

This is a sample report.

To view the full version for free please [register and login here.](#)

TANDEM 3

Final Report

GLA Economics

February 2007

TANDEM 3

Final Report

Project No: 115051
February 2007

Newcombe House
45 Notting Hill Gate,
London, W11 3PB
Telephone: 020 7309 7000
Fax: 020 7309 0906
Email : London@cbuchanan.co.uk

Prepared by:

Approved by:

Ryan Emmett and Amy Horton

Paul Buchanan

Status: final

Issue no: 0

Date: 27 February 2007

i:\11505x_tandem model\study\reports\draft report cb v4 ah.doc

(C) Copyright Colin Buchanan and Partners Limited. All rights reserved.

This report has been prepared for the exclusive use of the commissioning party and unless otherwise agreed in writing by Colin Buchanan and Partners Limited, no other party may copy, reproduce, distribute, make use of, or rely on the contents of the report. No liability is accepted by Colin Buchanan and Partners Limited for any use of this report, other than for the purposes for which it was originally prepared and provided.

Opinions and information provided in this report are on the basis of Colin Buchanan and Partners Limited using due skill, care and diligence in the preparation of the same and no explicit warranty is provided as to their accuracy. It should be noted and is expressly stated that no independent verification of any of the documents or information supplied to Colin Buchanan and Partners Limited has been made

Contents	Page
1. OVERVIEW OF TANDEM	1
1.1 Philosophy and Aim	1
1.2 Building on TANDEM 2005	1
2. MODELLING FRAMEWORK	2
2.1 The Simple Model	2
2.2 The Big Picture – Pulling everyone together	5
3. MODEL INPUTS & OUTPUTS	7
3.2 Elasticities – criteria and supplied data	7
3.3 Elasticities – estimated values	8
3.4 Redistribution factors	8
3.5 Outputs	9
3.6 Implications of the outputs and further developments	12
4. CONCLUSIONS	13
5. APPENDICES	14
APPENDIX A: DIMENSIONS OF THE MODEL	15
APPENDIX B – DETAIL OF LINKS USED	17
APPENDIX C: DATA SOURCES	19
APPENDIX D: SUMMARY OF FURTHER OUTPUTS	21
APPENDIX E: ELASTICITIES	22

Figures	Page
Figure 2.1: The Simple Model	2
Figure 2.2: The Simple Model for Commuters	3
Figure 3.1: Employment by zone	10
Figure 3.2: Central London Employment by Year	10
Figure 3.3: Difference in RGVA due to transport changes (present value, 25 years)	11
Figure 3.4: Demand by Mode	11
Figure 3.5: Demand by Purpose	12

1. Overview of TANDEM

1.1 Philosophy and Aim

- 1.1.1 It is important that policy makers understand the wider impacts of the transport changes they introduce. This is no simple task.
- 1.1.2 In developing the TANDEM model our aim has been threefold:
1. To think about the relationship between transport changes and the economy over the long term
 2. To create a framework that is as simple to understand as possible
 3. To be transparent about the inputs and assumptions which have been used and open to exploring their impact
- 1.1.3 This report describes the latest version of the TANDEM model in detail, discusses the issues raised during data collection and presents some preliminary outputs. One of the key lessons from the report is the importance of developing our understanding of how crowding is likely to impact upon economic growth in London.
- 1.1.4 Appendices following the main report give more technical details of the model, details of the sources used for the inputs, the elasticities, and some further results.

1.2 Building on TANDEM 2005

- 1.2.1 In October 2005 the first version of TANDEM was produced along with the report 'Investigating the Potential Impact of Transport Changes on the London Economy'. Since then we have been keen to improve upon the modelling we used. For this reason several substantial changes have been made including:
1. Increased number of zones modelled
 2. The source of the elasticities
 3. The addition of agglomeration bonuses in central London
 4. The addition of crowding penalties in central London
 5. The addition of exogenous employment growth
- 1.2.2 The main dynamic of the model and philosophy surrounding it remains unchanged.

2. Modelling Framework

2.1 The Simple Model

2.1.1 To start the investigation we proposed the following relationships between the demand for trips, generalised costs of trips and the levels of business and employment growth. This is illustrated in Figure 2.1.

2.1.2 Generalised cost is a measure of the total cost of a trip for the passenger. It includes monetary costs reflecting fares, parking costs and petrol costs, and time costs valuing the length of the journey, crowding on the route, and penalties for infrequent or unreliable routes. Economic output is measured in RGVA (Real Gross Value Added).

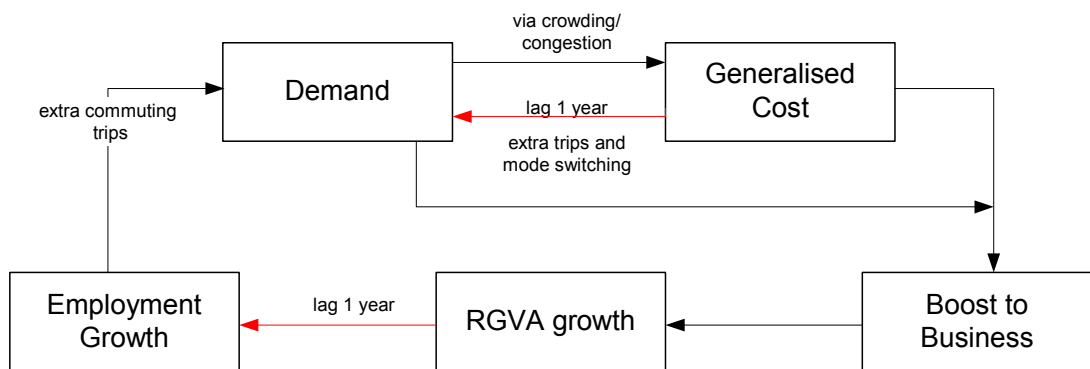


Figure 2.1: The Simple Model

2.1.3 The top two boxes - demand and generalised cost, both depend on each other. As the number of people travelling increases, the crowding and congestion within the system increase. This increases the generalised cost of trips made. As the generalised cost increases less people are willing to travel by that mode, and people either stop making the journey or change onto a different mode of transport, changing the level of demand. The full effects of this change take time to occur, since people are generally slow to change habits.

2.1.4 While these links have been widely explored in transport models, the lower loop in the diagram, which links through to employment, is more experimental. Firstly, the benefit to travellers of a change in generalised cost is calculated. This is given by:

$$\text{Boost} = \text{previous passengers} \times \text{absolute change in generalised cost}$$

+

$$0.5 \times \text{new passengers} \times \text{absolute change in generalised cost}$$

2.1.5 The benefit reflects the surplus/loss to consumers based on their willingness to pay. This method of valuing the welfare effects of a price change is a standard technique in economics.

- 2.1.6 Secondly, we assume a proportion of this benefit/loss is absorbed by businesses. The 'Boost' referred to in the equation above is multiplied by the relevant proportion to give the 'Boost to Business'.
- 2.1.7 This boost contributes to output growth in the period and, after a year, to additional employment growth. This follows the strong link between the amount of cash in an employer's pocket and the number of people they wish to employ. Employment growth is then linked back up to the top box as it causes a growth in commuting trips, which completes the circle.

The Simple Model – Commuters

- 2.1.8 For commuting trips we need to add a few more links between the boxes to count up the full impacts on employment and RGVA.
- 2.1.9 The lower loop via the boost and output growth is unchanged from the simple model and captures the 'demand side' of the employment changes. Here employers use the cash they have saved to increase the number of employees they hire.
- 2.1.10 The additional part of the commuting model links the change in demand from generalised cost changes, in the top of the diagram, to additional employment and RGVA. This link reflects a 'supply side' effect as employees decide whether they are willing to travel or not.
- 2.1.11 The relationship between generalised cost and demand therefore affects employment levels in two distinct ways and both need to be counted. So when generalised cost changes commuting demand, we correspondingly expect changes in employment and RGVA.

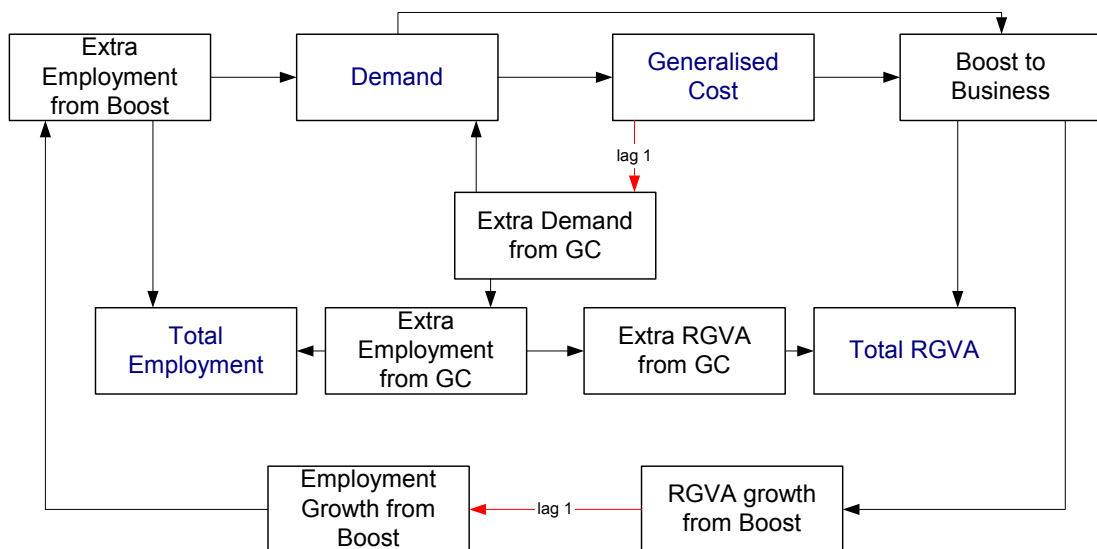


Figure 2.2: The Simple Model for Commuters

Exogenous Employment Growth

- 2.1.12 Employment in London is currently growing strongly. GLA forecasts expect 900,000 new jobs by 2026. This represents a growth of 20% overall and as