE improvements ranging from -0.4% to 3.7% , with an average annual efficiency improvement of approximately 1.3%. [X]

[X]

#### **Table 5.3** [X]

[X]

- 5.38 Between 2010/11 and 2014/15, Royal Mail's efficiency on RUOE basis has been consistent with that observed in other UK regulated industries, although towards the lower end. This may be expected due to a declining volume, a heavily unionised workforce and factor intensity as discussed in chapter 3. In particular, Royal Mail has achieved equal or higher efficiencies than UK airports (-1.2% to 0.0%) and England and Wales water and sewerage (0.2% to 1.3%).

**Table 5.4: RUOE estimates in a number of industries**

Industry	Period	Average RUOE efficiency % p.a.
Airports - UK designated	1997/98 - 2011/12	(1.20%)
Airports - non-UK	2000/01 - 2011/12	0.00%
Sewerage - England and Wales	1992/93 - 2010/11	0.20%
Airports - UK other	2000/01 - 2011/12	0.30%
Water -England and Wales	1992/93 - 2010/11	1.30%
Water Scotland	2002/03 - 2010/11	2.10%
Gas distribution	2006/07 - 2009/10	2.10%
Electricity distribution	1992/93 - 2009/10	2.50%
Gas transmission	2002/03 - 2009/10	2.90%
Rail	2002/03 - 2009/10	3.10%
Electricity transmission	1992/93 - 2010/11	4.90%
Sewerage - Scotland	2002/03 - 2009/10	5.30%
Range		(1.2)% to 5.3%
[X]	[X]	[X]
[X]	[X]	[X]

Source: CEPA, *Scope for efficiency gains at Heathrow, Gatwick and Stanstead Airports, 2013*, table 5.7, p33 and Royal Mail RUOE analysis.

Note: CEPA states that it considers “total controllable opex” in its RUOE calculations, however it does not state whether these costs are before or after transformation costs. We have included transformation costs in Royal Mail’s RUOE as these costs can be considered controllable. However, there is no material difference between RUOEs calculated before or after transformation costs.

5.39 [X]

## TFP

### What is TFP?

5.40 TFP, also sometimes called multi-factor productivity, is a form of top-down efficiency analysis commonly used by regulators.<sup>62</sup> This measures the efficiency with which a company, sector or state uses the inputs to its production (i.e. all capital and operating

<sup>62</sup> For example, CEPA, 2012, “Scope for improvement in the efficiency of Network Rail’s expenditure on support and operations”, prepared for the ORR and Reckon, 2007, “Update of analysis of productivity improvement trends”, for Ofgem. [Scope for Improvement in the Efficiency of Network Rail’s Expenditure on Support and Operations: Supplementary Analysis of Productivity and Unit Cost Change, CEPA, March 2012, Chapter 3](#)

expenditure) to produce outputs (so in post, for example, the total costs that are required to generate its output volume). The level of total factor productivity is defined as the change in efficiency not related to labour and capital inputs. TFP is estimated from the residual observed after stripping out the effects of changes in the capital and labour inputs to the level of total output.

- 5.41 As the TFP efficiency figure is determined after stripping out the effects of other input factors, and hence volume changes, it reflects the change in efficiency in a manner equivalent to the “E” factor in a PVEO analysis.
- 5.42 Long-term trends in TFP in sectors that have similar activities to the regulated firm under examination may be used as an efficiency benchmark. For example, one could first determine a number of different sectors for Royal Mail.<sup>63</sup> Each sector’s calculated productivity could then be compared to an industry-wide comparator sector. For example, vehicle costs could be compared to the transport industry, property to the construction industry, network delivery to distributive trades and mail centre networks to distributive trades and manufacturing.
- 5.43 Consequently, a TFP analysis has many similarities to PVEO analysis, where there is disaggregation of different cost categories and an overall efficiency figure calculated from these weighted categories. The key difference is that a TFP analysis is a top down analysis (i.e. a stepwise decomposition of data into discreet units), whereas PVEO analysis is a bottom-up analysis (i.e. a stepwise construction of the whole from its constituent parts). The two techniques, if performed correctly, should yield similar results.
- 5.44 Long-term TFP trends have been calculated across a number of different sectors and industries (including sectors that are generally considered to be competitive). For example, the European Union (“EU”) Capital, Labour, Materials and Services (“KLEMS”) project calculated long-term TFP growth within a number of different sectors between 1970 and 2009,<sup>64</sup> and the National Institute of Economic and Social Research’s (“NIESR”) NISECO2 data set calculates TFP growth in the period 1973 to 1999 for each sector.<sup>65</sup> The ONS also periodically provides an analysis of productivity growth of the

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<sup>63</sup> [Scope for Improvement in the Efficiency of Network Rail’s Expenditure on Support and Operations: Supplementary Analysis of Productivity and Unit Cost Change, CEPA, March 2012, Chapter 3](#)

<sup>64</sup> The EU KLEMS website states: “*This project aims to create a database on measures of economic growth, productivity, employment creation, capital formation and technological change at the industry level for all European Union member states from 1970 onwards.*”  
<http://www.euklems.net/>

<sup>65</sup> [Top Down Benchmarking of UK Gas Distribution Network Operators, Europe Economics, April 2007, page 39](#)

economy.<sup>66</sup>

- 5.45 TFP's relatively common use in regulatory settings allows some comparability between sectors and firms; however, as discussed below, such comparability may be limited.

***Limitations to be considered in the use of TFP***

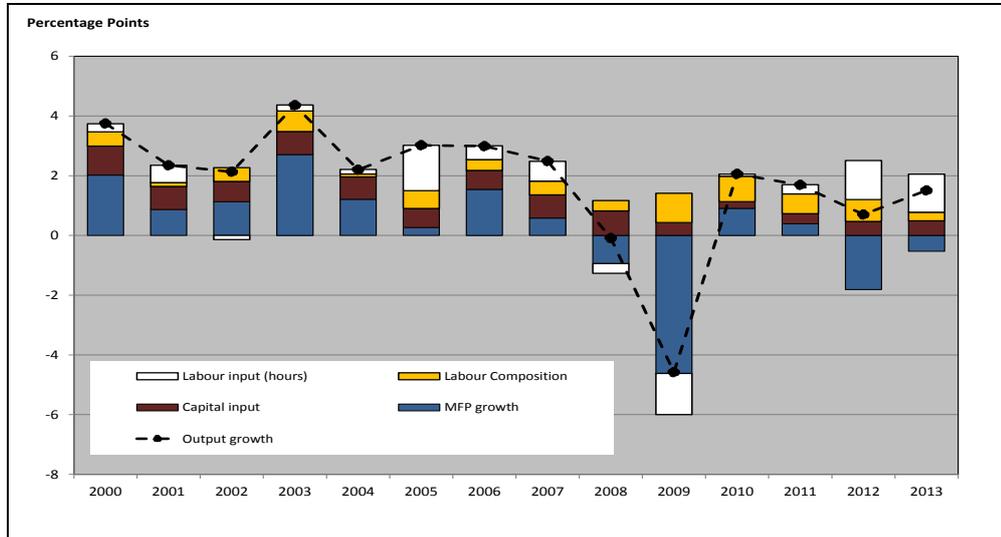
- 5.46 The calculation of TFP is heavily reliant on a number of assumptions. First, costs must be split into various categories for comparability with other industries. As with any comparator analysis, there are limitations in such categorisations. Differences in the Postal sector, which, as discussed above has a number of unique risks (for example, the threat of industrial action preventing the introduction of cost efficiencies such as reduced staffing and salaries or limited ability to reduce transportation costs as a result of the USO), which means that a direct comparison of cost efficiencies to the "comparable" sectors may be misleading as these sectors are unrestrained from these structural limitations. Moreover, there is no reliable source of volume data, as they are not disclosed by postal operators.
- 5.47 In deriving these comparisons there is a degree of subjectivity in deriving weightings. Not all costs can be directly allocated to specific sectors and consequently, the cost figures used to derive the weightings may be affected by accounting rules and cost allocation methodologies.
- 5.48 In addition, adjustments are required to aid comparability, such as the scale of economies adjustments usually performed to take account of changes in volume are reliant on assumptions such as the elasticity of cost to volume changes.<sup>67</sup>
- 5.49 There is also debate as to the appropriate length of the time period used to determine the long-term growth rate of comparator sectors. Often a longer-term period is used because this is considered to give a better picture of an estimate of potential frontier shift efficiency improvements as the calculated efficiency growth will be less influenced by a single (or partial) business cycle. However, there is no objectively "right" time period to use and the results may vary between longer time periods, e.g. from 1970's to more recent data from the 1990's or 2000's.
- 5.50 Indeed there can be significant variation between years. The figure below shows the variation in the ONS's TFP estimates in each year. Consequently, there will be significant. Variation between the estimated of TFP depending on the period used.

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<sup>66</sup> [Multi-factor productivity, ONS website](#)

<sup>67</sup> As discussed in paragraphs 5.27-5.29.

**Figure 5.1: example of the variation between year in ONS TFP estimates**



Source: ONS, *Multi-factor Productivity (experimental), Estimates to 2013*, 23 January 2015. Figure 1.

5.51 Finally, there are also limitations within commonly used data sets. For example the EU KLEMS database only runs to 2009 and is no longer updated, and the NIESR's NISEC02 data set calculates to 1999. Consequently, the data used may be out of date and inappropriate to use to benchmark Royal Mail's current efficiency or to set a target. As an additional issue, there may be significant volatility when using indexation techniques and there may be further comparability and volume issues that cannot be controlled for.

**Royal Mail workload productivity measure**

5.52 When calculating productivity for an individual business, such as Royal Mail, output is calculated directly on the basis of the volume of products delivered by the business, rather than having to derive the business' outputs. However, it is important that the measure of volume is adjusted to reflect the change in the product mix which is delivered by the business, by using appropriate weight that can be associated with each product. This is to reflect the fact that, for example, it is on average more time consuming to deliver a parcel than it is to deliver a letter. The workload measure which is used by Royal Mail to calculate productivity reflects the relative effort required to deliver each of its products.

5.53 In addition, the workload as defined by Royal Mail includes an additional element which is important for the calculation of productivity in a declining market, which is aimed at capturing the inflexibility of costs to the reduction in volume. Within the calculation of the workload, Royal Mail includes a fixed component which accounts for

the fixed costs which Royal Mail has to incur to cover the requirements of the USO. The effect of this component is that, if volumes decline, the average weight of each product used for the calculation of the workload, everything else being equal, will increase to reflect the fact that there are economies of scale which are lost.

#### ***Comparability of the Royal Mail measure***

- 5.54 The inclusion of an adjustment to capture the fixed costs in measuring outputs makes the Royal Mail version of outputs not directly comparable with the commonly used measures of productivity, such as the ONS measures based on GVA. This is because it is uncommon to define productivity measures in declining markets. However such adjustment is necessary to be able to extrapolate the effect of declining volumes from the calculation of productivity.
- 5.55 In addition to the adjustment for fixed costs, we note that there are two key differences which make the productivity measure use by Royal Mail more difficult to compare to other common productivity measures such as the one defined by the ONS:
- By using the monetary value of GVA to measure outputs, the ONS uses price as weight. Royal Mail, uses weights which are based on the relative processing time of each product; and
  - The Royal Mail measure of productivity is based on operational rather than revenue derived volumes. A revenue based measure of volume would mirror more closely the ONS definition of productivity.

#### ***Royal Mail's performance on a workload productivity basis***

- 5.56 Productivity has improved since 2010-11. In particular, compared to 2010-11, productivity has improved by 9% to March 2015.<sup>68</sup> This is defined as workload Processing and Delivery per weighted item.

#### **Econometric Frontier Methods**

- 5.57 Frontier approaches seek to estimate the efficient frontier – which is defined as the minimum cost needed to produce a specific level of output. The speed at which the frontier is moving provides an estimate of the “frontier shift” whilst the gap between the firm’s performance and the frontier is known as “catch-up” efficiency.
- 5.58 We understand that Ofcom has employed consultants to undertaken econometric frontier analysis and are aware that Royal Mail is engaging with Ofcom on this. Therefore, we do not seek to provide a critique of econometric approaches within this

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<sup>68</sup> Analysis performed by Royal Mail.

report.

### **The use of these metrics in regulation**

- 5.59 The metric that is chosen for this purpose requires a number of important characteristics.
- (a) The metric must be recognised by the business;
  - (b) It must be measurable on a consistent basis over years;
  - (c) The metric should not be susceptible to “noise”; and
  - (d) Ideally, it should be possible to compare to other companies or sectors.
- 5.60 These properties are crucial for both a regulator and management to gather a clear view of efficiency. The metric should be well understood by both parties along with its limitations, particularly if it produces misleading results that have little to do with underlying efficiency changes.
- 5.61 However, it is difficult to come up with a metric with all of the characteristics noted above and individual metrics might also provide conflicting results. Any efficiency metric is therefore best used in conjunction with a range of other efficiency metrics to obtain a balanced view on efficiency.

### **Conclusions**

- 5.62 There are a number of different potential metrics and types of efficiency analysis that have been used by regulators. Best practice indicates that a number of metrics should be considered. Many common issues arise with each method, such as the appropriate comparator and the assumptions that are required to calculate the metrics. Consequently, there is a potential risk that any efficiency analysis in isolation could lead to an erroneous finding that either efficiency is improving or declining, when the opposite is true.
- 5.63 It is important for the continued viability of the USO that Royal Mail and Ofcom can have confidence that efficiency is not misstated and that any potentially inappropriate regulatory intervention (or lack of intervention) is avoided and therefore to achieve a more reliable view as to whether efficiency is improving or declining, a number of efficiency metrics should be considered.
- 5.64 The advantage of assessing a number of metrics is that it provides a greater likelihood that one can be confident in the results achieved. If all efficiency metrics show a similar directionality and consistency in results, then greater confidence can be placed in those results.

- 5.65 However, even when a number of different methods are used, care must be taken in any interpretation of efficiency achievements or in setting of any targets. The postal industry is unique and faces a number of unique challenges that we have discussed previously. Therefore other regulated industry precedent and calculated efficiency savings may not be appropriate in the postal sector.
- 5.66 Additionally, as each metric is driven by numerous assumptions, it is important that the monitoring of Royal Mail's efficiency does not put it in a position where it lacks the ability to respond to events. Ex ante assumptions, which are used to calculate efficiency targets for all of the metrics discussed above, may differ from actual outturn for reasons outside of Royal Mail's control. Royal Mail needs to have sufficient flexibility to respond to these exogenous events rather than being constrained by targets.

## 6. Conclusions

- 6.1 Royal Mail has used several techniques to assess its historic and forecast efficiency. Additionally, it is co-operating with Ofcom who are conducting an econometrics analysis (results of which are not yet available), has calculated its RUOE performance and used Ofcom's PVEO approach which it has adjusted to more accurately distinguish between controllable and non-controllable costs and to align more closely with TFP benchmarks from other regulated industries. This has involved a greater use of specific asset price inflation estimates and a more detailed analysis on the extent to which costs are volume sensitive.
- 6.2 We agree with the approach of considering a range of metrics – incorporating both top-down and bottom-up estimates. This is because of the degree of judgement required when calculating a particular metric and also the sensitivity of metrics to factors outside of Royal Mail's control – such as declining volumes or asset price inflation. However, we also recognise that the calculation of metrics is data intensive and time consuming. Whilst it is optimal to look at a range of metrics, it is unrealistic to expect any company or regulator to look at all possible calculations.
- 6.3 PVEO is potentially a useful metric as it allows for discussion between Royal Mail and Ofcom and, when correctly constructed, is broadly comparable to other recognised measures of efficiency. However, it is not without limitations and these may reduce its reliability as a forward looking estimator.
- 6.4 The PVEO analysis shows that Royal Mail's historical efficiency performance has been above that of the general economy. [3<]. Since the operating characteristics of Royal Mail may be associated with relatively lower levels of efficiency than in many other regulated industries, this indicates that Royal Mail's management is setting itself a challenging target, which will require significant effort to achieve given the environment in which Royal Mail is operating.

## Appendix 1: Regulatory precedent on efficiency

### Introduction

- A1.1 UK regulators assess the efficiency of regulated companies as part of their periodic price control reviews.
- A1.2 The large networks that characterise regulated sectors are dominated by fixed costs, that is, costs that do not vary with the amount of output that the regulated entity produces: the network must be in place even if nothing is produced. However, whilst in most other regulated industries (telecoms, water, wastewater, electricity, gas, and rail) these networks are physical infrastructure networks, in mail there is a large network of labour.

### Efficiency reviews in other regulated sectors: Ofwat, Ofgem and ORR

- A1.3 Ofwat, Ofgem and ORR have significantly revised their approaches to cost assessment in their latest price review periods. Each regulator uses a suite of methodologies to assess the efficient costs of the companies they regulate. The methodologies differ in important ways due to legitimate reasons such as the nature and comparability of the activities of the companies within a sector and the information available for the companies and regulators to analyse.
- A1.4 Additionally, there is a fair amount of subjectivity and 'manual adjustment' layered on the results of the stated methodologies. As a result, the cost assessment approaches of these three regulators are not comparable per se and the approach of one regulator cannot in general be preferred to another's.
- A1.5 However, even in terms of efficient cost assessment there are a few issues that are common to all three regulators. These include, for example, the approach taken when the econometric models result in efficient costs that are higher than companies submit in their business plans, and the treatment of general inflation and real price effects.
- A1.6 Our key observations regarding the approaches taken by Ofgem, ORR and Ofwat to cost assessment are:
- Ofgem and Ofwat have moved to a system where the onus is on the regulated businesses to prepare robust business plans and good plans are incentivised

through fast tracking<sup>69</sup>;

- Ofgem and Ofwat place similarly large emphasis on econometric modelling, while ORR only uses it as a ‘sense check’. Importantly, we note that where the econometric models result in higher efficient costs than companies present, Ofgem and Ofwat adjusts the results downward;
- General inflation (typically measured by the retail price index, “RPI”) and input price inflation (termed real price effects, “RPE”) are issues common to all regulated sectors. However, the treatment of RPI and RPE differs across regulators:
  - Ofgem recognizes that companies are affected by both and adjusts the forecast efficient costs for their expected impacts;
  - ORR maintains that Network Rail should have a better control over its input prices and adds a 0.2% per annum efficiency challenge to the efficiency adjustment. It also determines that the expected RPE is zero. On the other hand, it recognizes that general inflation is not manageable by Network Rail, and therefore indexes revenues by RPI;
  - Ofwat does not recognize any RPE impacting the water sector. It indexes wholesale revenues by RPI, but retail revenues are not indexed.

### **Ofwat**

- A1.7 Ofwat regulates ten companies providing water and sewerage services, and eight companies providing water only services. It estimates the efficient levels of cost for providing services in price reviews, which take place every five years. Ofwat’s latest review concluded in 2014, and set revenue allowances for 2015-20.
- A1.8 Ofwat use different methods to assess wholesale costs (those associated with the transport and treatment of water) and retail costs (those associated with billing customers).<sup>70</sup>
- A1.9 In both cases, the primary method to assess efficient costs is comparative benchmarking. At the start of the price review, Ofwat required water companies to submit historical data on company structure and expenditure, and business plans estimating what their efficient costs will be over the review period. Ofwat used several techniques to compare the costs proposed by each company to their own historical costs and to the costs proposed by industry peers.

### *Wholesale costs*

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<sup>69</sup> Fast tracking implies a shorter review period, and in arguably a lower level of scrutiny

<sup>70</sup> Wholesale costs are approximately 90% of the total.

- A1.10 For wholesale costs, Ofwat estimates the efficient cost of running a company's entire network: it aggregates opex and capex into a single measure of total expenditure ("totex"). The differences between network structure across companies (such as length of pipe to maintain, and number of connections) are controlled for using econometric models.
- A1.11 Ofwat's analysis is based on panel data on costs and cost drivers supplied by the water and wastewater companies. For the 18 water companies, the data cover 5 years for a total of 90 observations; and for the 10 wastewater companies, the data cover 7 years for a total of 70 observations.
- A1.12 Ofwat uses several models to estimate:
- For water: full totex (three econometric models); or totex minus enhancement costs (two econometric models) plus a unit cost model for enhancement capital; and
  - For wastewater: five econometric models to estimate the cost of specific segments (such as total cost excluding enhancement capex, or only network maintenance or sewerage treatment costs) plus a unit cost model for enhancement costs.
- A1.13 For its econometric models, Ofwat does not use Stochastic Frontier Analysis ("SFA") to estimate cost efficiency. Rather, it uses two variations of Deterministic Frontier Analysis ("DFA"): pooled corrected ordinary least squares ("COLS") and Corrected Generalized Least Squares – Random Effects ("GLS-RE").
- A1.14 For each of its water and wastewater analyses, Ofwat uses the parameter estimates from each model to forecast costs (using cost driver values provided by independent consultants. It then combines the forecasts from all models (econometric and unit costs) using a "triangulation" approach, which weights models and makes adjustments for unmodelled costs, to ensure its final cost allowances reflect all costs that will be incurred in the industry. Ofwat considers that averaging several models avoids the possibility of placing too much weight on a single model that may give unusual results in some cases.<sup>71</sup>
- A1.15 We note that certain costs are assessed outside of the above modelling framework: these costs are classified by Ofwat as either policy additions or deep dive adjustments, and are quite sizeable:
- Policy additions include costs that are common to all companies, but for which the amount is not a common function of any company characteristics. These

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<sup>71</sup> Ofwat, Cost Assessment – Advanced Econometric Models, 20 March 2014 – FINAL REPORT, submitted by CEPA, pg.11.

cost items are estimated using bottom-up techniques for each company and include Business Rates, third party costs, and defined benefit pension deficit recovery costs;

- Deep dive adjustments are company-specific cost items that are assessed individually. For cost items that Ofwat accepts are relevant, it performs a detailed bottom-up assessment to determine their efficient cost allowance.

#### *Retail costs*

- A1.16 Retail costs are assessed using an average cost to serve metric – total retail costs divided by adjusted customer number. The adjustment is made to account for the lower cost associated with billing the same customer for both water and wastewater services.
- A1.17 Companies planning to spend more than the mean “average cost to serve” are required to reduce their expenditure to the average within three years.

#### *Efficiency savings proposed by Ofwat*

- A1.18 Although the model suite developed by Ofwat can estimate frontier efficiency, the minimum cost required to run the network, Ofwat sets cost allowances based on a less stringent upper quartile benchmark. This is intended to ensure no company is set an impossible target as a result of imperfect modelling:
- For wholesale water, Ofwat calculates that the upper quartile firm is 6.5% more efficient than the average firm.<sup>72</sup> Therefore, it reduces the modelled costs within each modelling stream by 6.5% before triangulation.
  - For wastewater, Ofwat calculates that the upper quartile firm is 10.5% more efficient than the average firm.<sup>73</sup> Therefore, it reduces the modelled costs within each modelling stream by 10.5% before triangulation.

#### **Ofgem**

- A1.19 Ofgem regulates the UK energy industries. It regulates transmission, gas distribution and electricity distribution separately:
- Transmission was most recently regulated in the RIIO-T1 Price Control, for the period 2013-21. Three electricity transmission owners, and one gas transmission owner, are regulated;<sup>74</sup>

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<sup>72</sup> Ofwat, Calculation of the PR14 upper quartile efficiency adjustment for wholesale water and wastewater, 2014

<sup>73</sup> Ofwat, Calculation of the PR14 upper quartile efficiency adjustment for wholesale water and wastewater, 2014

<sup>74</sup> RIIO Transmission Annual Report 2013-14, p2

- Gas distribution was most recently regulated in the RIIO-GD1 Price Control, for the period 2013-21. Eight gas distribution companies are regulated;<sup>75</sup> and
- Electricity distribution was most recently regulated in the RIIO-ED1 Price Control, for the period 2015-23. Eleven electricity distribution companies are regulated.<sup>76</sup>

*Method to assess efficient costs*

- A1.20 For both transmission and distribution, a key source used to estimate efficient costs is initial business plans submitted by energy companies. Ofgem make adjustments if they believe the business plan overestimates required spending in the review period.
- A1.21 Ofgem use different methods to estimate efficient costs for transmission and distribution. This is due to the small number of regulated transmission firms, which prevents the use of comparative benchmarking.

*Gas and electricity transmission*

- A1.22 Ofgem assesses the expenditure proposed by each transmission owner for each business activity, rather than estimating the efficient cost of running the entire network.
- A1.23 Rather than attempt to derive efficient costs, Ofgem and their industry consultants examine the business plan they were provided and attempted to demonstrate if it contained inefficiencies. Both quantitative and qualitative techniques were used, including unit cost benchmarking; trend analysis; and sample scheme review. The later involved Ofgem and consultants performing a detailed analysis of a number of planned projects. Based on the inefficiencies identified, the total level of inefficiency was extrapolated.
- A1.24 Ofgem aggregates all activities into three categories, and provides separate estimates of their estimate of efficient costs (and for comparison, the companies' view of efficient costs) for each:
- Load-related capex – investment required to increase capacity and cater for demand growth;
  - Non-load-related capex – replacement costs, and expenditure relating to network resilience and physical security; and
  - Opex – the ongoing costs of running the business, including asset maintenance

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<sup>75</sup> RIIO-GD1 Annual Report 2013-14, p2

<sup>76</sup> RIIO-ED1: Final determinations for the slow-track electricity distribution companies, p4

and support services.<sup>77</sup>

- A1.25 For transmission, Ofgem estimates costs without any allowance for catch-up inefficiency. However, as the final totex allowance is 75% Ofgem's view of efficient costs, and 25% the company's own view, the allowances are higher than Ofgem's view of totally efficient costs.<sup>78</sup>
- A1.26 Ofgem applies an ongoing efficiency adjustment to account for shifts in the efficient frontier. The frontier shift is assessed as an increase in efficiency of 1% per annum for Opex, and 0.7% for Capex. The values are informed by EU KLEMS (Capital, Labour, Energy, Materials, Service) data on productivity trends.<sup>79</sup>

#### *Gas and electricity distribution*

- A1.27 The gas and electricity distribution industries undergo a price control review every eight years. To estimate efficient costs for both gas and electricity distribution, Ofgem use top down modelling, to directly estimate the total cost ("totex") of running a network; and bottom-up, disaggregated modelling at the activity level – (For example, repairs or maintenance)<sup>80</sup>
- A1.28 There are several similarities between the methods used for gas and electricity distribution:
- Comparative benchmarking is the primary method used to determine the efficient level of costs;
  - When using econometrics for its benchmarking, Ofgem does not use SFA;
  - Ofgem estimates the costs that would be incurred by a firm at the upper quartile of efficiency, not the frontier. As with transmission, the final cost allowance is 75% Ofgem's view, 25% the company's view, so the cost allowance is less stringent than upper quartile efficiency;<sup>81 82</sup>
  - Like Ofwat, Ofgem excludes some costs from its top-down modelling. For

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<sup>77</sup> RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas, p.26,41.

<sup>78</sup> RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas, footnote 30.

<sup>79</sup> RIIO-T1/GD1: Real price effects and ongoing efficiency appendix, p.15

<sup>80</sup> RIIO-GD1: Final Proposals - Supporting document - Cost efficiency, p.6

<sup>81</sup> Gas: RIIO-GD1: Final Proposals - Supporting document - Cost efficiency p.10

<sup>82</sup> Electricity: RIIO-ED1: Final determinations for the slowtrack electricity distribution companies: Business plan expenditure assessment p.8

electricity, spending on smart grids is excluded, as Ofgem does not believe any company's forecasts represented efficient expenditure.<sup>83</sup> For gas, the costs associated with street repairs, smart metering and gasholder demolition are excluded, as Ofgem believes models focused specifically on these costs are more accurate.<sup>84</sup>

- A1.29 There are also some differences between gas and electricity distribution in the approach Ofgem takes towards top-down modelling:
- For the 14 electricity distribution network operators, Ofgem estimates two top-down models econometrically, using COLS based on a 13 year sample, including both historical and forecast (future) cost data. Each model uses a composite cost driver. In one case this was composed of customer number and modern equivalent asset value – in the other, cost drivers considered important in the disaggregated analysis were used.<sup>85</sup> The average of the models was equally weighted with the disaggregated analysis to find the final cost allowance;<sup>86</sup>
  - For the eight gas distribution network operators, Ofgem estimates a totex model using COLS econometric techniques, and disaggregated activity level models. Each is estimated twice, once using historic and once using forecast data. Ofgem then uses the unweighted average of the estimated costs as its estimate of the efficient gas distribution costs.
- A1.30 We note that although Ofgem indexes allowed revenues by the RPI, it also notes that the prices of several inputs (notably labour) do not change in line with the RPI. The forecasts are therefore adjusted for real price effects exceeding economy-wide inflation (RPI).
- A1.31 Ofgem finally applies an ongoing efficiency adjustment is applied to account for shifts in the efficient frontier:
- For gas distribution, the frontier shifts are the same as those applied to transmission (1% per annum for opex, 0.7% for capex).
  - For electricity distribution, firms were required to provide an ongoing efficiency adjustment in their business plan. All distribution network operators provided adjustments of between 0.8 and 1.1% per year. Ofgem considered this sufficient

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<sup>83</sup> RIIO-ED1: Final determinations for the slowtrack electricity distribution companies p.28

<sup>84</sup> RIIO-GD1: Final Proposals - Supporting document - Cost efficiency p.12

<sup>85</sup> RIIO-ED1: Final determinations for the slowtrack electricity distribution companies: Business plan expenditure assessment p.59.

<sup>86</sup> RIIO-ED1: Final determinations for the slowtrack electricity distribution companies: Business plan expenditure assessment p.10.

and did not propose an additional adjustment.<sup>87</sup>

- A1.32 Ofgem state the difference between their view of efficient costs, and the companies' own views, represented by the business plans they submit. This is not a true measure of the efficiency challenge, as it is possible the business plans already incorporate efficiency improvements, but it is indicative of its scale.<sup>88</sup>
- A1.33 For electricity distribution, Ofgem's total industry funding for the eight-year review period was 11% below the total of the initial business plans.<sup>89</sup> For gas distribution, funding for the eight-year review period was 19% below the business plan values.<sup>90</sup>

## ORR

- A1.34 The Office for Rail and Road ("ORR") regulates Network Rail, which is responsible for maintenance and expansion of the UK's rail network. The most recent control period ("CP"), CP5, concluded in 2013 and set Network Rail's funding for 2014-19.
- A1.35 We note that Network Rail does not have retail customers: its customers are the passenger and freight train operating companies that pay a complex range of charges to access the network. There are additional charges paid by Network Rail in relation to network possessions, and a complex structure of penalties/reimbursements for train delays. Access fares (and retail revenue) are insufficient to cover Network Rail's costs, which include considerable capital allowances on network enhancement projects:<sup>91</sup> the shortfall is made up by the Government through the network grant paid annually to Network Rail.

### *Method to assess efficiency*

- A1.36 The ORR assessed efficient expenditure separately for Network Rail's operational and non-enhancement (renewal) capex, and for its considerable enhancement capex. The

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<sup>87</sup> Electricity: RII0-ED1: Final determinations for the slowtrack electricity distribution companies: Business plan expenditure assessment p.158.

<sup>88</sup> It is also possible the business plans are less efficient than historical practice. This would lead to the percentage difference between the business plan and funding being an overstatement of the efficiency improvement demanded.

<sup>89</sup> [RIIO-ED1 Final Determinations](#) p6

<sup>90</sup> [RIIO-GD1 Final Proposals](#) p10

<sup>91</sup> We note that Network Rail's estimate of enhancement expenditure was £7.8 billion. The ORR reduced this to £7 billion, "*largely as a result of applying Network Rail's own efficiency overlay to more projects and reducing risk allowances where [it] concluded that the levels were too high*". (Source: Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19, p.340.)

ORR divides opex and non-enhancement capex into the following categories: support, operation, and maintenance and renewals expenditure.

- A1.37 The ORR makes different efficiency assumptions for each cost category (support, operations, maintenance and renewals, and enhancements) through a range of assessment methods, mainly bottom-up.
- A1.38 ORR also applied advanced econometric analysis (COLS and panel data SFA) for maintenance and renewal costs only, to benchmark Network Rail to a sample of international peers. It estimated four models, which gave estimated efficiency gaps of between 13 and 24%. The econometric models did not directly inform the ORR's estimate of efficient costs, but were used as evidence that the results of the bottom-up analysis (which estimated an efficiency gap for the entire network of 19.4%), were broadly accurate.<sup>92</sup>

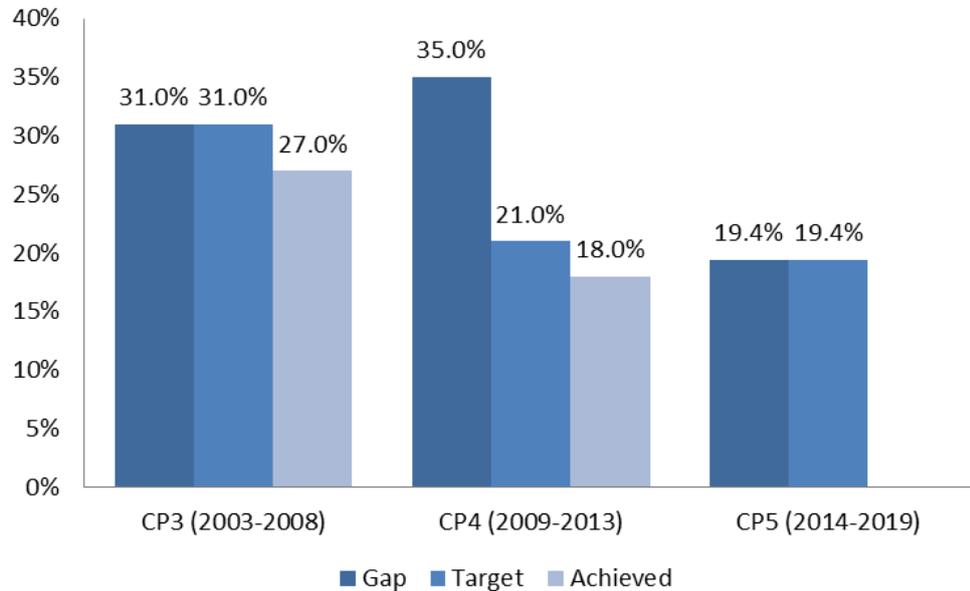
*Efficiency savings proposed by the ORR*

- A1.39 The ORR proposed Network Rail make aggregate efficiency savings of 19.4%, by the end of the 5 year review period. A different efficiency adjustment was set per division, and per year, with the annual efficiency improvement ranging between 6.8 and 3.1%.
- A1.40 In terms of inflation adjustments, the ORR is of the view that Network Rail could manage its input price risk better and therefore added 0.2% per annum efficiency improvement to its efficiency target. Additionally, it assumed input price inflation to be zero in CP5. On the other hand, ORR does not believe that the general inflation risk can be controlled by Network Rail and therefore it indexes allowed revenues by RPI.
- A1.41 The efficiency target set by ORR is ambitious, but in line with previous control periods. Figure A1.1 shows the ORR's assessment of the efficiency gap, the targeted cost reductions, and the level of efficiency achieved, for control periods 3, 4 and 5.

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<sup>92</sup> Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19, p.331.

**Figure A1.1: Efficiency targets set and achieved by Network Rail in previous Control Periods**



Source: ORR Final Determination for PR13

A1.42 In addition to efficiency improvements, ORR estimated a frontier shift. In contrast to PR08, the top-down frontier shift analysis is based on totex. The overall estimate for frontier shift is 0.3% per annum which equates to 1.5% for CP5 as a whole. The estimate is based on an “adjusted TFP” approach with an assumed split of 75% frontier shift and 25% catch-up for the industries upon which the calculations are based. An adjustment has been made to enhancement expenditure for which the frontier shift is set at 0.4% per annum.

**Ofcom**

A1.43 There are several markets for telecommunication services. BT is the dominant supplier in many of them, and is regulated by Ofcom.

A1.44 The most recent market to have its price reviewed is the market for leased lines. Leased lines provide dedicated symmetric transmission between fixed locations, and are required for wholesale access. The review is ongoing, and a final statement will be published in early 2016 - however, a consultation has been published which details the methodology proposed.

A1.45 The leased lines charge control (“LLCC”) will affect prices for the following baskets of services:

- Traditional Interface (“TI”) – Low bandwidth services nationwide apart from in

the Hull area, where BT is not considered dominant; and

- Ethernet – very high bandwidth services nationwide, excluding the Central London Area and Hull area.

*Method to assess efficiency*

A1.46 In the most recent market review, Ofcom used a variety of sources to estimate the scope for BT to make efficiency improvements in both its Traditional Interface (TI) and Ethernet businesses. Table A1.1 details the sources that were considered and the efficiency improvements estimated.<sup>93</sup>

**Table A1.1: Sources considered by Ofcom to assess efficiency**

<b>Evidence</b>	<b>Period</b>	<b>TI efficiency</b>	<b>Ethernet efficiency</b>
<b>Ofcom analysis of BT's management accounts (PVEOs)</b>	Historical - (2011/12 to 2013/14)	4.5% – 8.5% pa	5.0% – 7.5% pa
<b>Ofcom analysis of regulatory cost component data</b>	Historical - (2009/10 to 2013/14)	2.0-3.0% pa	8.0-10.5% pa
<b>Ofcom analysis of benchmarking report - 2013 AT Kearney Report</b>	Historical - (2012/13 to 2014/15)	[redacted]	[redacted]
<b>Ofcom analysis of BT's 2013/14 financial performance</b>	Current - Rerun of 2013 LLCC model with other assumptions consistent with 2015 LLCC Model	5% pa	5% pa
<b>Consideration of BT's Annual report for 2014/15</b>	Current – 2014/15	Significant cost reductions and efficiency improvements in 2014/15.	
<b>Ofcom analysis of BT's management accounts (PVEOs)</b>	Forecast - (2014/15 to 2017/18)	[redacted] [5-10% pa]	[redacted] [5-10% pa]

<sup>93</sup> Business Connectivity Market Review – Annexes: Leased lines charge controls and dark fibre pricing, table A8.38.

<b>Consideration of statements made by BT and Broker reports</b>	Forecast	Cost transformation remains a key part of BT strategy Analysts believe efficiencies are still available but likely to become more difficult to achieve over time
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*Source: Ofcom consultation – BCMR 2015, Leased lines charge control and dark fibre pricing annexes, annex 8*

- A1.47 Ofcom states that they place the most weight on the PVEO analysis of internal management accounting data, which decomposes profit changes into Price, Volume, Efficiency and Other effects.<sup>94</sup>
- Efficiency savings proposed by Ofcom*
- A1.48 Ofcom evaluate all sources available to them, and conclude that potential efficiency improvements of 4-7% per annum are possible.<sup>95</sup> The efficiency term has not been separated into catch-up efficiency and frontier shift. However Ofcom states that its measure is intended to capture both components, although has not demonstrated that there is catch-up efficiency to be obtained.
- A1.49 This approach is in contrast to that taken for the previous charge control, where separate efficiency assumptions were considered appropriate for TI and Ethernet, on the basis that they were based on different underlying technologies;<sup>96</sup> and real unit cost savings to be used were chosen to be capable of being decomposed into frontier shift and catch up, in a way which is consistent with other data on the potential for improvements each of these types of efficiency.<sup>97</sup>

<sup>94</sup> Business Connectivity Market Review – Annexes: Leased lines charge controls and dark fibre pricing, p136

<sup>95</sup> [Business Connectivity Market Review – Annexes: Leased lines charge controls and dark fibre pricing](#), p. 59, June 2015

<sup>96</sup> [BCMR final statement, 2013](#), paragraph A12.72.

<sup>97</sup> [BCMR final statement 2013](#), paragraph A12.109.

**Table A1.2 Summary of regulatory determinations**

Industry Location Price control	Companies regulated	Benchmarked costs	Frontier shift estimate Annual	Catch-up estimate Annual	Main techniques used
<b>RAIL INFRASTRUCTURE</b> UK ORR PR13 2014-2019	Network Rail.	Support, Operations, Maintenance and renewals costs <sup>98</sup>		4.22% <sup>99</sup>	Review of bottom-up calculations, supported by benchmarking against overseas rail operators <sup>100</sup>
<b>ELECTRICITY DIST</b> GB Ofgem RIIO-ED1 2015-2023	14 Distribution Network Operators	Total expenditure <sup>101</sup>	0.8- 1.1% <sup>102</sup>	N/A <sup>103</sup>	Econometric benchmarking against peers using a Pooled OLS approach – both top-down and disaggregated models <sup>104</sup>
<b>ELECTRICITY TRANS</b> GB Ofgem RIIO-T1 2010-2015	3 Electricity transmission operators	Total expenditure <sup>105</sup>	Opex: 1.00% Capex/ Repex: 0.7% <sup>106</sup>	N/A <sup>107</sup>	Bottom-up analysis of business plan <sup>108</sup>

<sup>98</sup> [ORR PR13 Final Determination para 4.149](#)

<sup>99</sup> [Periodic review 2013: Final Determination, Table 4.3, page 153](#) The ORR set an efficiency target of 19.4% over five years for these categories of spending. This is equivalent to a compound annual efficiency target of 4.22%  $(1-0.0422)^5 = (1-0.194)$ . The ORR PR13 target is the weighted average of targets for different cost categories of operations, support, maintenance and renewals and is 19.4% over the control period.

<sup>100</sup> [ORR Final Determination Para 4.25 p134](#)

<sup>101</sup> [RIIO-ED1 Overview para 4.9 p23](#)

<sup>102</sup> [RIIO-ED1 Final Determination Expenditure Assessment Para 12.49, p159](#)

<sup>103</sup> See footnote for Ofwat

<sup>104</sup> [RIIO-ED1 Final Determinations Para 5.6, Figure 3.1](#)

<sup>105</sup> Total expenditure was categorised as Load-related Capex, non-load related Capex, and opex – the efficient level of expenditure was assessed separately for each, on a bottom-up basis.

<sup>106</sup> [RIIO-T1/GD1: Real Price Effects and Ongoing Efficiency appendix para 3.3, p15](#)

<sup>107</sup> See footnote for Ofwat

<sup>108</sup> [RIIO-T1 Cost assessment and uncertainty para 1.7, page 3](#)

Industry Location Price control	Companies regulated	Benchmarked costs	Frontier shift estimate Annual	Catch-up estimate Annual	Main techniques used
<b>GAS TRANS</b> GB Ofgem RIIO-T1 2013-2021	1 Gas transmission operator	Total expenditure <sup>109</sup>	Opex: 1.00% Capex/ Repex: 0.7% <sup>110</sup>	N/A <sup>111</sup>	Bottom-up analysis of business plan <sup>112</sup>
<b>GAS DIST</b> GB Ofgem RIIO-GD1 2013-2021	8 Gas distribution companies	Total expenditure <sup>113</sup>	Opex: 1.00% Capex/ Repex: 0.7% <sup>114</sup>	N/A <sup>115</sup>	Econometric benchmarking against peers using a time fixed- effects panel approach <sup>116</sup>
<b>WATER</b> England/Wales Ofwat PR14 2015-2020	10 water and wastewater companies; 9 water only companies	Total expenditure and base expenditure for water. Base expenditure for wastewater <sup>117</sup>	N/A <sup>118</sup>		Econometric benchmarking against peers using corrected least squares and random effects methods <sup>119</sup>

<sup>109</sup> See footnote for electricity transmission

<sup>110</sup> [RIIO-T1/GD1: Real Price Effects and Ongoing Efficiency appendix para 3.3. p15](#)

<sup>111</sup> See footnote for Ofwat

<sup>112</sup> [RIIO-T1 Cost assessment and uncertainty para 1.7. page 3](#)

<sup>113</sup> Some costs were excluded from the main benchmarking process as techniques focused on these specific costs were more appropriate – these include costs associated with street works. [RIIO GD1 Cost efficiency para 1.115 p112](#)

<sup>114</sup> [RIIO-T1/GD1: Real Price Effects and Ongoing Efficiency appendix para 3.3. p15](#)

<sup>115</sup> See footnote for Ofwat

<sup>116</sup> [RIIO-GD1 Cost-Efficiency para 4.4 p22](#)

<sup>117</sup> Base expenditure excludes enhancement capital costs. [Ofwat Basic Cost Threshold Feeder Models. p4](#)

<sup>118</sup> In their most recent reviews, Ofwat (and Ofgem) do not report a per-annum efficiency reduction in costs. In both cases, they also do not report a comparison of the regulator's view of efficient costs to historical costs adjusted to reflect the same volume. Instead, they report comparisons between total revenue in this review period and the prior review period (not costs, and not volume adjusted), and comparisons between the initial business plan submitted by the company and the final determination.

Industry Location Price control	Companies regulated	Benchmarked costs	Frontier shift estimate Annual	Catch-up estimate Annual	Main techniques used
<b>TELECOMS</b> UK Ofcom LLCC – proposed 2013-2015	BT	Operating costs (for TI) Operating costs and capital expenditure (for Ethernet)	1.5% TI basket 4.5% Ethernet basket <sup>120</sup>		Historical trends, internal targets and external benchmarking studies <sup>121</sup>
<b>RAIL INFRASTRUCTURE</b> UK ORR PR08 2008-2013	Network Rail.	Opex, Maintenance and renewals	4.61% <sup>122</sup>		Review of Network rail business plans and policies, comparative benchmarking using trend analysis, benchmarking, using econometrics <sup>123</sup>
<b>ELECTRICITY DIST</b> GB Ofgem DPCR5 2010-2015	14 Distribution Network Operators	Opex and capex	Opex 1.00% <sup>124</sup>	Opex 0.80% <sup>125</sup>	Top down benchmarking for opex catch up, bottom up unit cost benchmarking for capex catch up, review of business plans and EU KLEMS data for frontier shift <sup>126</sup>
<b>WATER</b> England/Wales Ofwat PR09 2010-2015	21 water and wastewater companies	Opex and capex	0.25 – 0.38% <sup>127</sup>	2.2% - 2.9% <sup>128</sup>	Top down econometric analysis and review of business plans <sup>129</sup>

<sup>119</sup> [Ofwat Basic Cost Threshold Feeder Models, p4](#)

<sup>120</sup> BCMR 2015 Annexes Page 121., Table A8.31

<sup>121</sup> [BCMR March 2013 statement](#), TI - para 19.236, page 1021, Ethernet – para 20.320, page 1109

<sup>122</sup> [Periodic review 2013: Establishing Network Rail's efficient expenditure, Table 2.1, page 8](#) The ORR set an efficiency target of 21% over five years for operations, maintenance and renewals. This is equivalent to a compound annual efficiency target of 4.61%  $(1-0.0461)^5 = (1-0.21)$ . The figure is the weighted average for the operations, support, maintenance and renewal cost categories based on the gross catch up and frontier shift less input price effects.

<sup>123</sup> [Periodic review 2013: Establishing Network Rail's efficient expenditure, Table 2.1, page 8](#)

<sup>124</sup> [CEPA Report for the CAA, p14](#)

<sup>125</sup> [CEPA Report for the CAA, p14](#)

<sup>126</sup> CEPA Report for the CAA, p75

<sup>127</sup> [CEPA Report for the CAA, p14](#) (CEPA calculation)

Industry Location Price control	Companies regulated	Benchmarked costs	Frontier shift estimate Annual	Catch-up estimate Annual	Main techniques used
<b>ELEC DIST &amp; TRANS</b> Northern Ireland UR RP5 2012-17	One electricity transmitter	Capex and Opex	Capex: 1% Opex: 1% <sup>130</sup>		GB distribution networks as benchmarks, existing regulatory precedent and EU KLEMS data
<b>WATER</b> Northern Ireland UR PC15 2016-2021	1 water company	Capex and Opex	Opex: n/a Capex: 0.6% <sup>131</sup>	Opex: 2.3% Capex: 1.44% <sup>132</sup> <sup>133</sup>	Review of business plans and external benchmarking for capex target. Econometric benchmarking (COLS model) for setting opex catch up target <sup>134</sup>
<b>RAIL INFRASTRUCTURE</b> London PPP Arbiter 2010-2017	London Underground.	Opex and Capex, but certain costs were excluded <sup>135</sup>	1.0% <sup>136</sup>	n/a	Benchmarking based on TFP estimates and other regulatory precedent <sup>137</sup>
<b>AIRPORTS</b> UK CAA Q6 2014 -2021	Heathrow, Gatwick and Stansted airports	Mainly opex; capex included under certain assumptions around TFP calculations <sup>138</sup>	1.0-1.1% <sup>139</sup>	No conclusions	External benchmarking and historical analysis based on a number of productivity and cost measures chiefly RUOE, TFP and LEMS (labour, energy, materials and services) <sup>140</sup>

<sup>128</sup> [CEPA Report for the CAA, p14](#) (CEPA calculation)

<sup>129</sup> CEPA Report for the CAA, p76

<sup>130</sup> [Northern Ireland Electricity Limited, Price determination, final determination](#) Para 11.27

<sup>131</sup> [Utility Regulator, PC 15 final determination summary document](#)

<sup>132</sup> [Utility Regulator, PC 15 final determination summary document.](#)

<sup>133</sup> Annual 1.44% catch up has been estimated based on the 7% catch up target set over PC15

<sup>134</sup> [Utility regulator PC15 final determination](#), p52, para 5.7.9

<sup>135</sup> [Productivity and unit cost change in the UK reg network industries](#), May 2011. Reckon p 124

<sup>136</sup> [Productivity and unit cost change in the UK reg network industries](#), May 2011. Reckon p 122

<sup>137</sup> [Productivity and unit cost change in the UK reg network industries](#), May 2011. Reckon p 124

<sup>138</sup> CEPA Report for the CAA, p54

## Appendix 2 : Network Rail negotiations with its unionised workforce

- A2.1 Network Rail has a unionised labour force. Its Maintenance and Operations general collective bargaining groups are represented by The National Union of Rail, Maritime and Transport Workers (“RMT”), Transport Salaried Staffs’ Association (“TSSA”) and Unite
- A2.2 Network Rail was set challenging safety, train performance and efficiency targets for CP5 (2014-2019). The ORR specifically assumed that input price inflation, and therefore wage growth, to be zero in CP5. In order to improve its efficiency and meet the targets set by ORR, Network Rail has embarked in a challenging transformation programme, which includes the creation of large Rail Operating Centres that will eventually manage the entire rail network, replacing more than 800 signal boxes.
- A2.3 During the first pay settlement meeting in late 2014, Network Rail explained that, given the challenging efficiency targets required for CP5, any pay increase for 2015 needed to be self-funding (linked to the acceptance of productivity improvement measures) and that any future increases would be linked to the CPI, not the RPI. Also, it proposed not to extend the No Compulsory Redundancies Agreement (“NCR”) past the end of 2014.
- A2.4 The unions rejected the notion that pay increases should be linked to the introduction of productivity-enhancing measures and the CPI, and that the NCR would end. After a series of talks, Network Rail offered a four year settlement:
- 0% pay increase for 2015 and RPI-salary increases at the RPI rate in 2016, 2017, 2018;
  - An extension of the NCR agreement within (and not outside) Network Operations until 31 December 2015; and
  - Provision of a national rail card for employees, entitling them to a 33% discount to off-peak fares for themselves, their family and friends.
- A2.5 A referendum among union members overwhelmingly rejected the settlement and the subsequent strike ballot resulted in a 24 hour strike being called for the end of May (Bank Holiday), with an overtime additional hours and callouts ban in place. This would

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<sup>139</sup> CEPA Report for the CAA, p69

<sup>140</sup> CEPA Report for the CAA, p67

have led to a paralysis of the railway on one of the busiest days of the year, and considerable cost to Network Rail.

- A2.6 Further talks ensued, and Network Rail offered an “improved” deal including, in addition to the national rail card:
- A £500 lump sum for 2015 and RPI-salary increases at the RPI rate in 2016, 2017, 2018; and
  - An extension of the NCR agreement until 31 December 2016.
- A2.7 This proposal was rejected by the unions; they called a 24 hour and a 48 hour strike, and an overtime additional hours and callouts ban for the beginning of June. Given the strong response by union members, it was clear that the industrial action would have shut down the network.
- A2.8 Talks were held at Advisory, Conciliation and Arbitration Service (“ACAS”) and Network Rail made an offer for a deal covering a two-year period, rather than the previous four:
- A 2% pay increase for 2015 (backdated to 1st January) and an RPI increase for 2016, pegged to the RPI in November 2015;
  - A full extension of the NCR to December 2016; and
  - The rail card.
- A2.9 Moreover, it was agreed that Network Rail and the trade unions would enter into discussions in relation to the planned transformation programme to be undertaken by Network Rail during CP5:
- Job security: Voluntary Severance (also extended to those who are not affected by the programme but “want to go”); publication of a Network Rail vacancy list; re-training; relocation; and trial-period opportunities; and
  - Efficiency and improvement project (“EIP”): these discussions would be carried out through ACAS, will be separate from the pay deal, and will not affect terms and conditions agreed through the pay deal. Network Rail will make formal proposals with regards to the EIP, and the affected union members will be consulted on these.
- A2.10 The trade unions accepted the deal on 24 June 2015.
- A2.11 We note that this dispute lasted over six months; saw overwhelming member participation to the ballots, and overwhelming support for the strikes; and saw the unions opposed to any links between productivity improvement measures and pay deals. It can be argued that Network Rail needed to concede on pay to get the unions to sit at the table to discuss any changes in work practices.

The experience of Network Rail shows that even when the regulator does not provide any allowance for wage inflation, trade unions can successfully resist zero-growth pay settlements.

### Appendix 3 : Literature review of effect of public listing and privatisation

- A3.1 The principle that privatising state owned companies returns benefit to both consumers and the government has led to the substantial program of privatisations that has taken place in Western Europe and in the majority of the countries where government owned a large proportion of companies providing infrastructure and essential services to consumers. It is based on the fact that the market can provide a sufficient set of incentives to companies to operate more effectively than a group of civil servants could, because it is likely to encourage innovative behaviours to achieve these results.
- A3.2 There have been a number of theoretical and empirical studies that looked at the efficiency incentives which originate from moving a company from public to private ownership. For example, Villalonga<sup>141</sup>, summarises these incentives as a) market for ownership rights, which allows owners to sell the business if they are not satisfied with the management; b) threat of takeover; c) threat of bankruptcy, which would be absent in public ownership; and d) managerial labour market, where performance based wages can be set up to encourage the maximisation of efficiency in the labour force.
- A3.3 A number of empirical studies looked at the financial performance of firms before and after privatisation to understand the impact of privatisation on their operating efficiency. Other studies assess the efficiency of companies including both private and publically owned, to find evidence of the impact of private ownership on efficiency.
- A3.4 The studies we have review include utilities, whose privatisation was subjected to regulations, and a number of other companies operating in less regulated and more competitive markets. These include:
- i) *Meggison and Netter (2001)* examined a number of empirical studies relating to privatization and its effects in both transition and non-transition economies<sup>142</sup>. As part of their conclusions they consolidate results from different studies, and find that efficiency improved for 81.5% of the newly privatized firms.

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<sup>141</sup> [Privatization and efficiency: differentiating ownership from political, organizational and dynamic effects](#), Villalonga (2000)

<sup>142</sup> [From State to Market: A Survey of Empirical Studies on Privatization](#), Meggison and Netter (2001)

They also report that in almost all of the 22 studies from non-transition economies that they reviewed, they find significant efficiency and capital investment spending increases significantly as firms are privatized. Some of the key studies on which this work is based are summarised below:

1. *Megginson, Nash and van Randenborgh (1994)* compared 3-year averages of pre and post privatisation operational and financial performance for 61 firms in 18 countries and find statistically significant post privatization increases in operating efficiency and capital investment spending, as well as other factors such as output and profitability.
  2. *Boles de Boer and Evans (1996)* estimated the deregulation and privatization of Telecom New Zealand and found significant declines in price of phone services due to productivity growth which cut costs at 5.6% per annum and improvement at service levels.
  3. *Ramamurti (1997)* examined the restructuring and privatization of Ferrocarrilla Argentinos, the national railroad, and found a staggering 370% improvement in labour productivity, expanded and improved services and delivery of these at a lower cost to customers.
  4. *Newberry and Pollitt (1997)* performed a cost benefit analysis of the privatization of the CEGB (Central Electricity Generating Board) and found a permanent reduction of 5% in costs per year.
  5. *Boubakri and Cosset (1998)* performed a similar study to the one done by Megginson, Nash and van Randenborgh for a sample of 79 companies in 21 countries and yielded similar results, with performance improvements recorded being generally larger.
  6. *D'Souza and Megginson (1999)* perform another similar study looking at 78 companies from a mix developed and developing countries and find statistically significant increases in post privatization operating efficiency and an insignificant increase in capital spending.
  7. *Boardman, Laurin and Vining (2000)* examine the 3-year post privatisation averages to 5-year pre-privatization averages for 9 Canadian firms from and find that profitability more than doubles post-privatization, while efficiency also increases significantly but not as drastically.
- ii) *D'Souza, Megginson and Nash (2001)* try to examine the reasons why privatized firms exhibit performance improvements. To this end, they hypothesize the widely accepted reasons for performance gains such as capital market discipline, change in management, restructuring, ownership (foreign/employee/part state) and exposure to competition lead to the improvements observed. They use a sample of

118 firms in 29 countries privatized through 1961-95.<sup>143</sup> Their findings include an assessment that efficiency gains are stronger when a) there is restructuring; b) there is some foreign ownership and c) the firm operates in a large capital markets (relative to its own size): they argue that in larger and more sophisticated capital markets, shareholder rights are protected by the country's legal system, there is greater capital markets pressure and scrutiny. As such privatized firms in these markets are better monitored, which in turn leads them to operate with greater efficiency.

- iii) *Okten and Arin* studied on 23 Turkish cement firms that were privatized between 1989 and 1998, in particular how managerial attitude towards choice of technology can change following privatisation. The study finds that capital and investment increase while employment decreases. This directly contributes to a lower cost per unit while prices are not increased to customers.<sup>144</sup>
- iv) *Tongzon and Wu Heng (2005)* examine the impact of privatization on privatized ports on a sample of 25 ports globally using stochastic frontier analysis. They conclude that full privatization might not be the most effective way to improve operating efficiency but some level of public intervention is useful.
- v) *A study from the East-West Center (2005)* examines technical efficiency in the iron and steel industry using stochastic frontier analysis. They use data on 52 firms over a 20-year period of 1978-1997 and examine which firms are most efficient, and also which factors lead to higher efficiency. They find privatization improves technical efficiency. In particular for British Steel (UK) and CSN (Brazil), they find technical efficiency stabilizes following privatization. They also find investment in new and up-to-date technology is important contributor for technical efficiency.<sup>145</sup>
- vi) *Gasmi, Maingard and Noumba (2011)* empirically examine the differences in impact of privatization for fixed line telecom operators on network expansion, tariffs and efficiency during 1985-2007 for a large panel of different countries. They find significantly positive outcomes for OECD and African resource scarce coastal countries.<sup>146</sup>

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<sup>143</sup> [Determinants of performance improvement in privatized firms](#), D'Souza, Megginson and Nash (2001)

<sup>144</sup> [How Does Privatisation Affect the Firm's Efficiency and Technology Choice?: Evidence from Turkey](#), Okten and Arin

<sup>145</sup> [Technical Efficiency in the Iron and Steel Industry](#), East West Center, 2005

<sup>146</sup> [Empirical evidence on the impact of privatization of fixed line operators on telecommunications performance](#), Gasmi, Maingard and Noumba, February 2011

## Appendix 4 : Additional PVEO analysis

A4.1 **Table A4.1** [✂]

A4.2 **Table A4.2** [✂]