steer davies gleave

cambridge econometrics
clarity from complexity

# New or improved rail lines – Evaluation case studies of local economic impacts

Department for Transport Rail Group

Leamington Spa Case Study
January 2018

Our ref: 22961201

# New or improved rail lines – Evaluation case studies of local economic impacts

Department for Transport Rail Group

Leamington Spa Case Study
January 2018

Our ref: 22961201


Prepared by:

Steer Davies Gleave
28-32 Upper Ground
London SE1 9PD

+44 20 7910 5000
www.steerdaviesgleave.com


Prepared for:

Department for Transport Rail Group
Great Minster House
33 Horseferry Road
London SW1P 4DR

# Contents

## Figures

## Tables

# Executive Summary

## Background

The purpose of this project is to generate evidence to increase understanding of the economic impacts of rail infrastructure investments, including the relationship between the provision of improved rail services and economic growth. This project, commissioned by the Department for Transport (DfT), is an ex-post evaluation study which tests the insights that can be gained by using a case study approach to build a detailed and rich narrative of the particular context in which the new or improved rail lines are being delivered, and how this relates to any observed behavioural and economic impacts. We investigate first the evidence for behavioural change across case studies (e.g. demand response) before considering the potential for economic impacts.

This case study investigates the impacts of the investment on the Chiltern Main Line at Leamington Spa, as a result of the Evergreen 3, Phase 1 improvements. These improvements were completed in August 2011, and provided passengers at Leamington Spa with reduced journey times of 71 minutes to London (reduced by 20 minutes) and 29 minutes to Birmingham (reduced by 4 minutes). It is a retrospective study, considering the transport impacts of the investment which was completed in 2011, together with any impacts on the local economy, including through the use of econometric analysis.

Within each of the six case studies undertaken as part of this ex-post evaluation study, three central hypotheses are being tested:

1. That improved rail services will, by making rail travel more convenient for local people, encourage additional rail trips including some generated trips and some captured from other modes.
2. That improvements to the station and services will make the affected area a more attractive place to:

    i. live;
    ii. work; and / or
    iii. locate a business.
    (investment and employment effects).

3. That businesses located within the station catchment area with improved services will benefit from improved access to potential employees, customers, and suppliers, resulting in greater productivity (productivity effects).

In this report we:

- provide an overview of the pre-intervention socio-economic characteristics and market for rail travel in Leamington Spa (Chapter 2);
- introduce the chosen comparison area of Rugby, which is used to try to isolate the impacts of the rail intervention on Leamington (Chapter 3);
- explore the behavioural impacts of the service improvements in Leamington Spa (Chapter 4);
- identify the economic impacts of the intervention, including the results of econometric analysis (Chapter 5); and

- bring these findings together to establish what conclusions can be drawn regarding the economic impacts of the rail improvements to Leamington Spa (Chapter 6).

**Economic, socio-demographic and transport context (Chapter 2)**

Leamington Spa station is located towards the southern edge of the town centre, within Warwick local authority in the West Midlands. Chiltern Railways services operate to London Marylebone and Birmingham Moor Street, every half hour in each direction, with these services complemented by CrossCountry services to Coventry, Birmingham, Manchester and Leeds towards the north, and Oxford, Reading and Southampton to the south. Rail infrastructure improvements were completed as part of the Chiltern Evergreen 3 Phase 1 programme in 2011, which facilitated journey time improvements and reduced travel times from Leamington Spa towards London and Birmingham.

Leamington Spa's labour market is largely self-contained, with the majority of Leamington Spa residents who were employed in 2011 commuting within the Warwick local authority area (in which Leamington Spa is located). 6% of residents commuted to Birmingham or London at that time, before the improvement to rail services on the Chiltern Main Line which connects Leamington Spa to both cities.

The Warwick local authority area saw negative employment growth in most of the period immediately preceding the completion of the rail improvements in 2011 (2005-11), underperforming both the regional and national averages. This trend was evident before the onset of the recession in 2009. However, the area's employment rate exceeded the national average throughout the period.

Gross Value Added (GVA) per worker in the Warwick local authority area consistently exceeded the West Midlands and England averages between 2005 and 2010, most likely reflecting the significance of the high-value knowledge sector in the local economy.

Usage of Leamington Spa railway station rose roughly in line with the national average between 2004/05 and 2010/11, but this was significantly below the West Midlands regional average during this period.

**The comparison area (Chapter 3)**

A comparison area was used to attempt to disaggregate the effects of the rail investment in Leamington Spa from more general transport and economic trends. For this case study, a Rugby comparison area – located within Rugby local authority to the east of Coventry – was selected. The area was used to benchmark Leamington Spa's economic performance as it is economically similar to Leamington Spa but is located on a different railway line unaffected by the reduced travel times (such as to Birmingham) delivered through the Evergreen project.

Rugby experienced significantly higher population growth than Leamington Spa in the years leading up to the Chiltern Main Line rail intervention, with the town also exceeding the regional and national averages on this metric. A comparable proportion of the population in both Rugby and Leamington Spa used rail to commute to work according to the 2011 census, at 2.3% and 2.5% respectively.

Employment rates in both areas fell significantly at the onset of the Great Recession, and by 2010 both areas had employment rates close to the regional average, but below the national

average. Furthermore, unlike the England average, by 2010 the levels of employment in both towns remained below that of 2005. In terms of the sectoral composition of employment, in both towns, the largest employment sector was Wholesale and Retail trade and the Repair of Vehicles, accounting for more than 20% of employment in each. However, there are some significant differences, with a much stronger construction and manufacturing presence in Rugby's economy than in Leamington Spa's in 2010.

Rail usage in Rugby grew at a similar rate to that in Leamington Spa prior to 2011, although it should be noted the station also benefitted from significant improvements in services as a result of the upgrade to the West Coast Main Line in 2008.

In conclusion, the use of the Rugby comparison area is justified on the grounds that it was broadly similar in terms of its regional location, size, levels of rail commuting, employment trends and industrial sectors but did not receive an equivalent improvement in its rail service. However, two qualifications which limit its validity as a comparator need to be noted - that it had higher population growth than Leamington Spa in the period leading up to 2011, and that it was benefiting from some earlier improvements to its rail service and so did not represent a 'no treatment' scenario. With these provisos, the comparison is helpful to our understanding of what impacts occurred in Leamington Spa.

**Behavioural Impacts of the Transport Intervention (Chapter 4)**

Growth in station entries and exits at Leamington Spa has roughly kept pace with the regional and national trends in the period 2008-09 to 2015-16, but growth in station usage in the comparison area of Rugby has exceeded that of Leamington Spa, most notably since 2013-14.

This pattern is reflected in the results of station user surveys from Leamington Spa and Rugby, which suggest that, while a small but significant proportion of station users at Leamington Spa said they had become more likely to travel by rail to London or Birmingham in the five years to 2016, this proportion was noticeably larger at Rugby. An important finding in this context is the low awareness of the improvements (6% fully aware) amongst Leamington Spa users.

Station users at Leamington Spa seem broadly satisfied with the quality of service provision at the station, with over 70% of passengers being satisfied with the trains overall, and four of the five specific measures the survey queried. The remaining measure was whether there was sufficient room for all passengers to sit or stand with 60% of passengers also expressing satisfaction with this aspect. However, satisfaction levels amongst Rugby station users were higher when considering the proportions 'very satisfied'. This may indicate that the rail investment in this instance has only had a marginal impact on passenger satisfaction.

The main reason given for starting to use the station was that it was more convenient than other forms of transport. However, improvements to rail services *specifically* was not a commonly stated reason for starting to use the station. However, the 2016 station user survey suggested that there may have been a small amount of modal shift from car for Leamington Spa passengers since the rail intervention.

These findings show that growth in station usage in Leamington Spa kept pace with regional and national trends, and that passenger satisfaction was quite high. However, there was low awareness of the improvements among passengers, and local residents and businesses. So,

while the overall picture for the rail service was quite positive, there is no evidence that trends were more positive in Leamington Spa than elsewhere in the region.

**Economic Impact of the Transport Intervention (Chapter 5)**

The evidence suggests that the impacts of the Evergreen 3 Phase 1 investment on Leamington Spa are likely to be limited. Population growth has broadly tracked the wider regional trend and Rugby comparator since 2010, suggesting the rail improvements have not impacted on the rate of population growth or significantly increased the attractiveness of the town as a place to live. With comparatively few residents in Leamington Spa commuting to London and Birmingham, the enhanced rail connectivity to these destinations is not likely to have a significant impact on local residential investment.

Similarly, regarding business investment, interview evidence suggests that the overall impact of the attractiveness of the town for the majority of businesses is limited. Most businesses in the area do not appear to rely on rail connectivity, and hence any improvements are not likely to increase their investment in the town. It may, however, be the case that the improvements have supported business retention in Leamington Spa by maintaining the town's accessibility to London in relative terms (following the improvements on the West Coast Main Line which have improved the accessibility of Rugby, Northampton and Milton Keynes to London), although there is no evidence to support this.

Evidence from the Difference-in-Difference (D-i-D) employment and turnover analysis is also inconclusive, due in large part to the difficulty in establishing a common trend between Leamington Spa and Rugby. There does appear to be an increase in employment in the hotels, restaurants and retail sector relative to Rugby following the intervention, although again it is challenging to associate this conclusively with the rail improvements. Regarding business profitability, while GVA per worker does appear to have increased relative to Rugby, it is difficult to isolate the mechanisms that could link this to the rail improvements. While business time savings could provide a mechanism, it is unlikely that considering the incremental nature of the improvement and the limited use of rail by local businesses that they can account for a significant productivity uplift across the wider local economy.

**Conclusions and Future Work (Chapter 6)**

Since the improvements in Leamington Spa were completed in 2011, this has given a six-year period for the impacts of the investment to be felt on local transport patterns and economic impacts. Whilst, especially with respect to economic impacts, there remains a time lag effect before impacts can be identified as a result of businesses taking time to adjust to the interventions, it is unlikely that any future major economic impacts would be expected to arise from the scheme, given the scale of the investment and the inconclusive evidence found for behavioural effects.

Overall, the nature of the rail accessibility improvement on Leamington Spa was incremental rather than transformatory, and hence it is unlikely that future evaluation would be justified in identifying any longer-term economic impacts.

The evidence suggests that the intervention has been positive in supporting passenger growth and satisfaction levels that are comparable with other locations, and so maintaining rather than significantly changing the town's existing economic position within the West Midlands.

# 1 Introduction

1.1 This report outlines the findings of a case study into the economic impacts of the Evergreen 3 Phase 1 upgrade of the Chiltern Main Line at Leamington Spa, which forms part of a wider study into the economic impacts of investment in new and improved rail lines. In total, six case study reports have been produced and are supplemented by an Executive Summary document and a Technical Report. Leamington Spa was selected as a retrospective case study, where investment and rail service improvements were delivered in 2011.

1.2 This introductory chapter provides some brief background to the wider project and to this particular case study. Further information about the project and the methodological approach being used can be found in the accompanying Technical Report.

1.3 This chapter is followed by chapters which:

- provide an overview of the pre-intervention socio-economic characteristics and market for rail travel in Leamington Spa (Chapter 2);
- introduce the chosen comparison area of Rugby, which is used to try and isolate the impacts of the rail intervention on Leamington Spa (Chapter 3);
- explore the transport impacts of the service improvements in Leamington Spa (Chapter 4);
- identify the economic impacts of the intervention, including the results of econometric analysis (Chapter 5); and
- bring these findings together to establish what conclusions can be drawn regarding the economic impacts of the rail improvements to Leamington Spa (Chapter 6).

## Overall aims of the project

1.4 The purpose of this project is to generate evidence to increase understanding of the economic impacts of rail infrastructure investments, including the relationship between the provision of improved rail services and economic growth. DfT commissioned the project to start to build an evidence base in this area, for which there is currently limited ex-post evaluation evidence available. This project tests the insights that can be gained by using a case study approach to build a detailed and rich narrative of the particular context in which the new or improved rail lines are being delivered, and how this relates to any observed behavioural and economic impacts. The relative strengths and limitations of a case study approach are discussed further in the accompanying Technical Report.

1.5 We investigate first the evidence for behavioural change (e.g. demand response) as a precursor to economic impacts, before considering the potential economic impacts. Given that this is an innovative and methodologically challenging area, we aim to first build an evidence base across a small number of case studies on the scale and scope of potential economic

effects. We do not, however, go so far as to then explicitly address questions of additionality and displacement within this study (i.e. questions around whether any increased economic activity is newly generated or displaced from elsewhere).

1.6 Within each of the project case studies, three central hypotheses are being tested:

1. That improved rail services will, by making rail travel more convenient for local people, encourage additional rail trips including some generated trips and some captured from other modes.

2. That the new service, and enhanced connectivity it offers, will make the local area a more attractive place to:

   i. live;
   ii. work; and / or
   locate a business.
   (investment and employment effects).
   iii. That businesses located within the station catchment area with improved services will benefit from improved access to potential employees, customers, and suppliers, resulting in greater productivity (productivity effects).

1.7 Each case study has been selected to include different transport interventions that will deliver different outputs under different circumstances and lead to a diversity in the scale, nature and distribution of economic outcomes that may be realised and observed. The remainder of this report considers the specific features of the Leamington Spa case study.

## The Leamington Spa case study

**Why was Leamington Spa chosen as a case study?**

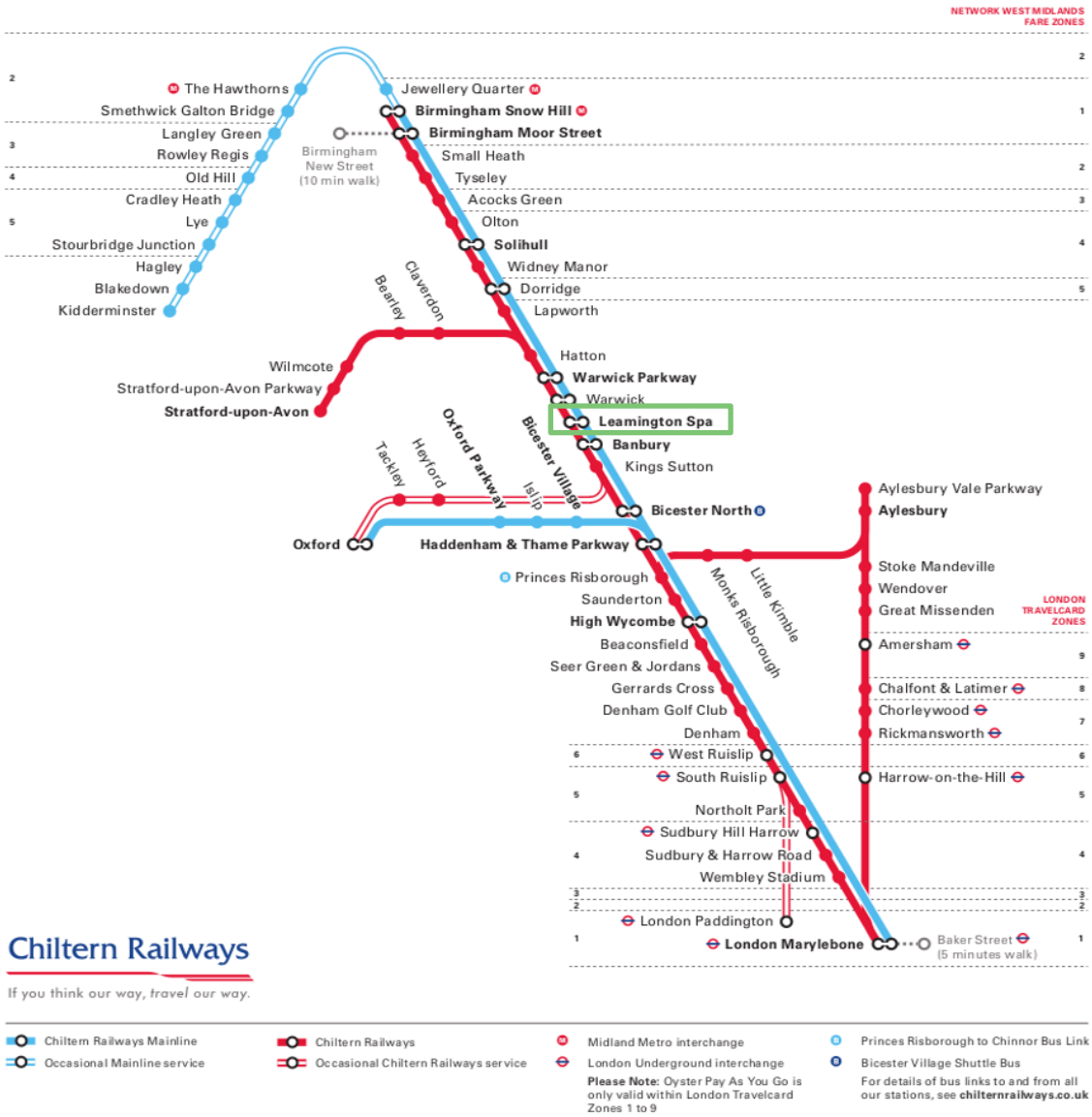
1.8 Leamington Spa was selected as a retrospective case study for several reasons:

- rail infrastructure improvements, completed in 2011 as part of the Chiltern Evergreen 3 Phase 1 programme, have led to faster journey times between Leamington Spa, London and Birmingham;
- completion of these improvements provides an opportunity to examine the impacts of the programme of rail improvements on the local area; and
- the timing of the rail improvements (completed in 2011) grants a sufficient timespan to retrospectively observe and identify any economic impacts that have arisen from the investment, and make informed comment on any potential future impacts.

### What is the nature of the improvements at Leamington Spa?

1.9 Leamington Spa is located on the Chiltern Main Line, and is served by frequent Chiltern Railways services between London Marylebone and Birmingham Moor Street. Figure 1.1 below outlines the Chiltern Railways services calling at Leamington Spa, following the rail improvements.

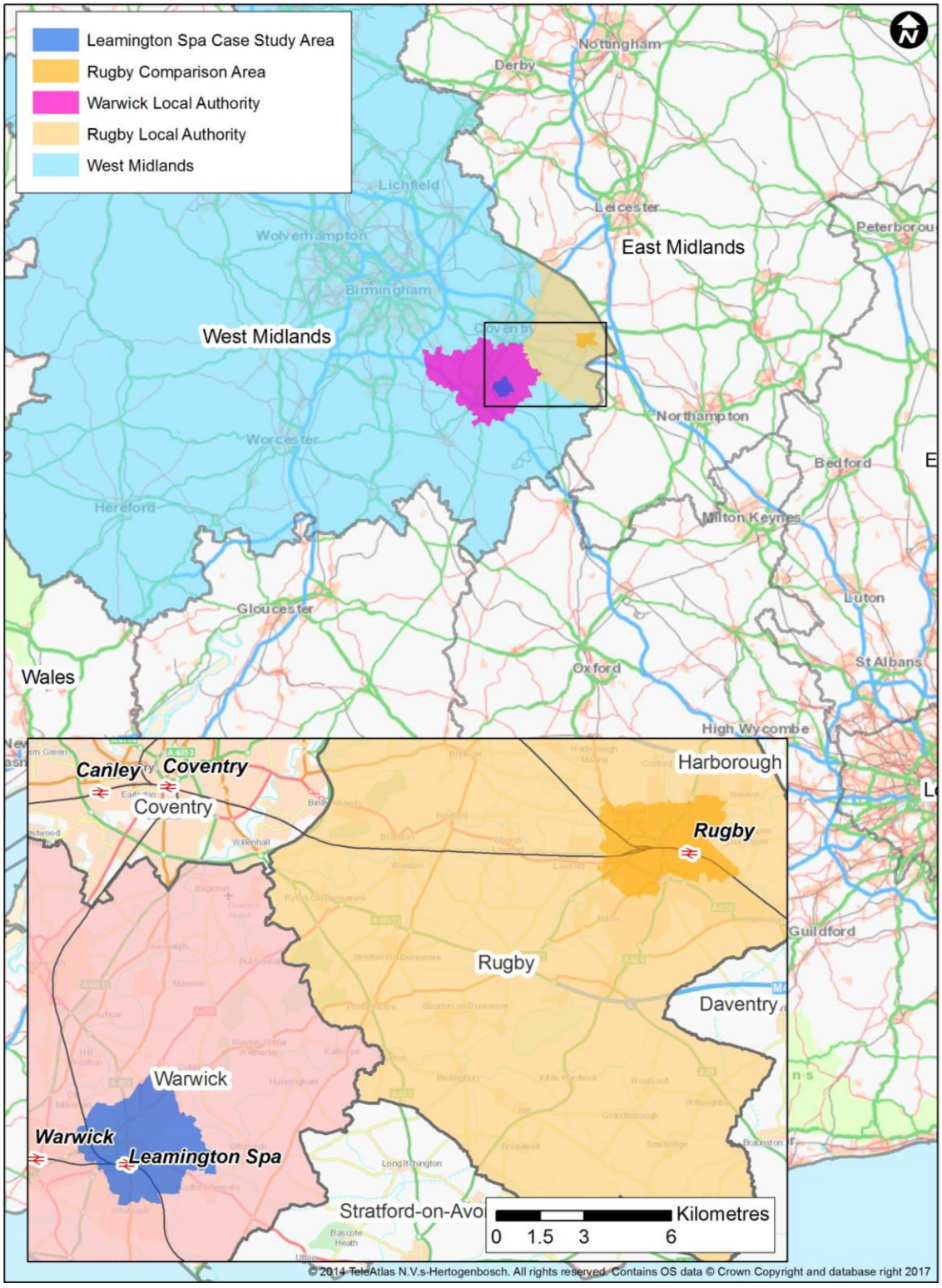
**Figure 1.1: Chiltern Railways Route Map**




Source: https://www.chilternrailways.co.uk/sites/all/themes/custom/chilterntheme/images/routemap2.png

1.10 Figure 1.2 below shows the location of the case study area within the West Midlands. It also shows the location of Rugby, the chosen comparator area which is the subject of Chapter 3.

**Figure 1.2: Leamington Spa within the West Midlands**



1.11 The current Chiltern Railways franchise, commenced in 2002, committed to major infrastructure works over the 20-year duration of the franchise to deliver faster services between London and the West Midlands, following on from improvements started under the previous franchise after privatisation. These successive improvements were known as Project Evergreen, and were divided into three phases as follows:

- **Evergreen 1** – delivered 1998 - 2001, this phase involved line speed improvements and the redoubling of the Chiltern Main Line between Princes Risborough, Bicester and Aynho Junction (between Bicester and Banbury), reducing journey times and increasing frequencies between London Marylebone and Birmingham Snow Hill (via Leamington Spa);
- **Evergreen 2** – this phase, commenced after the award of the franchise in 2002 and now complete, included the construction of two additional platforms at London Marylebone, track realignment at Beaconsfield to increase line speeds, and signalling improvements to boost capacity and reliability; and
- **Evergreen 3** – this phase represented a £250 million upgrade of the Chiltern Main Line, and was divided into two elements as follows:
  - **Phase 1** - **Chiltern Main Line**
    - line speed improvements to deliver faster journey times (90 minutes between London Marylebone and Birmingham, and 20% reduction in other journey times as shown in Table 1.1)
    - this phase was completed in August 2011, with the new timetable introduced in September 2011.
  - **Phase 2 – Chiltern to Oxford**
    - construction of a new chord connecting Bicester to the Chiltern Main Line, doubling of the railway track between Oxford and Bicester, upgrade of track and signalling and construction of two new stations at Oxford Parkway and Bicester Village
    - new services between Oxford Parkway and London Marylebone were introduced in October 2015, with the introduction of new direct services between London Marylebone and Oxford (via Oxford Parkway and Bicester) from December 2016
    - the impact of these new services is considered in detail within the Oxford Parkway case study, as part of the wider project within which this case study sits.

1.12 Overall, the Evergreen 3 Phase 1 programme delivered significant journey time savings between Leamington Spa and London. Some, albeit smaller, journey time savings were delivered between Leamington Spa and Birmingham Moor Street, as outlined in Table 1.1.

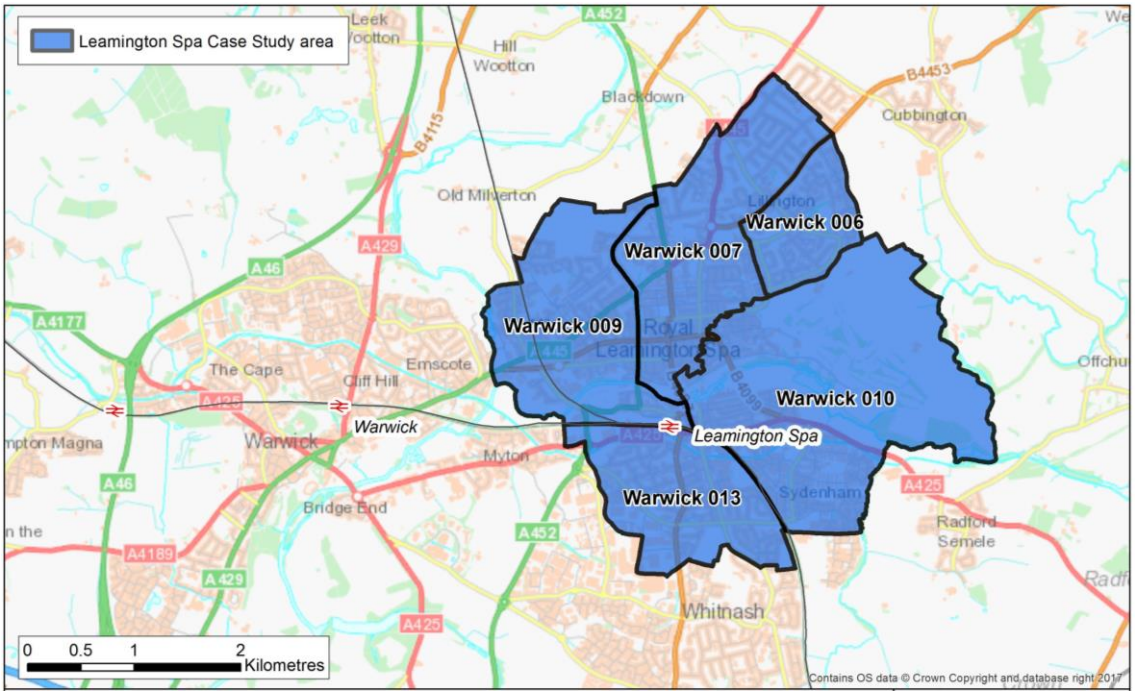
**Table 1.1: Chiltern Main Line journey times (fastest AM Peak time)**

| | 2011 (Pre-Evergreen 3) | 2017 (Post-Evergreen 3) | Minutes saving |
|---|---|---|---|
| Leamington Spa – London Marylebone | 90 minutes | 71 minutes | 20 minutes |
| Leamington Spa – Birmingham Moor Street | 36 minutes | 29 minutes | 4 minutes |

Source: Network Rail Timetable (22 May – 10 Dec 2011); until 2 September 2011

1.13 The Leamington Spa Case Study area has been defined using the Medium Super Output Area (MSOA) geography that is used by the Office of National Statistics (ONS) for analysis and presentation of Census data. Warwick 006, Warwick 007, Warwick 009, Warwick 010 and Warwick 013 were used to define the study area, as shown in Figure 1.3. These MSOAs form a contiguous combined case study area encompassing the town, including the town centre (which is around a third of a mile square) and the station.

**Figure 1.3: Leamington Spa Case Study area**



# 2 Economic, socio-demographic and transport context

## Introduction

2.1 This chapter offers an overview of the case study area of Leamington Spa prior to the transport intervention at the station, identifying how the area fits in to the wider West Midlands area. Particularly, the overview focuses on the transport links through Leamington Spa station prior to the completion of the Evergreen 3, Phase 1 timetable improvements, and the economic context in Leamington Spa at that time.

## Overview of Leamington Spa

**Where is Leamington Spa, and what is the geography of the area?**

2.2 Royal Leamington Spa, commonly known as Leamington Spa or Leamington, is located in the West Midlands within the local authority of Warwick. Leamington Spa railway station is located towards the southern edge of the town centre, and is a 5–10 minute walk from the town centre.

2.3 Warwick is located approximately two miles west of Leamington Spa, and the two towns are separated only by the River Avon. Coventry is located approximately 10 miles (30 minutes) by road to the north, and Birmingham approximately 20 miles (45 minutes) to the north-west.

**Transport networks in and around Leamington Spa prior to the intervention**

2.4 Leamington Spa is located on the Chiltern Main Line. The station is served by Chiltern Railways services between London Marylebone and Birmingham Moor Street, and CrossCountry services between Southampton, Reading and Oxford and Birmingham New Street, Coventry, Manchester and Leeds. Chiltern Railways services also operate between Leamington Spa and Stratford-upon-Avon, occasionally extending to London.

2.5 In 2011, immediately prior to the completion of the Evergreen 3, Phase 1 improvements programme, Chiltern Railways services between Leamington Spa and London Marylebone took approximately 90 minutes, with a frequency of three trains per hour (tph) in the AM Peak. Chiltern also operated fast regular services to Banbury (18 minutes) and Birmingham Moor Street (36 minutes, frequency of two tph in the AM Peak). The Leamington to Stratford Line was served by regular, albeit infrequent Chiltern Railways services every two hours[1].

[1] Network Rail Timetable (22 May – 10 Dec 2011); until 2 September 2011

CrossCountry services have operated to broadly the same operating pattern since the mid-2000s, consisting of a journey time of 32 minutes and two tph, with no major service changes since 2011.

2.6 Leamington Spa is served by an excellent road network, and is located five miles from the M40, four miles from the A46 and 11 miles from the M45 which provide links to major towns and cities across the Midlands, including Birmingham, Coventry, Leicester, Banbury, Oxford and Rugby. The town has several large car parks, providing over 1,700 spaces. These road links have not changed since before the rail intervention in 2011.

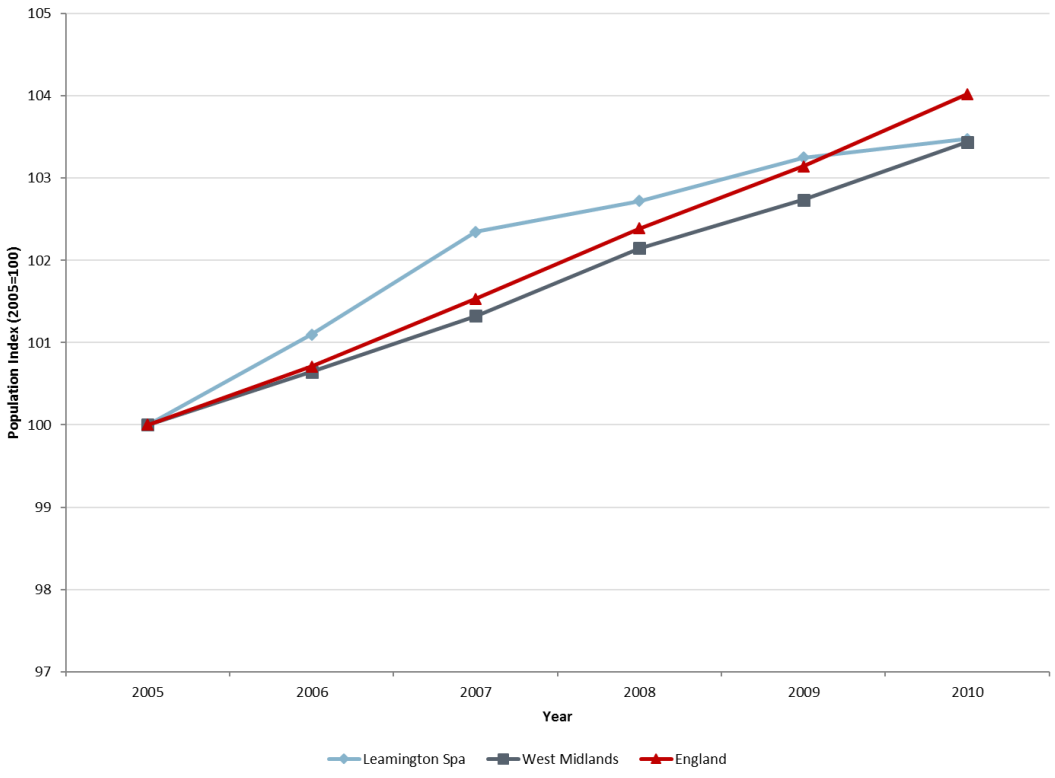
2.7 Regular bus services operate to and from the town centre bus station, providing links in and around the region, including the rail stations. National Express also operates long-distance coach routes through Leamington Spa.

## Socio-economic characteristics of the case study area

### Population growth

2.8 Figure 2.1 highlights the trends in population growth in Leamington Spa in the period preceding the transport intervention (2005-10), with the regional (West Midlands) and national (England) averages included for comparison. This data indicates that Leamington Spa's growth outpaced those regional and national averages until the onset of the Great Recession. Thereafter the evidence suggests Leamington Spa's growth was slower relative to the rest of the region and the country. However, these differences are relatively minor; overall, Leamington Spa's growth pattern was similar to the averages in this period.

**Figure 2.1: Population Index 2005-2010**




Source: ONS mid-year population estimates (accessed 2017)

### Commuting by Leamington Spa residents

2.9 Table 2.1 shows the top 10 commuting destinations (Local Authority Districts) for residents of Leamington Spa, based on all modes of transport, as sourced from the 2011 Census. Collection of this data precedes the completion of the Evergreen programme, and thus the associated rail travel time benefits. Almost 60% of employed residents commuted within the Warwick local authority (which includes Leamington Spa), and Coventry and Stratford-upon-Avon represent the second and third most popular commuting destinations (13% and 10% respectively). The data suggests a reliance on the local labour markets in neighbouring towns, such as Coventry, and that prior to the completion of the rail improvements, 4% of employed residents commuted to Birmingham and 2% to London.

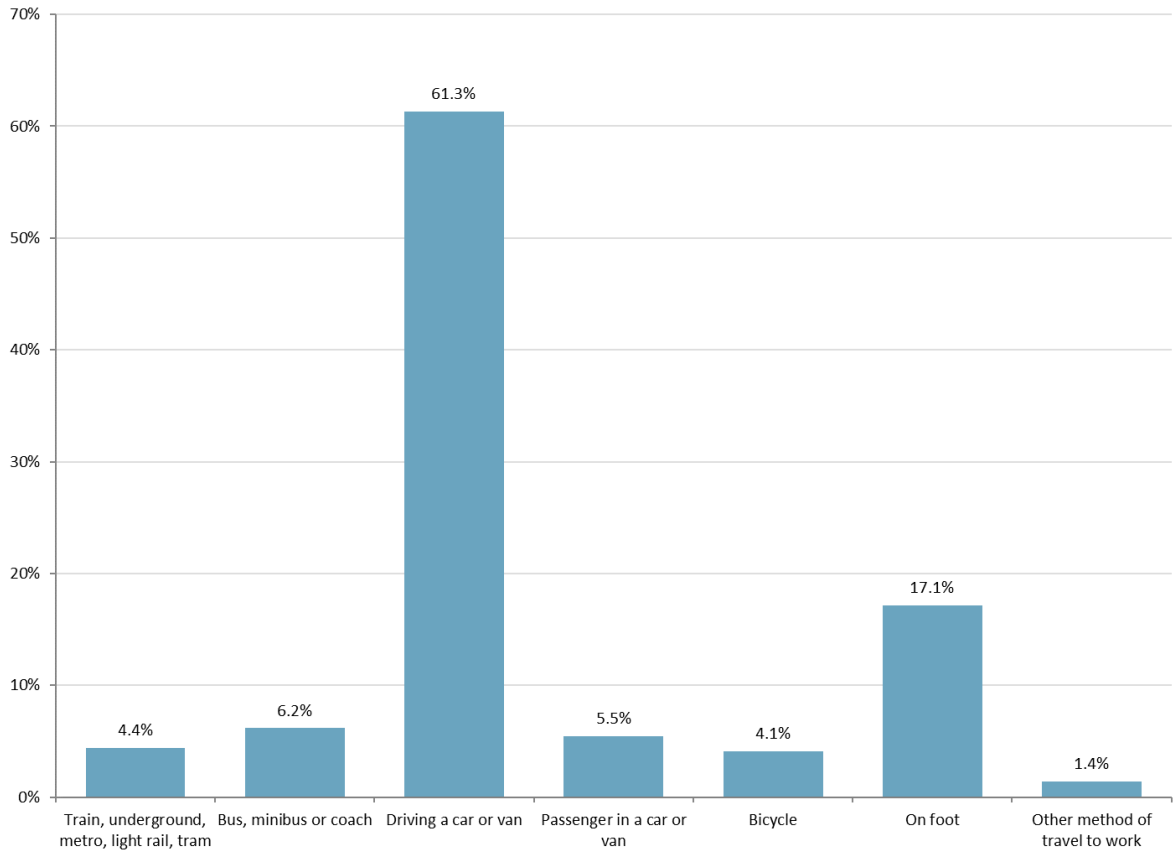
**Table 2.1: Top 10 commuting destinations (Local Authority District) for residents of Leamington Spa (all modes)**

| Rank | Place of Work | No. of workers | % of employed residents |
|---|---|---|---|
| 1 | Warwick | 11,582 | 58.3% |
| 2 | Coventry | 2,508 | 12.6% |
| 3 | Stratford-upon-Avon | 1,923 | 9.7% |
| 4 | Birmingham | 729 | 3.7% |
| 5 | Solihull | 412 | 2.1% |
| 6 | Rugby | 376 | 1.9% |
| 7 | All London boroughs (aggregated) | 372 | 1.9% |
| 8 | Cherwell | 196 | 1.0% |
| 9 | Nuneaton and Bedworth | 123 | 0.6% |
| 10 | Daventry | 119 | 0.6% |
| *All other destinations* | | 1,524 | 7.7% |

Source: Census Travel to Work data WU01EW (2011), Office for National Statistics; the definition of the Leamington Case Study area includes the following five Middle Super Output Areas (Warwick 006, Warwick 007, Warwick 009, Warwick 010 and Warwick 013) (see Figure 1.3). The place of work definitions are based on the 2011 Census merged local authority districts. (accessed 2017)

2.10 Figure 2.2 indicates how residents of Leamington Spa travelled to work as of the 2011 Census, immediately preceding the transport intervention. The data given excludes those not in work and who work from home. The data highlights how, as was the case for the whole of England, the mode share of rail compared to that of road transport, for commuting purposes, was small.

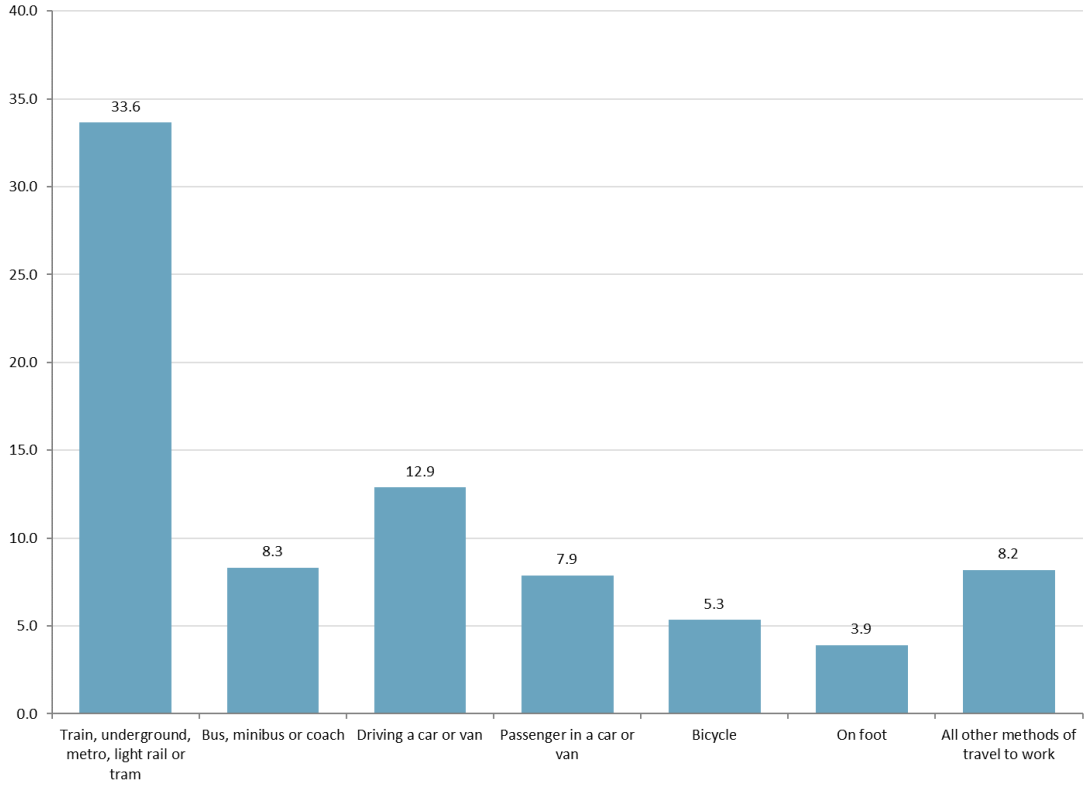
**Figure 2.2: Method of commuting to work for Leamington Spa residents, 2011**




Source: ONS Census 2011, Travel to Work (accessed 2017)

2.11 Further information on this theme is given in Figure 2.3, which indicates the average distance travelled to work by users of the modes outlined above. This data reflects residents of the Warwick local authority area, which contains Leamington Spa, and represents the lowest level of disaggregation at which this data is available. This data indicates how, on average, rail users travelled significantly further than users of other modes as of the 2011 census, as was generally observed across the UK.

**Figure 2.3: Average distance travelled to work by Warwick local authority residents (by mode), 2011**




Source: ONS Census 2011, Travel to Work (accessed 2017)

### Commuting to Warwick local authority

2.12 Table 2.2 indicates the top ten origin local authority areas for commuters to the Warwick local authority area as of the 2011 census. Census data on inbound commuting in only available at the local authority level, and as such, the data in Table 2.2 does not necessarily reflect the balance of inbound commuting to Leamington Spa specifically. However, Leamington Spa's status as one of the two main towns in the Warwick local authority area suggests that it will receive a considerable amount of this inbound commuting.

2.13 The evidence suggests that, in 2011, a substantial proportion of those working in Warwick local authority also lived in the area; however, there was a significant volume of inbound commuting from outside the area, and while Coventry and Stratford-upon-Avon were major contributors to this, there was in fact a wide spread of origins at a level above 1% of all inbound workers.

**Table 2.2: Top 10 origin local authorities for commuters to Warwick local authority, 2011**

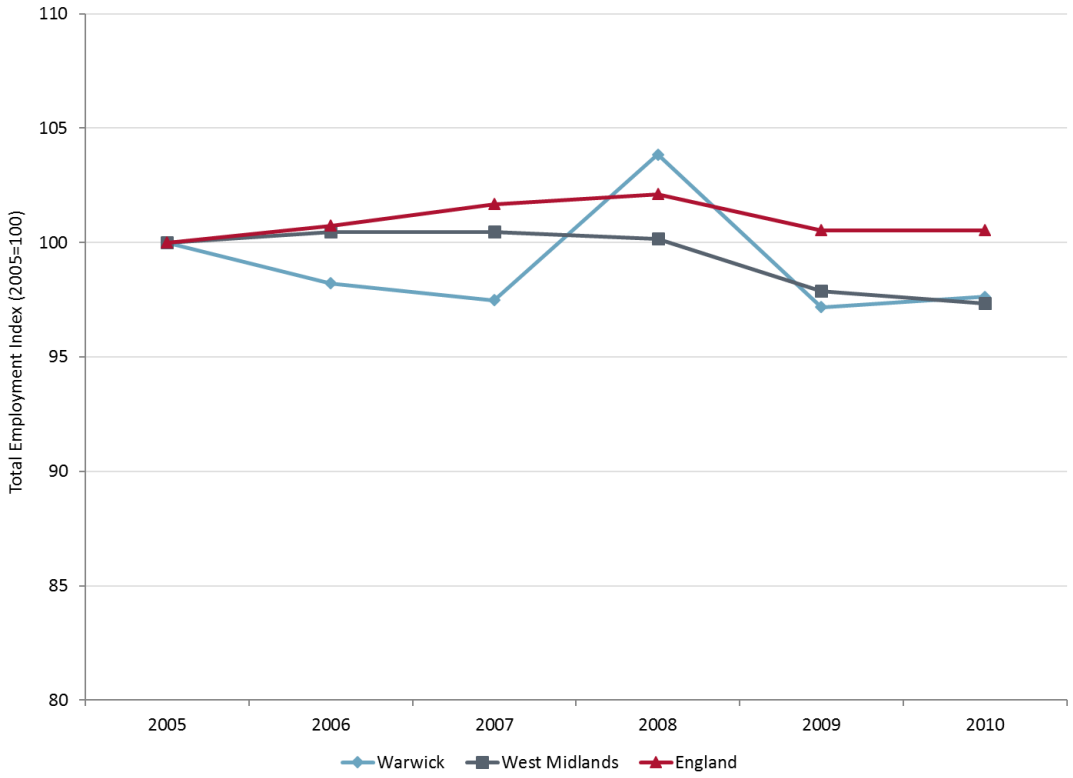
| Rank | Origin | Number of commuters | Percentage of inbound commuters |
|---|---|---|---|
| **1** | Warwick | 31,904 | 48.7% |
| **2** | Coventry | 9,249 | 14.1% |
| **3** | Stratford-upon-Avon | 5,879 | 9.0% |
| **4** | Rugby | 2,489 | 3.8% |
| **5** | Solihull | 2,317 | 3.5% |
| **6** | Birmingham | 2,135 | 3.3% |
| **7** | Nuneaton and Bedworth | 1,867 | 2.9% |
| **8** | Hinckley and Bosworth | 552 | 0.8% |
| **9** | Redditch | 546 | 0.8% |
| **10** | Cherwell | 453 | 0.7% |

Source: ONS Census 2011, Origins and Destinations (accessed 2017)

### Employment

2.14 Figure 2.4 indicates that in Warwick Local Authority area (the lowest level of disaggregation available for Annual Population Survey data for Leamington Spa), between 2005 and 2010 employment growth was significantly below the national average despite a spike in employment in 2008, and in fact was negative. Despite this downward trajectory in absolute employment levels, the proportion of working-age residents in work was above the regional average and comparable to the national average in 2010, the year before the transport intervention, as shown in Table 2.3.

**Figure 2.4: Total Employment Index in Warwick Local Authority**




Source: Annual Population Survey, Office for National Statistics (accessed 2017)

**Table 2.3: Employment rate (aged 16 - 64), Warwick Local Authority**

| Area | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Warwick | 75.4 | 73.6 | 72.4 | 76.4 | 71.1 | 70.1 |
| West Midlands | 71.6 | 71.3 | 70.7 | 70 | 68.2 | 67.6 |
| England | 72.9 | 72.6 | 72.6 | 72.3 | 70.8 | 70.3 |

Source: Annual Population Survey, Office for National Statistics (accessed 2017)

### Sectoral composition of employment

2.15 To gain an overview of the industrial makeup of employment in Leamington Spa, jobs by broad industrial category have been analysed using the Business Register and Employment Survey (BRES)[2] data. Key industries in 2010 were within the service sector (Wholesale and Retail Trade (21.2%) and Accommodation (9.6%)), Human Health Activities (12.2%), Education (9.8%), and Manufacturing (9.7%) (Figure 2.5).

**Figure 2.5: Employment by industry in Leamington Spa (2010)**


Source: Business Register and Employment Survey, Office for National Statistics (accessed 2017)

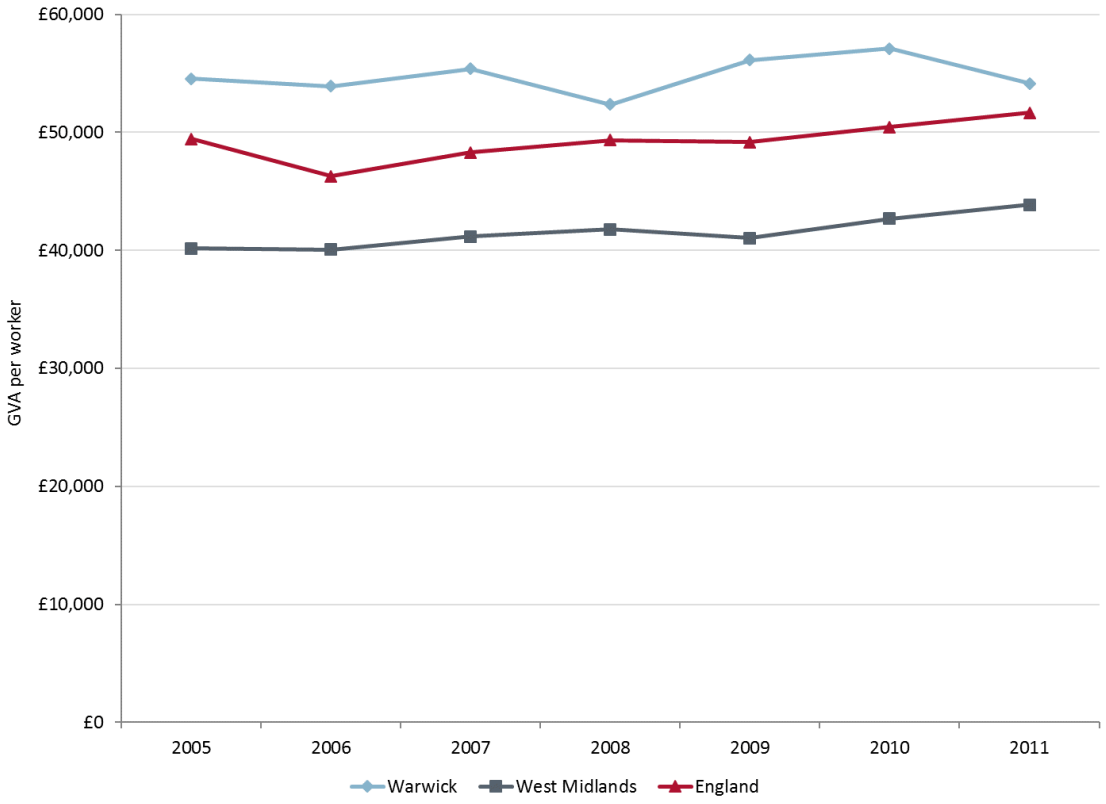
[2] The Business Register and Employment Survey (BRES) is a source of workplace-based employment data. It is comprehensive in terms of the geographic granularity at which the data can be extracted and in terms of industrial sector disaggregation.

### Productivity

2.16 GVA per worker is an economic measure of productivity, the value of outputs from the businesses in an area. In simple terms, it is the difference between the value of goods and services provided and the cost of providing them. Figure 2.6 shows GVA per worker in the Warwick local authority area[3] where Leamington Spa is located.

2.17 Output per worker in the Warwick local authority area was consistently higher than the regional and national average between 2005 and 2011. Knowledge-based sectors (such as professional and scientific activities) are significant in the area, which benefit from agglomeration economies and are more productive (and therefore more highly paid) than some other sectors. The concentration of knowledge-based sectors reflects the location of the University of Warwick (which attracts high-value firms including Rolls Royce, EON and Network Rail to co-locate) within the local authority area. It is worth noting, however, that these firms, and the university, are not based within the Leamington Spa area under study.

**Figure 2.6: GVA per worker in Warwick Local Authority**




Source: Regional GVA by Local Authority and Annual Population Survey, Office for National Statistics (accessed 2017)

[3] The Warwick local authority area is used as data is not available for the smaller Leamington Spa area.

## Rail usage at Leamington Spa

**What were the trends in usage of rail services at Leamington Spa prior to the intervention?**

2.18 Office of Rail and Road (ORR) data indicates that in 2010/11 Leamington Spa station had approximately 1.9m entries and exits per year, equivalent to approximately six thousand a day (Table 2.4). This figure reflected a Compound Annual Growth Rate (CAGR) of 7.6% from 2004/05, and represented growth slightly above the national average.

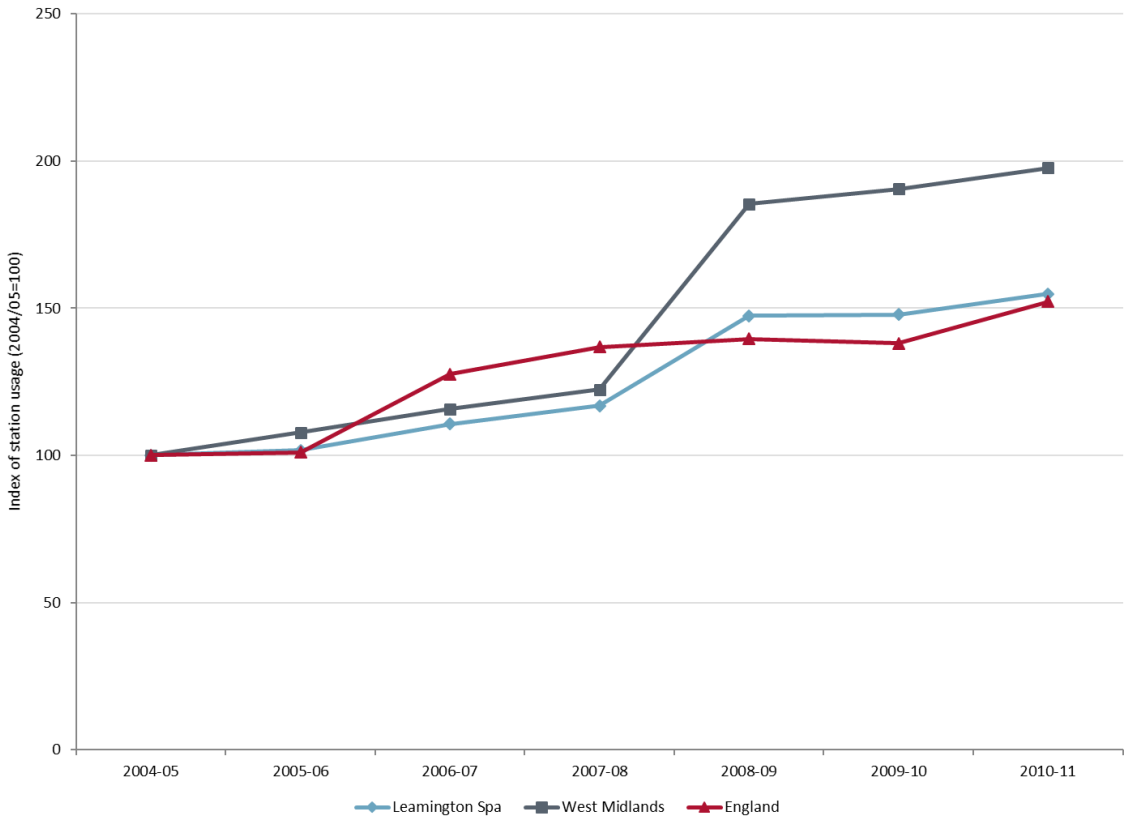
**Table 2.4: 2010/11 Leamington Spa entries and exits**

| Station | Entries and exits (annual) | Entries and exits (daily) | Compound Annual Growth Rate (2004/5 – 2010/11) |
|---|---|---|---|
| Leamington Spa | 1,856,300 | 6,100 | 7.6% |
| National average | | | 7.3% |

Source: ORR station usage data 2010/11; daily entries and exits calculated by dividing the total number of entries and exits by 300, to represent average daily usage. (accessed 2017)

2.19 Usage of Leamington Spa station has increased at a similar rate to the England average over the period 2004/5 to 2010/11, but at a lower rate than for the West Midlands region which saw a substantial jump in entries and exits in 2008/9 (most likely linked to completion of the major works in the upgrade of the West Coast Main Line). These trends are illustrated in Figure 2.7.

**Figure 2.7: Index of station usage 2004/05 to 2010/11**

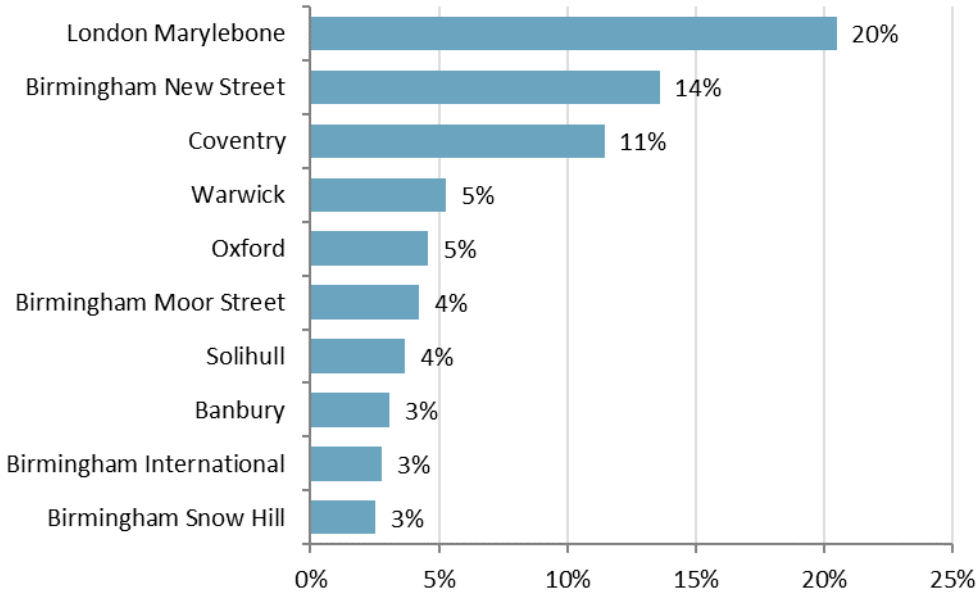



Source: National Rail Trends and Estimates of Station Usage, ORR (accessed 2017)

2.20 The Origin-Destination (OD) Matrix dataset from the ORR allows for closer analysis of the destinations of passengers travelling from Leamington Spa station. Figure 2.8 outlines the ten most popular destinations for passengers from Leamington Spa travelling in 2008-09.

2.21 London Marylebone was the most popular single destination, but taking the four Birmingham stations together (New Street, Moor Street, International and Snow Hill) shows the importance of Birmingham as a destination since it accounts for 24% of the total. Within Birmingham, journeys were twice as likely to terminate at New Street (14%) than at Moor Street and Snow Hill combined (4% and 3% respectively). This is relevant because New Street station is on the CrossCountry route from Leamington Spa, whereas the other two stations are served from Leamington Spa by the Chiltern Main Line. It is therefore possible that the service improvements could increase the overall share of Birmingham journeys to Moor Street and Snow Hill.

**Figure 2.8: Top ten most popular destination stations from Leamington Spa, 2008-09**




Source: Origin-Destination Matrix, ORR (accessed 2017)

## Summary

2.22 The majority of Leamington Spa residents who were employed in 2011 commuted within the Warwick local authority area in which Leamington Spa is located. 6% of residents commuted to Birmingham or London at that time, before the improvement to rail services on the Chiltern Main Line which connects Leamington Spa to both cities. The mode share of rail was low for commuting relative to road traffic, but this is consistent with national trends.

2.23 Warwick local authority area saw negative employment growth in most of the period immediately preceding the completion of the rail improvements in 2011 (2005-11), underperforming both the regional and national averages. This trend was evident before the onset of the recession in 2009. However, the area's employment rate exceeded the national average throughout the period.

2.24 GVA per worker in the Warwick local authority area consistently exceeded the West Midlands and England averages between 2005 and 2010, most likely reflecting the significance of the high-value knowledge sector in the local economy.

2.25 Usage of Leamington Spa railway station rose roughly in line with the national average between 2004/05 and 2010/11. The most popular destinations were London and Birmingham.

# 3 The comparison area

## Introduction

3.1 Comparison areas are used within the case studies to disaggregate the effects of the rail investment from more general transport and economic trends, such as increasing rail use nationally. This chapter introduces the comparison area of Rugby, used within this case study.

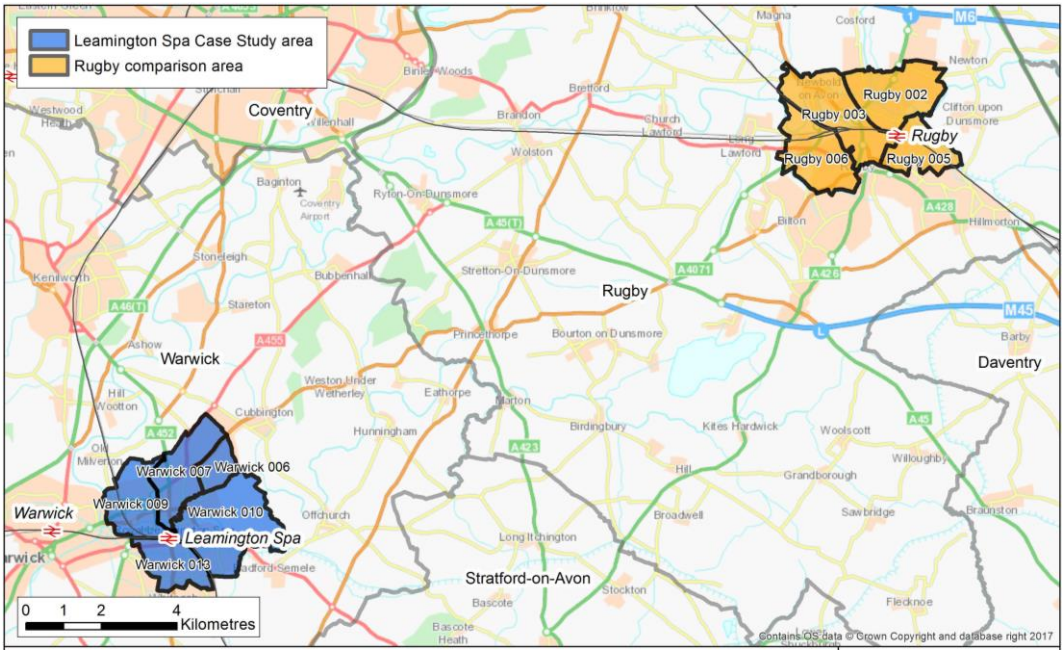
## Selection of the comparison area

### How (and why) was the comparison area selected?

3.2 Rugby comparison area – hereafter, Rugby – is located within Rugby local authority to the east of Coventry (Figure 3.1). It was identified as a suitable comparison area against which to benchmark Leamington Spa's economic performance as it has a similar socio-economic profile and transport provision to Leamington Spa but is located on a different railway line unaffected by the reduced travel times delivered by Evergreen 3, Phase 1.

3.3 For the purposes of comparison, four MSOAs were selected (Rugby 002, Rugby 003, Rugby 005, Rugby 006). These MSOAs form a contiguous combined comparison study area (11.9 km$^2$) encompassing the town, including the town centre and the station. Although Leamington Spa and Rugby are of comparable size (12.9 km$^2$ and 11.9 km$^2$ respectively), the population of Leamington Spa is greater compared to that of Rugby (48,700 and 30,500 residents respectively[4]).

**Figure 3.1: Location of Rugby comparison area**




[4] Census 2011, Office for National Statistics

## Rail transport in the treatment and comparison areas

### How do rail services of the treatment and comparison area compare?

3.4 Rugby is served by Rugby station, located approximately half a mile north of the town centre (around 15 minutes walk). The junction of the Trent Valley Line (which connects Rugby and Stafford and forms part of the West Coast Main Line) is located to the north west of the station. The Rugby–Birmingham-Stafford Line (or Birmingham Loop) is also located to the west of the station, and forms a loop off the West Coast Main Line between Rugby and Stafford via Birmingham.

3.5 Virgin Trains operates 1tph between London Euston and Birmingham (via Rugby and Coventry). London Midland also operates frequent regional services between London Euston and Birmingham, as well as services on the Trent Valley Line between London Euston and Stafford, Stoke-on-Trent and Crewe. Journey times from Rugby to London Euston and Birmingham New Street (derived from the 2011 Network Rail timetable) are shown in Table 3.1. Pre-intervention, the journey time from Rugby to London was substantially shorter than from Leamington Spa, despite the distance to London being relatively similar (85 miles for Rugby compared to 96 miles for Leamington Spa). However, journey times to Birmingham were very similar for both stations.

**Table 3.1: Journey times (fastest AM Peak time)**

| | 2011 (Pre-Evergreen 3) |
|---|---|
| Leamington Spa – London Marylebone | 90 minutes |
| Rugby – London Euston | 58 minutes |
| Leamington Spa – Birmingham Moor Street | 36 minutes |
| Rugby - Birmingham New Street | 36 minutes |

Source: Network Rail Timetable 2011 (22 May – 10 Dec)

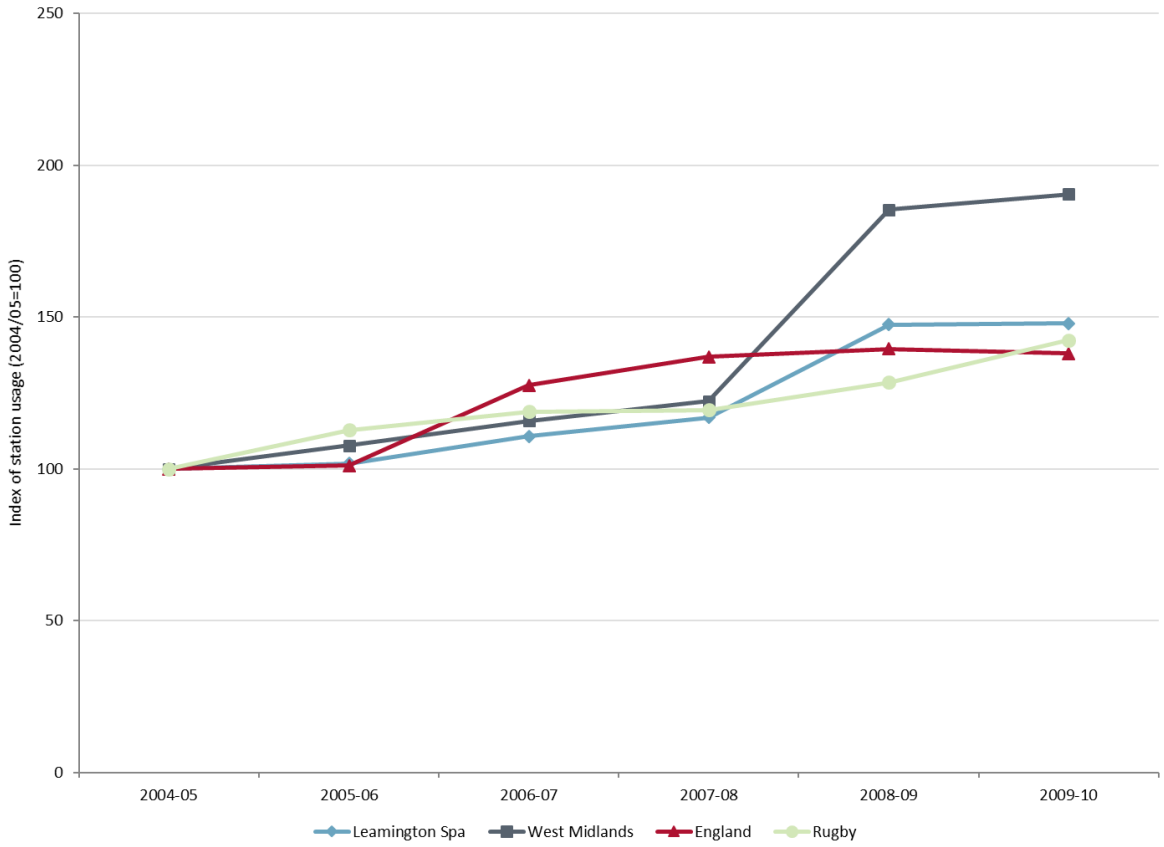
3.6 It is important to note that Rugby also saw improvements to its rail services not long before the completion of the Evergreen 3, Phase 1 project on the Chiltern Main Line. The West Coast Main Line upgrade programme was completed in late 2008 and service improvements were implemented from 2009, meaning that Rugby station would be expected to see increases in patronage from that date.

3.7 However, since the majority of works at Rugby were intended to increase line capacity and reliability (with associated improvements in journey times for non-stopping services) their impact upon rail patronage is smaller than at other locations on the West Coast Main Line.

### How do trends in rail usage compare between the treatment and comparator areas?

3.8 Figure 3.2 indicates the trends in rail usage at both Leamington Spa and Rugby stations in the period leading up to the completion of Evergreen 3, Phase 1. The data illustrates that the trend between the two was broadly similar over the period, with both stations seeing an acceleration in station usage growth over time, but neither station seeing a significant jump in patronage in 2008-09 at the level of the West Midlands region (it is likely that this jump reflected the completion of the West Coast Main Line upgrades through the West Midlands that year).

**Figure 3.2: Index of station entries and exits, 2004-05 to 2009-10**




Source: Estimates of Station Usage, ORR (accessed 2017)

3.9 Table 3.2 illustrates the top ten most popular destination stations from Leamington Spa and Rugby stations, prior to the transport intervention. The difference in the relative popularity of each station's London terminus is striking, with Euston from Rugby being twice as popular as Marylebone from Leamington Spa. This could be related to the significant gulf in journey times to London between these stations prior to the rail intervention. Also noteworthy is the similar proportion of journeys to Birmingham New Street from both stations, although it appears that Leamington Spa has a larger proportion of Birmingham-bound journeys than Rugby amongst its users. The data suggests that the three key destination cities for rail travel from both towns are the same, with Coventry the third destination.

**Table 3.2: Top 10 destination stations from Leamington Spa and Rugby stations, 2008-09**

| Rank | Leamington Spa | | Rugby | |
|---|---|---|---|---|
| 1 | London Marylebone | 20.5% | London Euston | 40.4% |
| 2 | Birmingham New Street | 13.6% | Coventry | 16.3% |
| 3 | Coventry | 11.4% | Birmingham New Street | 13.5% |
| 4 | Warwick | 5.3% | Birmingham International | 4.0% |
| 5 | Oxford | 4.6% | Northampton | 3.5% |
| 6 | Birmingham Moor Street | 4.2% | Milton Keynes Central | 1.5% |
| 7 | Solihull | 3.7% | Nuneaton | 1.0% |
| 8 | Banbury | 3.1% | Canley | 0.9% |
| 9 | Birmingham International | 2.8% | Long Buckby | 0.8% |
| 10 | Birmingham Snow Hill | 2.5% | Watford Junction | 0.7% |

Source: Origin-Destination Matrix, ORR (accessed 2017)

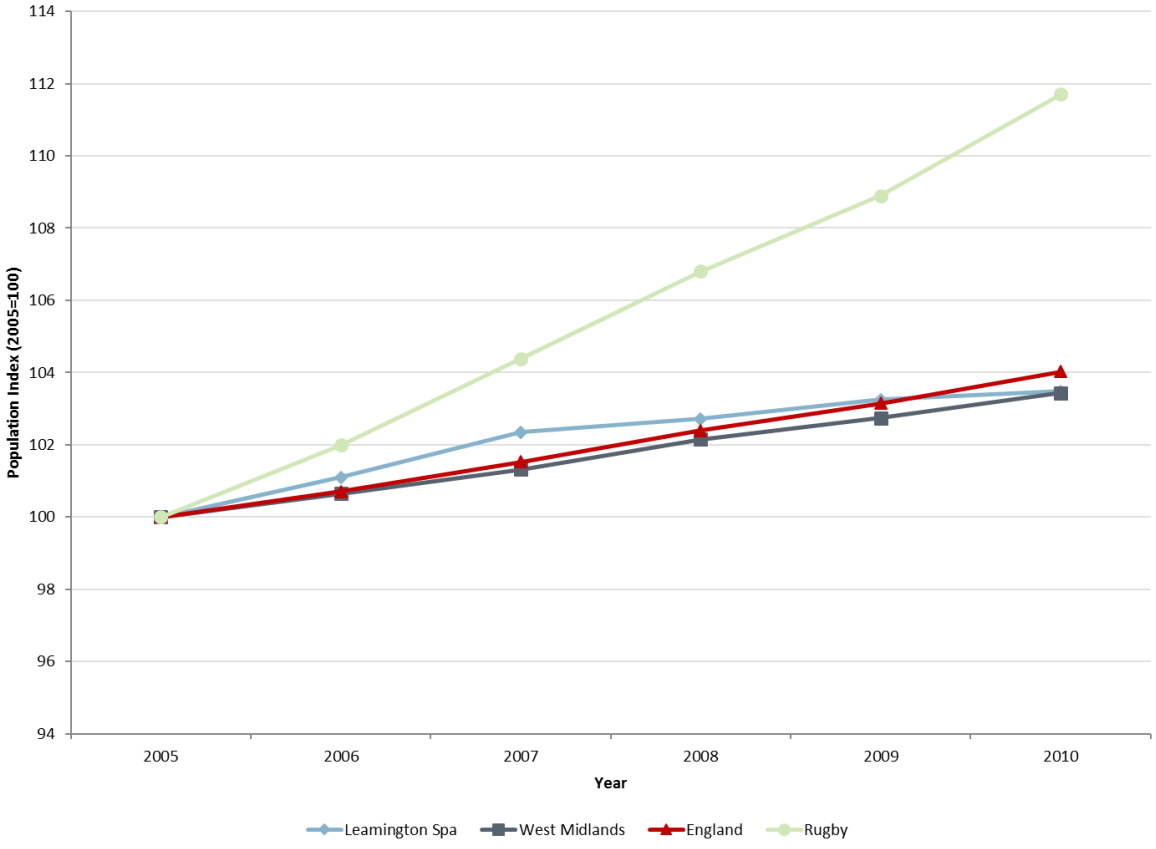
## Socio-economic characteristics of the treatment and comparison areas

### Population growth in Rugby and Leamington Spa

3.10 Figure 3.3 illustrates the differential patterns of population growth between Rugby and Leamington Spa in the period preceding the transport intervention. While Leamington Spa's population experienced moderate growth between 2005 and 2010, roughly in line with national and regional averages, Rugby enjoyed comparatively strong population growth.

3.11 The population of Rugby saw a 2.2% compound annual growth rate in this period, while Leamington Spa's population compound annual growth rate was 0.7% (the same as that for the West Midlands region), broadly in-line with the English average (0.8%). This trend of significantly higher population growth in Rugby must be considered when comparing Rugby and Leamington Spa in the post-treatment period.

**Figure 3.3: Population Index 2005-2010**



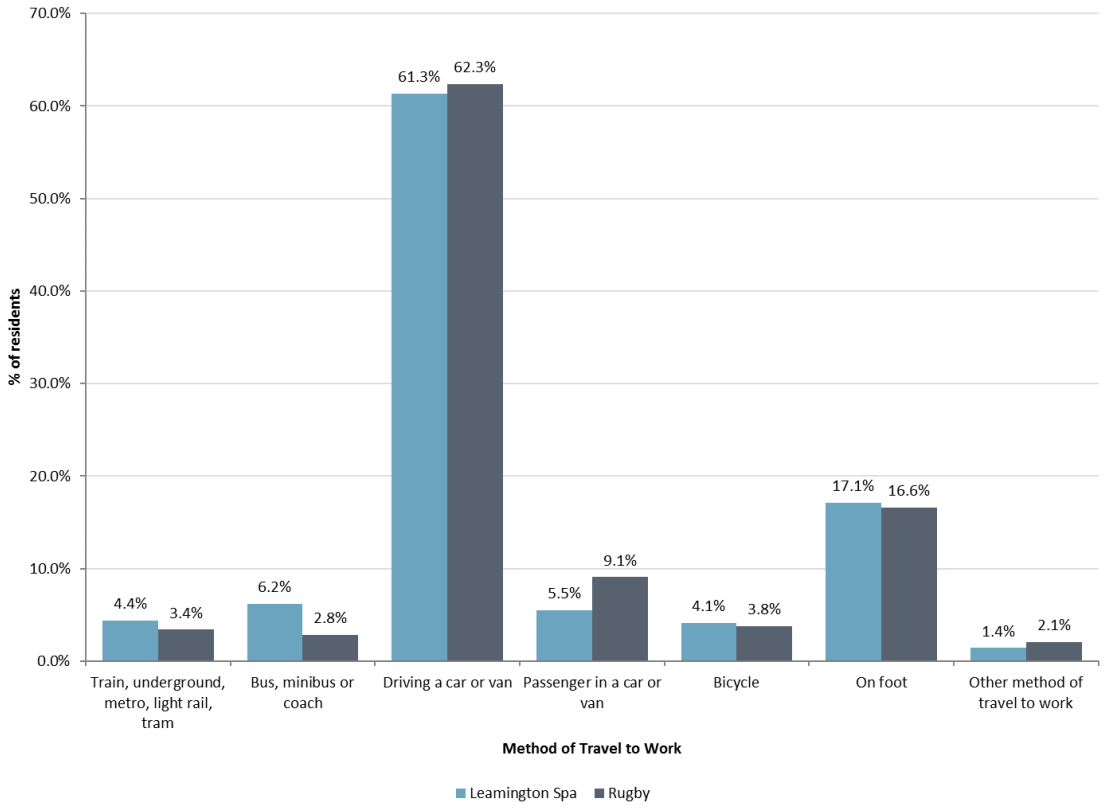

Source: ONS mid-year population estimates (accessed 2017)

### Commuting by Rugby and Leamington Spa residents

3.12 Travel to Work data from the 2011 Census has been used to allow comparisons between the travel patterns of Rugby residents with those of Leamington Spa.

3.13 Figure 3.4 indicates the primary mode of travel to work for residents of Rugby and Leamington Spa. There are similarities between the travel to work patterns of both areas; in both, driving in a car or a van is the most common means of commuting by a significant margin, although this is less pronounced in Leamington Spa. In both towns, rail commuters represent a small proportion of the workforce.

**Figure 3.4: Method of Travel to Work by residents of Rugby and Leamington Spa, 2011**




Source: ONS Census data, 2011 (accessed 2017)

3.14 Table 3.3 outlines the top ten commuting destinations for residents of Rugby and Leamington Spa, with destinations aggregated into Local Authority areas. The data highlights that a similar proportion of residents of both towns work within their respective boroughs; approximately 58% of commuting residents in both Rugby and Leamington Spa do so.

3.15 Notably, even though the direct rail connection from Rugby to London in 2011 took only approximately two-thirds of the time taken by the direct connection from Leamington Spa to London, the two towns saw a comparable proportion of their populations commuting to the London boroughs (1.9% in Leamington Spa and 1.5% in Rugby). Meanwhile, the proportion of Birmingham commuters from Leamington Spa was slightly higher than from Rugby (3.7% against 1.8%).

**Table 3.3: Top 10 commuting destinations for residents of Rugby and Leamington Spa, 2011**

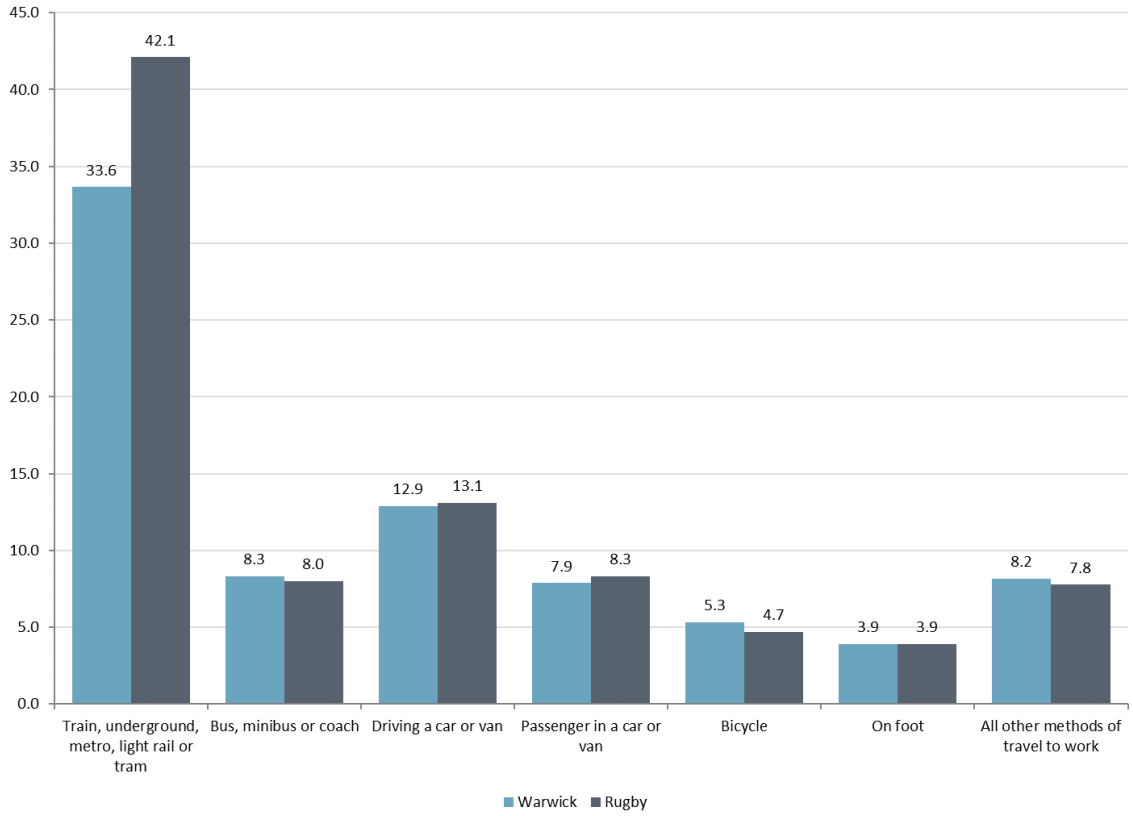
| | Origin: Leamington Spa | | Origin: Rugby | |
|---|---|---|---|---|
| | Place of Work | % of employed residents | Place of Work | % of employed residents |
| 1 | Warwick | 58.3% | Rugby | 57.6% |
| 2 | Coventry | 12.6% | Daventry | 11.2% |
| 3 | Stratford-upon-Avon | 9.7% | Coventry | 6.7% |
| 4 | Birmingham | 3.7% | Harborough | 4.3% |
| 5 | Solihull | 2.1% | Warwick | 3.6% |
| 6 | Rugby | 1.9% | Birmingham | 1.8% |
| 7 | All London boroughs (aggregated) | 1.9% | All London boroughs (aggregated) | 1.5% |
| 8 | Cherwell | 1.0% | Stratford-upon-Avon | 1.5% |
| 9 | Nuneaton and Bedworth | 0.6% | Northampton | 1.4% |
| 10 | Daventry | 0.6% | Nuneaton and Bedworth | 0.9% |
| | *All other destinations* | 7.7% | *All other destinations* | 8.6% |

Source: Census Travel to Work data WU01EW (2011), Office for National Statistics[5] (accessed 2017)

[5] The definition of the Leamington Spa Case Study area includes the following five Middle Super Output Areas (Warwick 006, Warwick 007, Warwick 009, Warwick 010 and Warwick 013), and the definition of the Rugby Case Study Area includes the following four Middle Super Output Areas (Rugby 002, Rugby 003, Rugby 005, Rugby 006) (see Figure 3.1) The place of work definitions are based on the 2011 Census merged local authority districts.

3.16 Figure 3.5 highlights the average distance travelled to work by users of different modes in the Warwick and Rugby local authority areas. The Warwick local authority contains Leamington Spa, while Rugby town is at the core of the Rugby local authority. This data suggests that, on average, those travelling by rail transport, including trams and light rail as well as heavy rail, travel considerably further for work than those using road-based modes. The difference in distance covered by train most likely reflects the greater proportion of London travel from Rugby, as highlighted by Table 3.2.

**Figure 3.5: Distance travelled to work by Warwick and Rugby local authority residents (by mode), 2011**




Source: ONS Census 2011, Travel to Work (accessed 2017)

### Commuting to Warwick and Rugby local authorities

3.17 Table 3.4 indicates the top ten origin local authorities for commuters into the Warwick and Rugby local authority area. The information presented in the table suggests that there is a comparable proportion of local workers also living in their respective local authorities in each area.

**Table 3.4: Top 10 origin local authorities for commuters to Warwick and Rugby local authorities, 2011**

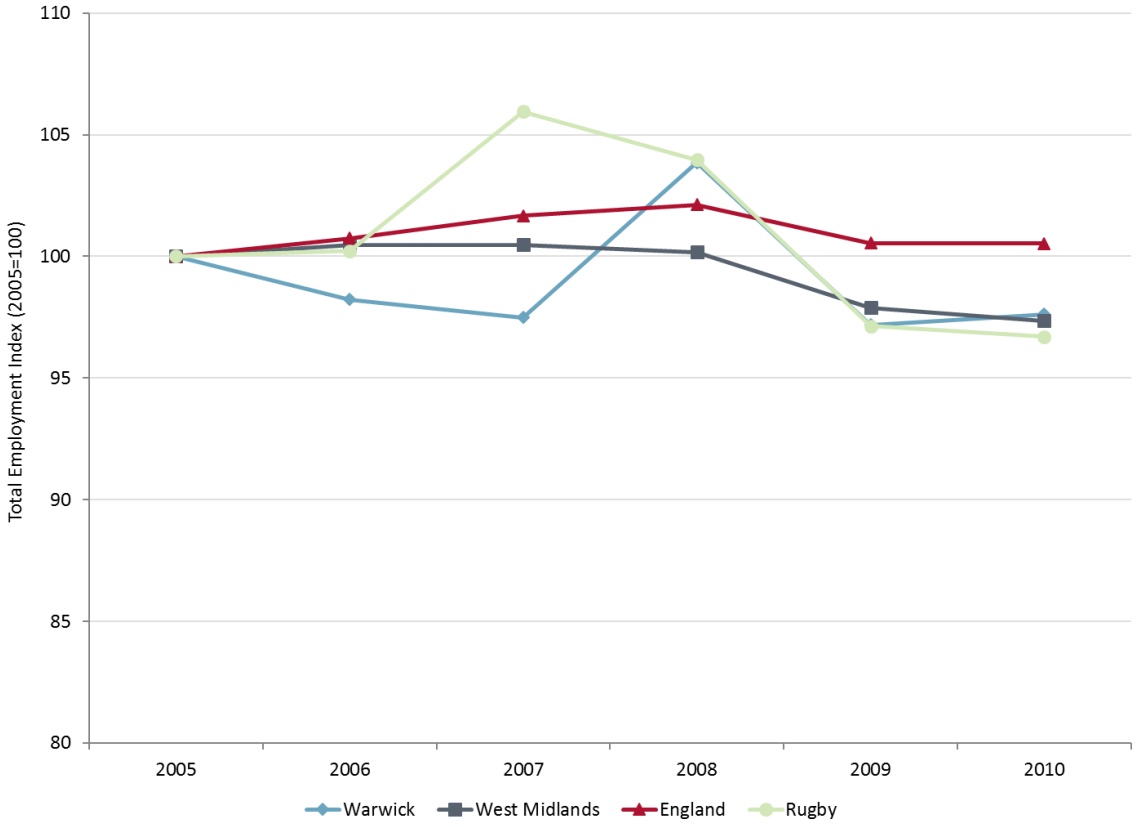
| Rank | Destination: Warwick Local Authority | | | Destination: Rugby Local Authority | | |
|---|---|---|---|---|---|---|
| | Origin | Number of commuters | Percentage of inbound commuters | Origin | Number of commuters | Percentage of inbound commuters |
| **1** | Warwick | 31,904 | 48.7% | Rugby | 21,538 | 55.4% |
| **2** | Coventry | 9,249 | 14.1% | Coventry | 3,800 | 9.8% |
| **3** | Stratford-upon-Avon | 5,879 | 9.0% | Nuneaton and Bedworth | 1,883 | 4.8% |
| **4** | Rugby | 2,489 | 3.8% | Daventry | 1,569 | 4.0% |
| **5** | Solihull | 2,317 | 3.5% | Hinckley and Bosworth | 984 | 2.5% |
| **6** | Birmingham | 2,135 | 3.3% | Harborough | 980 | 2.5% |
| **7** | Nuneaton and Bedworth | 1,867 | 2.9% | Warwick | 953 | 2.5% |
| **8** | Hinckley and Bosworth | 552 | 0.8% | Stratford-upon-Avon | 616 | 1.6% |
| **9** | Redditch | 546 | 0.8% | Birmingham | 471 | 1.2% |
| **10** | Cherwell | 453 | 0.7% | Blaby | 409 | 1.1% |

Source: ONS Census 2011, Origins and Destinations (accessed 2017)

### Employment

3.18 Figure 3.6 indicates the trends in employment in Warwick and Rugby local authority[6] areas prior to the transport intervention. The data suggests that employment levels in the Rugby area suffered a similar decline to those in Warwick in the wake of the Great Recession.

**Figure 3.6: Index of level of employment in Warwick and Rugby local authority areas**




Source: Annual Population Survey, Office for National Statistics (accessed 2017)

[6] The local authority areas are used for this analysis since historic data for the smaller Leamington Spa area is not available

3.19 The employment rates in each area immediately prior to the rail intervention, meanwhile, are given in Table 3.5. This data suggests that the employment rates in both local authority areas were close to the national average in 2010, and slightly ahead of the regional average.

**Table 3.5: Employment rate (16-64) by local authority area, 2010**

| Local Authority | Employment Rate (16-64) |
|---|---|
| Warwick | 70.1% |
| Rugby | 71.3% |
| West Midlands | 67.6% |
| England | 70.3% |

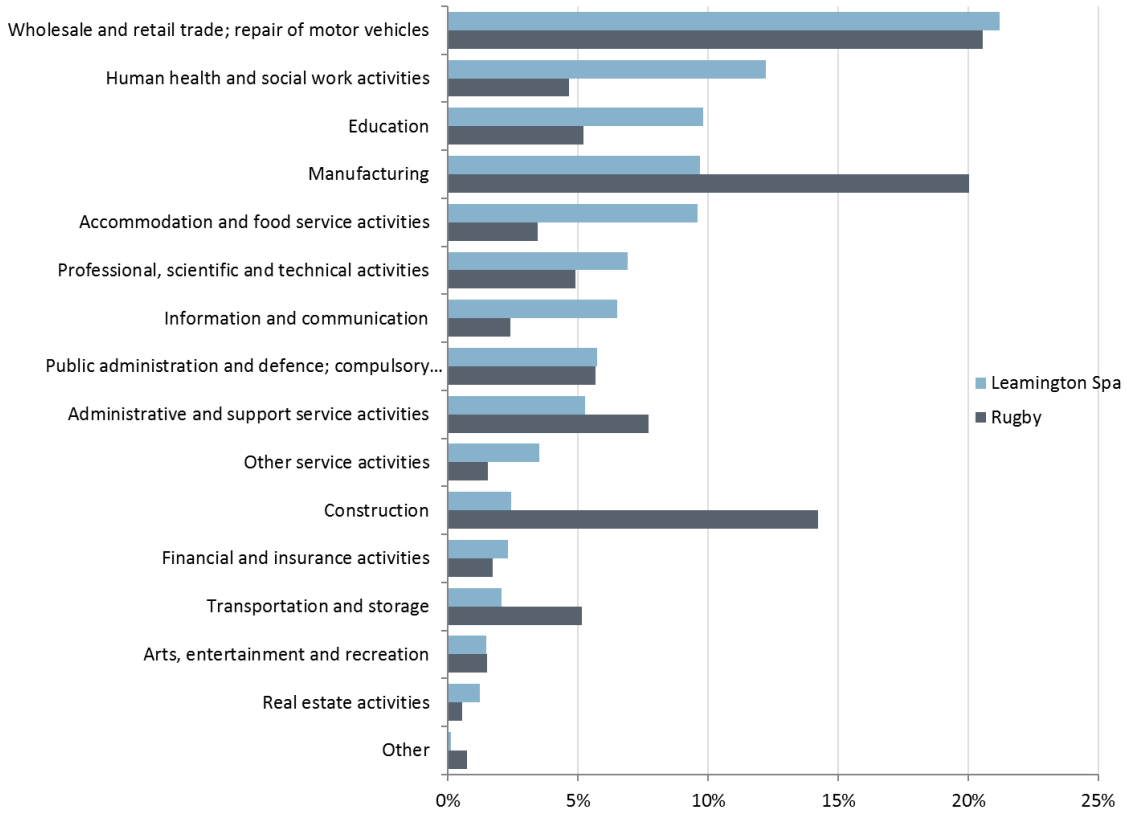
Source: Annual Population Survey, Office for National Statistics (accessed 2017)

### Sectoral composition of employment

3.20 The sectoral distribution of employment in Leamington Spa and Rugby is shown in Figure 3.7. The largest sector in Rugby in 2010 was Wholesale and Retail (20.5%), which is comparable to Leamington Spa (21.2%). In contrast, the second and third largest sectors in Rugby were Manufacturing (20.0%) and Construction (14.2%), whereas Human, Health and Social Work Activities and Education were more important in Leamington Spa at that time.

3.21 Leamington Spa's economy has a strong basis in the knowledge sector, whereas Rugby's economy is mainly industrial. Major industries include cement manufacture and engineering (Rugby is an engineering centre with a history of producing gas and steam turbines), reflecting its strategic location on the West Coast Main Line. Daventry International Rail Freight Terminal, 4 miles east of Rugby, is a major rail-road intermodal freight terminal with an associated warehousing estate, and represents an important employment sector.

**Figure 3.7: Sectoral distribution of employees in Leamington Spa and Rugby, 2010**

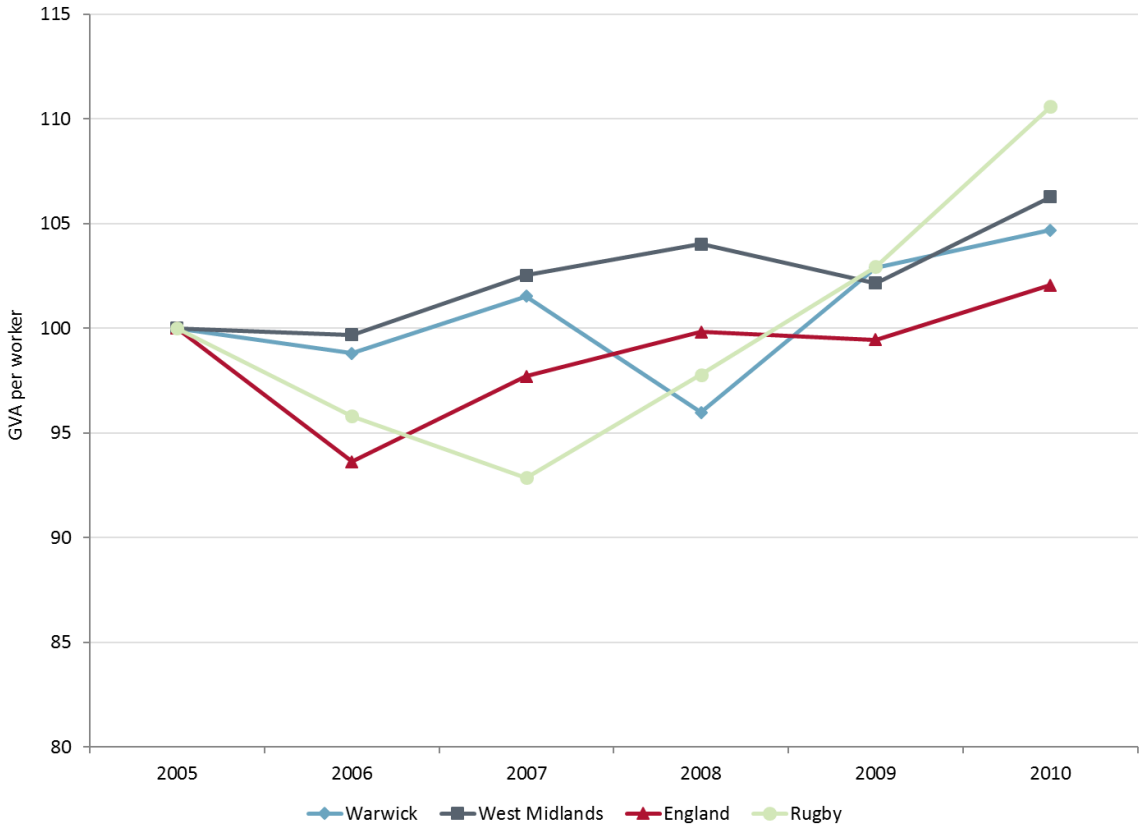



Source: Business Register and Employment Survey, Office for National Statistics (accessed 2017)

### Productivity

3.22 Figure 3.8 allows for a comparison of the trends in GVA per worker between Leamington Spa and Rugby local authority areas, and the regional and national averages, over the period preceding the transport intervention. This follows on from the absolute data for Leamington Spa given in Figure 2.6, and further information on absolute levels of GVA per worker, including Rugby, is available in Figure 5.11. The impact of the recession on GVA per worker is notable for both the case study and the comparison area; however, Rugby experienced strong growth in its GVA per worker after 2007, while the Warwick local authority area, containing Leamington, had a much slower pace of growth. Both, however, had exceeded their 2005 levels of GVA per worker by 2010.

**Figure 3.8: GVA per worker, 2005-10**




Source: Regional GVA by Local Authority and Annual Population Survey, Office for National Statistics (accessed 2017)

## Summary

3.23 Rugby enjoyed significantly higher population growth than Leamington Spa in the years leading up to the Chiltern Main Line rail intervention, with Rugby also exceeding the regional and national averages on this metric. However, for some other measures, the characteristics of the two towns were quite comparable:

- A comparable proportion of the population in both Rugby and Leamington Spa used rail to commute to work according to the 2011 census, at 2.3% and 2.5% respectively.

- Employment levels in both areas fell significantly at the onset of the Great Recession, and by 2010 both areas had levels of employment close to the regional average, but below the national average. Furthermore, unlike the England average, by 2010 the levels of employment in both towns remained below that of 2005.
- However, employment rates for the two areas in 2010 were close to the national average, and similarly higher than the regional average.
- Similar proportions of local workers lived within the local authorities within which each area is located.
- Both areas had exceeded their 2005 levels of GVA per worker by 2010.
- In terms of the sectoral composition of employment in each town, in both towns, the largest employment sector was Wholesale and Retail trade and the Repair of Vehicles, accounting for more than 20% of employment in each case. However, there are some significant differences in other sectors, with a much stronger construction and manufacturing presence in Rugby's economy than in Leamington Spa's as of 2010.

3.24 Rugby station saw improvements in service beginning two years before the completion of the Evergreen 3, Phase 1 project on the Chiltern Main Line, and as such, it may also experience rail passenger growth during the time period observed.

3.25 Overall, while Rugby is a useful comparator area with a number of similar characteristics to Leamington Spa in terms of its regional location, size, levels of rail commuting, employment trends and industrial sectors, it is important to acknowledge two differences. One is the greater population growth of Rugby compared to Leamington Spa, and the second is the fact that Rugby had also separately experienced rail improvements, which may affect rail patronage in the same time period as for Leamington Spa.

# 4 Behavioural Impacts of the Transport Intervention

## Introduction

4.1 This chapter explores the impacts of the transport intervention on travel behaviour in Leamington Spa, using evidence gathered from primary surveys and secondary data sources. The chapter aims to determine the nature of the changes in rail usage since the transport intervention, and contextualise these using Rugby, along with the regional and national comparisons.

4.2 Guidance in the Passenger Demand Forecasting Handbook suggest that the impacts of rail investment are not fully evident until around five years following the intervention. The analysis below covers observable trends at Leamington Spa in the 5 years since the completion of the improvements to the Chiltern Main Line in 2011, using data based on surveys taken in 2016. However, had data over a longer time period been available at the time of the study, it would have been appropriate to include this in our analysis to also get a longer term view.

## Rail usage

**Leamington Spa and Rugby station usage**

4.3 Figure 4.1 below shows ORR data regarding the change in station entries and exits relative to the baseline year of 2010-11 for Leamington Spa, Rugby, the West Midlands and England.

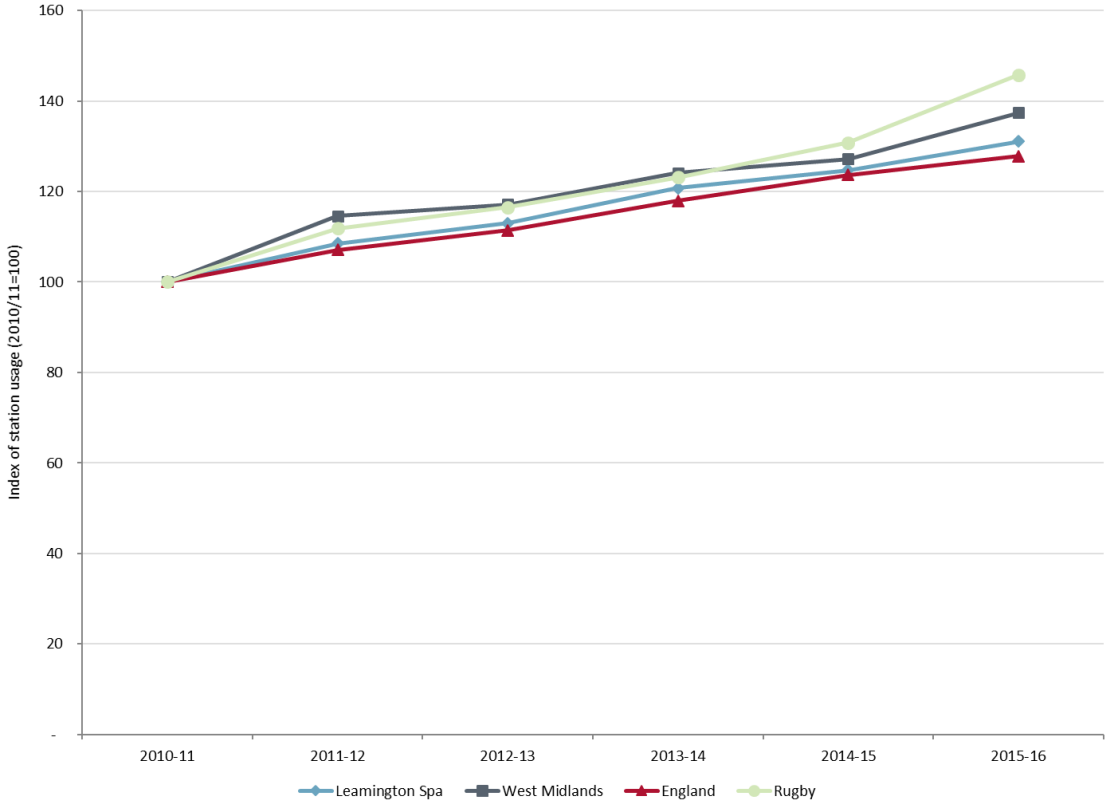
4.4 The data suggests that rail usage in Leamington Spa grew after 2009-10, broadly in line with that at Rugby and the wider West Midlands and England averages. The improvements to the Chiltern Main Line were completed in September 2011 and, as such, the pattern of sustained growth in rail usage to 2015-16 coincides with the implementation of the reduced journey times, and may be partly responsible for the observed growth. However, we cannot be sure that this is the case since the increases seen were found for all areas, suggesting other factors may be contributing to these trends.

4.5 In the five years after the improvements, from 2010-11 to 2015-16, Leamington Spa experienced a Compound Annual Growth Rate in entries and exits of 5.6%. This compares with an equivalent growth rate of 7.6% in the preceding period, as outlined in Table 2.4. It should be noted that the Evergreen 3, Phase 1 improvements at Leamington Spa were largely incremental in nature, building on previous phases of improvements which may have been partly responsible for the high growth seen previously. Completion of Evergreen 1 in 2001, for example, was associated with a significant frequency improvement at Leamington Spa.

4.6 It is evident that passenger growth at Rugby has been slightly ahead of that at Leamington Spa, but also that Rugby has outperformed the regional and national averages (most notably since 2013-14). One possible explanation for this is that the additional station and line capacity delivered through the West Coast Main Line upgrade have provided sufficient headroom to accommodate additional journeys made by Rugby's fast growing population (as highlighted in Chapter 3).

4.7 However, in the context of increasing population growth in Rugby and improvements to the West Coast Main Line, it is noteworthy that station usage at Leamington Spa has largely tracked the trajectory of the regional and national averages, rather than falling behind. This could suggest that the Evergreen 3, Phase 1 improvements have enabled Leamington Spa to keep pace with growth in the rest of the country in terms of rail patronage, by continuing to offer an attractive service provision.

**Figure 4.1: Index of station entries and exits, 2010-11 to 2015-16**



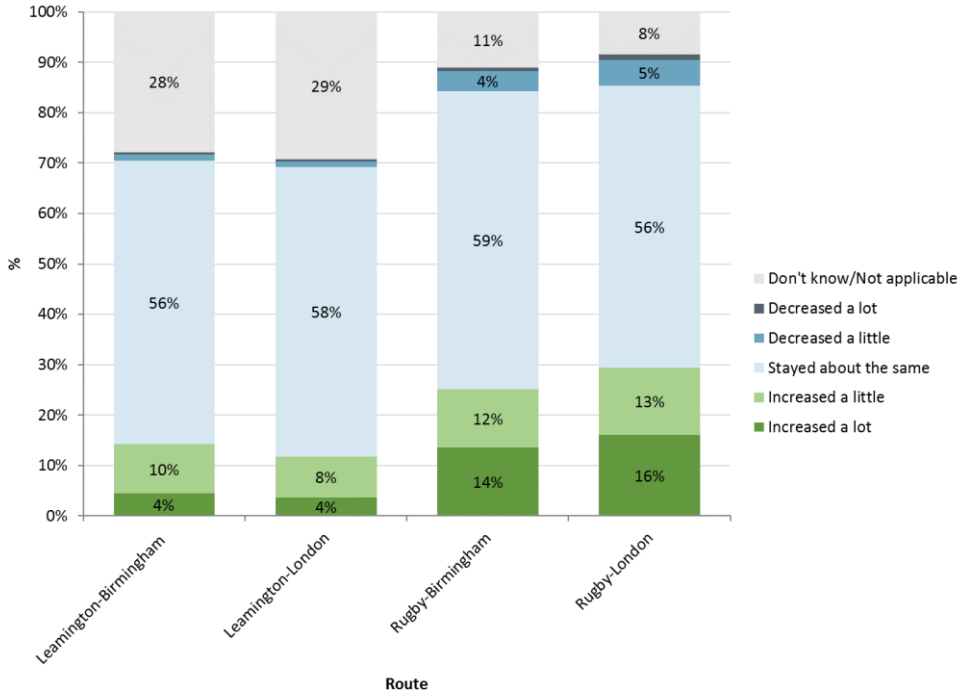

Source: Estimates of Station Usage, ORR (accessed 2017)

### Leamington Spa and Rugby station users

4.8 Figure 4.2 presents the results of station user surveys conducted at Leamington Spa and Rugby stations in 2016[7]. The Figure shows responses to a question on changed frequency of travel to London and Birmingham since 2011. It is important to note that all of the data presented in this chapter applies to all operators' services at Leamington Spa (and not just Chiltern which provide approximately 50% of all services).

4.9 The evidence collected shows that, while around one in ten passengers at Leamington Spa said they had increased the amount they travelled by rail to either London or Birmingham, the effect is much greater at Rugby station, with over a quarter stating they had increased their use on each route. This stated increase amongst Rugby users may reflect the improvements to the West Coast Main Line, completed not long before those on the Chiltern Main Line. Meanwhile, the larger proportions of "don't know/not applicable" responses at Leamington Spa could reflect the lower proportion of Birmingham and London travellers compared to Rugby.

**Figure 4.2: Leamington Spa and Rugby station user surveys, 2016 – "Over the past 5 years, has the amount you travel by rail to London or Birmingham increased, decreased, or stayed the same?"**




Source: Leamington Spa station user survey (n=569); Rugby station user survey (n=323)

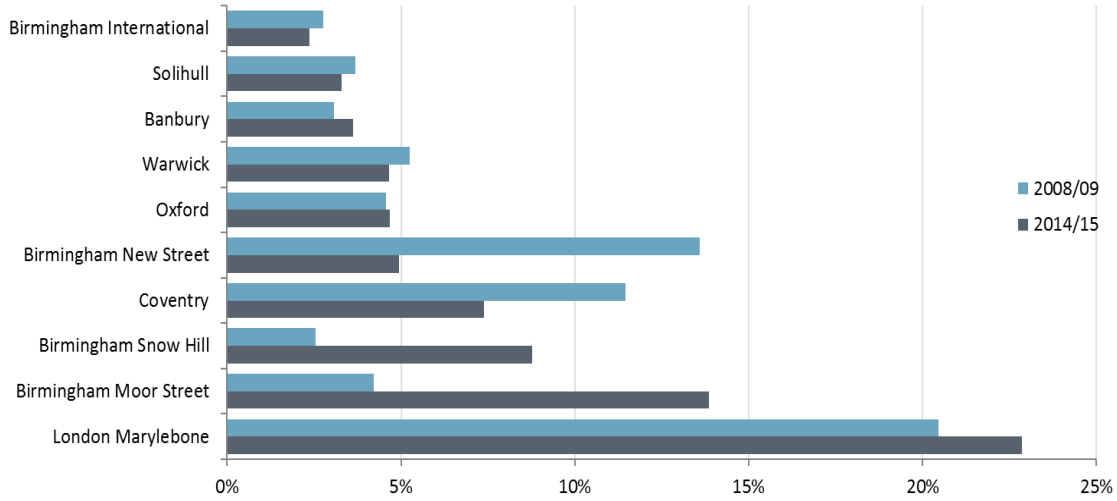
[7] Interviews took place on the main platforms at Leamington Spa and Rugby stations in November 2016, and covered both departing and arriving passengers. Surveying took place on all days of the week. Data was collected 07:00-19:00 on weekdays and 10:00-14:00 on weekends. Data was collected for 569 respondents at Leamington Spa and 323 respondents at Rugby. Information regarding the distribution of interviews between AM and PM peak, inter-peak, and weekend shifts is given in the accompanying Technical Report.

### Destination stations from Leamington Spa

4.10 While the ORR station entries and exits dataset only provides high-level figures regarding passenger volumes, additional information regarding the origin and destination of trips is available from the OD Matrix for Leamington Spa.

4.11 Figure 4.3 indicates the changes in the top ten destinations for users of Leamington Spa station between 2008-09 and 2014-15, with the former reflecting travel patterns before the completion of the Evergreen programme and the latter reflecting the situation following its completion.

**Figure 4.3: Top 10 destinations from Leamington Spa (Jan – Dec 2008/09 and 2014/15)**




Source: Origin-Destination Matrix, ORR (accessed 2017)

4.12 The data suggests that there has been a rebalancing in terms of passengers' rail destinations between Birmingham and London: while the proportion of journeys to Marylebone from Leamington Spa has increased (20% to 23%), the proportion of journeys to Birmingham terminal stations has increased to a greater extent (21% to 28%).

4.13 In fact, the most prominent change in rail travel behaviour regarding trips from Leamington Spa has been in the distribution of journeys to Birmingham, with trips to New Street station falling (14% of all journeys from Leamington Spa, down to 5%) while those to both Moor Street (up from 4% to 14%) and Snow Hill (up from 3% to 9%) stations rising significantly. This shift in the balance of stations used to access Birmingham may reflect the improved services via the Chiltern Main Line route to Moor Street and Snow Hill stations, and the redevelopment of Birmingham Eastside.

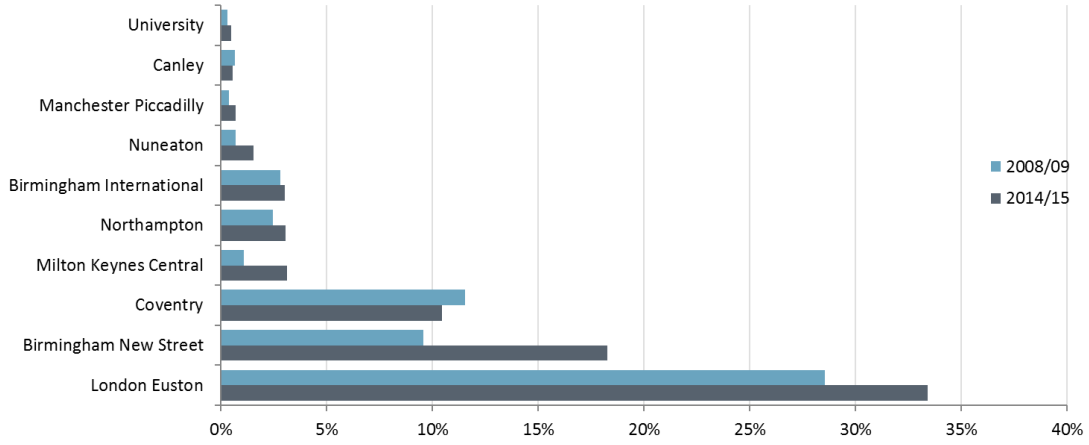
4.14 It is, however, difficult to disaggregate this effect from any temporary change in passenger preference related to the redevelopment of Birmingham New Street. It is also possible that a

change in the ORR station usage estimate methodology between the two years[8] has had an impact on the comparability of the data.

4.15 It is evident that the total volume of trips to Birmingham has increased over this period, with a shift in patronage toward the Chiltern Main Line route (as evidenced by the increase in Birmingham-bound patronage to Moor Street and Snow Hill compared to New Street) which is likely to reflect the Evergreen 3, Phase 1 improvements. However, it is important to note that the period covered by this data may include some lagged effects from some of the earlier Evergreen improvements to the Chiltern Main Line.

4.16 Figure 4.4 illustrates the change in the top 10 destinations over the same period for Rugby, indicating that there was a noticeable increase in the proportion of journeys to to Birmingham New Street in this time. This is markedly different from the pattern in patronage from Leamington Spa over this period, and suggests that the increases to Moor Street and Snow Hill stations was not only due to the redevelopment works at New Street station.

**Figure 4.4: Top 10 destinations from Rugby (Jan – Dec 2008/09 and 2014/15)**




Source: Origin-Destination Matrix, ORR (accessed 2017)

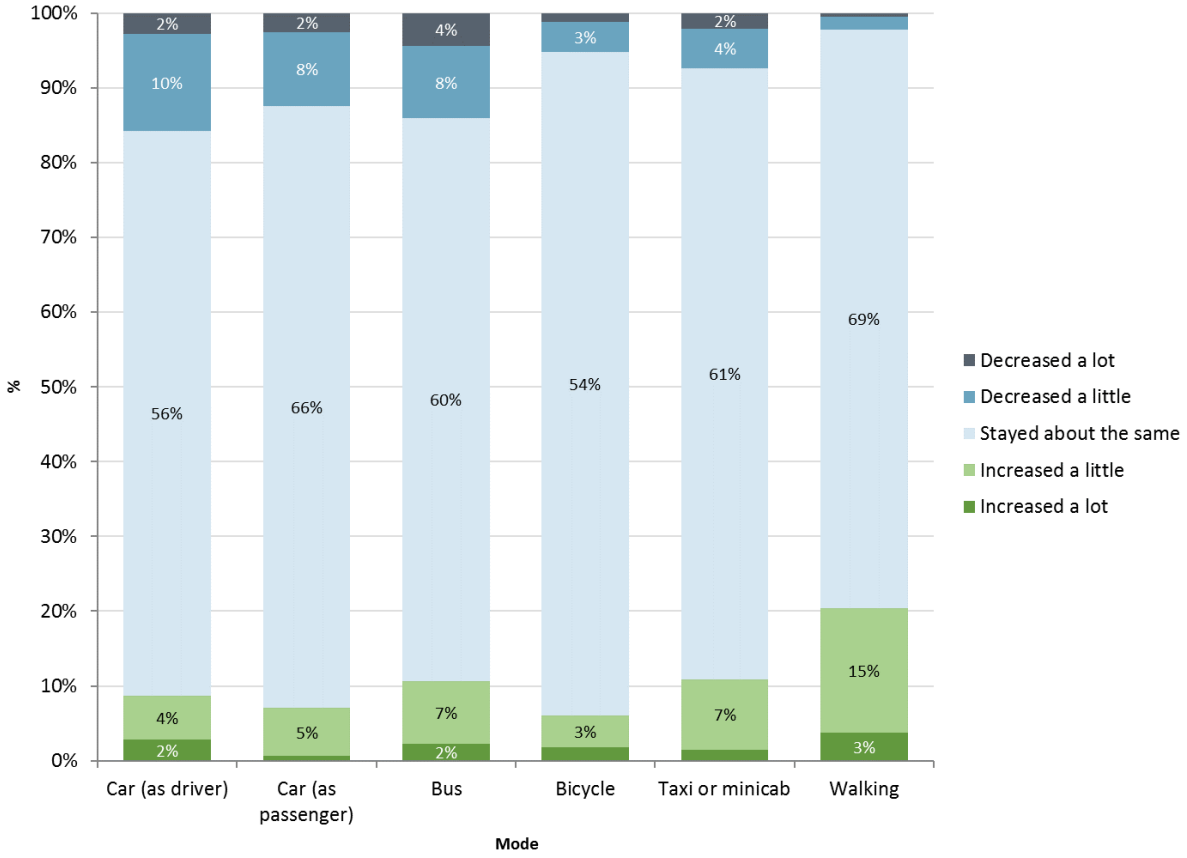
[8] There have been significant changes to the methodology between 2008/09 and 2014/15, with the total recorded usage of Birmingham Moor Street during this period increasing from 173,000 to 421,000 over this time period, likely in part due to both the inclusion of PTE-tickets within the Centro ticketing area within the usage estimate, as well as changes in how ticket sales to group stations (e.g. Birmingham BR Stations) are disaggregated into their respective stations (in this case Birmingham New Street, Snow Hill and Moor Street).

### Mode shift effects of the improvements at Leamington Spa

4.17 Figure 4.5 presents responses of Leamington Spa station users regarding impacts of the improvements on their travel by means other than rail. The data indicates that for each mode, the majority of station users said they have not changed their travel behaviour in a significant way. However, for cars (driver/passenger) and bus, just over 10% of those surveyed said they have decreased their usage by either "a little" or "a lot", compared with around 6% saying they had increased their use of car. This may imply a small mode shift effect from car to rail (Figure 4.5).

4.18 Additionally, around 18% of station users said they had increased the amount they walk since the completion of the improvements. This could potentially be linked to additional access and egress trips given that, based on the station user survey, over half (54%) of station users access it by foot.

**Figure 4.5: Leamington Spa station user survey, 2016 – "Since the station improvements, have you changed the amount you travel by other means?" (Question 15)**




Source: Leamington Spa station user survey (n=569)

### Reasons for starting to use the station

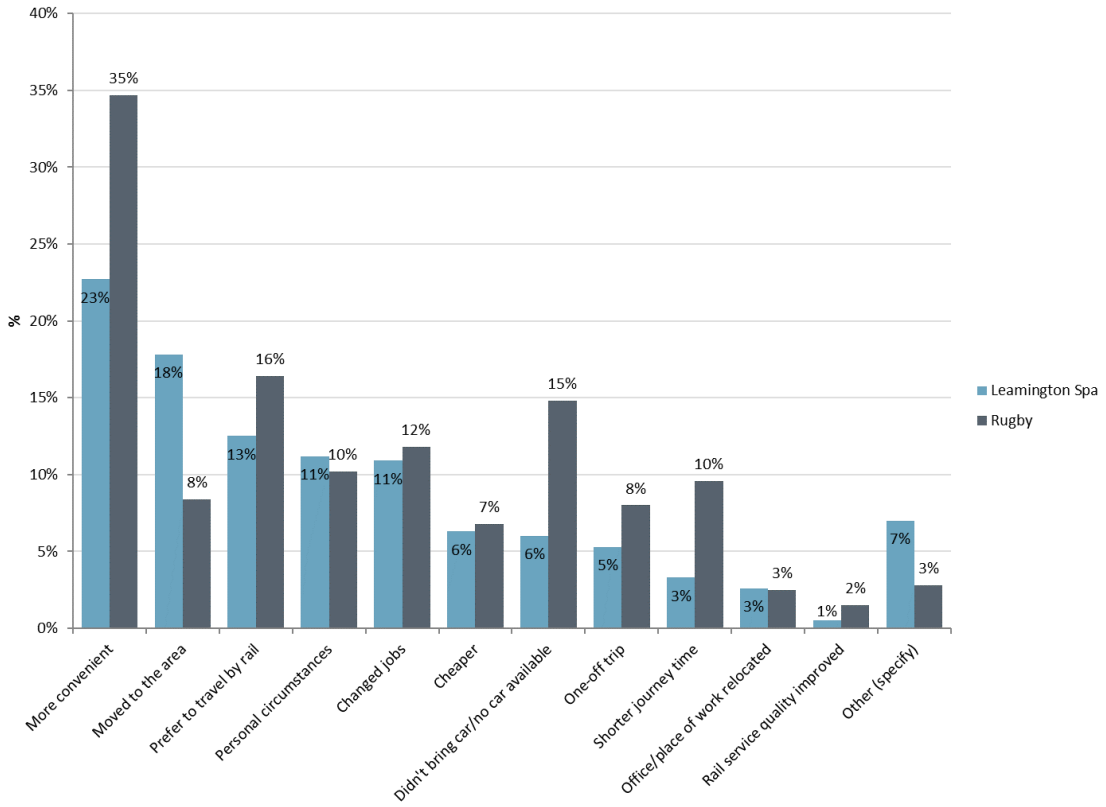
4.19 Figure 4.6 provides information on the main reason why station users started using the stations at Leamington Spa and Rugby. This data suggests that the primary attraction of Leamington Spa station was that it was more convenient than other modes of transport, although this was reported to a greater extent by Rugby users. Almost none of the survey respondents at Leamington Spa stated that the service improvements were the primary reason for using the station (1%).

4.20 Particularly relevant, in the context of the Evergreen 3, Phase 1 journey time improvements, is the proportion of Rugby station users suggesting they began using the station to shorten their journey time; this was more than triple the proportion reported by Leamington Spa station users, suggesting that the time savings produced by Evergreen 3, Phase 1 were not a major factor in attracting new passengers to the station.

4.21 An explanation for these findings is the low awareness of the improvements: in the station user survey, just 6% said they are fully aware of the improvements, with a further 12% saying they are aware, but not in detail. This likely reflects the incremental nature of the improvements at Leamington Spa.

4.22 Moving to the area was also given as a major reason for using the station, which is considered further in Chapter 5. This was considerably more important at Leamington Spa than at Rugby.

**Figure 4.6: Leamington Spa and Rugby station user surveys, 2016 – "What are the main reasons you started using this station?"**




Source: Leamington Spa station user survey (n=569); Rugby station user survey (n=323)

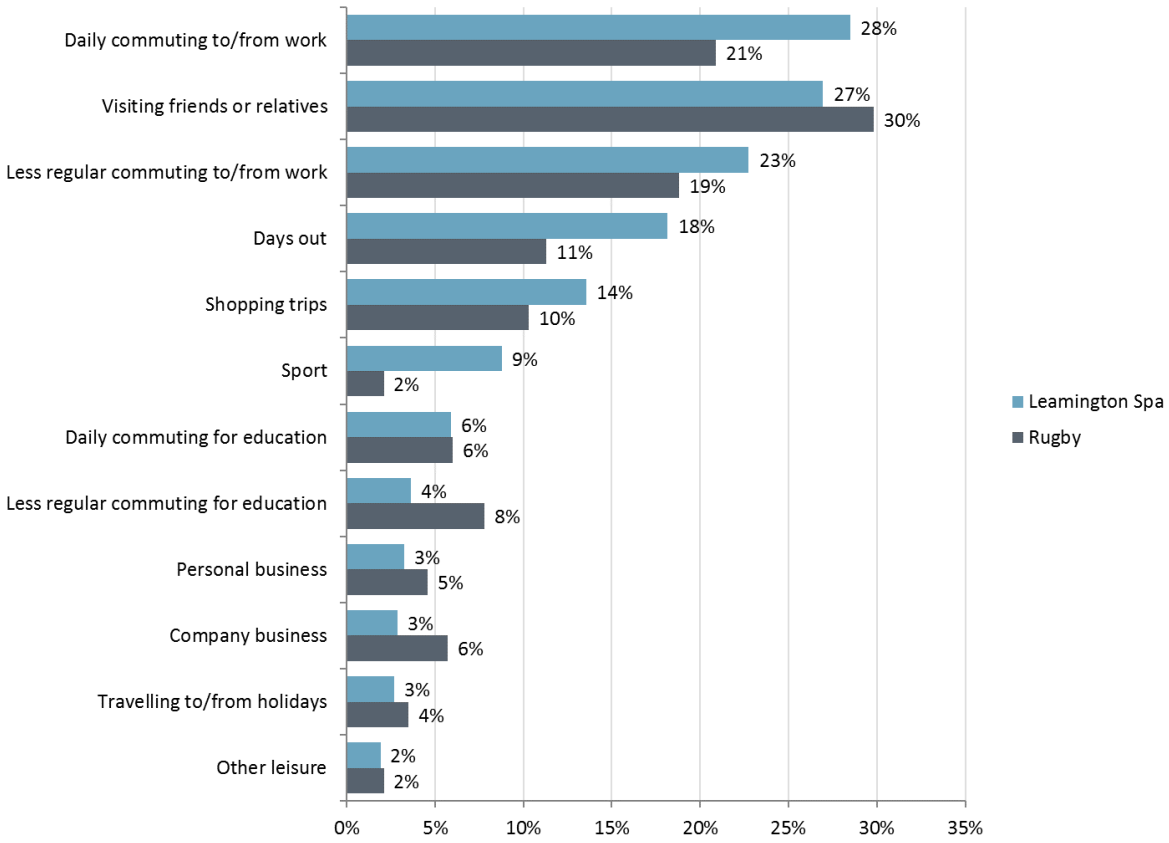
### Journey purposes of station users

4.23 Figure 4.7 shows the stated journey purpose of station users interviewed in the station user survey, for both Leamington Spa and Rugby.

4.24 The most common journey purpose given in the survey at Leamington Spa was commuting to work: 28% daily commuting plus 23% less regular commuting, suggesting that the station is an important facility for commuters. The second most common journey purpose was visiting friends or relatives, followed by days out. Within the context of this mix of journey purposes, it is worth noting that 17% of station users were full time students, reflecting the proximity of the University of Warwick and the large student population within Leamington Spa.

4.25 The profile of stated journey purposes at Rugby did not differ significantly from that at Leamington Spa, with the most pronounced difference being in daily commuting for work, at (28% at Leamington Spa and 21% at Rugby).

**Figure 4.7: Leamington Spa and Rugby station user surveys, 2016 – "For what journey purposes do you tend to use this station?" (Question 5)**




Source: Leamington Spa station user survey (n=569); Rugby station user survey (n=323)

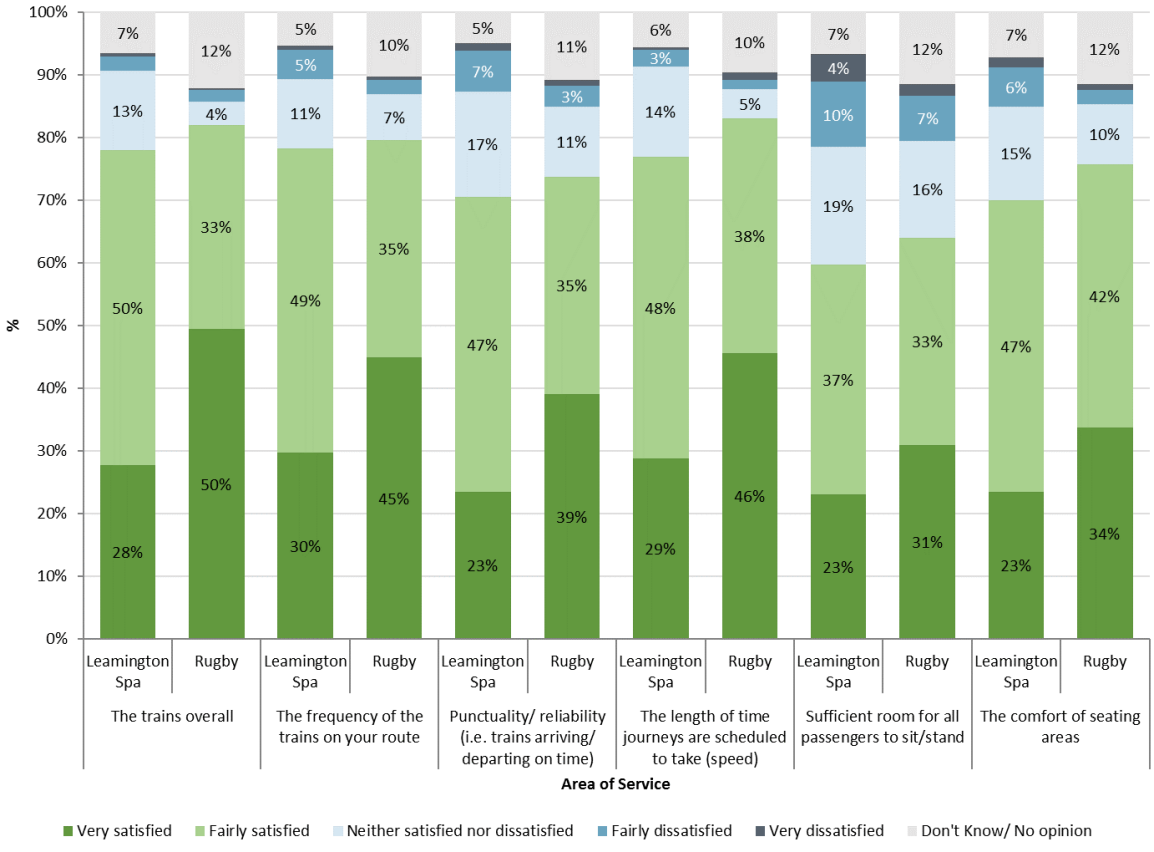
### Station user satisfaction with service provision from Leamington Spa and Rugby

4.26 Figure 4.8 shows passenger satisfaction with different elements of the service provision from Leamington Spa.

4.27 The findings suggest that station users are largely satisfied with service provision from Leamington Spa station: for five of the six areas of service, at least 70% of respondents claimed to be either "fairly" or "very" satisfied. The only area where fewer than 70% of respondents claimed to be "satisfied" was regarding whether there was sufficient room for all passengers to sit or stand.

4.28 It is worth noting, however, that the results of the Rugby station user survey suggested that a greater proportion of station users were "very" satisfied relative to Leamington Spa regarding all six areas of service provision. Despite this difference, satisfaction was quite high overall across both surveys, including for journey times (which were affected by the improvements at Leamington Spa).

**Figure 4.8: Leamington Spa and Rugby station user surveys, 2016 – "Based on your experience of local rail services, how satisfied are you with…" (Question 16)**




Source: Leamington Spa station user survey (n=569); Rugby station user survey (n=323)

## Summary

4.29 Growth in station entries and exits at Leamington Spa has roughly kept pace with the regional and national trends in the period 2008-09 to 2015-16, but growth in station usage in Rugby has exceeded that of Leamington Spa, most notably since 2013-14.

4.30 This pattern is reflected in the results of station user surveys from Leamington Spa and Rugby, which suggest that, while a small but significant proportion of station users at Leamington Spa said they had become more likely to travel by rail to London or Birmingham in the five years to 2016, this proportion was noticeably larger at Rugby. An important finding in this context is the low awareness of the improvements (6% fully aware) amongst Leamington Spa users.

4.31 The proportion of all Leamington Spa to Birmingham travellers using Moor Street and Snow Hill (Chiltern Main Line stations) appears to have increased considerably relative to the proportion using Birmingham New Street (connected via CrossCountry) between 2008-09 and 2015-16, potentially indicating greater patronage on the services affected by the improvements. However, this could be related to the disruption at Birmingham New Street during construction works.

4.32 Despite low awareness and little detectable impacts from the improvements, station users at Leamington Spa seemed to be broadly satisfied with the quality of service provision at the station, with over 70% of passengers being satisfied with the trains overall, on four of the five specific measures covered in the survey. This included a measure on journey times, which were affected by the improvements. Although there is not clear evidence of direct impacts from the improvements (from a passenger perspective), passengers nonetheless appear largely satisfied with the current level of service provision.

# 5 Economic Impacts of the Transport Intervention

## Introduction

5.1 Chapter 4 considered the impacts of the transport intervention on travel behaviour in Leamington Spa. It illustrated that the investment may have had a minimal impact on travel behaviour, with some potential effects regarding journeys to Birmingham, and that there has been steady growth in the usage of Leamington Spa station – though this has been at a rate below that of Rugby and the regional average.

5.2 It is possible that the increase in patronage at Leamington Spa station has led to a range of second-order economic effects, as the improved services lead to an adjustment in behaviour by firms and employees, though the evidence in the previous chapter suggests that the possibility of detecting substantial economic impacts for this case study is likely to be low.

5.3 This chapter considers the nature and magnitude of potential economic effects, using evidence from a variety of sources including ONS statistics, and it discusses three primary kinds of economic effects:

- investment effects (changes in the attractiveness of Leamington Spa as a place to locate for residents and businesses);
- employment effects (changes in the local labour market and firm employment); and
- productivity effects (changes in firm turnover).

5.4 Within the analysis the Rugby comparator area has been used to try and distinguish between the effects of the rail investment and background trends, though this has been complicated by the consistent growth seen in Rugby which may be linked to additional capacity delivered by the West Coast upgrade works.

## Investment effects (residential)

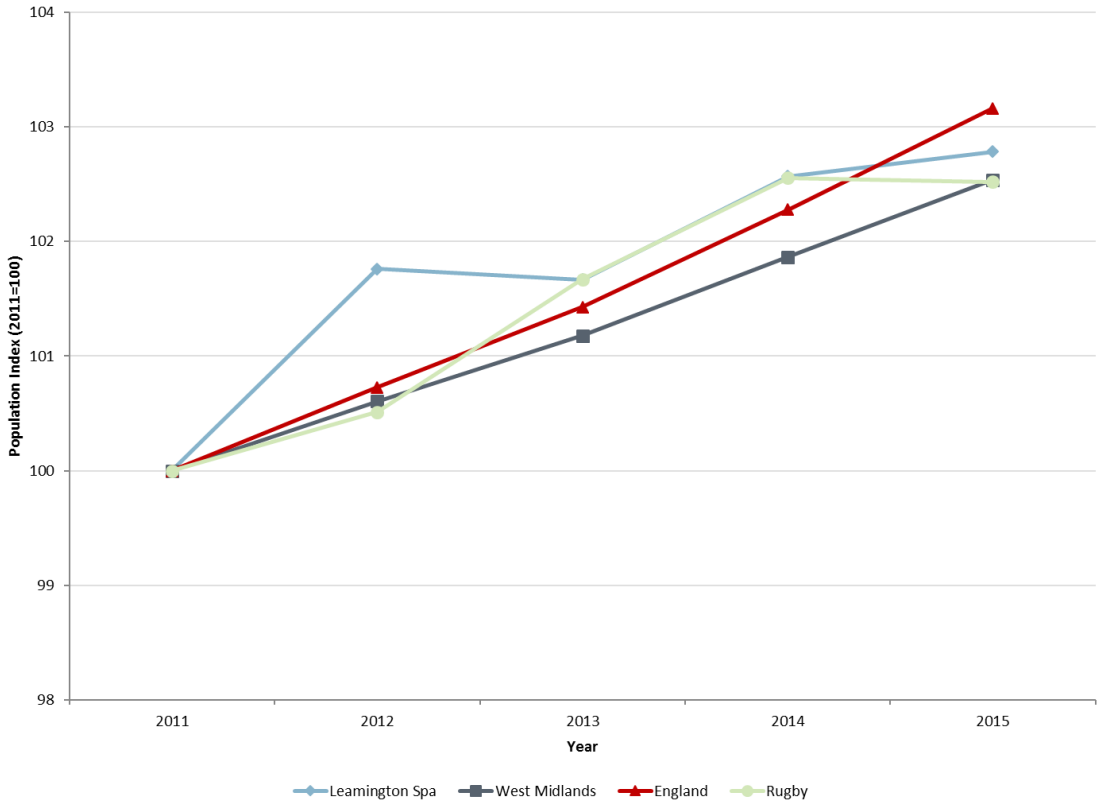
5.5 It is generally thought that individuals value the benefits associated with rail connectivity, and as such, it would be expected that the enhancements to rail services associated with the completion of the Evergreen 3, Phase 1 programme could increase the attractiveness of Leamington Spa as a place to live.

5.6 This effect would be highlighted by population growth in the town, reflecting its increased desirability as a residential area, and increases in local property prices. It would also be associated with increases in rail patronage by residents, and there appears to be some possible evidence of this in Chapter 4.

### Impact on local population growth

5.7 If the hypothesis presented above is correct, then it would follow that the period following the service improvements would be associated with a pattern of population growth in Leamington Spa. Figure 5.1 presents data from the ONS mid-year population estimates.

**Figure 5.1: Population index, 2010-15**




Source: ONS Mid-year population estimates (accessed 2017)

5.8 This data suggests that population growth in Leamington Spa has performed broadly in line the regional trend since the rail intervention, with population growth accelerating in 2012. While this might indicate an immediate effect of the rail intervention, the length of time required to permanently relocate a household is likely to be longer than one year. In practice, the volatility in population estimates from year-to-year is more likely to result from a number of factors, of which the rail intervention is probably a minor one.

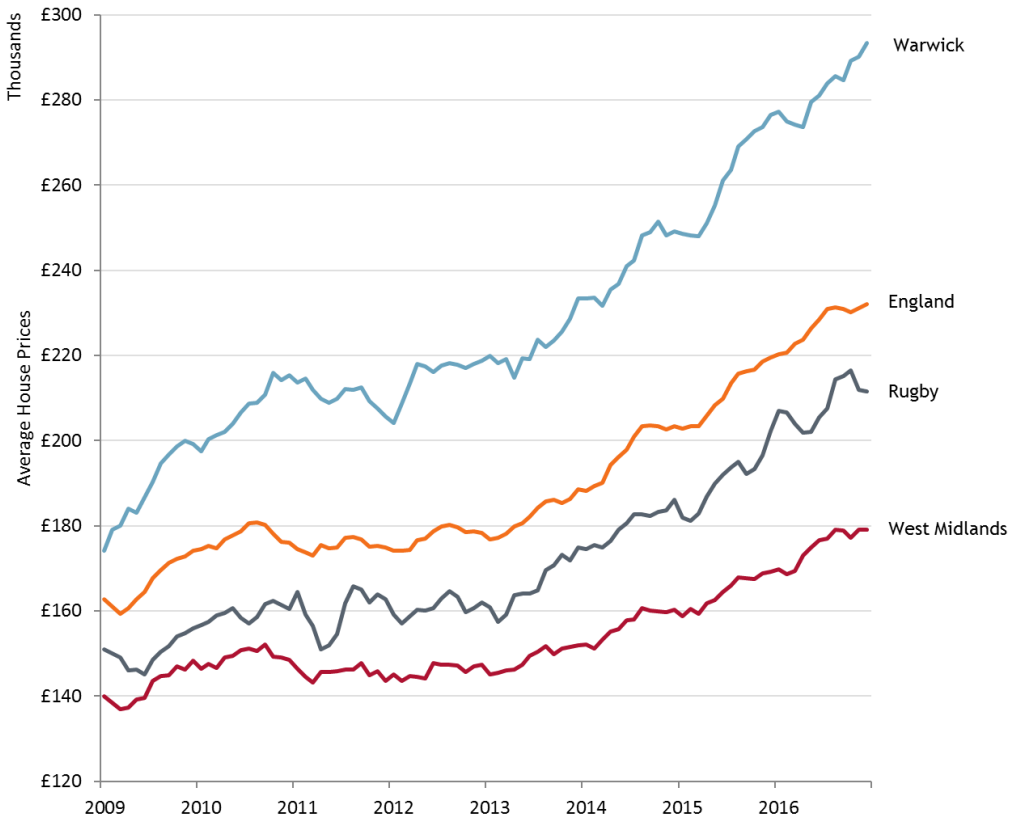
5.9 There is no evidence that population growth has increased over the longer-term as a result of the rail intervention. Chapter 2 suggested that Leamington Spa's labour market was largely self-contained prior to the intervention – with 58% of those in work commuting to within the Warwick local authority, and a further 13% commuting to Coventry, a link served by rail unaffected by the Evergreen improvements. Only a small proportion of workers commuted to London or Birmingham – the two destinations for which the rail improvements have been most significant – and hence such incremental time saving improvements are unlikely to have a major impact on the town's attractiveness as a place to live in order to commute to London or Birmingham.

### Impact on local property prices

5.10 If the rail improvements increase the attractiveness of an area as a place to live, this may be visible through property price impacts. Figure 5.2 indicates the trends in house price growth for the Warwick local authority area, containing Leamington Spa, since 2009, as well as the equivalent figures for Rugby, and the regional and national averages.

5.11 This data indicates that there did appear to be a widening of the gulf between Warwick house prices and those of the three comparators shown here, though this appeared to stabilise around the time of the intervention in 2011. It is difficult to establish whether this relative increase could have partly represented anticipatory effects related to the transport intervention, but the fact that the trajectory of growth has been similar between Warwick, Rugby, and the regional and national averages suggests that the impact on local property prices has been muted. A more detailed analysis of property price impacts is beyond the scope of this study, but given the earlier evidence and that shown here, such impacts due to the improvements seem unlikely.

**Figure 5.2: Property Price Trends in Warwick and Rugby, 2009-16**




Source: Land Registry (accessed 2017)

### Evidence from residents

5.12 Evidence from qualitative interviews with residents in Leamington Spa[9] suggests that the rail improvements have been a minor factor in attracting some residents to Leamington Spa, based on the increased attractiveness of commuting. One couple stated that:

*"I originally came from Leamington Spa then moved to London for ten years but re-located back to Leamington two years ago. Access to the rail network was very important when making that decision."*

5.13 This indicates that Leamington Spa's rail accessibility is important for a small number of residents and those locating to the town, but is unlikely to be an overriding consideration. As referenced in the quote above, the town has always been *connected* to the rail network, and hence a smaller incremental change in accessibility is unlikely to make a large change to the towns' attractiveness in this regard. Other factors, such as in this case the couple's previous connection to the town, are likely to be more important.

## Investment effects (businesses)

5.14 Broadly, businesses also value rail connectivity, and proximity to rail transport allows easier access for customers, suppliers and employees, and the reductions in travel costs associated with rail access would represent productivity gains. It is therefore possible that the rail improvements could lead to more businesses choosing to locate near Leamington Spa station.

### Importance **of rail to local businesses**

5.15 Qualitative interviews with local businesses were undertaken[10], with short interviews identifying the importance placed on rail connectivity by local businesses, and the degree to which it had influenced their decision to locate in the town. While the majority of businesses interviewed did not feel that they were particularly dependent on the local rail network (largely due to the geography of their clients and customers), two of the twenty businesses surveyed did suggest that the rail station and services were important to them when deciding where to locate. One commented:

"*I would say we depend on rail services to a large extent, in fact our office was originally based in London but we relocated to Leamington Spa which is a more central location for us. The proximity of the railway station and good railway links were a large part of our decision to base ourselves here."*

[9] The residents' interviews were undertaken using a random list of residential telephone numbers located within 3km of Leamington Spa railway station. Soft quotas were applied in line with Output Area Classifications to ensure a mixture of Leamington Spa residents were covered. Interviews were conducted over the telephone. The sample size was 20. The research was conducted in November 2016. For more detail, see the Technical Report.

[10] The business interviews were undertaken using a random database of businesses located within 3km of Leamington Spa railway station. Soft quotas were applied in line with the Business Register and Employment Survey data to ensure a mixture of Leamington Spa business types were covered. Interviews were conducted over the telephone. The sample size was 20. The research was conducted in November 2016. For more detail, see the Technical Report.

5.16 The other suggested that:

*"Access to rail services is very important and it would certainly be a major factor in considering where the business is located…links to London and Birmingham are both very important for visiting clients."*

5.17 While this suggests that some businesses view rail connectivity as important (as would be expected), this importance was not tied explicitly to the improvements in the rail services. Since railway services at Leamington Spa were already good prior to Evergreen 3, Phase 1, which represented an incremental improvement in connectivity, it is highly unlikely that rail improvements have led to a significant increase in the attractiveness of the town for business investment.

5.18 Most of the businesses surveyed did not expect their dependence on rail to change significantly in the future, with a few doing so only based on indirect changes, such as through the attraction of new customers due to improved connectivity. Furthermore, some businesses surveyed expressed a belief that current (post-intervention) levels of service remain insufficient.

**Leamington Spa as a place to work**

5.19 The survey of local businesses also indicated opinions towards the importance of rail for Leamington Spa as a place of employment. A limited number of businesses suggested that the rail services through Leamington Spa station made it easier for employees to reach the workplace, but, as suggested by the low proportion of businesses expressing a reliance on rail transport, this was a minority position. A small design agency, for example, commented:

*"…none of our staff commute by rail and we would visit clients by car, when necessary. Most of the offices we deal with are local, within Warwickshire…".*

Therefore, it is unlikely that the rail improvements have had any significant impact on the attractiveness of the town as a place to work, or on the location of businesses. It is possible that, in keeping with the improvements allowing rail patronage to grow and 'keep up' with regional and national patronage growth (discussed in Chapter 4), the improvements have allowed the town to maintain its position in relative terms in terms of rail accessibility to London, although it is difficult to prove this.

## Employment effects

**Firm employment**

*Aggregate firm employment across all local business units*

5.20 To investigate employment effects in local business units (individual factories or workplaces) more closely, econometric analysis was undertaken using the Business Structure Database (BSD) in Leamington Spa and Rugby.

5.21 A D-i-D methodology was applied, whereby the rail intervention at Leamington Spa in 2011 composed the treatment effect, and Rugby composed the comparison case where the treatment does not occur. The D-i-D approach estimates the differences in the trends between Leamington Spa and Rugby over time, both before and after the treatment, and establishes whether a meaningful difference in the trends occurred following the treatment. Further

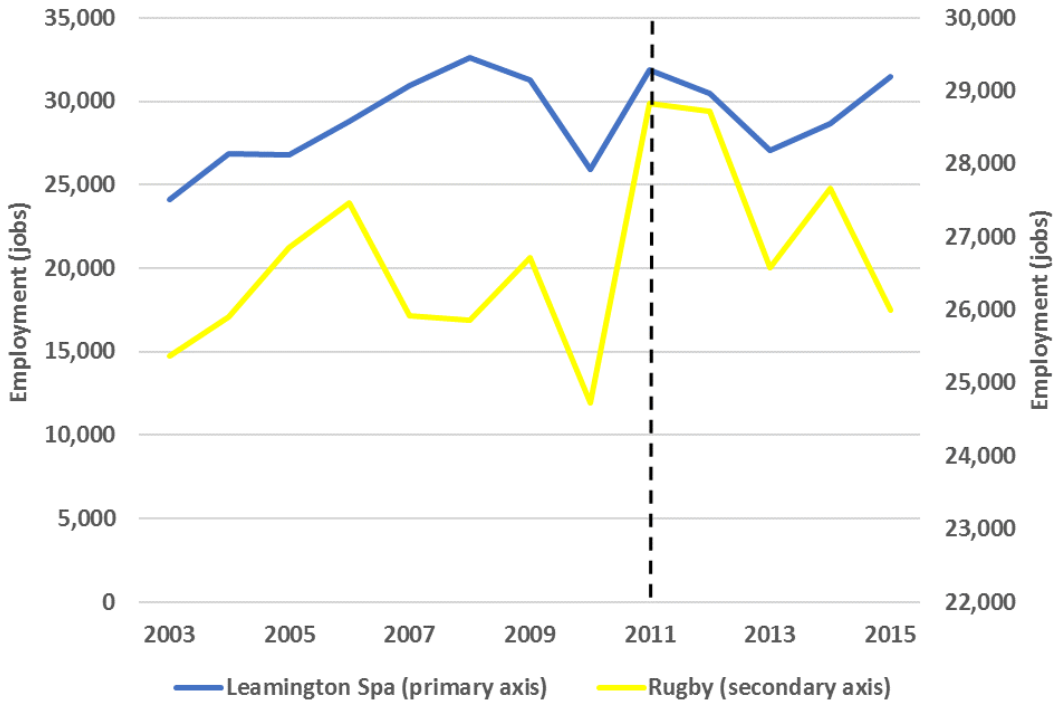
details regarding this approach are available in the accompanying Technical Report. Leamington Spa and Rugby were identified from the BSD data by postcodes linked to Lower-Level Super Output Areas; these LSOAs are then built up to the MSOAs used to construct the case study and comparison areas.

5.22 D-i-D analysis was only undertaken where common trends between the case study area and the comparison area were evident in the pre-intervention period. In this report, some additional charts indicating a lack of common trends on a certain metric have been included, and other variables were tested that did not produce common trends so are not shown here.

5.23 We conducted this analysis both on the case study and comparison areas, and on a tighter area surrounding each station, within a 0.5-mile radius. The results of the analysis for this tighter area did not differ significantly from those for the wider area, whether considered by sector or by class size, and hence those results have not been presented below.

5.24 Figure 5.3 indicates a summary of the aggregate employment data for each area, as used within the econometric analysis.

**Figure 5.3: Total local business unit employment in Leamington Spa and Rugby, 2003-15**



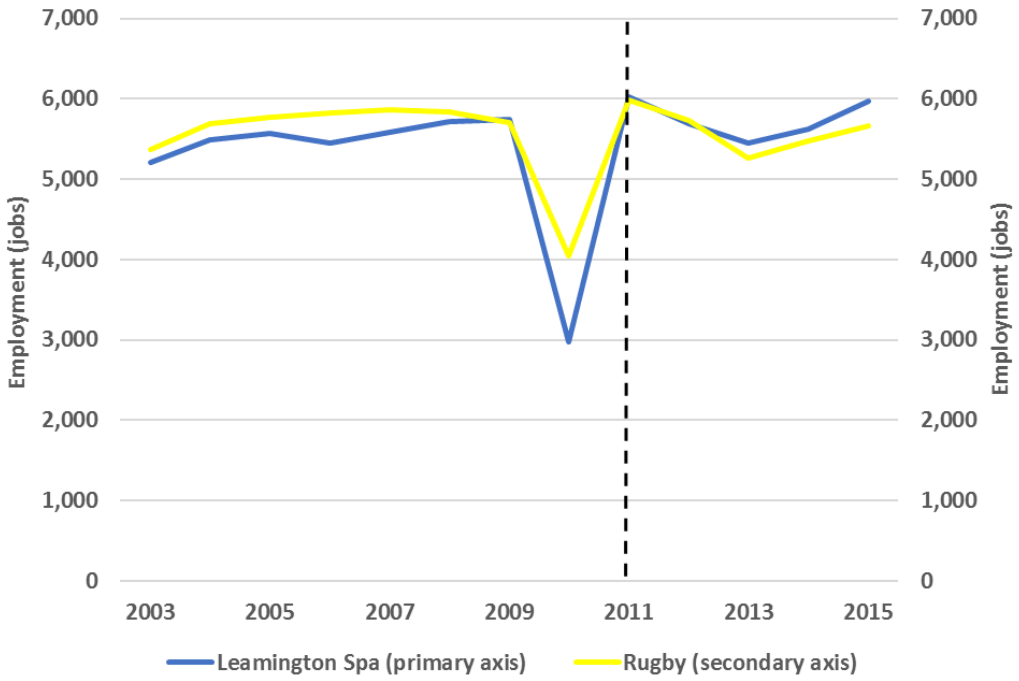

Source: Business Structure Database (Office for National Statistics) and Cambridge Econometrics

5.25 Between Leamington Spa and Rugby, evidence of common trends is not present. While it is clear that a divergence in employment levels occurs after 2014 from Figure 5.3 above, the difference in the patterns prior to the intervention means that it would be inappropriate to ascribe this to the treatment.

*Small and micro local business unit employment*

5.26 However, Figure 5.4 offers a representation of the data pertaining only to small micro and micro local business units. When the set of local business units is restricted to these size classes, a common trend is observable in the movements of job figures in the pre-treatment period.

**Figure 5.4: Total small micro and micro local business unit employment in Leamington Spa and Rugby, 2003-15**




Source: Business Structure Database (Office for National Statistics) and Cambridge Econometrics

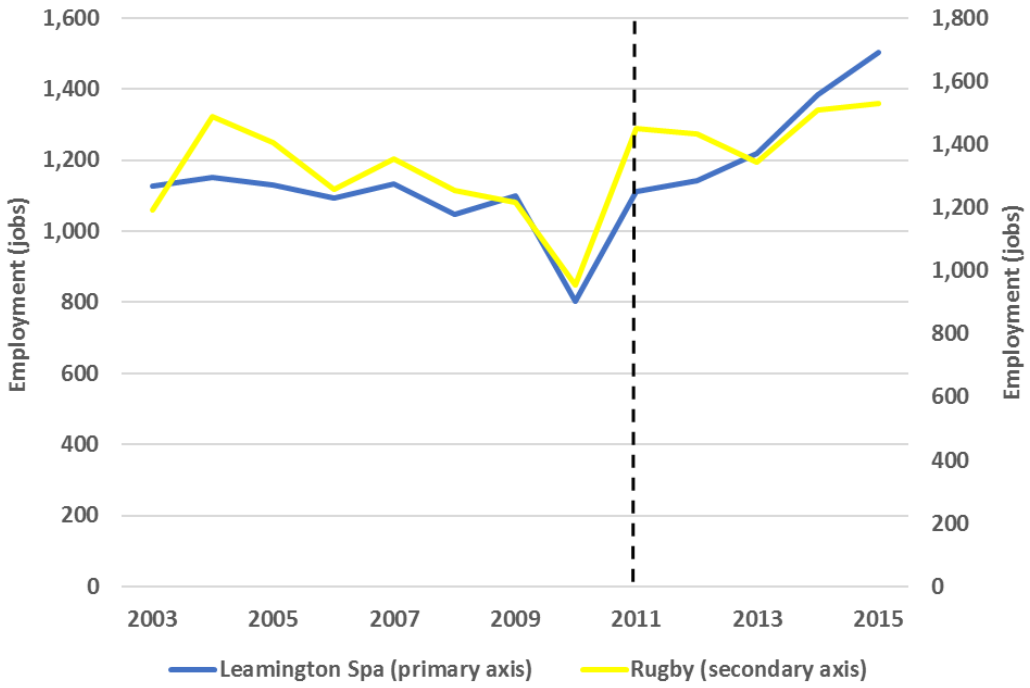
5.27 The movements in employment levels largely seem to follow one another in the pre-treatment period, and thus it would be reasonable to comment on the shift in trajectory observed following the treatment in Leamington Spa. The number of employees at small micro and micro local business units in Leamington Spa showed a small but steady increase following the treatment, returning to the pre-intervention peak; the number in Rugby, meanwhile, grew more slowly.

5.28 It is plausible that the transport intervention was partially responsible for this shift for Leamington Spa, as this would fit with assumptions about the benefits for businesses associated with greater connectivity; however, it is important not to overstate the importance of this finding, as D-i-D analysis indicates that this difference in trajectory is not statistically significant.

*Sectoral composition of employment*

5.29 Figure 5.5 illustrates the patterns in employment specifically for the Hotels and Restaurants sector, with a common trend observable in the pre-treatment period. The reduced travel times from Leamington Spa could be expected to increase employment in the Hotels and Restaurants sector, as increased connectivity and footfall increases the demand for these services and hence employment concurrently.

**Figure 5.5: Total local business units employment in Leamington Spa and Rugby in Hotels and Restaurants, 2003-15**

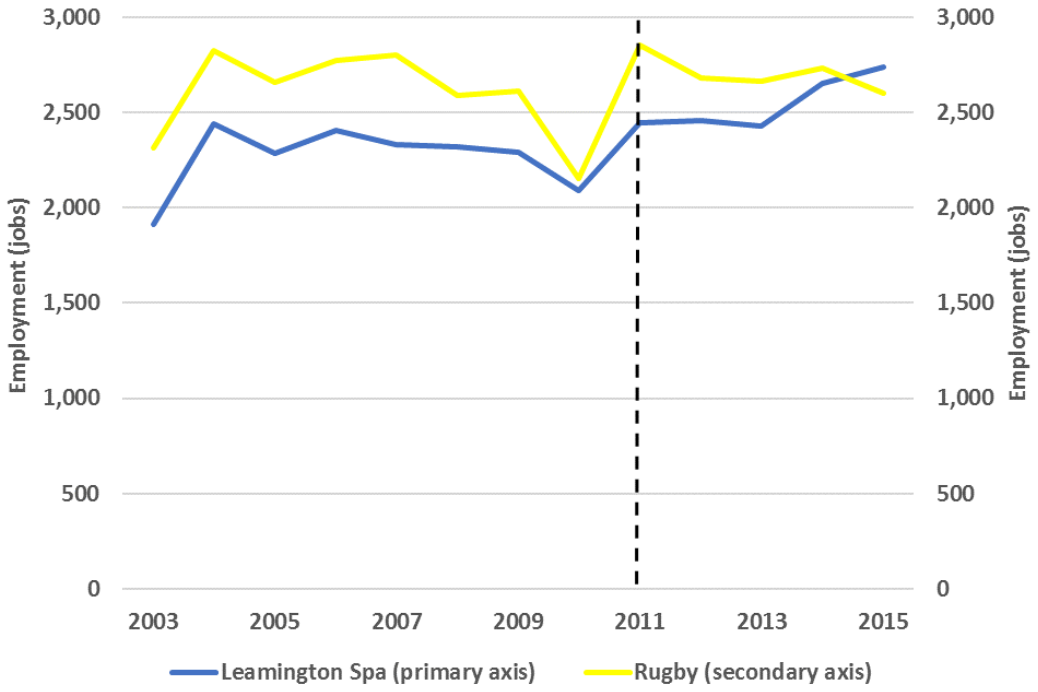



Source: Business Structure Database (Office for National Statistics) and Cambridge Econometrics

5.30 The divergence in the trends for Leamington Spa and Rugby observed in Figure 5.5 above suggest that a meaningful change in the fortunes of the sector in each town took place following the transport intervention. In Rugby, employment in this sector initially fell slightly after 2011 before rebounding; however, in Leamington Spa, growth in employment in the sector has been steadily gathering pace. The D-i-D analysis suggests that this differential pattern following the rail intervention has been statistically significant. The connectivity benefits of the railway improvements are likely to be felt particularly acutely in this sector, since they would have increased the relative accessibility of Leamington Spa; however, it is worth noting that Rugby station also saw increased patronage in this period. It thus seems difficult to identify the difference in trajectories in this sector primarily due to the rail intervention and its associated connectivity benefits.

5.31 A second sector where there is an observable common trend prior to the rail intervention is Retail. Figure 5.6 illustrates this. The Retail sector is thought to be indirectly impacted by the opening of the new rail station, as the service improvements could increase customer access to Leamington Spa retail outlets from the rail station. However, it is worth noting that the same effects would be expected to occur at Rugby due to the WCML improvements occurring in the period.

**Figure 5.6: Total local business units employment in Leamington Spa and Rugby in Retail, 2003-15**




Source: Business Structure Database (Office for National Statistics) and Cambridge Econometrics

5.32 This data illustrates another divergence in employment patterns between Leamington Spa and Rugby. After a decline around the onset of the recession in 2009, levels of employment in this sector rebound strongly in Leamington Spa around the time of the intervention. In Rugby, meanwhile, the initial recovery in Retail employment has been followed by gradual decline. Leamington Spa has seen a recent upturn in employment growth in this sector.

5.33 The coincidence of the spike in employment in this sector and the transport intervention illustrates a potential relationship, as does the fact that the two previously similar patterns of employment have diverged considerably since 2011. However, it is hard to establish the nature of the relationship between the rail intervention and employment patterns.

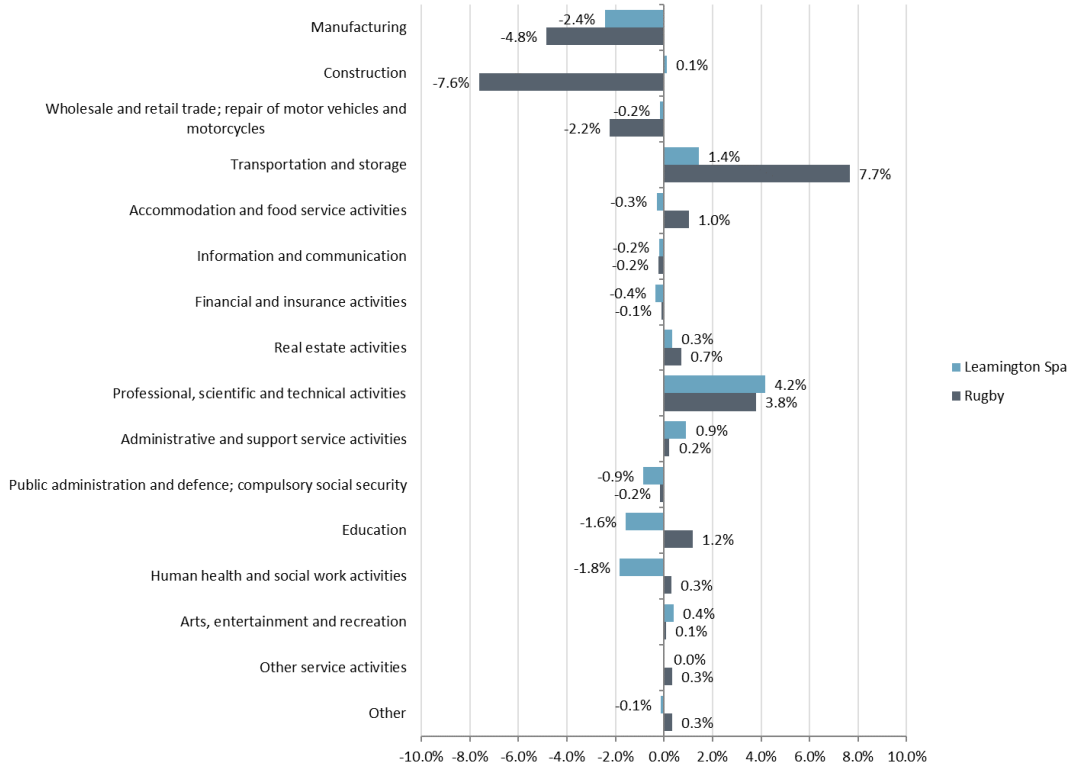
5.34 Overall, it is difficult to establish whether the transport intervention had an impact on overall firm employment in Leamington Spa, as the pre-intervention trend in Leamington Spa differed so substantially from that of Rugby. In any case, the nature of the transport improvement at Leamington Spa is unlikely to result in a significant uplift in local employment, since, as discussed earlier in this chapter, the majority of the businesses do not appear to be heavily reliant on the use of rail, and hence the rail improvements are likely to have a limited effect on overall employment levels within the town relative to Rugby.

5.35 However, there does appear to be a clear divergence in specific sectors, with Leamington Spa outperforming Rugby in the Hotels and Restaurants, and Retail sectors post-intervention, seeing faster growth than Rugby in the former sector, and growth rather than decline (unlike Rugby) in the latter. This could indicate local impacts of the intervention in these sectors (e.g. in retail, the improvements have resulted in more customers choosing to shop in the town, and hence an increased retail workforce), although again it is difficult to provide definitive evidence of such effects given that potential changes may be expected at Rugby during the same time period.

5.36 BRES data, as presented earlier in this report, also offers some useful information regarding the change in sectoral composition of employment, and largely confirms that the trends outlined in the D-i-D analysis were indicative of considerable divergence between Leamington Spa and Rugby.

5.37 However, the BRES data suggests that employment in the Accommodation and Food Service sector actually declined in Leamington Spa while rising in Rugby. This discrepancy may be due to the analyses using different levels of disaggregation by sector, different units of analysis or due to being based on a comparison of only two time points. It is also clear from the data that there has been considerably more volatility in sectoral employment in Rugby than in Leamington over this period, with a large fall in employment in the Construction sector accompanied by a large increase in the Transportation and Storage sector. It is difficult to establish a meaningful link between the rail intervention at Leamington and the sectoral trends seen here, due to the lack of a consistent picture between different measures.

**Figure 5.7: Change in the sectoral composition of employment in Leamington Spa and Rugby, 2010-15**

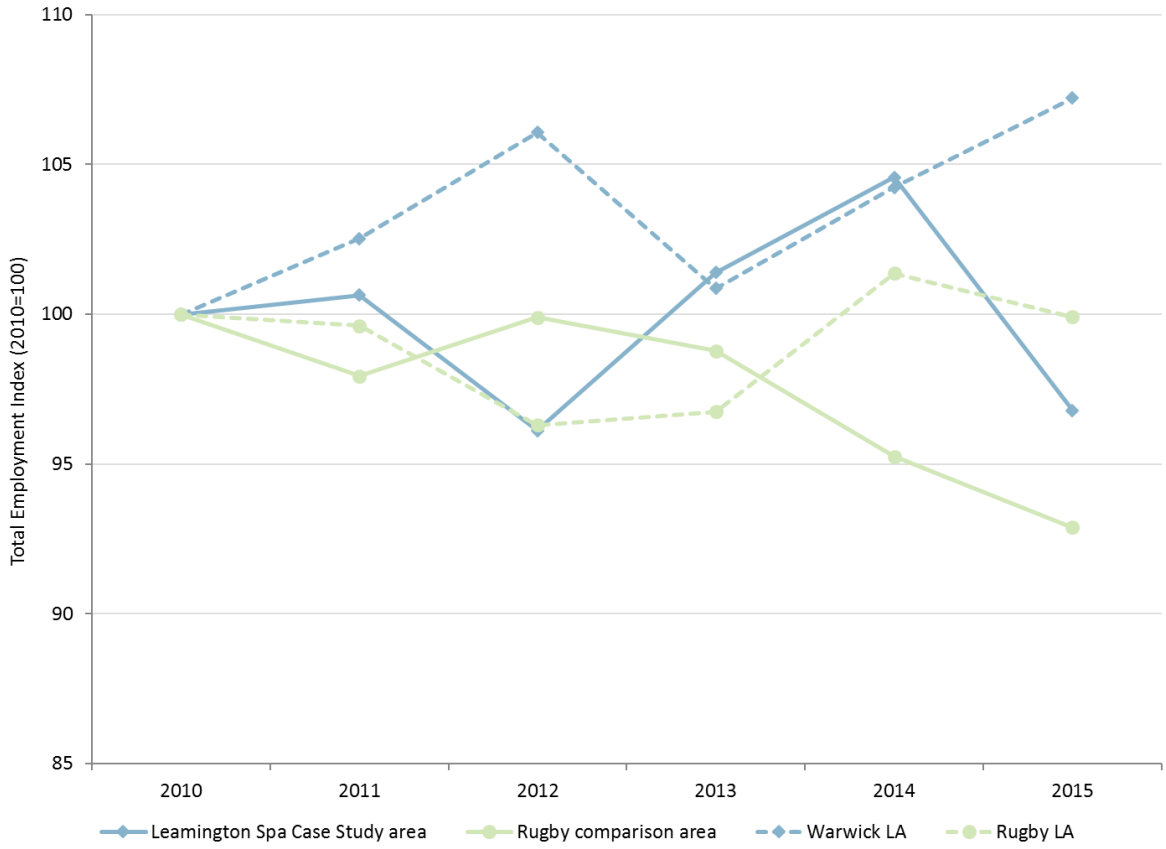



Source: Business Register and Employment Survey, Office for National Statistics (accessed 2017)

### Local labour market

5.38 BRES data highlights the complex nature of employment trends since the intervention, in both Leamington Spa and Rugby, and the local authorities in which they sit. Figure 5.8 illustrates the BRES number of employees, indexed to 2010 (the year before the intervention). While the impact on employment is likely to be most pronounced in the study areas, benefits to the wider local authority could also be expected.

**Figure 5.8: Index of employees for Leamington Spa and comparisons, 2010-15**



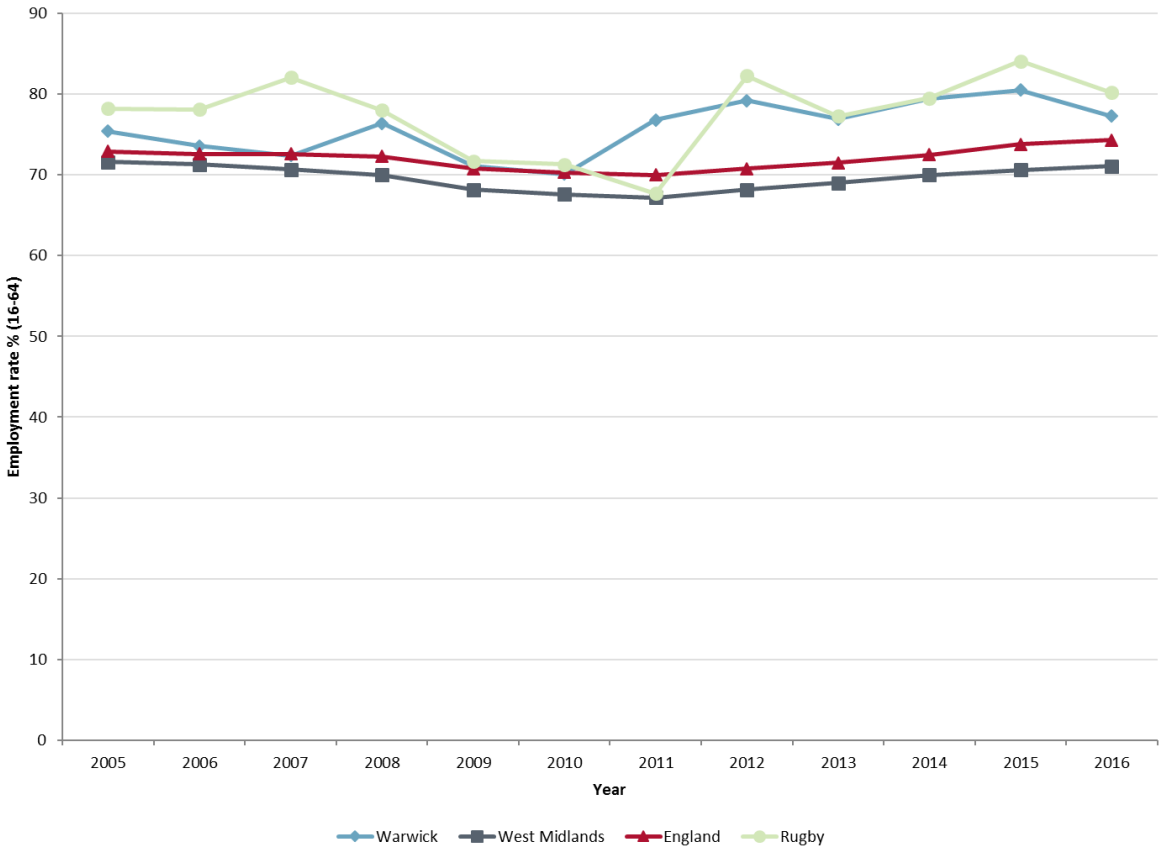

Source: Business Register and Employment Survey, Office for National Statistics (accessed 2017)

5.39 This data suggests more radical patterns of change in employment than the BSD figures, and it highlights a notable variation between the areas under study. One particularly salient point is that levels of employment in Warwick local authority have grown more than any of the other areas; however, the incremental nature of the rail improvements would not be expected to impact a geographical area the size of the entire Warwick local authority. The erratic growth patterns observed in Leamington Spa make it difficult to establish a uniform trend in this area, though this varying trajectory can be compared with the continued decline in employment according to the BRES data over this period observed in Rugby.

5.40 Figure 5.9 illustrates data from the Annual Population Survey on the employment rates in the Warwick and Rugby local authority areas, and the West Midlands and England averages. This data is presented at the Local Authority level, as this dataset is not available at the MSOA level of disaggregation. The data suggests that the average level of employment following the intervention has consistently exceeded pre-intervention levels in Warwick local authority area, including from before the recession.

5.41 On the other hand, Figure 5.9 also indicates that the employment rate, as a percentage, in the Warwick local authority area has been very slightly lower than that in the Rugby local authority area since the Leamington Spa intervention in 2011. This data measures the proportion of the population employed rather than the number of employees, which likely explains the discrepancy with the BRES data given above in Figure 5.8.

**Figure 5.9: Employment Rate in Warwick and Rugby local authority areas, 2005-16**




Source: Annual Population Survey, Office for National Statistics (accessed 2017)

5.42 These findings, from Figure 5.8 and Figure 5.9, suggest that there has been a limited change to the local labour market following the transport intervention, and it is difficult to establish a coherent trend in the number of employees over that period.

## Productivity effects

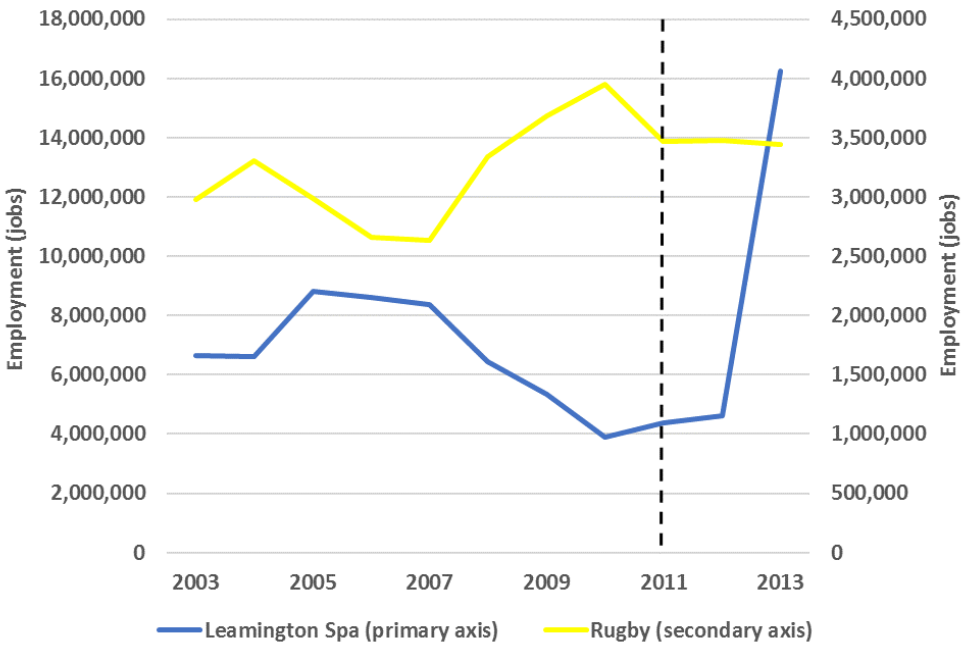
### Enterprise turnover

5.43 Econometric analysis was also undertaken to assess the level of firm turnover in Leamington Spa and the comparison area of Rugby in the period since the rail improvements. Again, the BSD was used. However, in this case, enterprises, rather than local business units, formed the unit of analysis.[11]

5.44 Turnover refers to the annual volume of sales of enterprises located within a given area; it would be expected that an increase in turnover would be associated with an increase in business productivity and profitability, and as such, turnover is used here as a proxy measure of productivity. Firms which benefit from rail connectivity could experience productivity gains resulting from reduced travel times and lower costs associated with the rail intervention.

5.45 Figure 5.10 illustrates the data for aggregate turnover for businesses in Leamington Spa and Rugby.

**Figure 5.10: Total turnover in Leamington Spa and Rugby for enterprises, 2003-15**




Source: Business Structure Database (Office for National Statistics) and Cambridge Econometrics

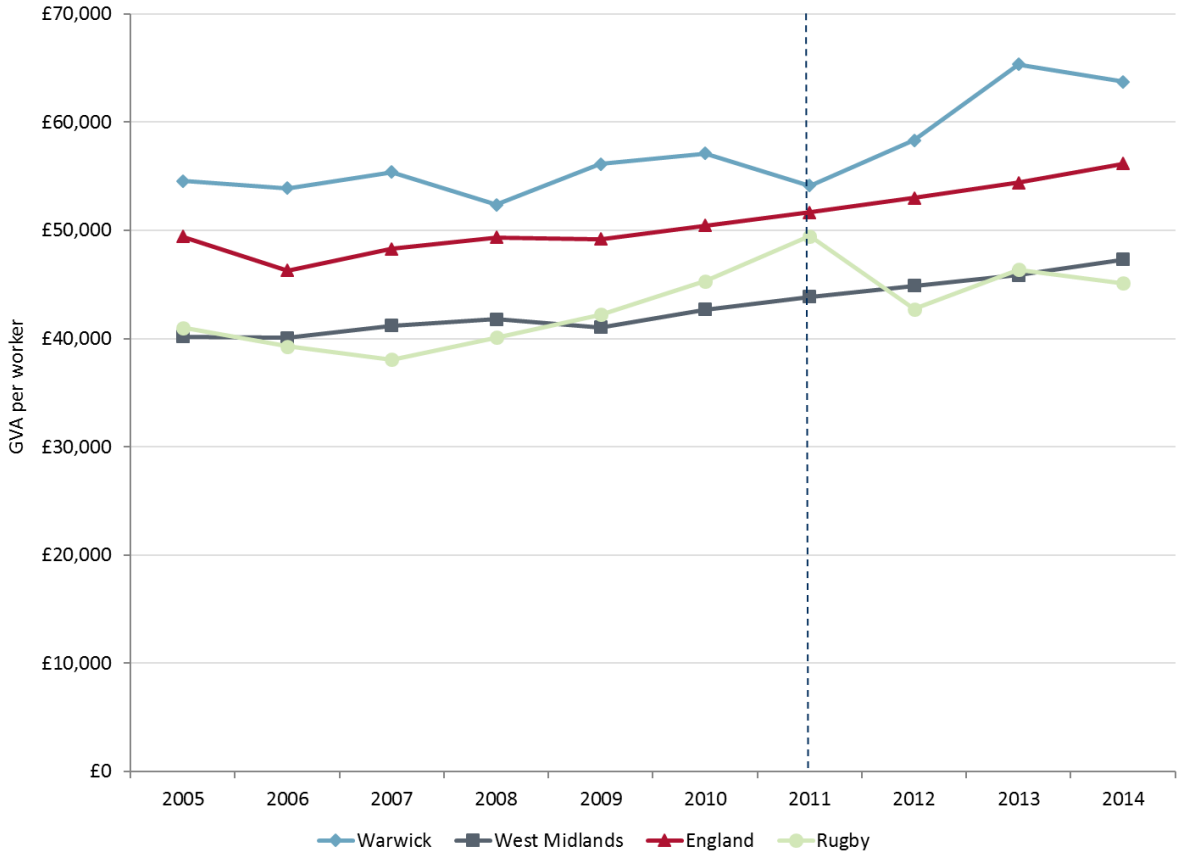
[11] An enterprise is any number of individual sites or workplaces (or local units) which forms one 'business', or the smallest legal unit (based on VAT and or PAYE records) with a certain degree of autonomy. Whilst local unit data is more disaggregated, enterprise data contains a measure of turnover which is not available in the local unit data. Where an enterprise has several local units, the location of an enterprise is generally the main operating site or the head office. Hence, for regional analysis, our sample may include data for local units outside of Leamington Spa if their head office/main operating site is located within Leamington Spa, and likewise data for some local units in Leamington Spa may be excluded if their head office/main operating site is located outside of Leamington Spa. This is a limitation of the available data.

5.46 As the D-i-D analytical method requires a common trend to be apparent prior to the intervention, it is impossible to draw a conclusion about the impact of the rail intervention on turnover based on the Rugby comparison area. While it is evident from the data that turnover in the Rugby comparison area has remained relatively static since the treatment, the difference from the trends in Leamington Spa prevent this trend from being contextualised. Similarly, no common trend is evident when enterprises are broken down by sector, as well as when smaller local units are analysed separately to larger local units.

### Gross Value Added

5.47 Figure 5.11 illustrates the change in GVA per worker[12] in the Warwick local authority area, with the Rugby local authority area and the regional and national averages included for reference. As GVA refers to the value of goods and services produced in a given area, it provides a good reflection of productivity change over time. The dotted line indicates the occurrence of the intervention.

**Figure 5.11: GVA per worker in Warwick and Rugby local authority areas, 2005-14**



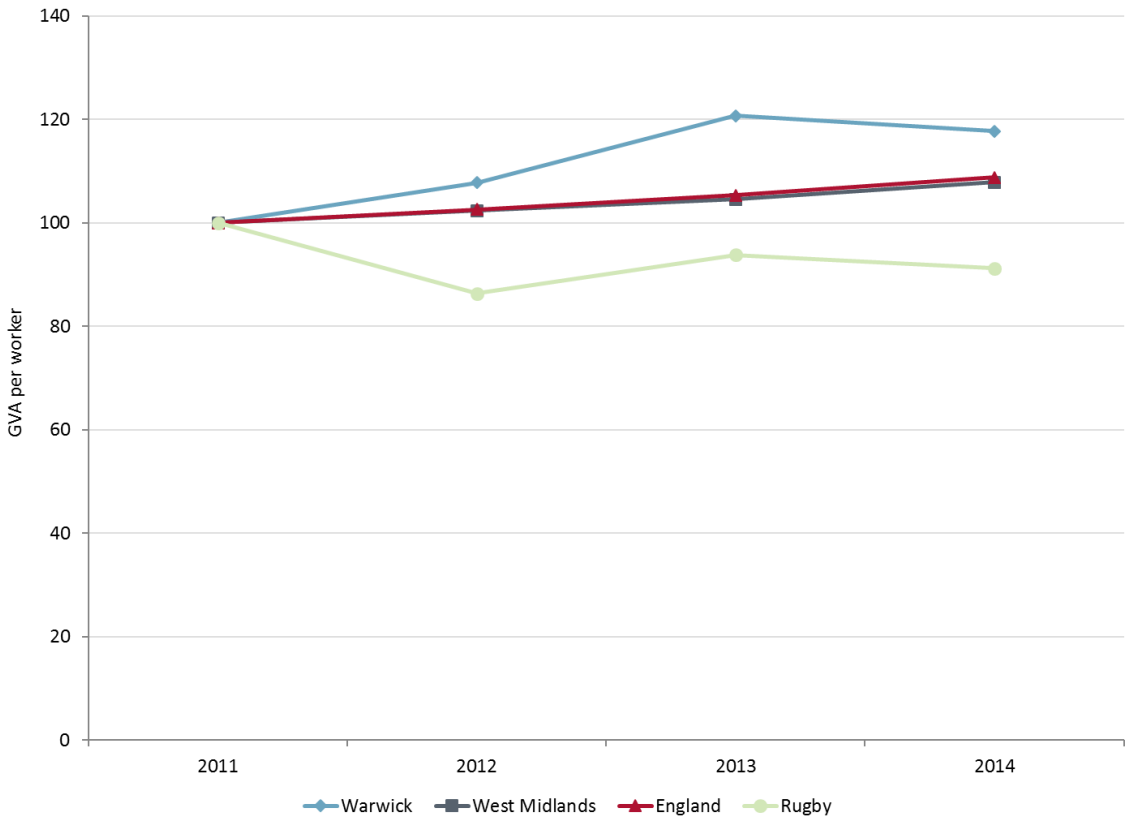

Source: Annual Population Survey and Regional GVA by Local Authority in England, Office for National Statistics (accessed 2017)

[12] GVA per worker represents the total value of all goods and services produced in an area, divided by the number of workers.

5.48 This data suggests that the Warwick local authority area has seen a pronounced increase in worker productivity since the rail intervention in 2011, after remaining roughly static overall between 2005 and 2010. The trends in both the West Midlands and England have indicated a slower pace of GVA per worker growth, and Rugby has in fact observed a decline in GVA per worker growth in that time. The timing of the increase suggests that the rail intervention may have contributed to these productivity gains, through providing increased connectivity for businesses, although it is not possible to conclusively prove this.

5.49 Figure 5.12 further complements this picture, by showing an index of GVA per worker since the intervention in 2011, with data for the Warwick and Rugby local authority areas, and the regional and national averages. The faster growth of Warwick's GVA per worker compared to the wider averages and the Rugby local authority is clear, and it is possible that there may be a relationship between this greater than average rate of growth, and the transport intervention. However, this cannot be proved.

**Figure 5.12: GVA per worker index, 2011-14**




Source: Annual Population Survey and Regional GVA by Local Authority in England, Office for National Statistics (accessed 2017)

5.50 Any increase in productivity arising from a rail improvement could be a result of the time savings for businesses whose employees travel by rail, since the faster journey times to London delivered by the transport intervention represent a clear financial saving to businesses (reducing the time 'wasted' while travelling). While for some specific businesses that rely on rail this effect is likely to be significant, and could enhance their productivity, across the wider

local economy it is likely to be limited, since comparatively few businesses regularly rely on rail connectivity. Furthermore, the analysis is at Local Authority level so a significant effect seems especially unlikely given the scale of the improvements.

## Summary

5.51 Overall, the evidence suggests that the impacts of the Evergreen 3, Phase 1 investment on Leamington Spa are likely to have been limited for the observed economic outcomes. Population growth has broadly tracked the wider regional trend and Rugby comparator since 2010, suggesting that the rail improvement has not impacted on the rate of population growth or significantly increased the attractiveness of the town as a place to live. With comparatively few residents in Leamington Spa commuting to London and Birmingham, the enhanced rail connectivity to these destinations is not likely to have a significant impact on local residential investment.

5.52 Similarly, regarding business investment, interview evidence suggests that the overall impact of the attractiveness of Leamington Spa for the majority of businesses is limited. Most businesses in the area do not appear to rely on rail connectivity, and hence any improvement is not likely to increase their investment in the town. It may, however, be the case that the improvement has supported business retention in Leamington Spa by maintaining the town's accessibility to London in relative terms (following the improvements on the West Coast Main Line which have improved the accessibility of Rugby, Northampton and Milton Keynes to London), although there is no evidence to substantively support this.

5.53 Evidence from the D-i-D employment and turnover analysis is also inconclusive, due in large part to the difficulty in establishing a common trend between Leamington Spa and Rugby, as summarised in Table 5.1 below.

5.54 There does appear to be an increase in employment in the Hotels and Restaurants sector, and the Retail sector, relative to Rugby following the intervention, although it is challenging to plausibly associate this conclusively with the rail improvements. Regarding business productivity, while GVA per worker does appear to have increased relative to Rugby, it is difficult to isolate the mechanisms that could link this to the rail improvements. While business time savings could provide a mechanism, the incremental nature of the improvement and the limited use of rail by local businesses mean that it is very unlikely that they can account for a significant productivity uplift across the wider local economy.

**Table 5.1: Summary of D-i-D econometric analysis**

| | | |
|---|---|---|
| Increase in small micro and micro local business unit employment | No | Common trends were evident in local business units between Leamington Spa and Rugby 2003-11, but D-i-D analysis indicated this was not statistically significant. |
| Increase in Retail sector employment | Yes | 3 years after treatment, there was a 7.9% effect on sectoral employment in Leamington Spa compared to Rugby. This effect was statistically significant. |

**Table 5.2: Results of D-i-D analysis for Leamington Spa total local unit employment in the Hotels and Restaurants sector, 2003-15**

| | | |
|---|---|---|
| P-value | 0.045 | 0.091 |
| Leamington observations | 1,225 | 967 |
| Total observations | 2,713 | 2,122 |

Notes: Data is at local unit level, all models estimated with local units fixed effects

Source: BSD (ONS) and Cambridge Econometrics

**Table 5.3: Results of D-i-D analysis for Leamington Spa total local unit employment in the Retail sector, 2003-15**

| | | |
|---|---|---|
| | | |
| P-value | 0.000 | 0.010 |
| | | |
| Leamington observations | 1,749 | 1,307 |
| | | |
| Total observations | 4,024 | 3,075 |

Notes: Data is at local unit level, all models estimated with local units fixed effects

Source: BSD (ONS) and Cambridge Econometrics

# 6 Conclusions and Scope for Future Work

6.1 This chapter summarises the transport and economic impacts of the improved service at Leamington Spa, drawing from the findings in Chapters 4 and 5, and comments on the scope for future work.

## Transport impacts

6.2 Growth in station entries and exits at Leamington Spa has roughly kept pace with the regional and national trends in the period 2008-09 to 2015-16, but growth in station usage in the comparison area of Rugby has exceeded that of Leamington Spa, most notably since 2013-14.

6.3 This pattern is reflected in the results of station user surveys from Leamington Spa and Rugby, which suggest that, while a small but significant proportion of station users at Leamington Spa said they had become more likely to travel by rail to London or Birmingham in the five years to 2016, this proportion was noticeably larger at Rugby. An important finding in this context is the low awareness of the improvements (6% fully aware) amongst Leamington Spa users.

6.4 Despite low awareness of improvements, station users at Leamington Spa seem broadly satisfied with the quality of service provision at the station, with over 70% of passengers being satisfied with the trains overall, and four of the five specific measures the survey queried (the exception was for whether there was sufficient room for all passengers to sit or stand with 60% of passengers also expressing satisfaction with this aspect). This suggests quite high satisfaction with the current level of service provision, but that this is unlikely to have been driven by the improvements in isolation.

6.5 The main reason given for starting to use the station was that it was more convenient than other forms of transport. However, improvements to rail services *specifically* was not a commonly stated reason for starting to use the station; this ties in with the finding that awareness of the improvements was low amongst station users.

6.6 These findings indicate that the transport impacts appear to be limited, with the station improvements not attracting enough awareness to produce a shift in transport behaviour, and the Rugby comparison area outperforming Leamington Spa in terms of rail patronage growth. However, considering that Rugby underwent significant rail investment not long before the completion of Evergreen 3, Phase 1, Leamington Spa's patronage growth post-intervention, and high satisfaction levels with service provision, indicate that the station has been able to keep pace with comparable stations following the intervention.

## Economic impacts

6.7 The evidence suggests that the impacts of the Evergreen 3, Phase 1 investment on Leamington Spa are likely to be limited, despite the six-year period that has elapsed following the investment. However, this would perhaps be expected, considering that the truly transformative project in the Leamington Spa area was the completion of Evergreen 1 in 2001, redoubling the Chiltern Main Line. The effects studied here have been a largely incremental improvement.

**Investment effects**

6.8 Population growth has broadly tracked the wider regional trend and Rugby comparator since 2010, suggesting the rail improvement has not impacted on the rate of population growth or significantly increased the attractiveness of the town as a place to live. House price data similarly does not offer evidence to suggest a significant effect. This is likely to be a result of the incremental improvement in accessibility, and the local commuting patterns of Leamington Spa residents. With comparatively few Leamington Spa residents commuting to London and Birmingham in 2011, the enhanced rail connectivity to these destinations is not likely to have a significant impact on local residential investment.

6.9 Similarly, regarding business investment, interview evidence suggests that the overall impact of the attractiveness of the town for the majority of businesses is limited. Most businesses in the area do not appear to rely on rail connectivity, and hence any improvement is not likely to increase their investment in the town. It may, however, be the case that the improvement has supported business retention in Leamington Spa by maintaining the town's accessibility to London in relative terms (following the improvements on the West Coast Main Line which have improved the accessibility of Rugby, Northampton and Milton Keynes to London), although there is no evidence to prove this effect.

**Employment and productivity effects**

6.10 The results of D-i-D analysis on employment and turnover generated a mixture of results. In terms of employment, statistically significant increases occurred in the Hotels and Restaurants sector, and in the Retail sector, in Leamington Spa compared to Rugby. However, it is difficult to definitively link these developments to the rail intervention. In terms of turnover, meanwhile, the lack of common trends between Rugby and Leamington Spa prior to the intervention prevented econometric analysis.

6.11 GVA per worker in the Warwick local authority area seemed to increase relative to Rugby, but again, this cannot be definitively linked to the transport intervention and covers wider geographical areas. Further, the results of business surveys suggest that business use of rail in Leamington Spa is limited, making major productivity gains resulting from the intervention unlikely.

## Scope for Future Work

6.12 Since the improvements in Leamington Spa were completed in 2011, this has given a six-year period for the impacts of the investment to be felt on local transport patterns and economic impacts. There remains a time lag effect before impacts can be identified, particularly with respect to economic effects; however, it is unlikely that any future major economic impacts

would be expected to arise from the scheme given the limited nature of any behavioural effects.

6.13 Overall, the nature of the rail accessibility improvement on Leamington Spa was incremental – rather than transformative – and hence it is very unlikely that future evaluation would be justified in identifying any longer-term economic impacts.

6.14 The evidence suggests that the intervention has been positive in supporting passenger growth and satisfaction levels that are comparable with other locations, and so maintaining rather than significantly changing the town's existing economic position within the West Midlands.

6.15 This case study has however highlighted some of the challenges in retrospectively attempting to establish any impacts (behavioural or economic) for relatively small scale improvements, and provides methodological lessons which can inform future studies of this type (see the Technical Report for more detail).

## CONTROL INFORMATION

| Prepared by | Prepared for |
|---|---|
| Steer Davies Gleave<br>28-32 Upper Ground<br>London SE1 9PD<br>+44 20 7910 5000<br>www.steerdaviesgleave.com | Department for Transport Rail Group<br>Great Minster House<br>33 Horseferry Road<br>London SW1P 4DR |

| SDG project/proposal number | Client contract/project number |
|---|---|
| 22961201 | |

| Author/originator | Reviewer/approver |
|---|---|
| Jake Cartmell | Tony Duckenfield |

| Other contributors | Distribution |
|---|---|
| Tom Leach<br>Matthew Whearty<br>Daniela Phillips<br>Adam Brown (CE) | *Client:* Lorraine Pearson<br>Steven Finch<br>*SDG*: Study team |

| Version control/issue number | Date |
|---|---|
| Version 3 | January 2018 |